# ENVIRONMENTAL IMPACT ASSESSMENT REPORT

**for**

# Kilshane Power Generation Station Project

**at**

# Kilshane, Co. Dublin



**prepared for: Kilshane Energy Ltd**

**by**
**Environmental Impact Services**

1st Floor
26 -24 Ormond Quay Upper
Dublin 7

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| Document Control | Author/Reviewer | Date |
|---|---|---|
| **Prepared by** | contributors listed in Table 1.1 | various dates to 08 September 2022 |
| **Reviewed by** | Paul Fingleton | 08 September 2022 |
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# Table of Contents

# List of Appendices

Appendices are provided in relation to the below listed chapters. They are contained in two separately bound volumes.



## Volume 1

**Chapter 6 Biodiversity**

Appendix 6.1 Natura 2000 Sites, Natural Heritage Areas and proposed Natural Heritage Areas within 15km of the proposed development site
Appendix 6.2 National Biodiversity Centre records
Appendix 6.3 Site habitat type details
Appendix 6.4 Permitted other projects in within 500 m of site

**Chapter 7 Land, Soils, Geology & Hydrogeology**

Appendix 7.1 NRA criteria for rating the magnitude and significance of impacts at EIA stage National Roads Authority (NRA, 2009)
Appendix 7.2 Site investigation report logs
Appendix 7.3 Soil quality tables
Appendix 7.4 Soil quality laboratory reports

**Chapter 8 Water & Hydrology**

Appendix 8 Hydrology impact rating and assessment criteria

**Chapter 9 Air Quality & Climate**

Appendix 9.1 Description of the AERMOD model
Appendix 9.2 AERMET
Appendix 9.3 A comparison of future carbon emissions within the SEM with and without the Kilshane GT
Appendix 9.4 Sensitivity analysis
Appendix 9.5 Plume modelling report

**Chapter 10 Noise & Vibration**

Appendix 10.1 Glossary of acoustic terminology
Appendix 10.2 Noise modelling details & assumptions
Appendix 10.3 Noise model parameters

**Chapter 11 Landscape & Visual Impact**

Appendix 11 Photomontage Pack

**Chapter 13 Traffic & Transportation**

Appendix 13.1 Construction programme
Appendix 13.2 PICADY output report

**Chapter 14 Waste Management**

Appendix 14 Resource Waste Management Plan

## Volume 2

**Chapter 17 Interactions and Cumulative Effects**

Appendix 17 Environmental Report for (GIS) Substation and Underground Transmission Line Connection

# 1 INTRODUCTION

## 1.1 INTRODUCTION AND TERMS OF REFERENCE

### 1.1.1 GENERAL

Environmental Impact Services has been commissioned by Kilshane Energy Ltd, (hereafter referred to as Kilshane Energy) to prepare an Environmental Impact Assessment Report (EIAR) for a proposed development of Gas Turbine Power Generation Station at Kilshane Road, Kilshane, Finglas, Dublin 11.

Kilshane Energy is Energy Ltd. is a new entrant to the Irish Energy Market. Kilshane Energy Ltd. provides Fast Start Peaking Plants to support Irelands National transition to sustainable renewable energy sources in line with the targets set for 2030 and beyond.

The site is approximately 29 ha in area, and is located at Kilshane, Dublin 11, just west of the N2 Primary Road as shown in Figure 1.1 and is located approx. 2 km north-west of the M50.

The proposed development provides for a Fast Start Peaking Gas Turbine Power Generation Station with a with a maximum of 293 MW output and all necessary components and infrastructure to facilitate the development and further contribute to the area. The overall development is considered in compliance with its HI – Heavy Industry Land Use Zoning, the objective of which is to provide for Utility Installations.

The proposed development consists of all necessary components to operate the Gas Turbine Power Generation Station. There is a variety in height, scale and massing of buildings and components throughout the subject site. The highest components on site include the Exhaust Stack (c. 28m high), Fuel Oil Tank (c. 16.2m high), Raw and Fire Fighting Water Tank (c. 15.3m high) and a Demin Water Tank (c. 18.3m high).

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

A full project description and further details are contained in Chapter 4 of this EIAR *Project Description* and in the Planning Report which also accompanies the planning application.

In this EIAR the figures given for the site area and the boundaries shown on maps are generally approximate. These approximations are adequate for EIA purposes and do not compromise the assessments of effects presented in the specialist chapters. Definitive metrics and maps are provided in the Planning Application Report and the submitted drawing set.

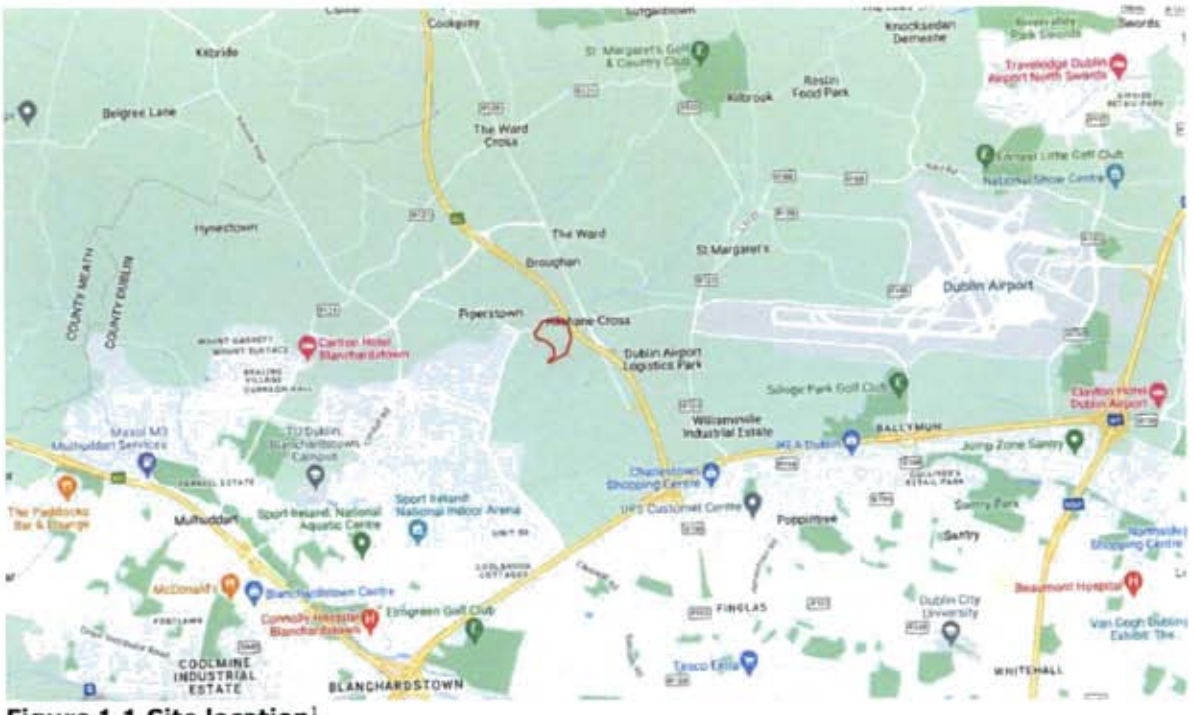



**Figure 1.1 Site location**[1]
(Approximate site boundary is outlined in red)

### 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.

## 1.1 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:

**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 current baseline and 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
- Traffic Impact Assessment (TIA) Report
- Preliminary Construction Environmental Management Plan
- Engineering Assessment Report
- Planning Application Report

Some of these reports are also relevant in the consideration of the prescribed EIA topics so these are referred to in the EIAR, as and where appropriate. For example, the Water & Hydrology chapter refers to the Engineering Assessment Report, the Traffic & Transportation chapter refers to the TIA Report and MMP and the Biodiversity chapter refers to the NIS.

## 1.2 STUDY TEAM



**Table 1.2 Study team for EIAR**

| Role | Personnel[1] | Company |
|---|---|---|
| Study Manager | Paul Fingleton | Environmental Impact Services |
| Study Coordinator | Andrew Reynolds | Environmental Impact Services |
| **Specialist Topics** (Chapter 2 *Screening & Scoping* sets out the basis for selection of these topics) | | |
| **Chapter** | **Part(s)** | **Personnel** | **Company** |
| **Population & Human Health** | Main Author(s) | Joe Corr & Mark Whelan | CWPA |
| **Biodiversity** | Main Author(s) | Karen Dylan Shevlin | Environmental Impact Services |

[1] The personnel named for each chapter / environmental factor have been the lead assessors for their chapters. They have each been responsible for the whole chapter which they prepared. Where other personnel made significant contributions, these are generally as described within the EIAR (including the Appendices).

| | | | |
|---|---|---|---|
| **Land, Soils, Geology & Hydrogeology** | Main Author(s) | Marcello Allende | AWN Consulting |
| **Water & Hydrology** | Main Author(s) | Marcello Allende | AWN Consulting |
| **Air Quality & Climate** | Main Author(s) | Dr. Jovanna Arndt | AWN Consulting |
| **Noise and Vibration** | Main Author(s) | Mike Simms | AWN Consulting |
| **Landscape & Visual Impact** | Main Author(s) | Conor Skehan | Environmental Impact Services |
| | Photomontages | John Healy | Digital Dimensions |
| **Material Assets** | Main Author(s) | Paul Fingleton & Andrew Reynolds | Environmental Impact Services |
| **Traffic & Transportation** | Main Author(s) | Luke Byrne | Waterman Moylan Engineering Consultants |
| **Waste Management** | Main Author(s) | Chonaill Bradley | AWN Consulting |
| **Archaeology & Cultural Heritage** | Main Author(s) | Donald Murphy | Archaeological Consultancy Services Unit |
| **Accident & Disaster Risks** | Main Author(s) | Paul Fingleton & Andrew Reynolds | Environmental Impact Services |
| **Interactions & Cumulative Effects** | Main Author(s) | Paul Fingleton & Andrew Reynolds | Environmental Impact Services |

**Study Manager, Paul Fingleton** has an MSc in Rural and Regional Resources Planning (with specialisation in EIA), University of Aberdeen, 1990. Paul is a member of the International Association for Impact Assessment as well as the Institute of Environmental Management and Assessment. Paul has over twenty years' experience working in the area of Environmental Assessment. Paul has been involved in a diverse range of projects including contributions to, and co-ordination of, numerous complex EIARs, NISs and / or IPPCL Applications for projects.

**Study Coordinator - Andrew Reynolds** has a BSc in Environmental Planning and Management, Dublin Institute of Technology, 2015. Andrew has contributed to a number of complex Environmental Impact Statements, planning applications and environmental reports. He has experience working as part of team projects and in the preparation of EIA documents on behalf of multi-nationals and infrastructural providers for a diverse range of projects.

**Population & Human Health – Joe Corr** has 15 years' professional experience of town and spatial planning in Ireland, is a Corporate Member of the Irish Planning Institute and holds a MSc in Spatial Planning from TU Dublin.

**Population & Human Health – Mark Whelan** has 6 years' professional experience in planning in private consultancy in Ireland, he holds a MRUP – Masters in Regional & Urban Planning and is a Corporate Member of the Irish Planning Institute.

**Biodiversity - Karen Dylan Shevlin** is an ecologist with over 7 years' experience working in a variety of capacities in Ireland and as part of international research projects. Her experience ranges from academic research looking at trophic structures, multi-species interaction dynamics etc. to consultancy work undertaking and reviewing assessments for government agencies and private sector

clients. Karen has undertaken stage 2 AAs and prepared NISs for a number of projects. As part of her work Karen has developed a strong set of field ecology skills, form complex habitat assessments to detailed invertebrate and mammal surveys. Karen has a wealth of experience gathering, interpreting and presenting complex data to ensure a clear understanding of the ecological integrity of sites is demonstratable. This work provides the backbone of the assessment process and is fundamental to successful project deliver. Karen has strong insights into ecological theory and the practical implication and impacts/effects to altering natural dynamics. These skills ensure that all of the baseline and detailed data gathered in the field is interpreted in a manner that is grounded in best scientific knowledge. This is a crucial element of ecological work that is often overlooked.

**Land, Soils, Geology & Hydrogeology & Water & Hydrology – Marcello Allende** is a Senior Environmental Consultant (Hydrologist) at AWN with over 15 years of experience in Environmental Consulting and water resources. Marcelo holds a degree in Water Resource Civil Engineering from the University of Chile. He has worked on a wide of range of projects including multi-aspect environmental investigations, geo-environmental impact assessments, groundwater resource management, hydrological and hydrogeological conceptual and numerical modelling, strategic and site specific flood risk assessments, Due Diligence reporting, baselines studies, soils, surface water and groundwater monitoring and field sampling programmes on a variety of brownfield and greenfield sites throughout Ireland as well as overseas in Chile, Argentina, Peru and Panama. He also has detailed knowledge of environmental guidance, legislation, regulations & standards and expertise in GIS (expert level) and MATTE studies at COMAH establishments. He is currently a member of the International Association of Hydrogeologists (Irish Group) and a member of Engineers Ireland (MIEI).

**Air Quality & Climate – Dr. Jovanna Arndt** is an Environmental Consultant in the Air Quality section of AWN Consulting. She holds a BSc (Hons) in Environmental Science from University College Cork and completed a PhD in Atmospheric Chemistry at University College Cork in 2016. She is a Member of the Institute of Air Quality Management and specialises in assessing transportation impacts and industrial emissions on air quality using dispersion modelling, source apportionment of particulate matter, and EIA. Jovanna has been involved in assessing air quality impacts from major Highways England road schemes, Clean Air Zones and major rail infrastructure in the form of HS2. She has also provided Air

**Noise & Vibration – Mike Simms** BE MEngSc MIOA MIET, Senior Acoustic Consultant at AWN, who has worked in the field of acoustics for 20 years and has been a consultant since 1998. He has extensive experience in all aspects of environmental surveying, noise modelling and impact assessment for various sectors including, energy, industrial, commercial and residential.

**Landscape and Visual Assessment – Conor Skehan** (BSC), (MLArch) Master of Landscape Architecture, University of Pennsylvania, 1983. Conor has been chartered by a number of professional Institutes including the International Association for Impact Assessment; the Irish Landscape Institute; the Royal Institute of the Architects of Ireland; and the Irish Planning Institute. He co-founded and served as President of the Irish Landscape Institute from 1993 to 1994. Environmental Impact Services is a Registered Assessor member of the Institute of Environmental Assessment (UK). Conor is an Architect, Landscape Architect, Strategic Planner, Impact Analyst, academic and writer. He has worked for over 30 years in many countries providing strategic and spatial planning and environmental consultancy to a wide range of government, public and private clients on assignments varying in scale from very large-scale infrastructural and industrial projects to large urban renewal and tourism projects. He has made significant contributions to a wide range of complex Environmental Impact Statements, planning applications and environmental reports for Industry (ICT, Bio-pharma), Infrastructure (road, rail, airport, port, power, energy waste, drainage and water supply), Institutions (hospital, prison projects) as well as major urban renewal and extension projects.

**Photomontages – John Healy**. Digital Dimensions was established in 2000 by John Healy and Jim Manning. It is one of Ireland's leading architectural visualisation companies with 20+ years of experience covering a wide range of solutions in the areas of architectural visualisation, environmental design and digital media.

**Traffic & Transportation – Luke Byrne** has a MSc in Civil Engineering with Business and BSc in Structural Engineering with Architecture, University College Dublin, 2020. Luke is a member of Engineers Ireland. Luke has over two years' experience in Traffic Engineering including use of programme such as PICADY, ARCADY and TRANSYT. Luke has been involved a several diverse planning applications ranging from residential development, schools and places of employment.

**Waste Management –. Chonaill Bradley** BSc Environmental Science and is a Graduate Member of the Institute of Waste Management (GradCIWM). He is a Senior Environmental Consultant in AWN and has over 5 years' experience in environmental consultancy experience with 3+ years in waste management. He has helped coordinate and prepare multiple specialist inputs and EIAR chapters including the Waste Management Chapters, Operational and C&D Waste Management Plans for numerous EISs/EIARs.

**Archaeology & Cultural Heritage - Donald Murphy** MSC from University College Dublin has over 20 years' experience in professional archaeology having founded Archaeological Consultancy Services Unit. Having carried out some large-scale excavations between 1992 and 1997 for various clients including local authorities and state agencies, he then acted as archaeological advisor and consultant on some of the largest infrastructural projects between 1996 and 2009. Since 2009 he has focused on the publication of some of the major excavations and also acted as archaeological consultant on some Windfarm projects which were successfully seen through the process from inception to planning and construction. He continues to provide a full range of archaeological services through the firm originally founded in 1992 and which continues in operation today.

## 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.

[2] Draft Guidelines on the information to be contained in Environmental Impact Statements, EPA, 2017 (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.

**Table 1.3 Impact predictions**[2]

| 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 |

## 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'.

- A Preliminary Construction Environmental Management Plan (PCEMP) is provided as a separate report. Some of the construction details will be a matter for the construction contractor(s) who will be engaged following a competitive tendering process. A more detailed description of the project's construction plan will be prepared prior to commencement of the works.

- 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.

In this EIAR the figures given for the site area and the boundaries shown on maps are generally approximate. These approximations are adequate for EIA purposes and do not compromise the assessments of effects presented in the specialist chapters. Definitive metrics and maps are provided in the Planning Application Report and the submitted drawing set.

## 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[3], 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 out of 293 MW.
There will be heat output, mainly in the stack emissions. The heat output is unquantified. Because the proposal will generate a heat output, albeit unquantified, it corresponds to project type 2(a). Because it is not known if the heat output is above or below the 300 MW threshold, it is not clear if EIA is mandatory for it or not. If it is above 300 MW heat output it would be considered to correspond to the project class and EIA would be mandatory. If it is below 300 MW heat output then the project would be considered to correspond to the project type but be sub-threshold. Review against specified criteria set out in Schedule 7 of the Regulations would then need to be carried out to determine if EIA is required or not.

Questions regarding EIA screening were raised in a number of submissions and in the Fingal County Council Planners' Report on the previous application by Kilshane Energy for a Power Station on the

[3] ref. s2.1

same site which was refused permission (FCC planning ref FW21A/0250). The grounds of the refusal included lack of information on environmental effects.

Given the nature and scale of the development, the fact that it falls into the prescribed type 2(a) and taking account of the planning history, the applicant, Kilshane Energy, has decided to prepare an EIAR to support this application.

## 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;
- 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);
- the EIA team's experience of preparing and submitting previous EIARs.

The scoping process included circulation of a pre-planning cover letter setting out the topics to be addressed in this EIAR to and discussion same with the Planning Authority.

### 2.3.2 RELATED PROJECTS

The realignment of the Kilshane Road, while not a core part of the power station development, is included within the same planning application. It is thus part of the subject development and its environmental effects form part of the scope of this EIAR.

There are two closely related projects that are not part of the subject proposal but are integral to its operation. These are an Above Ground Installation (AGI) gas supply project and a Gas Insulated Switchgear (GIS) project. Although these are both subject to separate consent processes, they are both integral to the operation of the power station.

Neither of these projects is subject to EIA requirements nor is likely to give rise to significant environmental effects. Thus they do not require detailed environmental assessment. Notwithstanding, for the purposes of consideration of the whole (power station) development, they are considered in this EIAR where relevant.

An environmental report on the GIS project, including its underground cable connection to the national electrical grid is included as Appendix 17 to this EIAR. This environmental report will also support an application by Kilshane Energy to An Bord Pleanála for planning consent for that project (a Strategic Infrastructure Development). Any environmental reporting required for the AGI will be provided by Gas Networks Ireland to support its separate consent process, as regulated by the Commission for Regulation of Utilities (CRU).

### 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 7 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 has been screened for requirement for a Natura Impact Statement (NIS) (a.k.a. a Stage 2 Appropriate Assessment or AA) and this found an NIS report to not be required. Chapter 6 *Biodiversity*, takes account of the results of the AA Screening as relevant.

#### 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]

A Flood Risk Assessment screening report and an Engineering Assessment Report are included as part of the planning permission application documents. The former follows the specific requirements of *The Planning System and Flood Risk Management - Guidelines for Planning Authorities* (OPW and the Department of the Environment and Local Government, 2009). Chapter 8, *Water & Hydrology*, has regard to requirements arising from these Directives as relevant. A separate Flood Risk Assessment report is is also submitted as part of the application.

[4] as amended

# 3 ALTERNATIVES

## 3.1 INTRODUCTION

Before looking at the impacts of any development on the environment, the 2018 regulations[4] 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.*

### 3.1.2 GUIDELINES

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 are developing a 293MW Open Cycle Gas Turbine (OCGT) facility. The Original Equipment Manufacturer (OEM) has confirmed that 293MW is the maximum, technically possible electrical output of the OCGT and it has a typical design life of 15 to 20 years.

## 3.3 ALTERNATIVE LOCATIONS

### 3.3.2 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.

Once locations within Dublin were identified close to both connection points, 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 example, for a large 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 and both to close to connection points.


**Figure 3.1 Heavy Industry zoned lands (coloured blue) within Fingal County Council**

## 3.4 SITE SELECTION PROCESS

Property consultants were engaged to enquire on the commercial availability of lands within ths 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;

*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 – as shown on Figure 3.2 [following]

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.

These 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 closer to the N2
- 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

**Alternative Layout 1** **Alternative Layout 2**

**Final Layout**

**Figure 3.2 Alternative Layout options 1, 2 compared to the Final Layout**

## 3.6 ALTERNATIVE PROCESSES & TECNOLOGIES

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.

In this EIAR the figures given for the site area and the boundaries shown on maps are generally approximate. These approximations are adequate for EIA purposes and do not compromise the assessments of effects presented in the specialist chapters. Definitive metrics and maps are provided in the Planning Application Report and the submitted drawing set.

## 4.2 GENERAL DESCRIPTION OF SITE AND SURROUNDINGS

The site is located at Kilshane, Dublin 11, just west of the N2 Primary Road as shown in


Figure 4.1 and is located approx. 2 km north-west of the M50.

The subject site is mostly defined as a greenfield site, though there is currently a farmhouse and associated structures clustered on the northwest of the site. The area of the subject site is c. 13 ha. This includes c. 0.96 ha of adjacent public roads which are included for purposes of laying of buried services and local upgrades. The site is mostly in the northern part of lands owned by Kilshane Energy which cover a total area of c. 30 ha in area.

The site is bound to the north and northwest by the Kilshane Road, to the west and southwest by an industrial site (Flaherty Logistics), and agricultural lands, to the south and southeast by Huntstown Quarry, and again to the east by agricultural lands.

These boundary ditches merge to an unnamed ditch to the east of the site. 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. 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.

# 4.3 GENERAL DESCRIPTION OF THE PROPOSED DEVELOPMENT

## 4.3.2 GENERAL DESCRIPTION

The proposed development is a gas turbine power generation station with an output of up to 293 Megawatts. The application includes a turbine, associated exhaust stack, two air cooled condenser units, administration and control building, workshop, stores, fuel gas area, electrical module for fuel gas area, step-up transformer, black start diesel generator, transfer compound, three reserve fuel storage tanks and recessed bund area, miscellaneous plant, and equipment, staff car parking spaces (10% of which will be EV charging spaces), site and landscaping works, and all associated ancillary site development infrastructure including foul and surface water drainage, internal roads, and footpaths, and all associated engineering and site works necessary to facilitate the development.

It is also proposed to realign a section of the Kilshane Road and construct a new roundabout junction as part of the works. The road realignment will tie into the existing road network in the public domain.

The proposed development will consist of the following;

- The construction of a Gas Turbine Power Generation Station with an output of up to 293 Megawatts. The proposed station will consist of 1 no. Gas Turbine, 1 no. 28 m high Exhaust Stack, 1 no. 2 story Admin Building (c. 680 $m^2$), 1 no. single storey Workshop (c. 661 m2), 1 no. single storey Plant Room Building (c. 608 $m^2$), 1 no. single storey Dew Point Heater Boiler Building (c. 52 $m^2$), 1 no. single storey Electrical Module for Fuel Gas Area Building (c. 45 $m^2$), 1 no. single storey Packaged Electronic Electrical Control Compartment Building (PEECC) (c. 150 $m^2$), 1 no. single storey E-Room Building (c. 227 $m^2$), 1 no. single storey Fuel Gas Block Building (152 $m^2$), 1 no. single storey Continuous Emission Monitoring System (CEMS) Building (c. 9 $m^2$), 1 no. single storey Fuel Oil Treatment & Forwarding Building (c. 59 $m^2$), an Above Ground Installation (AGI) area consisting of 1 no. single storey Instrument Building (c. 28.5 $m^2$), 1 no. single storey Regulator Building (47 $m^2$), 1 no. single store Boiler Building(c. 28 $m^2$), and 1 no. single storey Analyser Kiosk (6 $m^2$), 2 no. 20 m high diesel storage tanks and recessed bund area, 1 no. 17 m high Raw and Fire Fighting Water Tank, miscellaneous plant and equipment.
- The realignment of a portion (263 m) of the Kilshane Road within the subject site boundary, including the provision of new footpaths and off-road cycle ways, together with the construction of a new roundabout linking the proposed realignment of Kilshane Road back to the existing road network to the north west of the subject site and to the proposed internal road network to serve the proposed development.
- The construction of entrance gates, 1 no. single storey security office (40 $m^2$ GFA) and a private internal road network providing for vehicular, cyclist and pedestrian access to serve the development.
- Provision of 20 no. car parking spaces including 2 no. disabled parking spaces and 4 no. Electrical Charging Points.
- Provision of lighting columns to serve the development and the installation of closed-circuit television system (CCTV) for surveillance and security purposes.
- Provision of 20 no. sheltered bicycle parking spaces.
- Provision of hard and soft landscaping works, tree planting and boundary treatments.
- Construction of a wastewater treatment plant and percolation area together with a surface water attenuation area to serve the development.
- All associated site works necessary to facilitate the development.


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

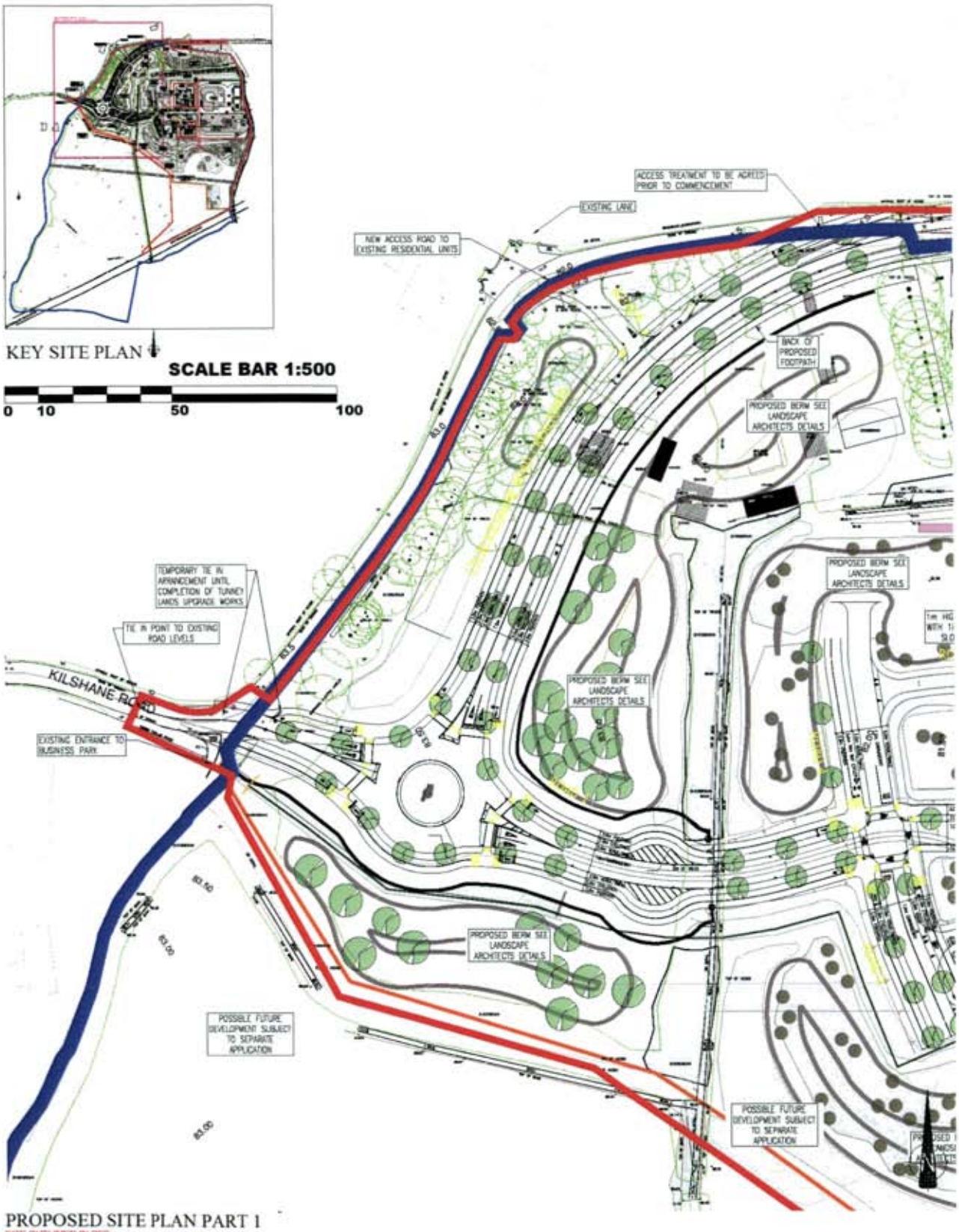
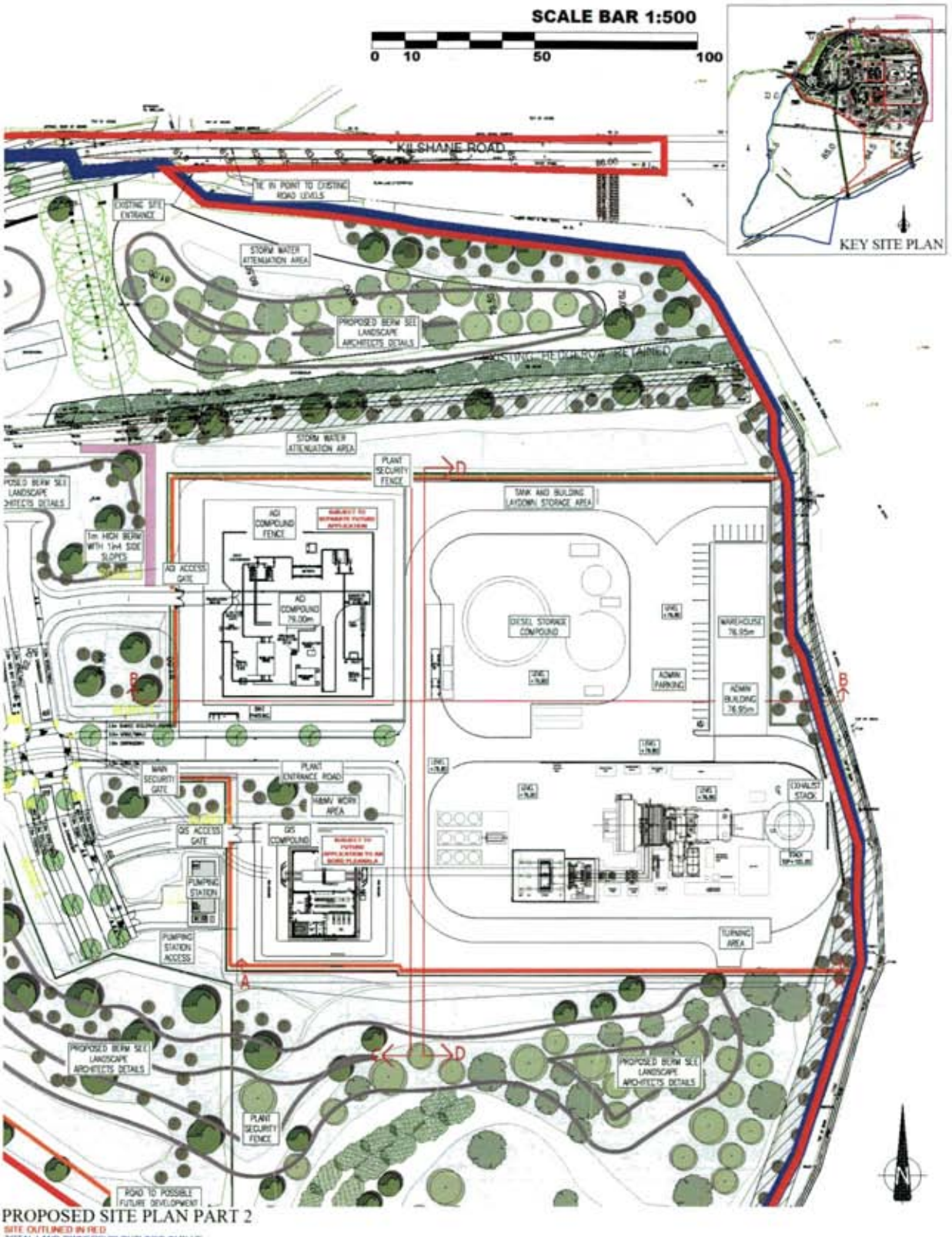



**Figure 4.2 Proposed site plan part 1**
(see drawing set for final and full resolution version)




PROPOSED SITE PLAN PART 2

SITE OUTLINED IN RED

**Figure 4.3 Proposed site plan part 2**
(see drawing set for full resolution version)

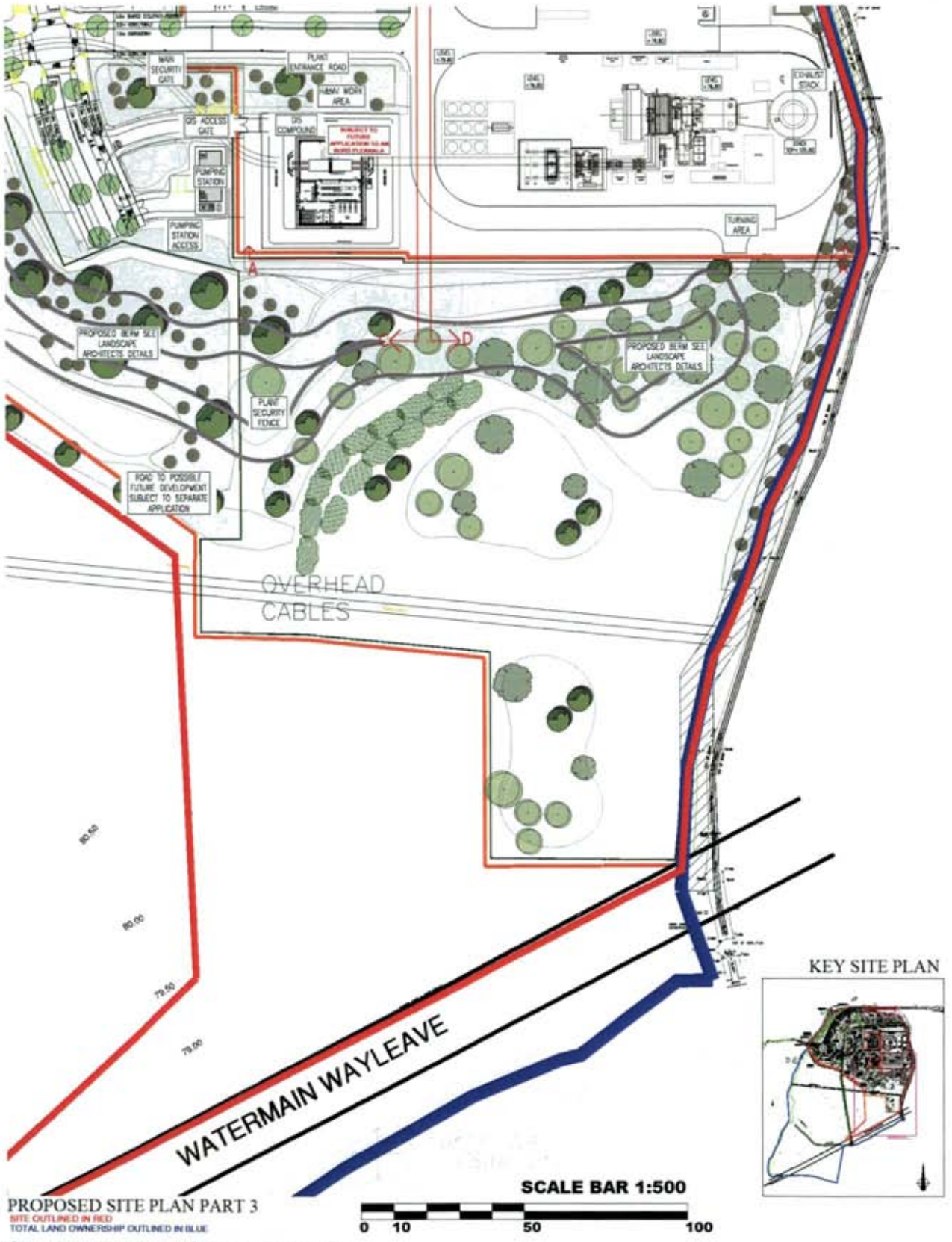
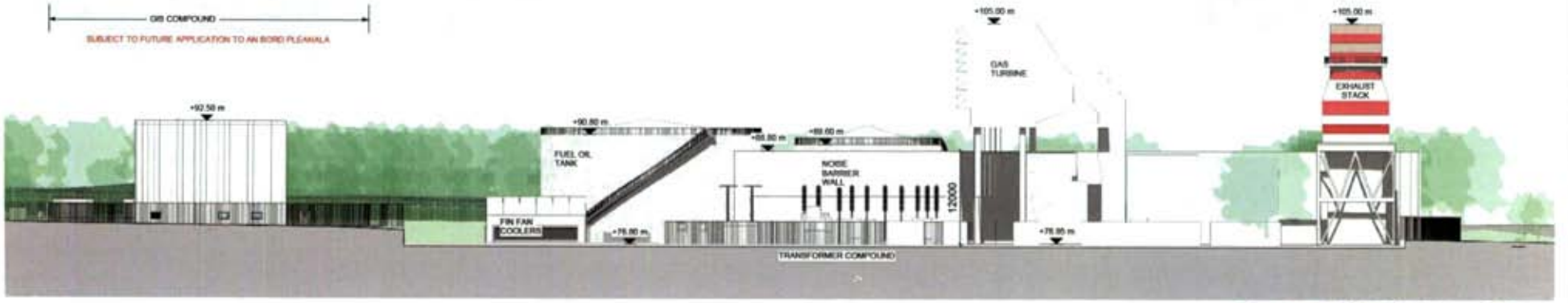



**Figure 4.4 Proposed site plan part 3**
(see drawing set for full resolution version)

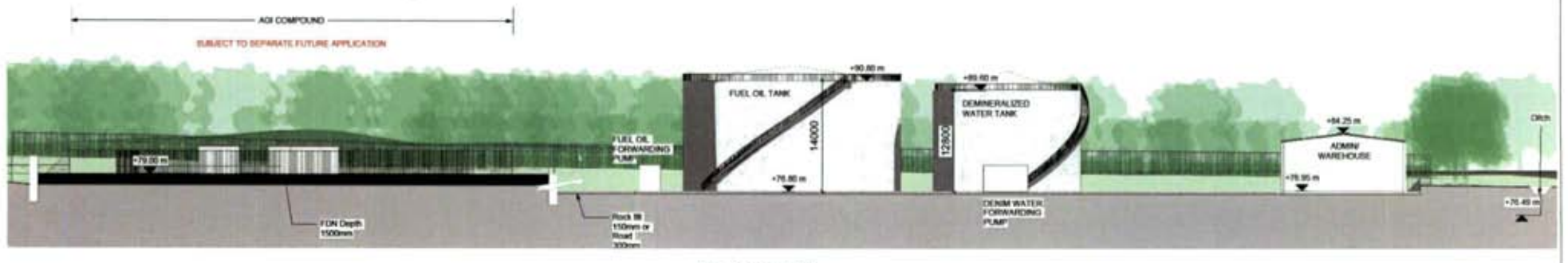



SECTION AA


KEY SITE PLAN

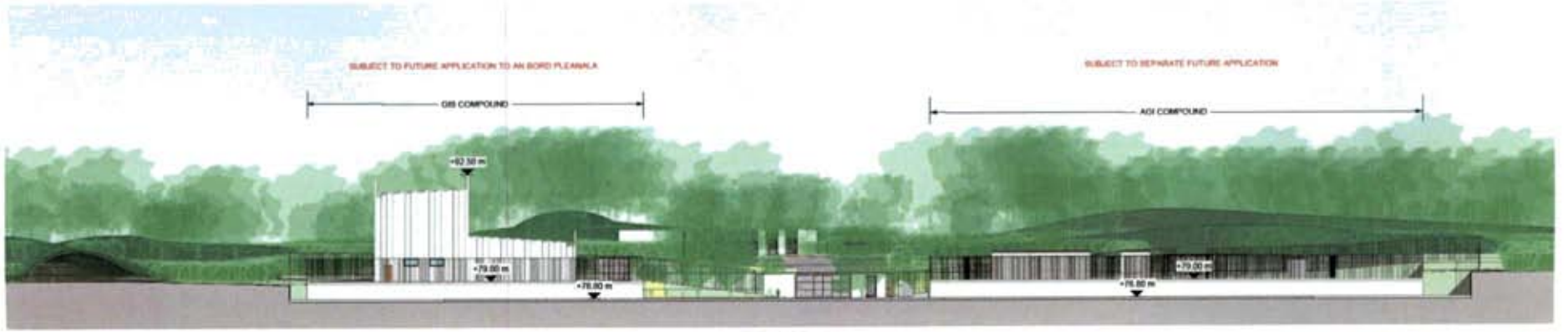
**SCALE BAR 1:250**

0 10 20 30 40 50

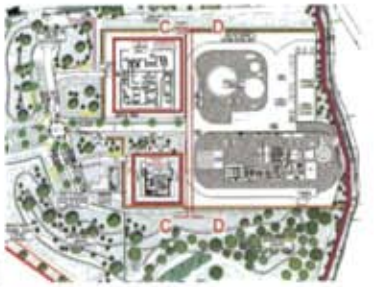



SECTION BB

**Figure 4.5 Proposed site sections AA and BB**
(see drawing set for final and full resolution versions)




SECTION CC




KEY SITE PLAN

**SCALE BAR 1:250**

0 10 20 30 40 50


SECTION DD

**Figure 4.6 Proposed site sections CC and DD**
(see drawing set for final and full resolution versions)

## 4.4 OVERALL PROCESS DESCRIPTION

The power plant facility is 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 one single shaft General Electric 9FA.04 outdoor gas turbine with one air cooled electric generator. 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 supplied from a gas yard owned and operated by Gas Networks Ireland. 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 has a perimeter security fence and an access gate.

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

The gas turbine draws air through the inlet filter house and into the compressor, where it is pressurized and raised in temperature before combustion. Compressed air is mixed with fuel and ignited in the combustion chambers. The hot pressurized gas enters the turbine, where it expands and produces mechanical energy by spinning the shaft. The exhaust gas exits the turbine through ducting and a horizontal silencer before being discharged out of the vertical stack.

The mechanical energy is converted in the generator to three-phase, 50Hz power at 21kV. The power is transmitted in isophase bus duct to the generator circuit breaker. Taps off of the isophase bus duct after the generator circuit breaker 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 lowers the voltage and supplies power to the facility switchgear and MCC's. The facility switchgear and MCC's distribute power to the facility loads, and are located in the outdoor power distribution center enclosure and in the control/warehouse building electrical room. The isophase bus transmits the remaining power to the generator step-up transformer (GSUT). The GSUT increases voltage from 21kV to 220kV transmission line voltage. The high voltage system includes a disconnect switch, underground cables, and a gas insulated switchgear (GIS) building. The GIS building has a perimeter security fence and an access gate. The transmission line continues underground offsite into the EirGrid transmission system. A relay protection system maintains safety and power quality between the facility 220kV system and the generator. The power plant Point of Interconnect is on the high side bushings of the GSUT.

## 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. Appendix 4 (*A comparison of future carbon emissions within the SEM with and without the Kilshane GT*), describes the basis of the likely operating hours (p16) and the circumstances that would lead to what is referred to as 'baseload operation' (p31-32). Baseload operation means operation for the maximum theoretical design capacity hours. This would see the

plant operating for approximately 98% of available time, i.e. 24 hours every day of the year less approximately 2% maintenance time. As described in the report the conditions that would lead to baseload operation are highly improbable to occur. Nonetheless for the purposes of a compliant EIA process, this EIAR includes assessment of the baseload operational scenario.

## 4.6 CONSTRUCTION

It is envisaged that the construction of the facilities will take approximately 29 months. A Preliminary Construction Management Environmental Plan is separately included in the planning application document set and this provides information of the key elements of the construction plan including environmental controls.

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

- Site clearance and demolition of the existing structures and construction of associated infrastructure including drainage, water supply, utilities, and roads.
- Construction and subsequent fitting out of the power plant facility.

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 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[10]. The proposed development will be subject to licensing under these Regulations.

# 5 POPULATION & HUMAN HEALTH

## 5.1 INTRODUCTION

This Chapter of the EIAR has been prepared by CWPA Planning & Architecture to assess the likely impacts associated with Population and Human Health during the Construction and Operational Phases of the Proposed Development 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".*

The Proposed Development will consist of the construction of a Gas Turbine Generation Station with an output of up to 293 Megawatts and all associated ancillary site development works including road and water services infrastructure, all at a site of approximately 13.4 Ha.

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 9: Air Quality and Climate.
- Chapter 10: Noise and Vibration.
- Chapter 12: Material Assets.
- Chapter 11: Landscape & Visual Impact.
- Chapter 13: Traffic + Transportation.

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.

This chapter has been prepared by Joe Corr, Managing Director and Mark Whelan, Senior Planner, of CWPA Planning and Architecture Consultants. Joe has 15 years' professional experience of town and spatial planning in Ireland, is a Corporate Member of the Irish Planning Institute and holds a MSc in Spatial Planning from TU Dublin. Mark has 6 years' professional experience in planning in private consultancy in Ireland, he holds a MRUP – Masters in Regional & Urban Planning and is a Corporate Member of the Irish Planning Institute.

# 5.2 ASSESSMENT METHODOLOGY

As per Article 3 of Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment, as amended by Directive 2014/52/EU: -

*"1. The environmental impact assessment shall identify, describe, and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors:*

a. *population and human health;*
b. *biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC;*
c. *land, soil, water, air and climate;*
d. *material assets, cultural heritage and the landscape;*
e. *the interaction between the factors referred to in points (a) to (d).*

*2. The effects referred to in paragraph 1 on the factors set out there in shall include the expected effects deriving from the vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project concerned."*

The effects of the Proposed Development on the population and human health are analysed in compliance with the requirements of the EPA Draft EIA Report Guidelines 2022.

## 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 Significance Determining Scale (EPA EIAR Guidelines 2022).demonstrates how the significance of an impact may be determined by comparing the magnitude of an effect to the sensitivity of the receiving environment.

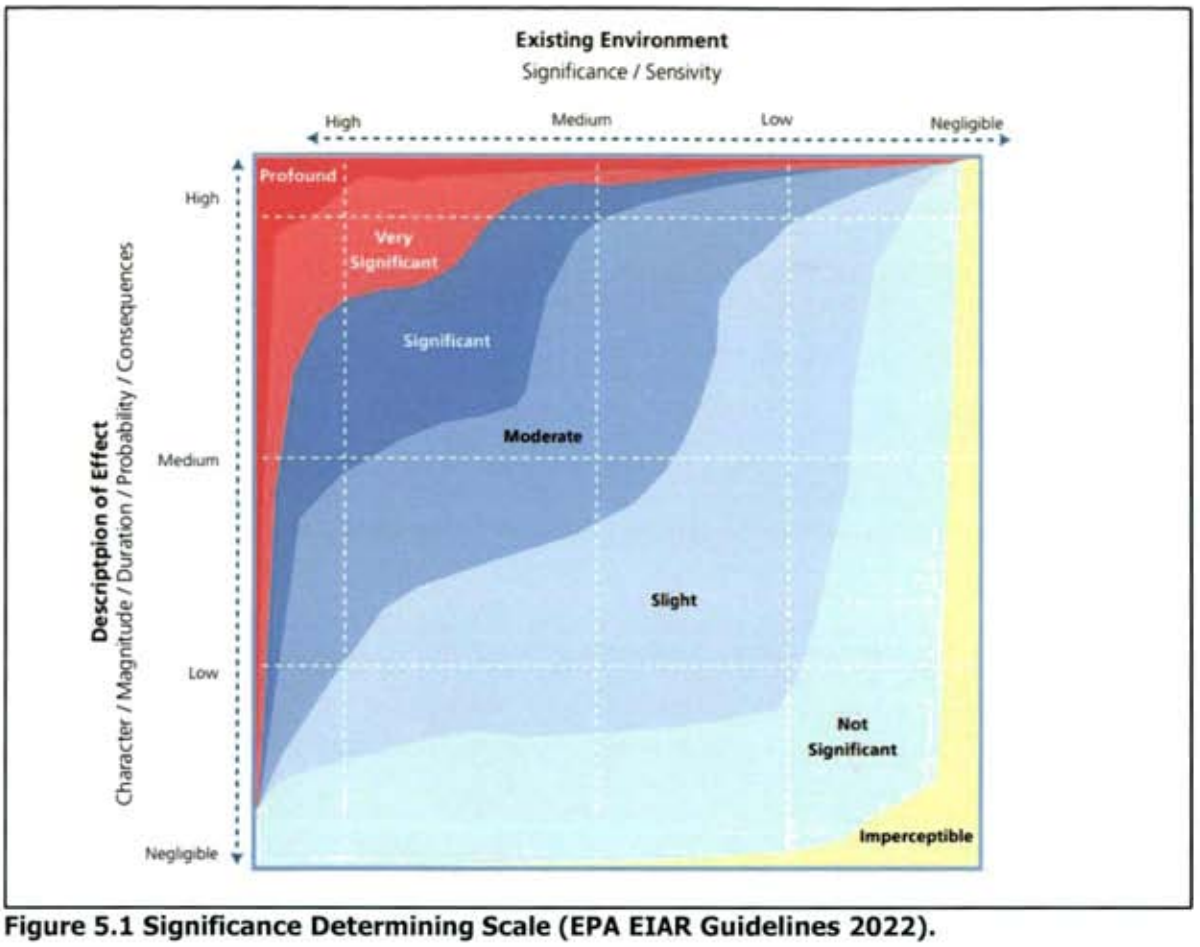



**Figure 5.1 Significance Determining Scale (EPA EIAR Guidelines 2022).**

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. 13.4 Ha. The overall landholding within the designated blue line boundary extends to c. 29 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 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 EXISTING BASELINE CONDITIONS

### 5.4.1 POPULATION AND 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 5.3 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 5.4 shows the age profiles Nationally for 2016.

**Table 5.2 Age profile at National and County level 2016 (Source: www.cso.ie).**

| 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 |

This table shows that at national level and in the study area, the dominant age grouping is 25-44 at 29.53% of the total state population and an average of 37% of the study area, respectively. This also reflects that the overall labour force population (12-64 age group) in the study area is reflective of the national level. This is in keeping with census data from 2011 and 2006.

### 5.4.3 SOCIOECONOMICS

### 5.4.4 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 5.5 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.

**Table 5.3** ***Employment statistics Nationally and at County level in 2011 and 2016 (Source: www.cso.ie).***

| | 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 Over 2011 to 2016** | All ages | Fingal | D. Non-manual | Persons at work | 2016 | 35962 |
| **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** | All ages | Fingal | J. Agricultural workers | Persons at work | 2016 | 516 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Years and Over 2011 to 2016** | | | | | | |
| **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%).

### 5.4.5 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).

### 5.4.6 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 5.6. 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) (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).***

| area | no formal education | primary education | secondary [5] | higher education [6] | undergraduate degree[7] | postgraduate degree[8] | 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** | | | | | | | |

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

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **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 |

### 5.4.7 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 5.7 below.

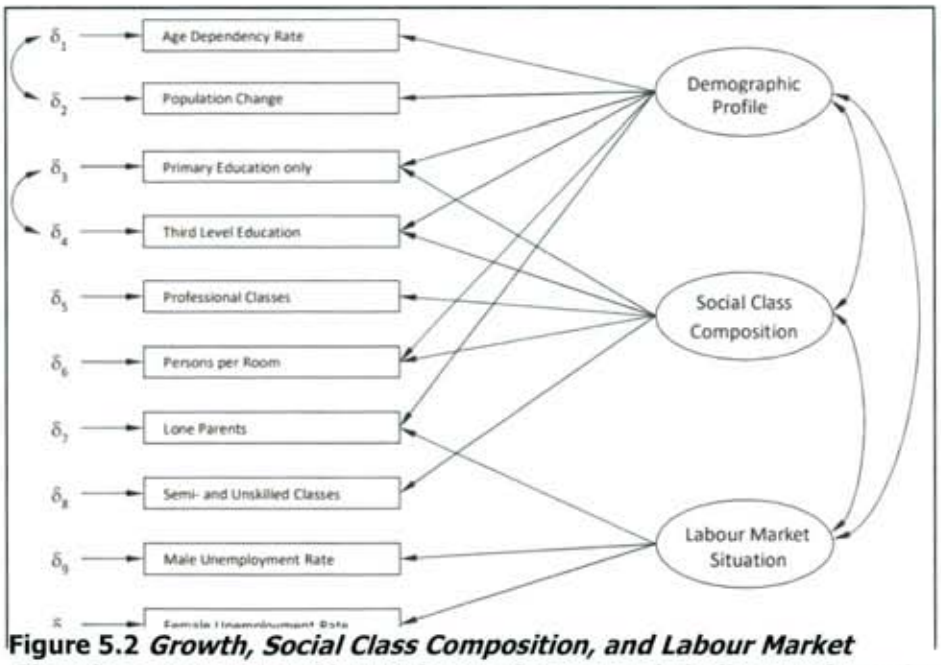



**Figure 5.2** ***Growth, Social Class Composition, and Labour Market Situation are measured by ten key socio-economic indicators from the Census of Population.***

**Table 5.5** ***Pobal HP Index Relevant Index Score labels (Source: Pobal HP Deprivation Index).***

| 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 5.8 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 Figures at a Local and County level (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 |

### 5.4.8 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.* [9]

### 5.4.9 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.

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.

A COMAH Regulations report has been prepared in respect of the proposed development as part of this planning application. Please refer to this report for further information.
There are also a number of IEL and IPPC facilities located in the wider study area. These are referred to as follows:

- *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).*

### 5.4.10 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.

### 5.4.11 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

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

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.

### 5.4.12 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).

### 5.4.13 Educational 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.

### 5.4.14 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.

### 5.4.15 Emergency Services

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

## 5.5 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The proposed development is as described in Chapter 4.

## 5.6 POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT

### 5.6.1 Construction Phase

### 5.6.2 Potential Impact on Population

The Construction Phase of the proposed development is unlikely to result in a significant increase or decrease to the local population. Construction workers would be anticipated to travel from their existing residence as opposed to using temporary accommodation in the local area. There will, however, be a short-term increase in the local working population during the Construction Phase of Proposed Development.

During the construction works there will be an increase in the number of people working in the local area before, during and after the anticipated site working hours. There is also the potential for some of the construction workers to move into the area to be closer to their workplace. The number of workers during the construction phase will be c. 150 no. workers. The number present during these hours or that move to the area will not represent a high proportion of the total population. Therefore, the increase in population numbers during the Construction Phase is not likely to be significant. The impact on the local population is considered to be neutral, imperceptible and temporary in nature.

### 5.6.3 Potential Impacts on Employment

Employment is assessed in terms of human health as a weak connection under the Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022). The construction of the Proposed Development will result in direct employment within the construction and related sectors throughout the construction period. This is likely to lead to direct and indirect benefits for the local area due to the increase in the number of workers present in the area during the daytime. These workers are likely to increase the level of consumption in the area resulting in a modest increase in income for local businesses during this time.

As a secondary effect, this increase in income may lead to an increase in spending by these businesses in the local area. However, the number of construction workers and new jobs is not likely to be a significant relative to the existing population of the area.
As a consequence, the resultant spending is likely to be small and insignificant as a proportion of standard turnover levels. The effects on employment and economic activity during the Construction Phase are likely to lead to a slight and positive effect in the area which is short term in duration.

### 5.6.4 Potential Impact on Health and 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.

The site has been assessed in relation to the following external natural disasters; landslides, seismic activity, volcanic activity, and sea level rise/flooding as outlined below. The potential for major accidents to occur at the development has also been considered with reference to Seveso/Control of Major Accident Hazards (COMAH) Regulations.

Due to the proximity to the Huntstown Power Station that is notified to the Health and Safety Authority (HSA) as a Lower Tier COMAH site. A Land Use Planning (LUP) Assessment under the COMAH directive has been prepared by AWN and is included as part of this planning application.

The following is concluded for the individual risk arising from the proposed development:

- The maximum level of individual risk on-site is 6 x 10-6 per year and the maximum level of individual risk off-site is 5 x 10-6 per year.
- The risk contours corresponding to the Outer LUP zone extend over the site boundary to the east but do not extend to the N2 Primary Road. This area is typically unoccupied.
- The maximum level of risk at any off-site receptor location is less than the maximum tolerable risk to a member of public (1 x 10-6 per year) and less than the maximum tolerable risk to a person at an off-site location (5 x 10-6 per year).

**It is concluded that the level of individual risk on and off-site is acceptable.**

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. Please refer to the Flood Risk Assessment prepared by Waterman Moylan Consulting Engineers for further information.

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.

### 5.6.5 Potential Impacts on Residential Dwellings

The main potential population and health impacts on residential dwellings in the area associated with the proposed development will be in relation to air quality and noise, visual impact and traffic. The potential impacts are assessed within the corresponding chapters of this EIA Report.

### 5.6.6 Potential Impacts on Human Health from Air Quality & Climate

As detailed in '*Chapter 9: Air Quality & Climate Change*', best practice mitigation measures are proposed for the Construction Phase of the Proposed Development which will focus on the proactive control of dust and other air pollutants to minimise generation of emissions at source. The mitigation measures that will be put in place during construction 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, there is the potential for imperceptible, negative, short-term impacts to human health during the construction phase of the proposed development.

### 5.6.7 Potential Impacts on Human Health from Noise & Vibration

Exposure to Excessive noise is becoming recognised as a large environmental health concern. According to the 2015 European Commission report '*Noise Impacts on Health*', (European Commission, 2015), the most common effects of noise on the vulnerable include: -

- Annoyance.
- Sleep Disturbance.
- Heart and circulation problems.
- Quality of Life.
- Cognitive Process.
- Hearing.

It is acknowledged that humans are particularly sensitive to vibration stimuli and that any perception of vibration may lead to concern. In the case of road traffic, vibration is perceptible at around 0.5mm/s and may become disturbing or annoying at higher magnitudes.
It is predicted that the construction programme will create typical construction activity related noise on site. During the Construction Phase of the Proposed Development, a variety of items of plant will be in use, such as excavators, lifting equipment, dumper trucks, compressors and generators.

*'Chapter 10: Air Noise & Vibration'* finds that the predicted noise impact is not significant, negative and short term in nature.

### 5.6.8 Potential Impacts on Human Health from Traffic

As outlined in *Chapter 13: Traffic & Transportation*, Mitigation measures and management procedures outlined in the Construction Management Plan and the Construction Traffic Management Plan are incorporated during the Construction Phase, the residual impact upon the local receiving environment is predicted to be short-term in the nature and slight in terms of effect.

### 5.6.9 Operational Phase

### 5.6.10 Potential Impacts on Population

The Proposed Development will provide for the construction of a Gas Turbine Generation Station with an output of up to 293 Megawatts and all associated ancillary site development works including road and water services infrastructure, all at a site of approximately 13.4 Ha. The Operational Phase of the Proposed Development will result in c. 25 no. permanent staff. Therefore, impact on population resulting from the proposed development is assessed as not significant.

### 5.6.11 Potential Impact on Employment

It is predicted that there will be a positive impact on business activity during the Operational Phase. Therefore, the Proposed Development is likely to have a long term, slight effect on the area in relation to employment and economic activity.

### 5.6.12 Potential Impact on Health from Air Quality & Climate

Traffic related air emissions have the potential to impact air quality which can affect human health. Traffic emissions are predicted to be below the ambient air quality standards set for the protection of human health. It can be determined that the impact to human health during the Operational Phase is long-term, negative, and ranging from imperceptible to slight.. Further discussion of these impacts are included in *Chapter 9: Air Quality & Climate Change.*

### 5.6.13 Potential Impact on Health from Noise & Vibration

The main potential outward noise impact to the surrounding will be from additional vehicles on the surrounding road network and building services and mechanical plant serving the Proposed Development. The effects are considered neutral , negative and not significant.

### 5.6.14 Potential Impact on Health from Traffic

As outlined in *Chapter 13: Traffic & Transportation*, 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 and not significant in terms of effect.

### 5.6.15 Do – Nothing Impact

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 5.9.

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).* |

### 5.6.16 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.

### 5.6.17 MITIGATION MEASURES (AMELIORATIVE, REMEDIAL OR REDUCTIVE MEASURES)

Mitigation measures proposed to minimise the potential impacts on human health in terms of air quality, landscape & visual impact and noise & vibration are discussed in the relevant sections of Chapters.

## 5.7 RESIDUAL IMPACT OF THE PROPOSED DEVELOPMENT

### 5.7.1 PROPOSED DEVELOPMENT

### 5.7.2 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.

### 5.7.3 DIFFICULTIES ENCOUNTERED

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

## 5.8 REFERENCES


- Central Statistics Office. Statbank Databases (Accessed August 2022, https://www.cso.ie/en/databases/).
- Central Statistics Office. Census of Population, 2011, 2016 and 2022. (Accessed August 2022, https://www.cso.ie/en/census/).
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- Environmental Protection Agency (EPA). Draft Advice Notes for Preparing Environmental Impact Statements (EPA, 2015).
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- 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 AND 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

Specific focus is placed on protected species/habitat features as well as those of local or national importance. Ireland's National Biodiversity Action Plan 2017–2021[10], 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

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

still considered to be of national and international importance and, under Article 27(4)(b) of the European 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 walkover 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[11]. Habitats were classified using habitat descriptions and codes published by the Heritage Council in 'A Guide to Habitat Types in Ireland'[12]. Plant species nomenclature follows Rose's 'The Wild Flower Key: How to identify wild flowers, trees and shrubs in Britain and Ireland[13]. 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).

[11] Smith, George F., et al. "Best practice guidance for habitat survey and mapping." The Heritage Council: Ireland (2011)
[12] Fossitt, J.A., 2000. A guide to habitats in Ireland. Heritage Council/ Chomhairle Oidhreacht
[13] 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[14] (birds), and Marnell *et al.* 2019[15] (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[16]. 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[17].

### 6.2.3 LIMITATIONS

The survey effort and assessment were deemed sufficient for the proposed site context 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 site is located on an area that is largely composed of intensive agricultural farmland, framed by hedgerows, in north-west Dublin County. In a wider landscape context, the site is located to the west of Dublin airport and is surrounded by other areas of intensively managed agricultural grassland, and crop land, areas of commercial and industrial developments and roadways. The proposed development is to construct a 298 Megawatts power station and realign part of the Kilshane Road. A fully detailed project description is supplied in Chapter 4 *Project Description*.

## 6.4 RECEIVING ENVIRONMENT

### 6.4.1 OVERVIEW

The proposed site for the Kilshane power station lies within an area of agricultural grassland in the North of County Dublin adjacent to the N2. Dublin airport lies to the east with Huntstown power station and quarry lying just to the south. The area as a whole provides an area of relatively low levels of biodiversity, with most of the proposed site consisting of agricultural grassland and crop lands.

On a landscape scale and as mentioned above, the proposed site lies within a wider area of low level biodiversity; with the proposed site being surrounded by both industrial and commercial developments and various agricultural grasslands which offer little to the ecological value of an area. However, the proposed site contains areas of hedgerows, treelines and scrub which can provide refuge to local flora and fauna in the intensively managed, urban expanse of the immediate and surrounding areas.

[14] RGilbert, G., et al. 2021. Birds of Conservation Concern in Ireland 4: 2020–2026. Irish Birds, 43, pp.1-22.
[15] 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.
[16] Collins, J. (ed.) 2016. Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London.
[17] 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. 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 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 can convey flow to the Huntstown Stream to the east of the site, (Figure 6.1). 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, (Figure 6.3). Section 7.3.1 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[18] 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 Nature 2000 sites within a 15km pathway consideration zone of the proposed project; hydrological pathways were considered beyond 15km also.

[18] 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 pNHA 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.

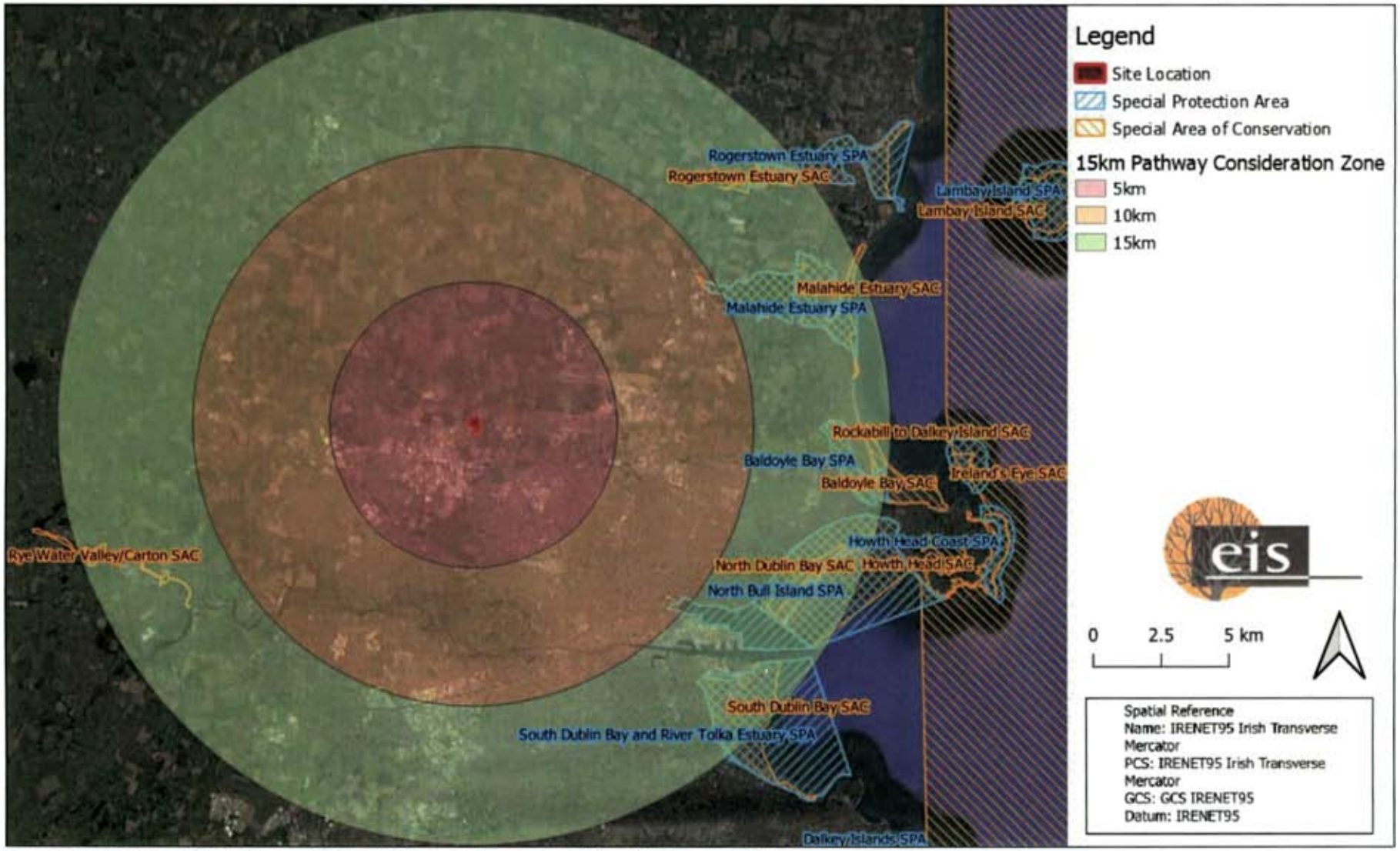


**Figure 6.1 Natura 2000 sites within a 15km pathway consideration zone of the proposed development area**

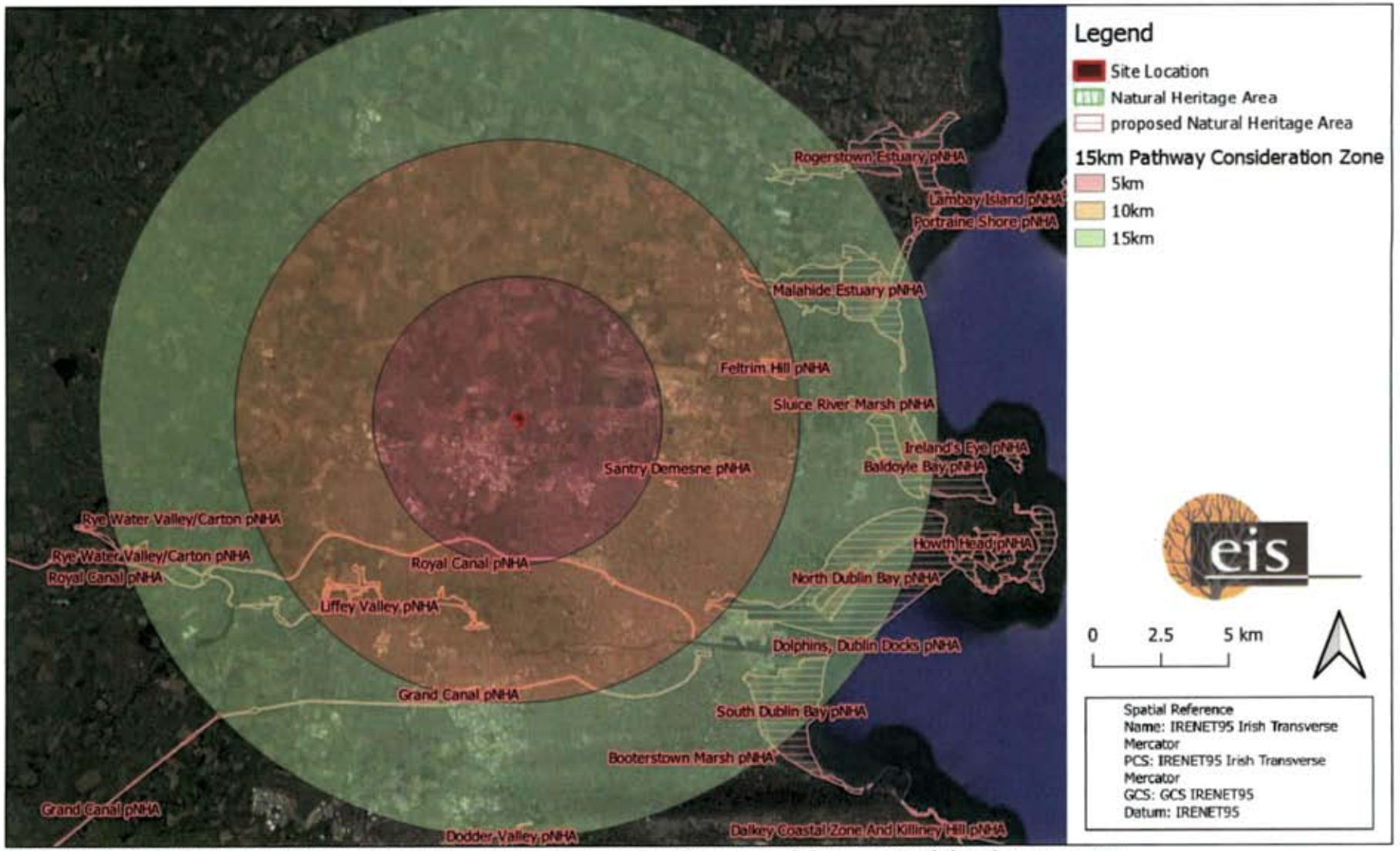


**Figure 6.2 Natural Heritage Sites within a 15km pathway consideration zone of the proposed development area**

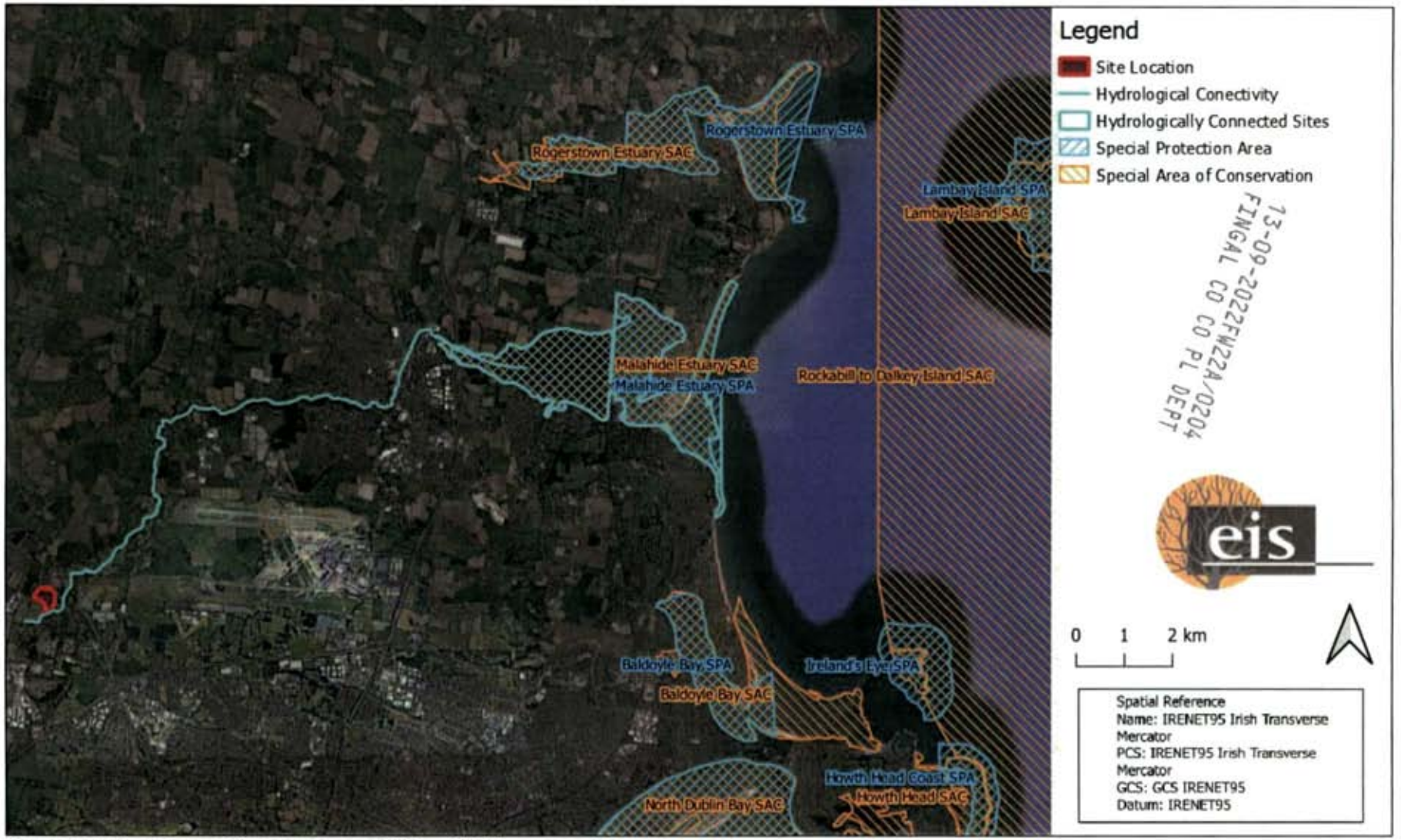


**Figure 6.3 Huntstown Stream connectivity with European Sites**

### 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[19].

### 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. A detailed habitat map is provided in Figure 6.4.

#### 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 in the area 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 agricultural grassland and crop systems (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). See Figure 6.4 for a habitat map.

As mentioned above, the habitats in the proposed site are mainly composed of agricultural grassland/crop systems. Most of this is maintained and used for crop sowing and harvesting, which offers very little to the ecological value of the area. 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 however, the treeline itself is in bad condition. The majority of hedgerows which border the agricultural grasslands are thin and sparse with little maturity and don't offer much in terms of ecological value and are dominated by bramble and hawthorn. The habitats towards the south of the proposed site have been impacted by disturbance from the quarry to the south of the proposed site.

The habitat types recorded, their distributions, and their ecological significance are aligned with what is expected of areas of intensively managed agricultural grassland. A comprehensive habitat map of the proposed site is supplied in Figure 6.4 and a description of each of the habitats identified on site along with a species list for each can be found in Appendix 6.3.

#### 6.4.7.2 Invasive Species

No invasive species were recorded during the site visits. It is noted there are 6 of the invasive species recorded for the 10x10 km area within which the site is located by the National Biodiversity Data Centre which

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

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. This indicates low use of the site by badger, especially given the optimum season for signs, which is not surprising given the lack of suitable habitat, and disturbance in the surrounding area from 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 that would be much more suitable for badgers.

No evidence of any other non-volant mammals was found on the site.

**Bats**

All trees within the site boundary were inspected for potential bat roost features and only two potential bat roosts were identified (Figure 6.5). Buildings on the site were surveyed and found to have no bat roost potential. A bat emergence survey was carried out at these potential roots in June 2022 to establish whether they were in use by local populations, and no bat activity was recorded.

Bat activity transects were also conducted after emergence surveys, along hedgerows of the site. The site was found to have very low levels of bat activity in terms of feeding and commuting. This is unsurprising considering the overall low ecological value of the site and more specific low ecological of almost all of the hedgerow habitats assessed during the previous ecological site walkover conducted in February.

**Birds**

The scrub and treeline 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 grassland which may hold some ecological value for local birds but 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[20].

**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 |

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

| Scientific name | Common name | List status |
|---|---|---|
| *Larus canus* | Common Gull | Amber |

**Amphibians**
No frogs were observed on site. There are little sources in terms of suitable habitat, of potential local importance for amphibians in the proposed site, a thus dedicated amphibian survey was not deemed necessary for this assessment.

**Invertebrates**
There are little sources potential local importance for invertebrates in these habitats, and thus invertebrate survey was not deemed necessary for this assessment.


**Figure 6.4 Habitat map using the Fossitt code [21]**

[21] Fossitt, J.A., 2000. A guide to habitats in Ireland. Heritage.


**Figure 6.5 Map of Potential Bat Roosts**

# 6.5 POTENTIAL IMPACTS

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

1. Augmentation of existing habitats, as well as the removal of hedgerows
2. Construction and Earthworks
3. Lighting during construction
4. Noise/vibration
5. Emissions/Air pollution
6. Hydrology
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 AND EARTHWORKS

- The proposed development could interact with local habitats via dust, soil removal, and construction disturbance.

## 6.5.3 LIGHTING DURING CONSTRUCTION AND 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 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 near the site so this impact may not be across the whole site.
- Disturbance due to operational phase noise.

## 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.

## 6.5.6 HYDROLOGY

- A minor agricultural drain runs along the eastern boundary of the site and connects to the Huntstown Stream. 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.

- 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 to the quality of downstream riverine habitats that are part of and connected to the Huntstown Stream (ref Chapters 7 and 8 also).

### 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

Overall, it is assessed that the implementation of the proposed development will have little impact in terms of the ecological resources present and current levels of biodiversity. However, the following mitigation measures are nonetheless proposed in order to ensure that potential impacts are avoided and/or minimised.

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

- No vegetation will be removed during the breeding bird season (1st March to the 31st of August).
- Any vegetation removal or disturbance works that must take place during the breeding season 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.
- Bat boxes will be installed at locations to be specified by an appropriately qualitied ecologist to mitigate the loss of a tree identified as having bat roost potential.

### 6.6.2 CONSTRUCTION AND EARTHWORKS

- Dust and debris control measures will be implemented during construction.

### 6.6.3 LIGHTING DURING CONSTRUCTION AND OPERATION

- Construction phase lighting will be controlled to minimise light pollution as a matter of good practice. Controls will include implementation of lights out hours when construction is not active on site (evening and night hours).

- Operational phase lighting at night will be only be used where necessary and will be directional/cowled and at a low level where possible. 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[22] (see table 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.

Lighting types:
Light emitting diodes (LEDs) will be used where possible[23].
Also possible are compact fluorescent lights, but variants with 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.

| 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, as set out in the accompanying PCEMP.

### 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

- The direct $CO_2$ emissions from electricity to operate the proposed power plant facility, will not be significant in relation to Ireland's national annual $CO_2$ emissions. The Sustainable Energy Authority of Ireland(35) states on its website that the average $CO_2$ emission factor for electricity generated from natural gas in Ireland was 202.2 $gCO_2/kWh$ in 2020. On the basis that the proposed power generation facility will generate a maximum of 293 MW of electricity using natural gas, which equates to 2,515 GWh annually. This translates to approximately 508,603 tonnes of $CO_2eq$ per year. This scenario assumes that the facility will operate for 98% of the year, with a approx. 2% maintenance time. However, as described in Ch 4 - Project Description and Appendix 9.3 *("A comparison of future carbon*

[22] 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

[23] 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).

*emissions within the SEM with and without the Kilshane GT"*), the facility is forecast to operate considerably less than this with a projected annual average of 46 hours.
- Considering the above, the facility's impact will be less than 0.04% of the total EU-wide Emissions Trading System market, which is not significant and thus an EU-wide cumulative assessment is not merited.
- Therefore overall, the impact on climate associated with the operational phase of the power generation facility is considered direct, long-term, negative 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 the maintenance of locally important hedgerows along with supplemental planting. Taking account of the mitigation measures detailed above, the potential impacts on flora and fauna during construction are predicted to be negligible, and of a temporary duration.

The operational phase will be in keeping with the current function and usage of the surrounding area in terms of both human pressures and ecological condition. Climate and the impact on emissions on air were also considered in this assessment (see Chapter 9), 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. Residual long-term impacts on the biodiversity and ecological integrity of the site are anticipated to be localised and negligible.

# 6.8 CUMULATIVE IMPACTS

## 6.8.1 PLANS OF RELEVANCE TO THIS PROPOSAL

Plans of relevance in the context of this proposal include:
- Fingal County Development Plan 2017-2023:
- No current relevant Local Area Plan:

As the proposed development area is within a relatively industrialised area in Dublin, there are other 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 the projects within the area are large scale works predominantly relating to the construction of warehouses and industrial structures with some medium scale projects relating to extensions and alterations of already existing structures (a list of recent planning applications is provided in Chapter 17 of this EIAR).

No significant cumulative effects are anticipated during the construction or operational phases.

## 6.8.2 PROJECTS OF RELEVANCE TO THIS DEVELOPMENT

A full list of surrounding projects relevant to this development can be found in the planning report. Projects in the immediate area that are of relevance to this project assessment in terms of cumulative impacts are:

Realignment of the Kilshane Road
While not a core part of the power station development, is included within the same planning application. It is thus part of the subject development and its environmental effects form part of the scope of this EIAR and has received a full ecological assessment.

A. GIS and Grid Connection
A dedicated Ecological Impact Assessment (EcIA) report on this is included in an Environmental Report (ER) which is appended to this EIAR. This ER will also support an application by Kilshane Energy to An Bord Pleanála for planning consent for that project (a Strategic Infrastructure Development).

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.

The GIS substation in project A 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 Grid connection will mostly run under existing roadways and the section within the Kilshane Energy site will run under a roadway that forms part of the power station planning application. The connection will cause no significant effects on biodiversity. (Ref appended ER for further details.)

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 is likely to entail crossing two or three agricultural fields and their hedgerow field boundaries. It can be reasonably predicted that any ecological effects will be readily mitigated without causing any significant residual effects.

Therefore, considering the above, no significant cumulative effects are anticipated during the construction or operational phases when these other projects are taken into account.

## 6.9 INTERACTIONS

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

# 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 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.

This chapter was prepared by Marcelo Allende (BSc, BEng). Marcelo is a Senior Environmental Consultant (Hydrologist) at AWN with over 15 years of experience in Environmental Consulting and water resources. Marcelo holds a degree in Water Resource Civil Engineering from the University of Chile. He has worked on a wide of range of projects including multi-aspect environmental investigations, geo-environmental impact assessments, groundwater resource management, hydrological and hydrogeological conceptual and numerical modelling, strategic and site specific flood risk assessments, Due Diligence reporting, baselines studies, soils, surface water and groundwater monitoring and field sampling programmes on a variety of brownfield and greenfield sites throughout Ireland as well as overseas in Chile, Argentina, Peru and Panama. He also has detailed knowledge of environmental guidance, legislation, regulations & standards and expertise in GIS (expert level) and MATTE studies at COMAH establishments. He is currently a member of the International Association of Hydrogeologists (Irish Group) and a member of Engineers Ireland (MIEI).

### 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 (EPA, 2003) and Guidelines on the Information to be contained in Environmental Impact Statements (EPA, 2022a).
- TII/National Roads Authority Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (TII/formerly NRA, 2009).
- 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 National Roads Authority (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 subject site;
- Landfills, industrial sites in the vicinity of the site and the potential risk of encountering contaminated ground;
- The quality, drainage characteristics and range of agricultural 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 site to within a 2km radius and the potential for increased risk presented by the proposed development;
- Classification (regionally important, locally important etc.) and extent of aquifers underlying the site perimeter area and increased risks presented to them by the proposed development 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 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; and
- Fingal County Council - illegal landfill information.

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 site is located on a 4.3 ha site in the townland of Kilshane, and Piperstown, Kilshane Road, Dublin 11. The proposed development comprises the construction of a gas turbine power generator station with an output of up to 293 Megawatts, the application of which includes a turbine, an associated exhaust stack, two air cooled condenser units, administration and control building, workshop, stores, fuel gas area, electrical module for fuel gas area, step-up transformer, black start diesel generator, transfer compound, three reserve fuel storage tanks and recessed bund area, miscellaneous plant, and equipment.

The proposed development will also include 26 no. staff car parking spaces, site and landscaping works, and all associated ancillary site development infrastructure such as foul and surface water drainage works and internal roads, footpaths, access routes, and all associated engineering and construction site works necessary to facilitate the development. Additionally, the proposal includes the realignment of a section of the Kilshane road and construction of a new roundabout junction (bounding the site to the east).

The proposed development is described in further detail in Chapter 4 *Project Description* and in the CEMP. The details of the construction and operation of the development in terms of Land, Soils Geology and Hydrogeology is detailed in the 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.<br>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.<br>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.<br>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.<br>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 represents an overall increase in hardstanding surfaces of c. 28,720m2.<br>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 |

| Phase | Activity | Description |
|---|---|---|
| | | 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.<br>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.<br>Combustion turbine fuel oil will be stored in a nominal 6,246 m3 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.<br>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.<br>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 the activities required for the construction phase of the proposed development represents 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. 4.33 hectares 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 (Refer to Figure 7.1 below).

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.

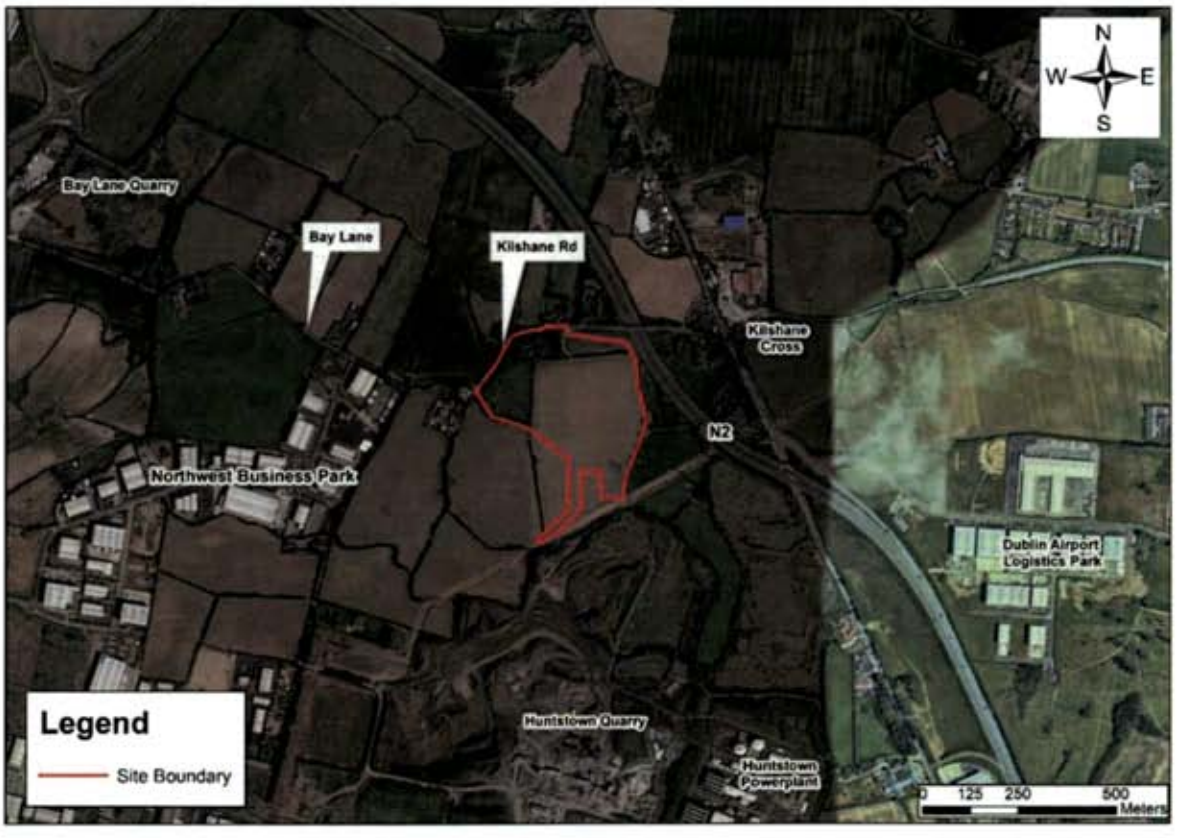


**Figure 7.1 Site Location and Surrounding Activities**

## 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 x building structures characterised by an 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 6.3.8 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

Site investigations were carried out by Site Investigation Ltd in 2021 throughout the Kilshane site. These investigations included the following:

- Excavation of sixteen (16) no. 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 (4) no. Cable Percussion Boreholes followed by rotary coreholes (depths up to 6.7 mbgl).
- 8 no. 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. The full analytical laboratory reports are presented in Appendix 7.4. The locations of trial pits and boreholes from which representative samples were collected are presented Figure 7.2 below.

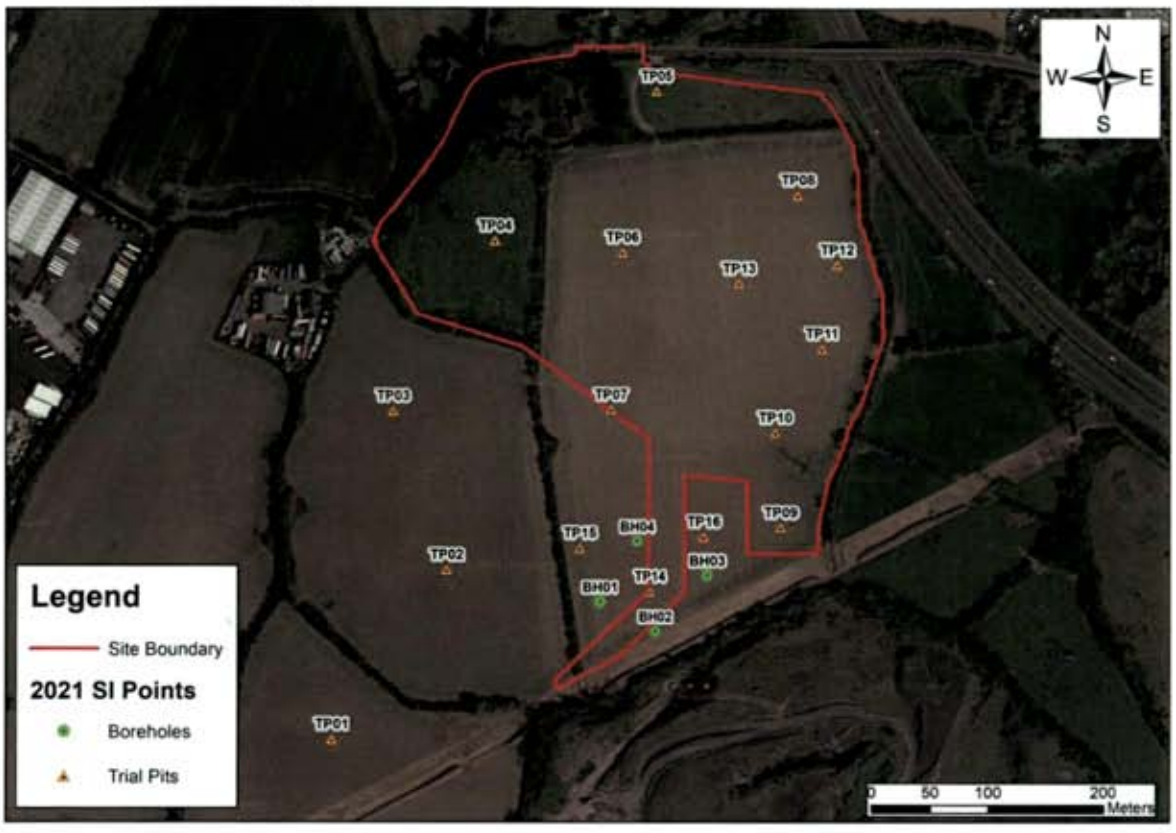


**Figure 7.2 Site Investigation Points (Site Investigation Ltd., 2021)**

## 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 as presented in Figure 7.3. 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.


**Figure 7.3 Soils Map (Source: Teagasc, 2022)**

## 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, as shown in Figure 7.4 below. 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.


**Figure 7.4 Subsoils Map (Source: GSI, 2022)**

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. Refer to Figure 7.2 above for locations of trial pits and boreholes. 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. (Refer to Figure 7.5 below).

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 vicinity of 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.

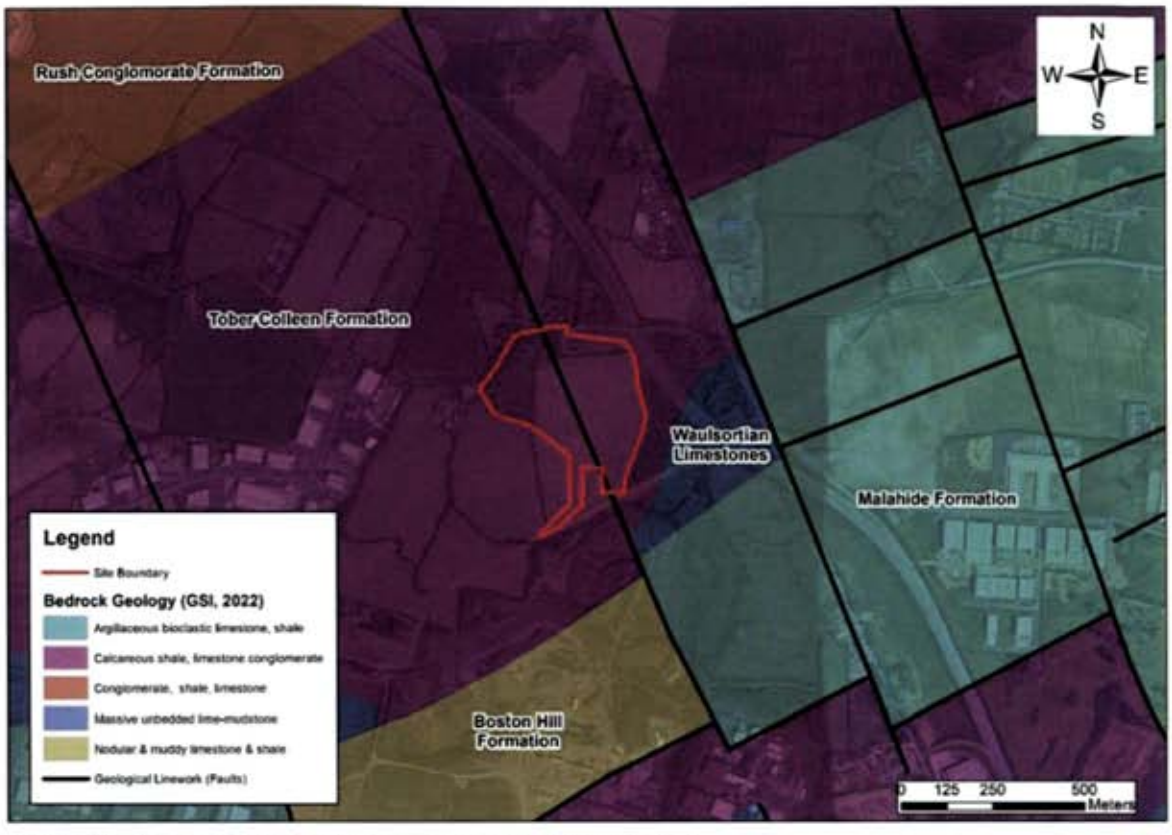


**Figure 7.5 Bedrock Geology Map (Source: GSI, 2022)**

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 BH02 and BH03 mbgl at BH03 to the east of the site, 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 ($m^3/d$), specific capacity ($m^3/d/m$) and groundwater transmissivity ($mm^3/d$). There are three main classifications: regionally important, locally important and poor aquifers. Where an aquifer has been classified as regionally important, it is further subdivided according to the main groundwater flow regime within it. This sub-division includes regionally important fissured aquifers (Rf) and regionally important karstified aquifers (Rk). Locally important aquifers are sub-divided into those that are generally moderately productive (Lm) and those that are generally moderately productive only in

local zones (LI). Similarly, poor aquifers are classed as either generally unproductive except for local zones (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 (refer to Figure 7.6 below).


**Figure 7.6 Aquifer Classification Map (Source: GSI, 2022)**

## 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. 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. The aquifer vulnerability class in the region of the site is presented below.

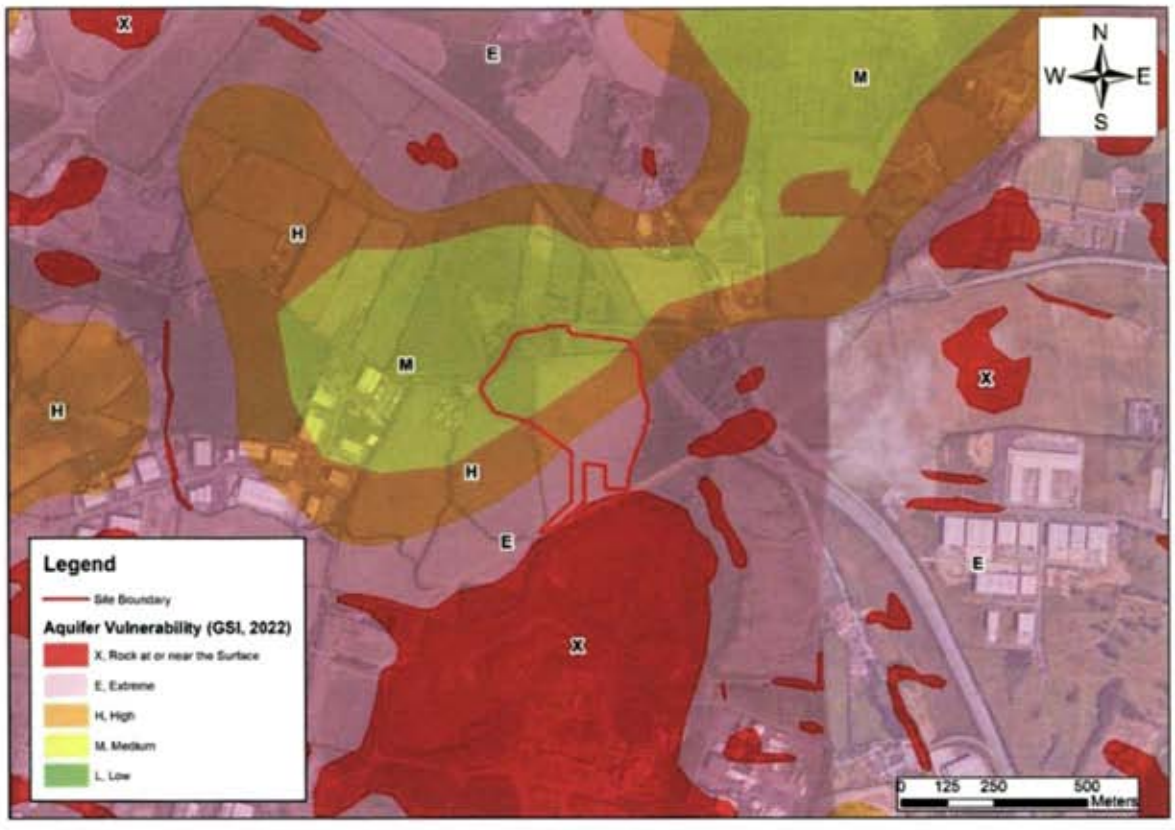


**Figure 7.7 Aquifer Vulnerability Map (Source: GSI, 2022)**

**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
(3) 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 between1.5-3.7 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.

Figure 7.8 below presents the GSI well search for the area surrounding the site (note this source does not include all wells). There are no details of this recorded well in the GSI Well Card Index

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.


**Figure 7.8 GSI Well Search Map (Source: GSI, 2022)**



## 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. Full laboratory result tables for the soil and groundwater samples are presented in Appendix 7.4.

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.
-

The full analytical laboratory report is presented in Appendix 7.4. 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.

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.

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.

PCBs

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

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.

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. The comparison tables for the analysed samples against current WAC criteria can be seen in Appendix 7.2.

### 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 '2a – Not at Risk" meaning the GWB has achieved its objectives and has either no significant trends or improving trends. 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/m$^3$. This is the lowest of the five radon categories which are assessed by the EPA.

### 7.3.15 GEO-HAZARDS

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. Figure 7.9 below presents the location of these protected areas in the context of the Huntstown site.

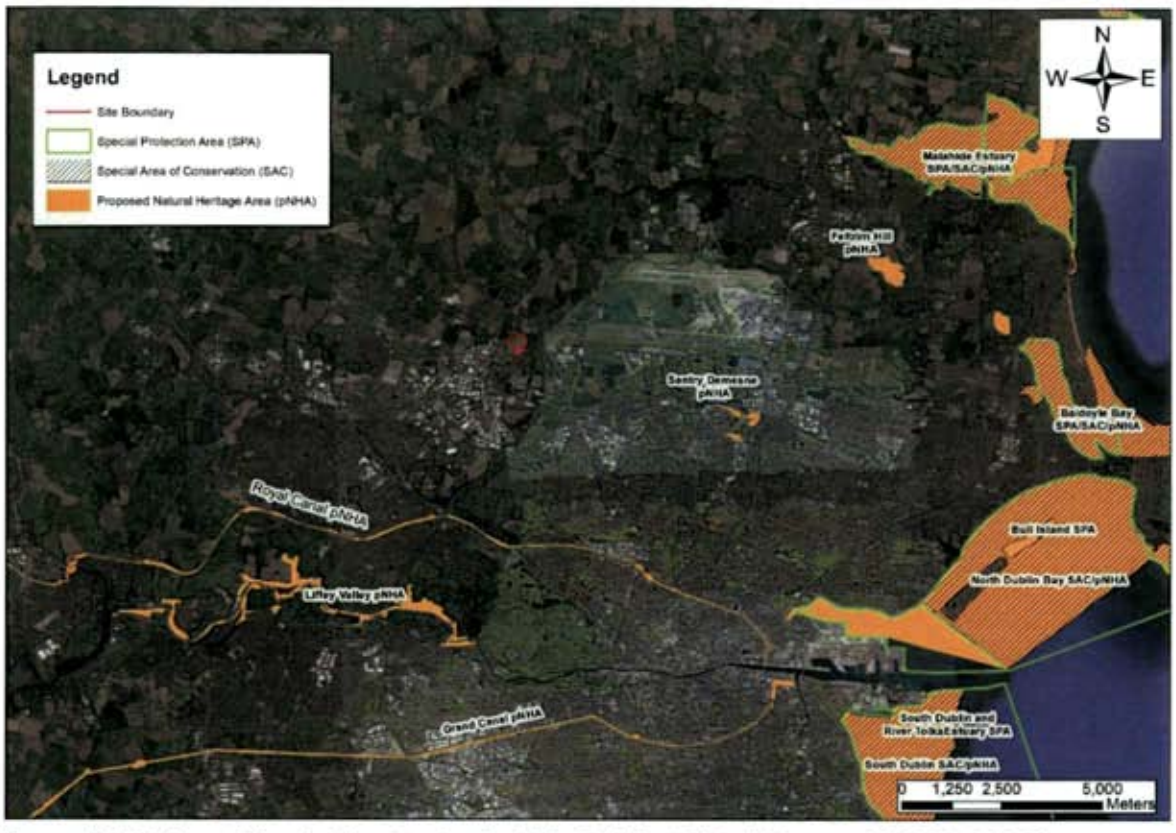


**Figure 7.9 Natura Sites in the Context of the Subject Site (Source: NPWS, 2022)**

## 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.

A regional cross section can be seen in Figure 7.10.

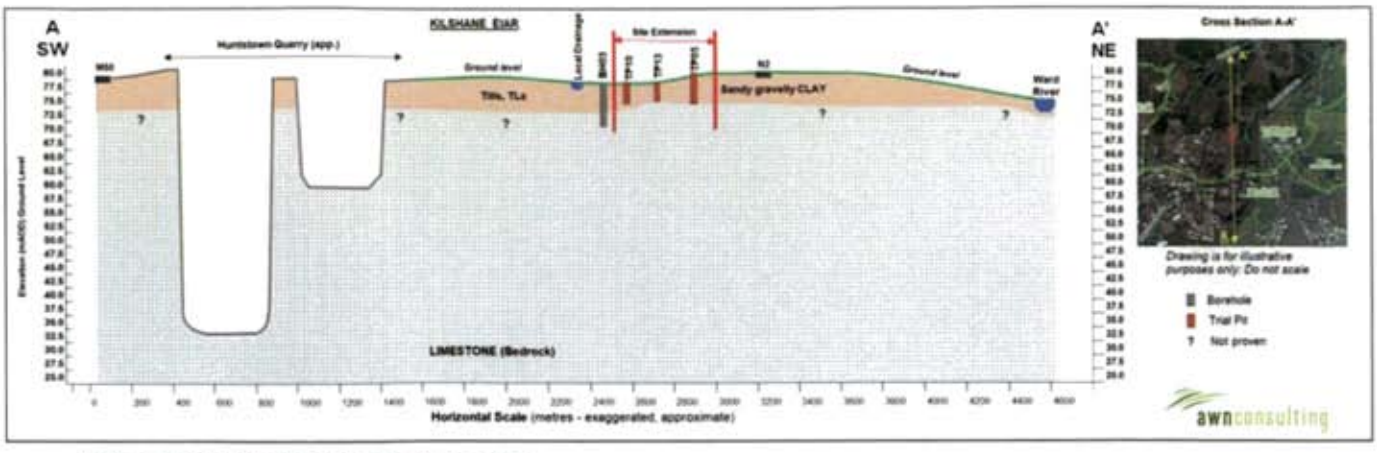


**Figure 7.10 Regional Cross Section**

### 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 impacts of the proposed development on the land, soils, geology and hydrogeological environment during the construction and operation is outlined below. Due to the inter-relationship between soils, geology and hydrogeology and surface water (hydrology) 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 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 64,500m3 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 6.4, it is noted that the deepest 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 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 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 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.

Accidental spillages which are not mitigated may result in localised contamination of soils and groundwater underlying the site, should contaminants migrate through the subsoil's 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 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 fuel will be stored in belly-tanks situated at ground floor level within compound yards. These bunded areas will be greater than 110% of the storage capacity.

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 7 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' due to 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.

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 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.

#### 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 foul sewer. 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 sewer. 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 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 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) which 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.

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

## 7.6 RESIDUAL IMPACTS

### 7.6.1 CONSTRUCTION PHASE

The implementation of mitigation measures outlined above (Section 7.6) 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 highlighted above (Section 7.6) 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 IMPACT

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 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.

### 7.7.1 Construction Phase

Contractors for the Proposed Development will be contractually required to operate in compliance with the CEMP which includes the mitigation measures outlined in this EIA report. Other developments will also have to incorporate measures to protect soil and water quality in compliance with legislative standards for receiving water quality (European Communities Environmental Objectives (Groundwater) Regulations (S.I. 9 of 2010 and S.I. 266 of 2016). As a result, there will be minimal cumulative potential for change in soil quality or the natural groundwater regime. The cumulative impact is considered to be ***neutral*** and ***imperceptible***.

### 7.7.2 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 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, the assessed impacts and mitigation measures discussed will be considered applicable to 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.

Refer to Chapter 17 Interactions & Cumulative Effects for further details in relation to these interactions.

# 8 WATER & HYDROLOGY

## 8.1 INTRODUCTION/METHODOLOGY

This chapter assesses and evaluates the potential impacts of the 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.

This chapter was prepared by Marcelo Allende (BSc, BEng). Marcelo is a Senior Environmental Consultant (Hydrologist) at AWN with over 15 years of experience in Environmental Consulting and water resources. Marcelo holds a degree in Water Resource Civil Engineering from the University of Chile. He has worked on a wide of range of projects including multi-aspect environmental investigations, geo-environmental impact assessments, groundwater resource management, hydrological and hydrogeological conceptual and numerical modelling, strategic and site specific flood risk assessments, Due Diligence reporting, baselines studies, soils, surface water and groundwater monitoring and field sampling programmes on a variety of brownfield and greenfield sites throughout Ireland as well as overseas in Chile, Argentina, Peru and Panama. He also has detailed knowledge of environmental guidance, legislation, regulations & standards and expertise in GIS (expert level) and MATTE studies at COMAH establishments. He is currently a member of the International Association of Hydrogeologists (Irish Group) and a member of Engineers Ireland (MIEI).

### 8.1.1 RELEVANT 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 TII 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)
- South Dublin City Council (2005), Greater Dublin Strategic Drainage Study: Technical Documents of Regional Drainage Policies. Dublin: Dublin City Council; and
- '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:

- Engineering Assessment Report. Proposed Road Realignment and Gas Turbine Power Generation Station at Kilshane, Dublin 11. Waterman Moylan June 2022;
- 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 site is located on a 4.3 ha site in the townland of Kilshane, and Piperstown, Kilshane Road, Dublin 11. The proposed development comprises the construction of a gas turbine power generator station with an output of up to 293 Megawatts, the application of which includes a turbine, an associated exhaust stack, two air cooled condenser units, administration and control building, workshop, stores, fuel gas area, electrical module for fuel gas area, step-up transformer, black start diesel generator, transfer compound, three reserve fuel storage tanks and recessed bund area, miscellaneous plant, and equipment.

The proposed development will also include 27 no. staff car parking spaces, site and landscaping works, and all associated ancillary site development infrastructure such as foul and surface water drainage works and internal roads, footpaths, access routes, and all associated engineering and construction site works necessary to facilitate the development. Additionally, the proposal includes the realignment of a section of the Kilshane road and construction of a new roundabout junction (bounding the site to the east).

The proposed development is described in further detail in Chapter 4 *Project Description* and in the CEMP . 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 sulfur 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 curbed concrete tanker truck unloading pad adjacent to the facility road sized to contain 110% of a tanker truck volume (33.4 $m^3$), 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 6246 $m^3$ 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.

**Fuel Oil Storage 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:

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

Fingal County Council have requested that the Kilshane Road realignment, which is to be taken in charge, be attenuated separately from the remained of the subject application which is to remain under private management.

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.

It is proposed to introduce permeable paving at parking courts 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 is proposed to 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.

Refer to Engineering Assessment Report (Waterman Moylan, 2022) for further details.

#### 8.2.2.4 Foul water

A reason for the previous planning applications refusal was the lack of consideration given to the remainder of the lands outside the subject application area, but under the ownership of the applicant. A masterplan has now been developed and the flows from these industrial units which will form a future application, have now been incorporated into the foul design of the subject application.

It is now proposed, due to site topography, to serve the subject application and masterplan lands by a pumping station as agreed with Irish Water, which is to remain under private management. The location, depth, and dimensions of the pumping station as per Drawing Number: 21-099-P203, has been designed in anticipation of the future connection of the masterplan lands.

A 150mm diameter rising main will be constructed from the on-site pumping station for a distance of C. 1,818m to the existing gravity foul network on Mitchelstown Road. While the Kilahane pumping station is closer, it is not considered feasible to undertake the construction of the rising main under the N2 and through the Kilshane Cross junction.

A pre-connection enquiry was submitted to Irish Water with a reference number of CDS22004080, the subsequent confirmation of feasibility letter received is included in the accompanying Engineering Report.

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

#### 8.2.2.5 Water Supply

It is not considered feasible to upgrade the existing watermain network which traverses the N2. As such, 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 4.33 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 (refer to Figure 8.1 below). 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 hydrological environment is presented in Figure 7.1 below. 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 the Broadmeadows 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.


**Figure 8.1 Local Hydrological Environment (EPA, 2022)**

## 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 8.2 below for locations of these EPA quality monitoring points in the context of the site.

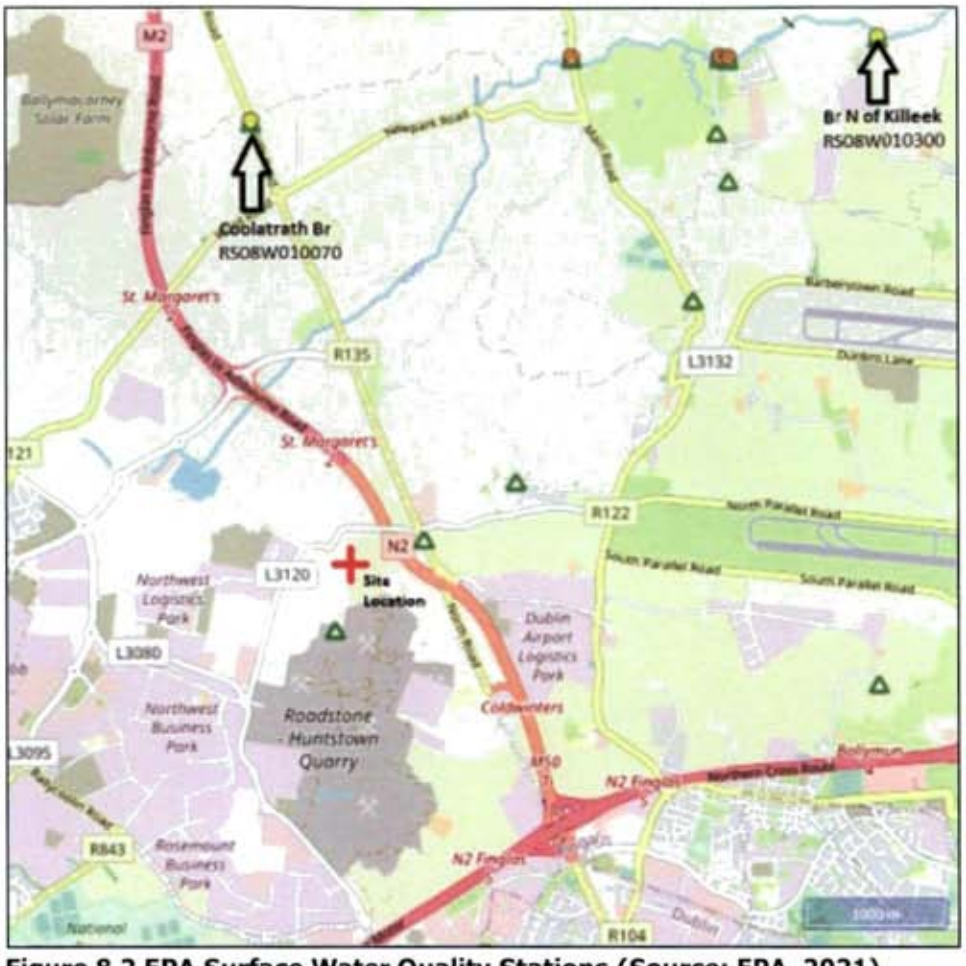


**Figure 8.2 EPA Surface Water Quality Stations (Source: EPA, 2021)**

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 AND 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 Kilhane 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 FLOOD RISK

According to the Flood Risk Assessment carried out by Waterman Moylan (2022), 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).

### 8.3.5 AREAS OF CONSERVATION

According to the NPWS (2021) 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. Figure 8.3 below presents the location of these protected areas in the context of the Hunstown site.

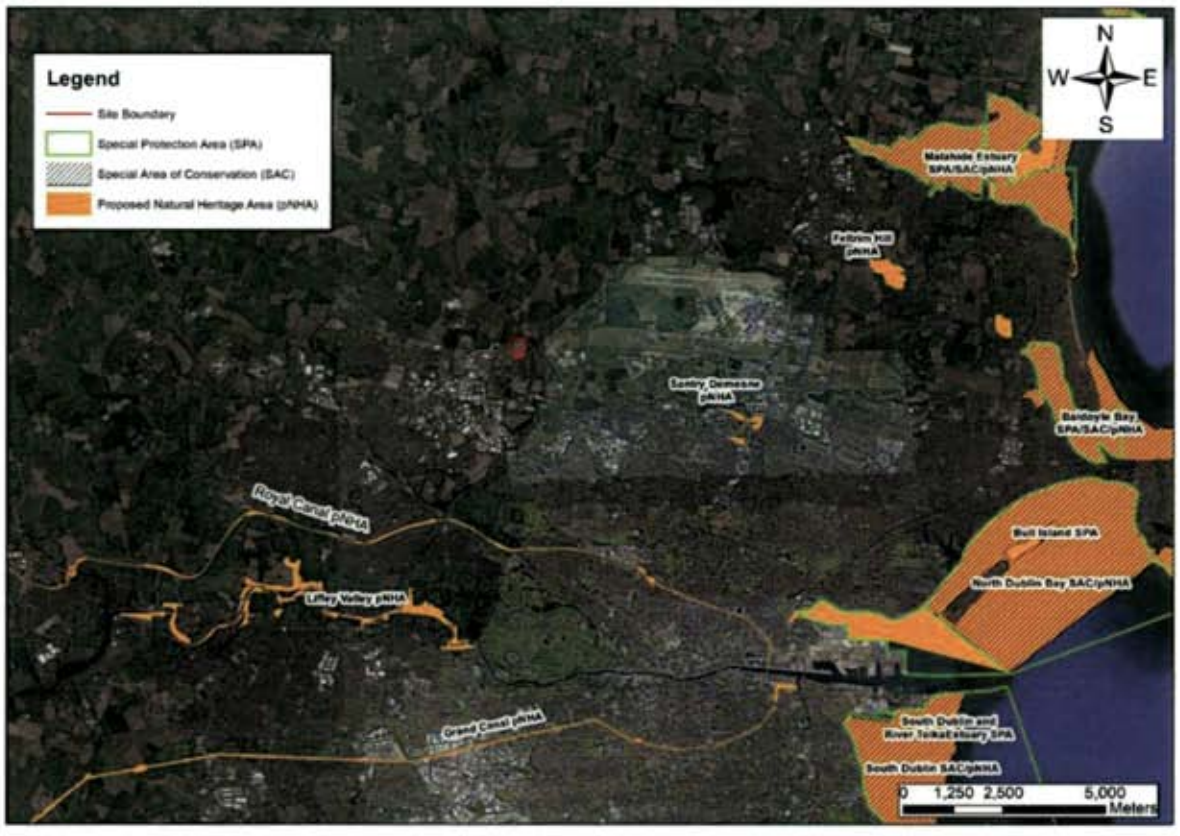


**Figure 8.3 Natura Sites in the Context of the Subject Site (Source: NPWS, 2022)**

### 8.3.6 RATING OF IMPORTANCE OF HYDROLOGICAL ATTRIBUTES

Based on the TII methodology (2009) (See Appendix 7.1) the importance of the hydrological features at this site is rated as 'Low importance' based on the assessment that the attribute has a low quality significance or value on a local scale.

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

An analysis of the potential impacts of the proposed development on the and hydrological environment during the construction and operation 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 6 and 7 of the EIAR. Mitigation measures included in the design of this project to address these potential impacts are presented in Section 7.6 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 CONSTRUCTION PHASE

### 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' is related to the lack of evidence of contamination observed in the subsoils during the ground investigations carried out by Waterman Moylan in 2021 (refer to Chapter 6 for further details); therefore it is not expected 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 this potential leakage can 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 OPERATIONAL 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' due to 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. The fuel will be stored in belly-tanks situated at ground floor level within compound yards. These bunded areas will be greater than 110% of the storage capacity.

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; 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' due to 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 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.

#### 8.5.1.2 Surface Water Run-Off

As there is potential for run-off to entre 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 foul sewer. 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.

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 sewer. 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.

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 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 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.

### 8.5.2 OPERATIONAL PHASE

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 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. This together with hardstand cover and permeable paving will minimise the potential for any impact to the hydrological environment.

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.

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

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.

Spill Kit Facilities

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

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. Refer to the Engineering Assessment Report for further details (Waterman Moylan, 2022).

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 7.1) 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 7.1) for rating the magnitude and significance of impacts on the hydrological related attributes, the magnitude of impact is considered **negligible**.

# 8.7 MONITORING OR REINSTATEMENT

## 8.7.1 CONSTRUCTION PHASE

During construction phase the following monitoring measures will be considered:

- Regular inspection of surface water run-off and sediments controls e.g. silt traps will be carried during the construction phase.

- Soil sampling to confirm disposal options for excavated soils in order to avoid contaminated run-off.
- Regular inspection of construction/mitigation measures will be undertaken e.g. concrete pouring, refuelling etc.

### 8.7.2 Operational Phase

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

## 8.8 CUMULATIVE IMPACT

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.

### 8.8.1 Construction Phase

Contractors for the Proposed Development will be contractually required to operate in compliance with the CEMP which includes the mitigation measures outlined in this EIA report. Other developments will also have 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). As a result, there will be minimal cumulative potential for change in surface water quality or the natural hydrological regime. The cumulative impact is considered to be ***neutral*** and ***imperceptible***.

### 8.8.2 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 is considered to be ***neutral*** and ***imperceptible***.

## 8.9 INTERACTIONS

Due to the inter-relationship between land, soils, geology, hydrogeology and hydrology, the assessed impacts and mitigation measures discussed will be considered applicable to both chapters.

Refer to Chapter 17 Interactions & Cumulative Effects for further details in relation to these interactions.

# 9 AIR QUALITY & CLIMATE

## 9.1 INTRODUCTION/METHODOLOGY

This chapter evaluates the impacts which the Proposed Development may have on Air Quality & Climate in line with the Industrial Emissions Directive (2010/75/EU) and Best Available Techniques (BAT) Reference Document for Large Combustion Plants[1], and as defined in the Environmental Protection Agency (EPA) documents Guidelines on the Information to be contained in Environmental Impact Assessment Reports[2] and Draft Advice Notes for Preparing Environmental Impact Statements[3], as well as in line with Article 94 and Schedule 6 of the Planning and Development Regulations 2001 (as amended) and Article 5 and Annex IV of the EIA Directive (2011/92/EU, as amended).

An assessment of the likely dust related impacts as a result of construction activities and decommissioning activities was undertaken and used to inform a series of mitigation measures presented in this chapter.

Air dispersion modelling of operational stage emissions from the proposed gas fired power generation facility in isolation and cumulatively with the existing licensed facilities nearby was carried out using the United States Environmental Protection Agency's regulated model AERMOD as recommended by the EPA[4].

The purpose of this modelling study is to determine whether the emissions from the facility will lead to ambient concentrations which are in compliance with the relevant ambient air quality standards for nitrogen dioxide ($NO_2$), carbon monoxide (CO), sulphur dioxide ($SO_2$) and particulate matter ($PM_{10}$) and to identify the location and maximum of the worst-case ground level concentrations for each compound assessed.

This chapter describes the outcome of this study. The study consists of the following components:

- Review of emission data and other relevant information needed for the modelling study;
- Summary of background $NO_2$, CO, $SO_2$ and $PM_{10}$ levels;
- Dispersion modelling of $NO_2$, CO, $SO_2$ and $PM_{10}$ under the maximum emission scenario;
- Dispersion modelling of $NO_2$ under a cumulative emission scenario, considering all existing IE licenced emission points within 1km of the Proposed Development in line with the methodology of AG4[4] ;
- Dispersion modelling of $NO_2$ under a sensitivity analysis scenario, considering the impact of a larger diameter (7.4 m) stack (Appendix 9.4);
- Presentation of predicted ground level concentrations of released substances;
- Evaluation of the significance of these predicted concentrations, including consideration of whether these ground level concentrations are likely to exceed the relevant ambient air quality limit values;
- Assessment of the potential greenhouse gas (GHG) emissions associated with the proposed development (Appendix 9.3); and
- Assessment of the potential impact of the plume associated with the operational phase of the proposed station on aircraft (Appendix 9.5).

### 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 $NO_2$, $PM_{10}$, and $PM_{2.5}$ 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 $PM_{2.5}$.

**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 ($NO_2$) | 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 + $NO_2$) | 2008/50/EC | Critical limit for the protection of vegetation and natural ecosystems | 30 µg/m³ |
| Particulate Matter (as $PM_{10}$) | 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 $PM_{2.5}$) | 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 | 10mg/m³ |
| Sulphur Dioxide ($SO_2$) | 2008/50/EC | Hourly limit for protection of human health - not to be exceeded more than 24 times/year | 350 µg/m³ |
| | | 24-Hourly limit for protection of human health - not to be exceeded more than 3 times/year | 125 µg/m³ |
| | | Critical level for protection of vegetation (annual and winter) | 20 µg/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 $PM_{10}$ and $PM_{2.5}$.

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/m²/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 $PM_{2.5}$. In relation to Ireland, 2020 emission targets are 25 kt for $SO_2$ (65% below 2005 levels), 65 kt for $NO_X$ (49% reduction), 43 kt for volatile organic carbons (VOCs) (25% reduction), 108 kt for ammonia ($NH_3$) (1% reduction) and 10 kt for $PM_{2.5}$ (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 $SO_2$ in recent years but failed to comply with the ceilings for $NH_3$, $NO_X$ 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 $SO_2$, $NO_X$, NMVOC, $NH_3$, $PM_{2.5}$ and methane ($CH_4$). In relation to Ireland, 2020-29 emission targets are 25 kt for $SO_2$ (65% on 2005 levels), 65 kt for $NO_X$ (49% reduction on 2005 levels), 43 kt for VOCs (25% reduction on 2005 levels), 108 kt for $NH_3$ (1% reduction on 2005 levels) and 10 kt for $PM_{2.5}$ (18% reduction on 2005 levels). In relation to 2030, Ireland's emission targets are 10.9 kt (85% below 2005 levels) for $SO_2$, 40.7 kt (69% reduction) for $NO_X$, 51.6 kt (32% reduction) for NMVOCs, 107.5 kt (5% reduction) for $NH_3$ and 11.2 kt (41% reduction) for $PM_{2.5}$.

#### 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], published in June 2019, 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 2021 *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. 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

### 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

### 9.1.3.1 Air Quality

Air dispersion modelling was carried out by AWN Consulting Ltd. using the United States Environmental Protection Agency's regulated model AERMOD (Version 21112). AERMOD is recommended as an appropriate model for assessing the impact of air emissions from industrial facilities in the EPA Guidance document "Air Dispersion Modelling from Industrial Installations Guidance Note (AG4)"[4].

The modelling of air emissions from the site was carried out to assess the concentrations of nitrogen dioxide ($NO_2$) beyond the site boundary and the consequent impact on human health. The assessment was undertaken in order to quantify the impact of the Proposed Development and the existing baseline level of pollutants on ambient air quality concentrations.
To obtain all the meteorological information required for use in the model, data collected during 2017 – 2021 from the Met Éireann meteorological station at Dublin Airport has been incorporated into the modelling. The air dispersion modelling input data consisted of information on the physical environment, design details for all emission points on-site and five full years of meteorological data. Using this input data, the model predicted ambient concentrations beyond the site boundary for each hour of the meteorological year. The model post-processed the data to identify the location and

maximum of the worst-case ground level concentration. This worst-case concentration was then added to the background concentration to give the worst-case predicted environmental concentration (PEC). The PEC was then compared with the relevant ambient air quality standard to assess the significance of the releases from the site.

Throughout this study a worst-case approach was taken. This will most likely lead to an over-estimation of the levels that will arise in practice. The worst-case assumptions are outlined below:

- Maximum predicted concentrations were reported in this study, even if no residential receptors were near the location of this maximum;
- Worst-case background concentrations were used to assess the baseline levels of substances released from the site;
- The effects of building downwash, due to on-site and any nearby off-site buildings, has been included in the model; and
- Worst-case operations for $NO_2$ emissions assumes all emission points were running continuously for a full year and emergency operations on backup liquid fuel would run for 100 hours per year.

AERMOD is a "new-generation" steady-state Gaussian plume model used to assess pollutant concentrations associated with industrial sources. The model is an enhancement of the Industrial Source Complex-Short Term 3 (ISCST3) model which has been widely used for emissions from industrial sources. Details of the model are given in Appendix 9.1. Fundamentally, the model has made significant advances in simulating the dispersion process in the boundary layer. This will lead to a more accurate reflection of real-world processes and thus considerably enhance the reliability and accuracy of the model particularly under those scenarios which give rise to the highest ambient concentrations.

Due to the proximity to surrounding buildings, the PRIME Building Downwash Program (BPIP Prime) has been incorporated into the model to determine the influence (wake effects) of these buildings on dispersion in each direction considered.

The AERMOD model incorporated the following features:

- Three receptor grids were created at which concentrations would be modelled. Receptors were mapped with sufficient resolution to ensure all localised "hot-spots" were identified without adding unduly to processing time. The receptor grids were based on Cartesian grids with the site at the centre. An outer grid extended to 10,000 $m^2$ with the site at the centre and with concentrations calculated at 200 m intervals. A middle grid extended to 3,000 $m^2$ with concentrations calculated at 100 m intervals. A smaller denser grid extended to1,00 $m^2$ from the site with concentrations calculated at 50 m intervals. Boundary receptor locations were also placed along the boundary of the site, at 25 m intervals, giving a total of 4,067 calculation points for the model. All receptors have been modelled at 1.5 m to represent breathing height;
- All on-site buildings and significant process structures were mapped into the computer to create a three-dimensional visualisation of the site and its emission points. Buildings and process structures can influence the passage of airflow over the emission stacks and draw plumes down towards the ground (termed building downwash). The stacks themselves can influence airflow in the same way as buildings by causing low pressure regions behind them (termed stack tip downwash). Both building and stack tip downwash were incorporated into the modelling.;
- Detailed terrain has been mapped into the model using SRTM data with 90 m resolution. The site is located in gentle terrain. All terrain features have been mapped in detail into the model using the terrain pre-processor AERMAP[17];
- Hourly-sequenced meteorological information has been used in the model covering the years 2017 – 2021 from the Met Éireann[18] meteorological station at Dublin Airport as shown in Figure 9.1. AERMOD incorporates a meteorological pre-processor AERMET which allows AERMOD to account for changes in the plume behaviour with height using information on the

surface characteristics of the site. AERMET calculates hourly boundary layer parameters for use by AERMOD, including friction velocity, Monin-Obukhov length, convective velocity scale, temperature scale, convective boundary layer (CBL) height, stable boundary layer (SBL) height, and surface heat flux (see Appendix 9.2); and

- The source and emission data, including stack dimensions, gas volumes and emission temperatures have been incorporated into the model.

#### 9.1.3.2 Terrain

The AERMOD air dispersion model has a terrain pre-processor AERMAP[17] which was used to map the physical environment in detail over the receptor grid. The digital terrain input data used in the AERMAP pre-processor was obtained from SRTM. This data was run to obtain for each receptor point the terrain height and the terrain height scale. The terrain height scale is used in AERMOD to calculate the critical dividing streamline height, Hcrit, for each receptor. The terrain height scale is derived from the Digital Elevation Model (DEM) files in AERMAP by computing the relief height of the DEM point relative to the height of the receptor and determining the slope. If the slope is less than 10%, the program goes to the next DEM point. If the slope is 10% or greater, the controlling hill height is updated if it is higher than the stored hill height.

In areas of complex terrain, AERMOD models the impact of terrain using the concept of the dividing streamline (Hc). As outlined in the AERMOD model formulation[19] a plume embedded in the flow below Hc tends to remain horizontal; it might go around the hill or impact on it. A plume above Hc will ride over the hill. Associated with this is a tendency for the plume to be depressed toward the terrain surface, for the flow to speed up, and for vertical turbulent intensities to increase.

AERMOD model formulation states that the model "captures the effect of flow above and below the dividing streamline by weighting the plume concentration associated with two possible extreme states of the boundary layer (horizontal plume and terrain-following). The relative weighting of the two states depends on: 1) the degree of atmospheric stability; 2) the wind speed; and 3) the plume height relative to terrain. In stable conditions, the horizontal plume "dominates" and is given greater weight while in neutral and unstable conditions, the plume traveling over the terrain is more heavily weighted"[20].

#### 9.1.3.3 Geophysical Considerations

AERMOD simulates the dispersion process using planetary boundary layer (PBL) scaling theory (USEPA, 2021). PBL depth and the dispersion of pollutants within this layer are influenced by specific surface characteristics such as surface roughness, albedo and the availability of surface moisture. Surface roughness is a measure of the aerodynamic roughness of the surface and is related to the height of the roughness element. Albedo is a measure of the reflectivity of the surface whilst the Bowen ratio is a measure of the availability of surface moisture.

AERMOD incorporates a meteorological pre-processor AERMET[21] to enable the calculation of the appropriate parameters. The AERMET meteorological preprocessor requires the input of surface characteristics, including surface roughness (z0), Bowen Ratio and albedo by sector and season, as well as hourly observations of wind speed, wind direction, cloud cover, and temperature. The values of albedo, Bowen Ratio and surface roughness depend on land-use type (e.g., urban, cultivated land etc) and vary with seasons and wind direction. The assessment of appropriate land-use type was carried out to a distance of 10km from the meteorological station for Bowen Ratio and albedo and to a distance of 1km for surface roughness in line with USEPA recommendations[19] as outlined in Appendix 9.2.
In relation to AERMOD, detailed guidance for calculating the relevant surface parameters has been published[22]. The most pertinent features are:

- The surface characteristics should be those of the meteorological site (Dublin Airport) rather than the installation;
- Surface roughness should use a default 1km radius upwind of the meteorological tower and should be based on an inverse-distance weighted geometric mean. If land use varies around

the site, the land use should be sub-divided by sectors with a minimum sector size of 30°; and

- Bowen ratio and albedo should be based on a 10km grid. The Bowen ratio should be based on an un-weighted geometric mean. The albedo should be based on a simple un-weighted arithmetic mean.

AERMOD has an associated pre-processor, AERSURFACE[19], which has representative values for these parameters depending on land use type. The AERSURFACE pre-processor currently only accepts NLCD92 land use data which covers the USA. Thus, manual input of surface parameters is necessary when modelling in Ireland. Ordnance survey discovery maps (1:50,000) and digital maps such as those provided by the EPA, National Parks and Wildlife Service (NPWS) and Google Earth® are useful in determining the relevant land use in the region of the meteorological station. The Alaska Department of Environmental Conservation has issued a guidance note for the manual calculation of geometric mean for surface roughness and Bowen ratio for use in AERMET[22]. This approach has been applied to the current site with full details provided in Appendix 9.2.

#### 9.1.3.4 Building Downwash

When modelling emissions from an industrial installation, stacks which are relatively short can be subjected to additional turbulence due to the presence of nearby buildings. Buildings are considered nearby if they are within five times the lesser of the building height or maximum projected building width (but not greater than 800m).

The USEPA has defined the "Good Engineering Practice" (GEP) stack height as the building height plus 1.5 times the lesser of the building height or maximum projected building width. It is generally considered unlikely that building downwash will occur when stacks are at or greater than GEP[23].

When stacks are less than this height, building downwash will tend to occur. As the wind approaches a building it is forced upwards and around the building leading to the formation of turbulent eddies. In the lee of the building these eddies will lead to downward mixing (reduced plume centreline and reduced plume rise) and the creation of a cavity zone (near wake) where re-circulation of the air can occur. Plumes released from short stacks may be entrained in this airflow leading to higher ground level concentrations than in the absence of the building.

The Plume Rise Model Enhancements (PRIME)[24],[25] plume rise and building downwash algorithms, which calculates the impact of buildings on plume rise and dispersion, have been incorporated into AERMOD. The building input processor BPIP-PRIME produces the parameters which are required in order to run PRIME. The model takes into account the position of each stack relative to each relevant building and the projected shape of each building for 36 wind directions (at 10° intervals). The model determines the change in plume centreline location with downwind distance based on the slope of the mean streamlines and coupled to a numerical plume rise model[24].

Given that most stacks onsite are less than 2.5 times the lesser of the building height or maximum projected building width, building downwash will need to be taken into account and the PRIME algorithm run prior to modelling with AERMOD. The dominant building may change as the wind direction changes for each of the 36 wind directions. The dominant building for each relevant stack will vary as a function of wind direction and relative building heights.

#### 9.1.3.5 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 further detail in Chapter 4 (Project Description). The details of the construction and operation of the development in terms of air quality and climate are 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

The information used in the dispersion model for the normal operations of the gas turbine and the emergency operations of the turbine running on liquid fuel is shown in Table 9.2. Information on the gas turbine to be used at the power generation facility was provided by the engine supplier. Information on the Huntstown Power Company Ltd and Energia Power Generation Ltd IE Licensed facilities in the area has been taken from their IE Licences (P0483-04 and P0777-02). For the purposes of this assessment all plants were assumed to be operating at full load continuously all year round.

**Table 9.2 Process Emission Characteristics Used In The Air Modelling**

| Parameter | Emission Details | | | | | |
|---|---|---|---|---|---|---|
| Process | Normal operations (turbine running on natural gas) | Testing of turbine (liquid fuel mode) | Emergency operations (turbine running on liquid fuel for 100 hours per year) | E1 (Hunts-town Power) | E2 (Hunts-town Power) | E3 (Energia Power) |
| Stack Location (UTM Zone 29) | 677422 E, 5922495 N | 677422 E, 5922495 N | 677422 E, 5922495 N | 677732 E, 5921512 N | 677747 E, 5921551 N | 677736 E, 5921395 N |
| Height above Ground (m) | 28 | 28 | 28 | 34.5 | 34.5 | 34.5 |
| Exit Diameter (m) | 6.7 | 6.7 | 6.7 | 7 | 7 | 7 |
| Cross-sectional Area ($m^2$) | 35.3 | 35.3 | 35.3 | 38.5 | 38.5 | 38.5 |
| Temperature (K) | 855.95 | 837.55 | 837.55 | 853.2 | 853.2 | 853.2 |
| Max Volume Flow ($Nm^3/hr$) | 2,348,699 | 2,470,228 | 2,470,228 | 2,250,000 | 2,250,000 | 2,800,000 |
| Exit Velocity (m/sec actual) | 43.5 | 43.2 | 43.2 | 36.3 | 36.3 | 45.0 |
| $NO_X$ Conc. ($mg/Nm^3$) | 35 | 250 | 250 | 50 | 50 | 50 |
| $NO_X$ Mass Emission (g/s) | 22.835 | 816.815 | 9.324 | 31.366 | 31.366 | 38.889 |
| CO Conc. ($mg/Nm^3$) | 40 | 24 | 24 | n/a | n/a | n/a |
| CO Mass Emission (g/s) | 26.097 | 51.178 | 0.584 | n/a | n/a | n/a |
| $SO_X$ Mass Emission (g/s) | n/a | 0.38 | 0.004 | n/a | n/a | n/a |
| PM Mass Emission (g/s) | n/a | 6.63 | 0.076 | n/a | n/a | n/a |

# 9.3 THE RECEIVING ENVIRONMENT

## 9.3.1 METEOROLOGICAL DATA

The selection of the appropriate meteorological data has followed the guidance issued by the USEPA[20]. A primary requirement is that the data used should have a data capture of greater than 90% for all parameters. Dublin Airport meteorological station, which is located approximately 1 km south of the site, collects data in the correct format and has a data collection of greater than 90%. Long-term hourly observations at Dublin Airport meteorological station provide an indication of the prevailing wind conditions for the region (see Figure 9.1 and Appendix 9.2)[18]. Results indicate that the prevailing wind direction is westerly to south-westerly in direction over the period 2017 - 2021. The mean wind speed was approximately 5.3 m/s over the period 1981 - 2010. Calm conditions account for only a small fraction of the time in any one year peaking at 70 hours in 2018 (0.8% of the time). There are also no missing hours over the period 2017 – 2021. All meteorological data used in this assessment is provided by Met Eireann[18].


**Figure 9.1 Dublin Airport Windrose 2017 – 2021**

# 9.4 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.

**$NO_2$**

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/m³ in 2019 (see Table 9.3). 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/m³. Based on these results, an estimate of the current background $NO_2$ concentration in the region of the facility is 17 µg/m³.

**Table 9.3 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.

**PM10**

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 9.4), 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 9.4 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)

### PM2.5

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 2015 – 2019 period, with a $PM_{2.5}/PM_{10}$ ratio ranging from 0.60 – 0.68. Based on this information, a conservative ratio of 0.7 was used to generate a background $PM_{2.5}$ concentration in the region of the development of 10.5 $\mu g/m^3$.

### CO

Continuous CO monitoring carried out at one Zone A location at Winetavern St in 2019[27] showed an annual mean concentration of 0.3 $\mu g/m^3$. Long-term data for the period 2015 – 2019 for Winetavern St and Coleraine St shows that concentrations range from 0.1 – 0.5 $\mu g/m^3$. Based on this EPA data, an estimate of the background $PM_{10}$ concentration in the region of the facility is 0.5 $\mu g/m^3$.

### SO2

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 TableTable 9.5). 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 99.7$^{th}$%ile of 1-hour means for Winetavern Street, Rathmines, Tallaght and Ringsend in 2019 was 32 $\mu g/m^3$ whilst the average 99.2$^{th}$%ile of 24-hour means in 2019 was 6.9 $\mu g/m^3$.

**Table 9.5 Annual Mean and 99.8$^{th}$ Percentile 1-Hour $NO_2$ Concentrations In Zone A Locations ($\mu g/m^3$)**

| Station | Averaging Period | Year | | | | |
|---|---|---|---|---|---|---|
| | | 2015 | 2016 | 2017 | 2018 | 2019 |
| Winetavern Street | Annual Mean $SO_2$ ($\mu g/m^3$)Note 1 | 1.0 | 0.2 | - | 0.7 | 0.8 |
| | 99.7th%ile of 1-hour mean $SO_2$ ($\mu g/m^3$)Note 2 | 20.0 | 10.2 | 5.8 | 21.0 | 37.2 |
| | 99.2th%ile of 24-hour mean $SO_2$ ($\mu g/m^3$)Note 3 | 6.0 | 3.9 | 1.4 | 7.0 | 6.1 |
| Coleraine Street | Annual Mean $SO_2$ ($\mu g/m^3$) | 0.3 | 0.6 | 0.1 | - | - |
| | 99.7th%ile of 1-hour mean $SO_2$ ($\mu g/m^3$) | 17.0 | 13.8 | 34.2 | - | - |
| | 99.2th%ile of 24-hour mean $SO_2$ ($\mu g/m^3$) | 7.0 | 4.0 | 9.2 | - | - |
| Rathmines | Annual Mean $SO_2$ ($\mu g/m^3$) | 2.0 | 1.7 | 1.7 | 2.3 | 1.3 |
| | 99.7th%ile of 1-hour mean $SO_2$ ($\mu g/m^3$) | 27.0 | 26.6 | 29.5 | 25.0 | 29.3 |

| Station | Averaging Period | Year | | | | |
|---|---|---|---|---|---|---|
| | | 2015 | 2016 | 2017 | 2018 | 2019 |
| | 99.2th%ile of 24-hour mean $SO_2$ ($\mu g/m^3$) | 10.0 | 7.6 | 12.1 | 8.0 | 4.3 |
| Tallaght | Annual Mean $SO_2$ ($\mu g/m^3$) | 3.0 | 2.4 | 2.2 | 2.2 | 2.5 |
| | 99.7th%ile of 1-hour mean $SO_2$ ($\mu g/m^3$) | 30.0 | 20.7 | 47.6 | 22.0 | 18.6 |
| | 99.2th%ile of 24-hour mean $SO_2$ ($\mu g/m^3$) | 17.0 | 10.0 | 16.0 | 9.0 | 10.4 |
| Ringsend | Annual Mean $SO_2$ ($\mu g/m^3$) | - | - | 4.3 | 3.3 | 1.4 |
| | 99.7th%ile of 1-hour mean $SO_2$ ($\mu g/m^3$) | - | - | 50.0 | 51.0 | 42.8 |
| | 99.2th%ile of 24-hour mean $SO_2$ ($\mu g/m^3$) | - | - | 14.0 | 20.0 | 6.9 |

Note 1 Annual average limit value of 20 $\mu g/m^3$ (EU Council Directive 2008/50/EC & S.I. No. 180 of 2011)

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

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 99.2$^{th}$%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 99.7$^{th}$%ile of total 1-hour $SO_2$ is equal to the maximum of either A or B below:

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

### 9.4.1 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 9.6.

**Table 9.6 Sensitivity of the Area to Dust Soiling Effects on People and Property[14]**

| 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 |

| Receptor Sensitivity | Number of Receptors | Distance from source (m) | | | |
|---|---|---|---|---|---|
| | | <20 | <50 | <100 | <350 |
| 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 $\mu g/m^3$ 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 9.7, the worst case sensitivity of the area to human health is considered to be low.

**Table 9.7 Sensitivity of the Area to Human Health Impacts[14]**

| Receptor Sensitivity | Annual Mean $PM_{10}$ Concentration | Number of Receptors | Distance from source (m) | | | |
|---|---|---|---|---|---|---|
| | | | <20 | <50 | <100 | <350 |
| High | < 24 µg/m³ | >100 | Medium | Low | Low | Low |
| | | 10-100 | Low | Low | Low | Low |
| | | 1-10 | Low | Low | Low | Low |
| Medium | < 24 µg/m³ | >10 | Low | Low | Low | Low |
| | | 1-10 | Low | Low | Low | Low |
| Low | < 24 µg/m³ | >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.

### 9.4.2 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[29]. 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 $CO_2$eq) with 45.58 Mt$CO_2$eq 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 Mt$CO_2$eq, 2.94 Mt$CO_2$eq, 5.57 Mt$CO_2$eq, 6.98 Mt$CO_2$eq and 6.73 Mt$CO_2$eq 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 2019. 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 12.2Mt$CO_2$eq 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 2019 Climate Action Plan and the use of the flexibilities available.

# 9.5 PREDICTED EFFECTS

## 9.5.1 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.).

## 9.5.2 CONSTRUCTION PHASE

### 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 (see Section 9.3.1) 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. 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[18] 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 9.4.1, 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 9.8, 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 9.8 Risk of Dust Impacts – Earthworks**

| 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 9.9, 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 9.9 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 9.10, 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 9.10 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 9.11 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 9.11 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 9.6.1) 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. It can therefore be determined that the construction stage traffic will have an imperceptible, neutral and short-term impact on air quality.

### 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.

### 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 Table 9.7 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 9.11). 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.

**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.

### 9.5.3 OPERATIONAL PHASE

**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.

**$NO_2$**

The $NO_2$ modelling results are detailed in Table 9.12. The results indicate that the ambient ground level concentrations are below the relevant air quality standards for $NO_2$. Emissions from the existing and proposed emission points lead to an ambient $NO_2$ concentration (including background) which is 37% of the maximum ambient 1-hour limit value (measured as a 99.8$^{th}$%ile) and 41% of the annual limit value at the worst-case receptor (see Figure 9.2 and Figure 9.3). The locations of the maximum concentrations for $NO_2$ are close to the boundary of the site with concentrations decreasing with distance from the facility.

**Table 9.12 Dispersion Model Results for Nitrogen Dioxide ($NO_2$)**

| Pollutant/ Year | Averaging Period | Process Contribution $NO_2$ ($\mu g/m^3$) | Background Concentration ($\mu g/m^3$) | Predicted Environmental Concentration $NO_2$ ($\mu g/m^3$) | Limit Value ($\mu g/m^3$) Note 1 | PEC as a % of Limit Value |
|---|---|---|---|---|---|---|
| $NO_2$ / 2017 | Annual Mean | 0.2 | 16 | 16.2 | 40 | 40% |
| | 99.8$^{th}$%ile of 1-hr means | 21.0 | 32 | 53.0 | 200 | 26% |
| $NO_2$ / 2018 | Annual Mean | 0.4 | 16 | 16.4 | 40 | 41% |
| | 99.8$^{th}$%ile of 1-hr means | 41.9 | 32 | 73.9 | 200 | 37% |
| $NO_2$ / 2019 | Annual Mean | 0.1 | 16 | 16.1 | 40 | 40% |
| | 99.8$^{th}$%ile of 1-hr means | 9.8 | 32 | 41.8 | 200 | 21% |
| $NO_2$ / 2020 | Annual Mean | 0.2 | 16 | 16.2 | 40 | 40% |
| | 99.8$^{th}$%ile of 1-hr means | 11.3 | 32 | 43.3 | 200 | 22% |
| $NO_2$ / 2021 | Annual Mean | 0.3 | 16 | 16.3 | 40 | 41% |
| | 99.8$^{th}$%ile of 1-hr means | 27.8 | 32 | 59.8 | 200 | 30% |

Note 1 Air Quality Standards 2011 (from EU Directive 2008/50/EC and S.I. 180 of 2011).

### CO

The CO modelling results are detailed in Table 9.13. The results indicate that the ambient ground level concentrations are below the relevant air quality standards for CO. Emissions from the existing and proposed emission points lead to an ambient CO concentration (including background) which is 9% of the ambient 8-hour limit value (see Figure 9.4)

**Table 9.13 Dispersion Model Results for Carbon Monoxide (CO)**

| Pollutant/ Year | Averaging Period | Process Contribution CO ($\mu g/m^3$) | Background Concentration ($\mu g/m^3$) | Predicted Environmental Concentration CO ($\mu g/m^3$) | Limit Value ($\mu g/m^3$) Note 1 | PEC as a % of Limit Value |
|---|---|---|---|---|---|---|
| CO / 2017 | Maximum Daily 8-Hour Mean | 0.14 | 0.5 | 0.6 | 10 | 6% |
| CO / 2018 | Maximum Daily 8-Hour Mean | 0.40 | 0.5 | 0.9 | 10 | 9% |
| CO / 2019 | Maximum Daily 8-Hour Mean | 0.10 | 0.5 | 0.6 | 10 | 6% |
| CO / 2020 | Maximum Daily 8-Hour Mean | 0.15 | 0.5 | 0.7 | 10 | 7% |
| CO / 2021 | Maximum Daily 8-Hour Mean | 0.25 | 0.5 | 0.8 | 10 | 8% |

Note 1 Air Quality Standards 2011 (from EU Directive 2008/50/EC and S.I. 180 of 2011).

### $SO_2$

The $SO_2$ modelling results at the worst-case off-site receptor are detailed in Table 9.14. The results indicate that the ambient ground level concentrations are in compliance with the relevant air quality standards for $SO_2$. Emissions from the facility lead to an ambient $SO_2$ concentration (including background) which is 3% of the maximum 1-hour limit value (measured as a 99.7$^{th}$%ile) and 8% of the maximum 24-hour limit value (measured as a 99.2$^{th}$%ile) at the worst-case off-site receptor (see Figure 9.5 and Figure 9.6) for the worst-case year modelled (2018). The locations of the maximum concentrations for $SO_2$ are close to the boundary of the site with concentrations decreasing with distance from the facility.

**Table 9.14 Dispersion Model Results for Sulphur Dioxide ($SO_2$)**

| Pollutant/ Year | Averaging Period | Process Contribution $SO_2$ ($\mu g/m^3$) | Background Concentration ($\mu g/m^3$) | Predicted Environmental | Limit Value | PEC as a % of |
|---|---|---|---|---|---|---|

| | | | | Concentration $SO_2$ (µg/m³) | (µg/m³) Note 1 | Limit Value |
|---|---|---|---|---|---|---|
| $SO_2$ / 2017 | 99.7th%ile of 1-hr means | 0.003 | 10 | 10.003 | 350 | 3% |
| | 99.2th%ile of 24-hr means | 0.001 | 10 | 10.001 | 125 | 8% |
| $SO_2$ / 2018 | 99.7th%ile of 1-hr means | 0.006 | 10 | 10.006 | 350 | 3% |
| | 99.2th%ile of 24-hr means | 0.003 | 10 | 10.003 | 125 | 8% |
| $SO_2$ / 2019 | 99.7th%ile of 1-hr means | 0.002 | 10 | 10.002 | 350 | 3% |
| | 99.2th%ile of 24-hr means | 0.001 | 10 | 10.001 | 125 | 8% |
| $SO_2$ / 2020 | 99.7th%ile of 1-hr means | 0.003 | 10 | 10.003 | 350 | 3% |
| | 99.2th%ile of 24-hr means | 0.001 | 10 | 10.001 | 125 | 8% |
| $SO_2$ / 2021 | 99.7th%ile of 1-hr means | 0.004 | 10 | 10.004 | 350 | 3% |
| | 99.2th%ile of 24-hr means | 0.002 | 10 | 10.002 | 125 | 8% |

Note 1 Air Quality Standards 2011 (from EU Directive 2008/50/EC and S.I. 180 of 2011).

**$PM_{10}$**

The $PM_{10}$ modelling results are detailed in Table 9.15. The results indicate that the ambient ground level concentrations are below the relevant air quality standards for $PM_{10}$. Emissions from the existing and proposed emission points lead to an ambient $PM_{10}$ concentration (including background) which is 30% of the maximum ambient 1-hour limit value (measured as a 90.4th%ile) and 38% of the annual limit value at the worst-case receptor (see Figure 9.7 and Figure 9.8).

**Table 9.15 Dispersion Model Results for Particulate Matter ($PM_{10}$)**

| Pollutant/ Year | Averaging Period | Process Contribution $PM_{10}$ (µg/m³) | Background Concentration (µg/m³) | Predicted Environmental Concentration $PM_{10}$ (µg/m³) | Limit Value (µg/m³) Note 1 | PEC as a % of Limit Value |
|---|---|---|---|---|---|---|
| $PM_{10}$ / 2017 | Annual Mean | 0.001 | 15 | 15.001 | 40 | 38% |
| | 90.4th%ile of 24-hr Mean | 0.002 | 15 | 15.002 | 50 | 30% |
| $PM_{10}$ / 2018 | Annual Mean | 0.001 | 15 | 15.001 | 40 | 38% |
| | 90.4th%ile of 24-hr Mean | 0.002 | 15 | 15.002 | 50 | 30% |
| $PM_{10}$ / 2019 | Annual Mean | 0.001 | 15 | 15.001 | 40 | 38% |
| | 90.4th%ile of 24-hr Mean | 0.001 | 15 | 15.001 | 50 | 30% |
| $PM_{10}$ / 2020 | Annual Mean | 0.001 | 15 | 15.001 | 40 | 38% |
| | 90.4th%ile of 24-hr Mean | 0.001 | 15 | 15.001 | 50 | 30% |
| $PM_{10}$ / 2021 | Annual Mean | 0.001 | 15 | 15.001 | 40 | 38% |
| | 90.4th%ile of 24-hr Mean | 0.001 | 15 | 15.001 | 50 | 30% |

Note 1 Air Quality Standards 2011 (from EU Directive 2008/50/EC and S.I. 180 of 2011).

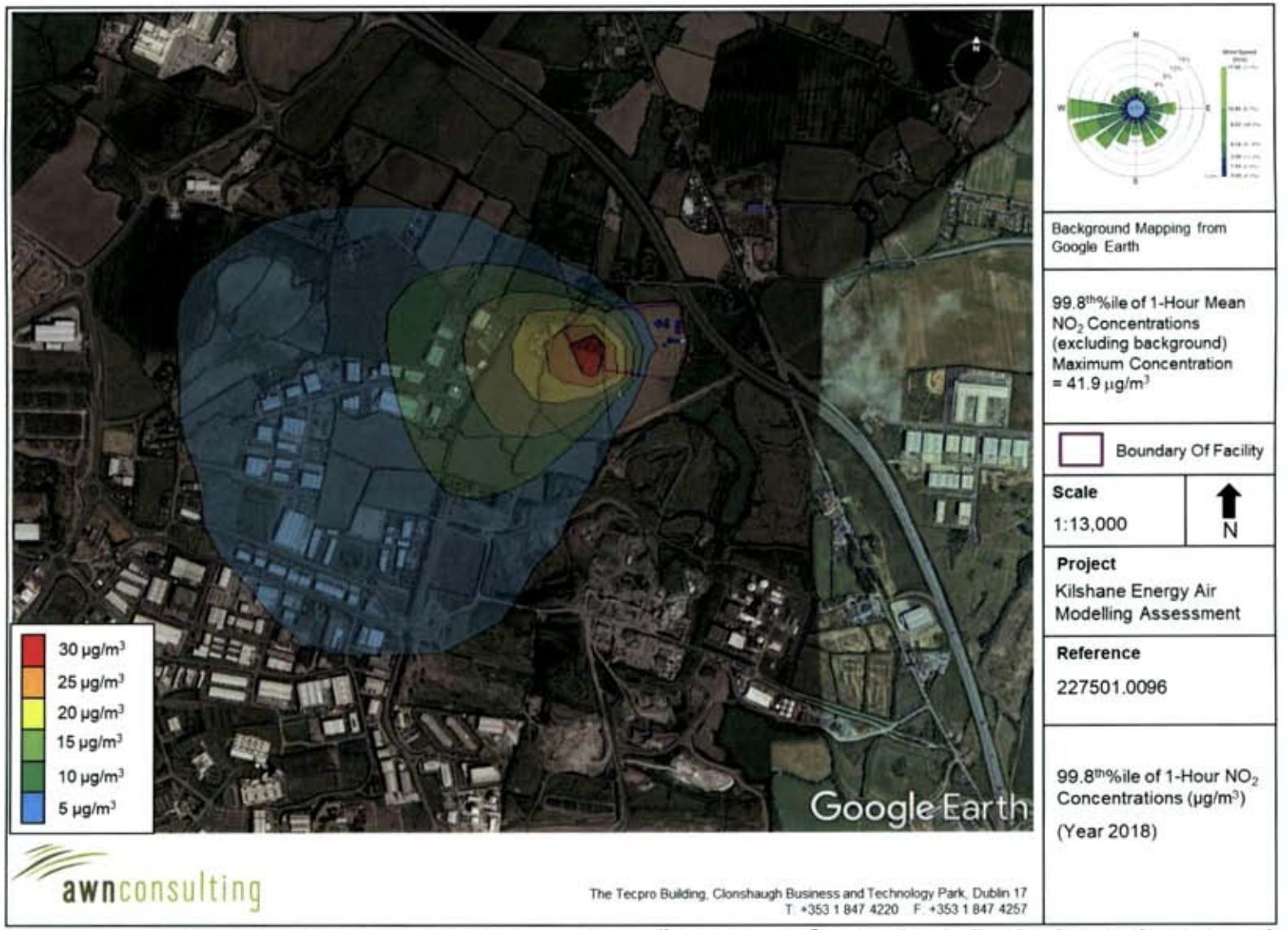


**Figure 9.2 Maximum 1-Hour $NO_2$ Concentrations (as 99.9$^{th}$%ile) (µg/m$^3$) 2018 (excluding background concentrations)**

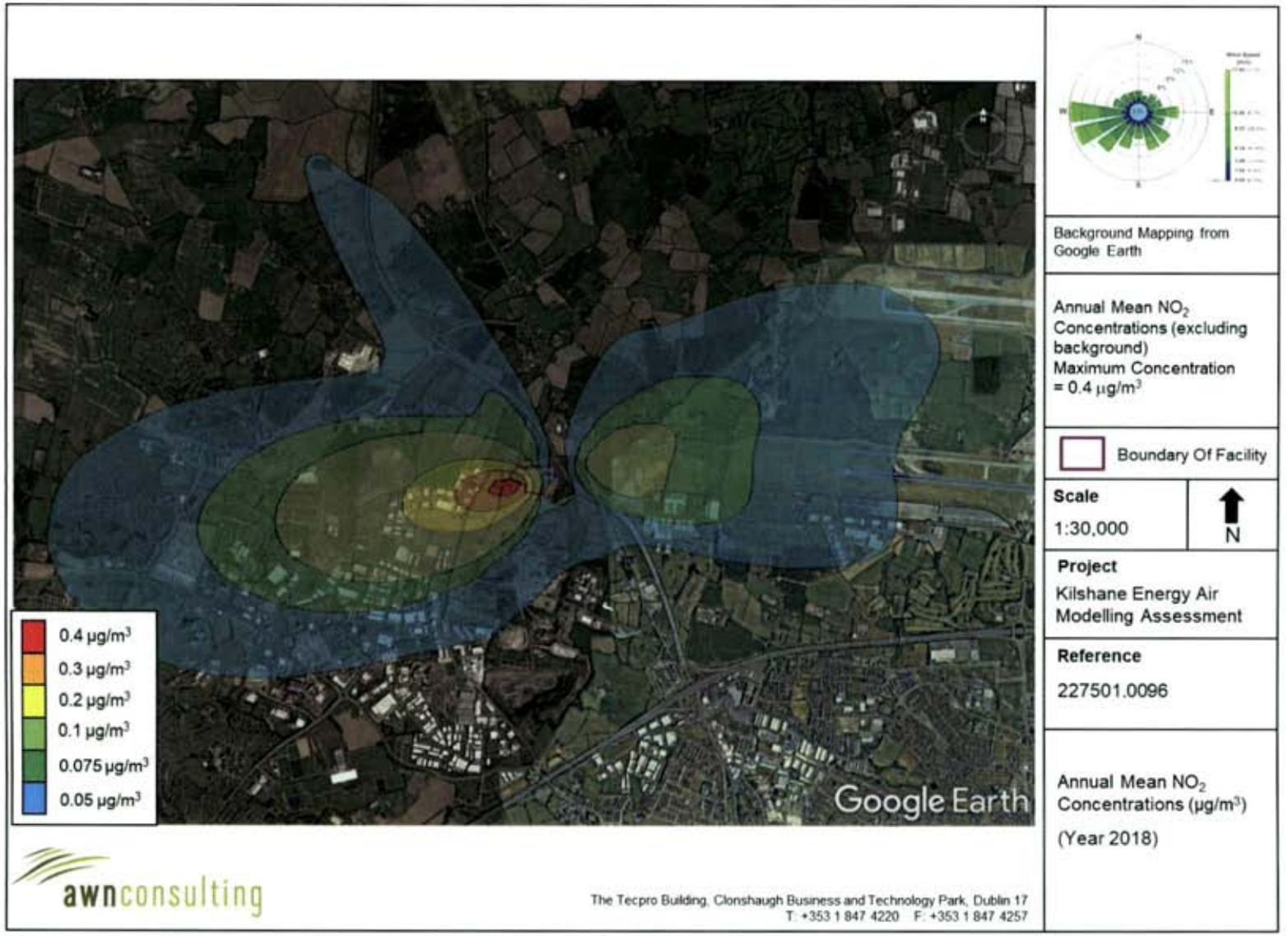


**Figure 9.3 Annual Mean $NO_2$ Concentrations (µg/m³) 2018 (excluding background concentrations)**

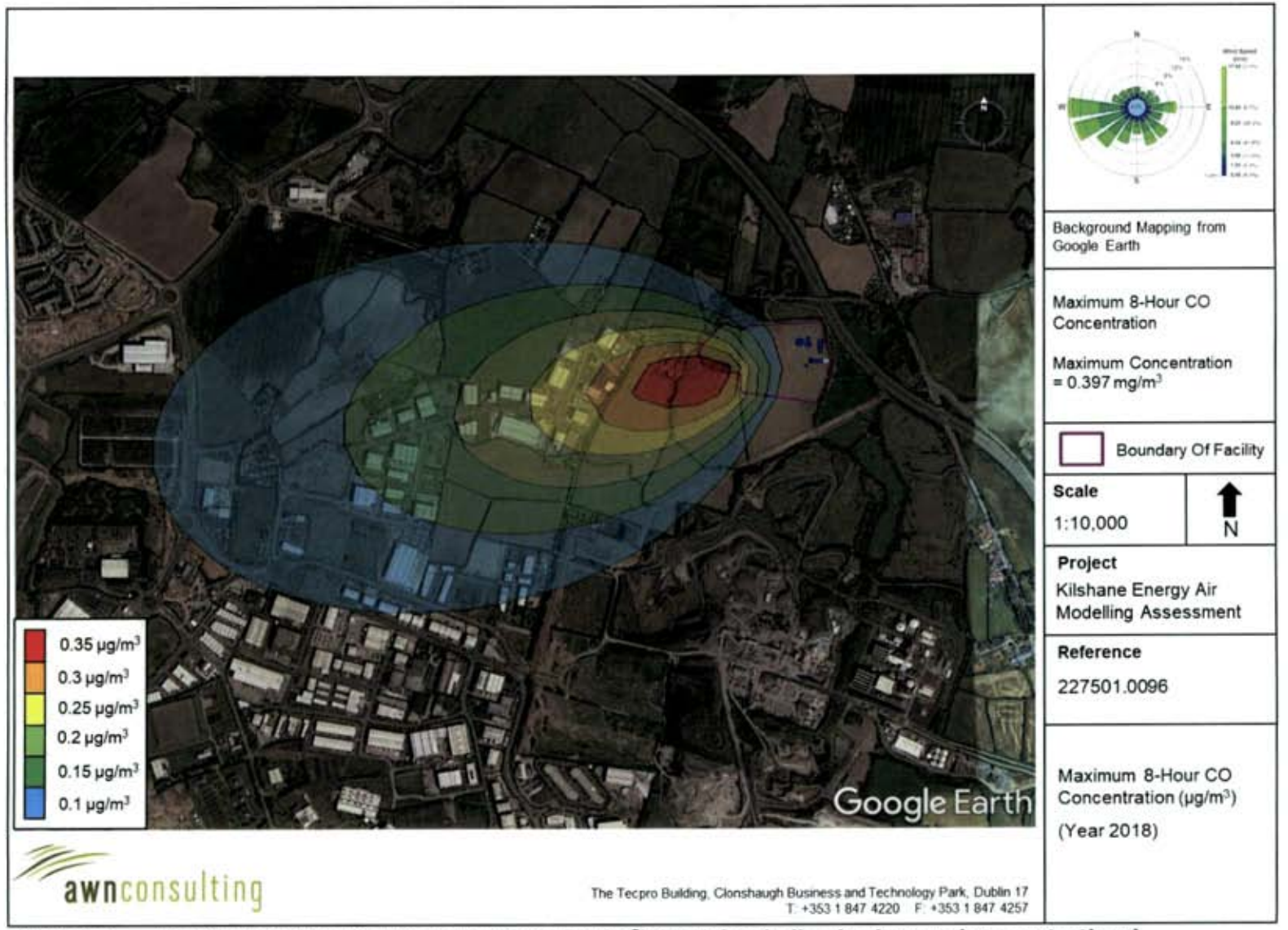


**Figure 9.4 Maximum 8-Hour CO Concentrations (µg/m³) 2018 (excluding background concentrations)**

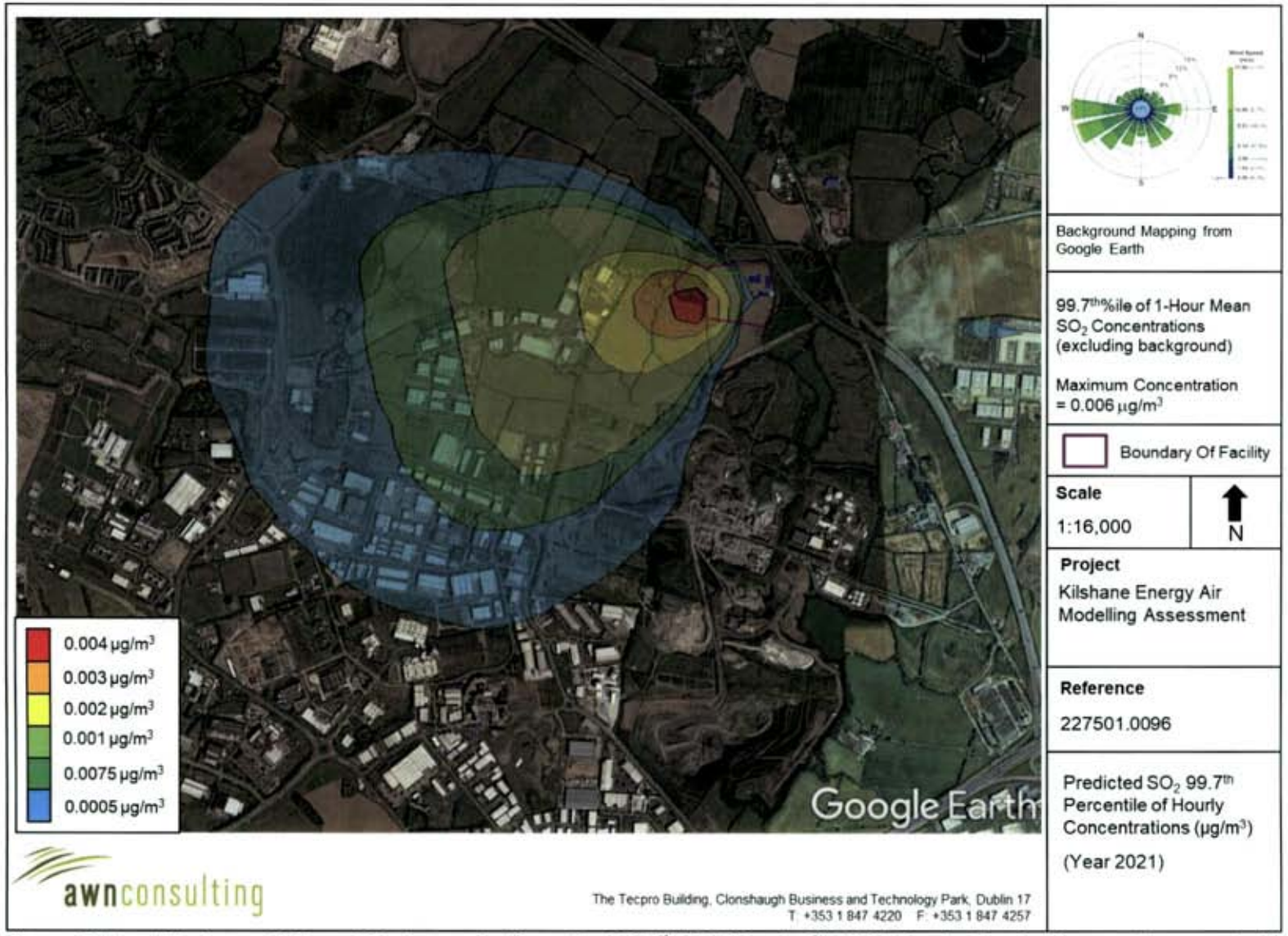


**Figure 9.5 Maximum 1-Hour $SO_2$ Concentrations (as 99.7$^{th}$%ile) (µg/m$^3$) 2021 (excluding background concentrations)**

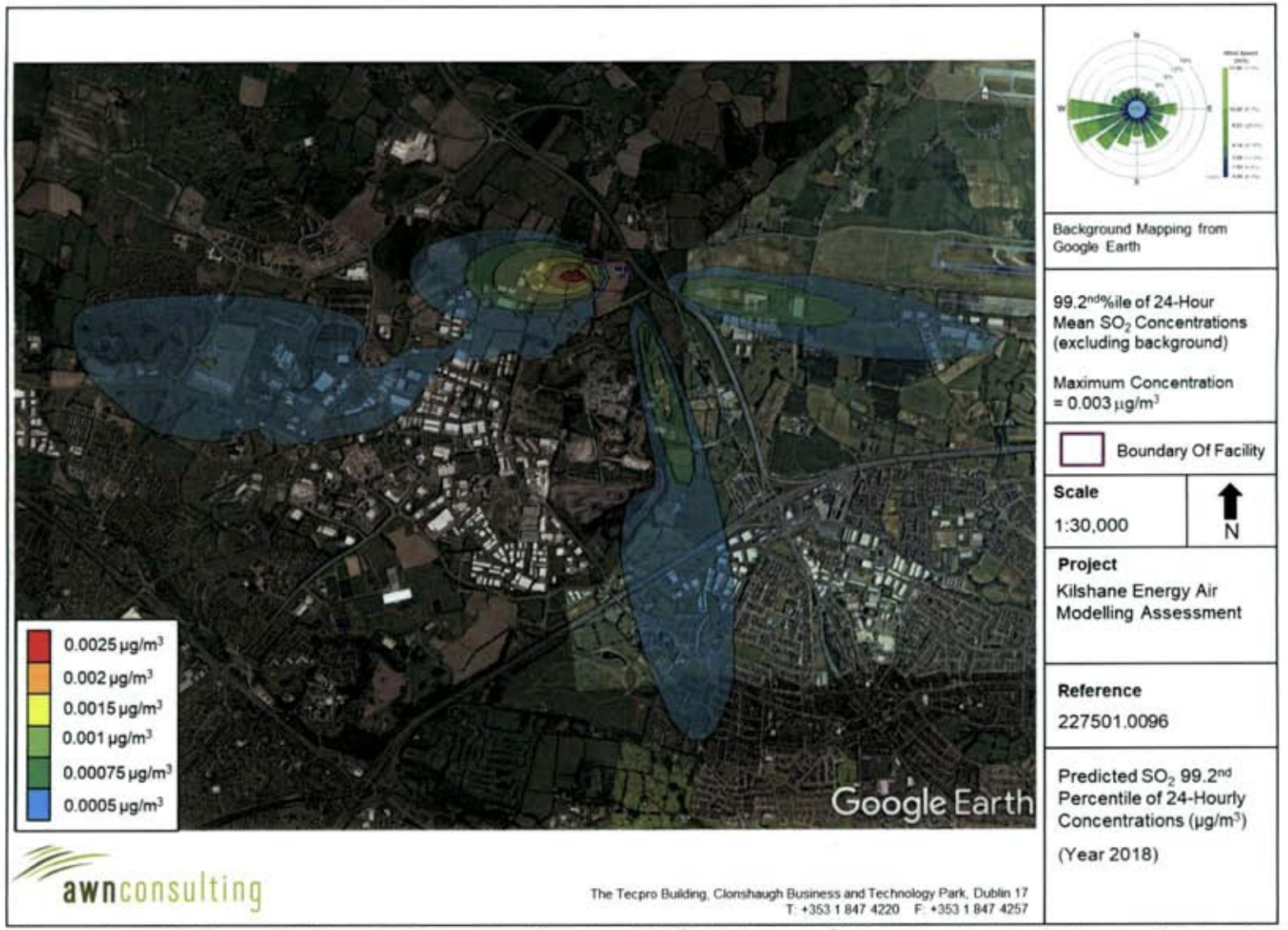


**Figure 9.6 Maximum 24-Hour $SO_2$ Concentrations (as 99.2$^{th}$%ile) (µg/m$^3$) 2018 (excluding background concentrations)**

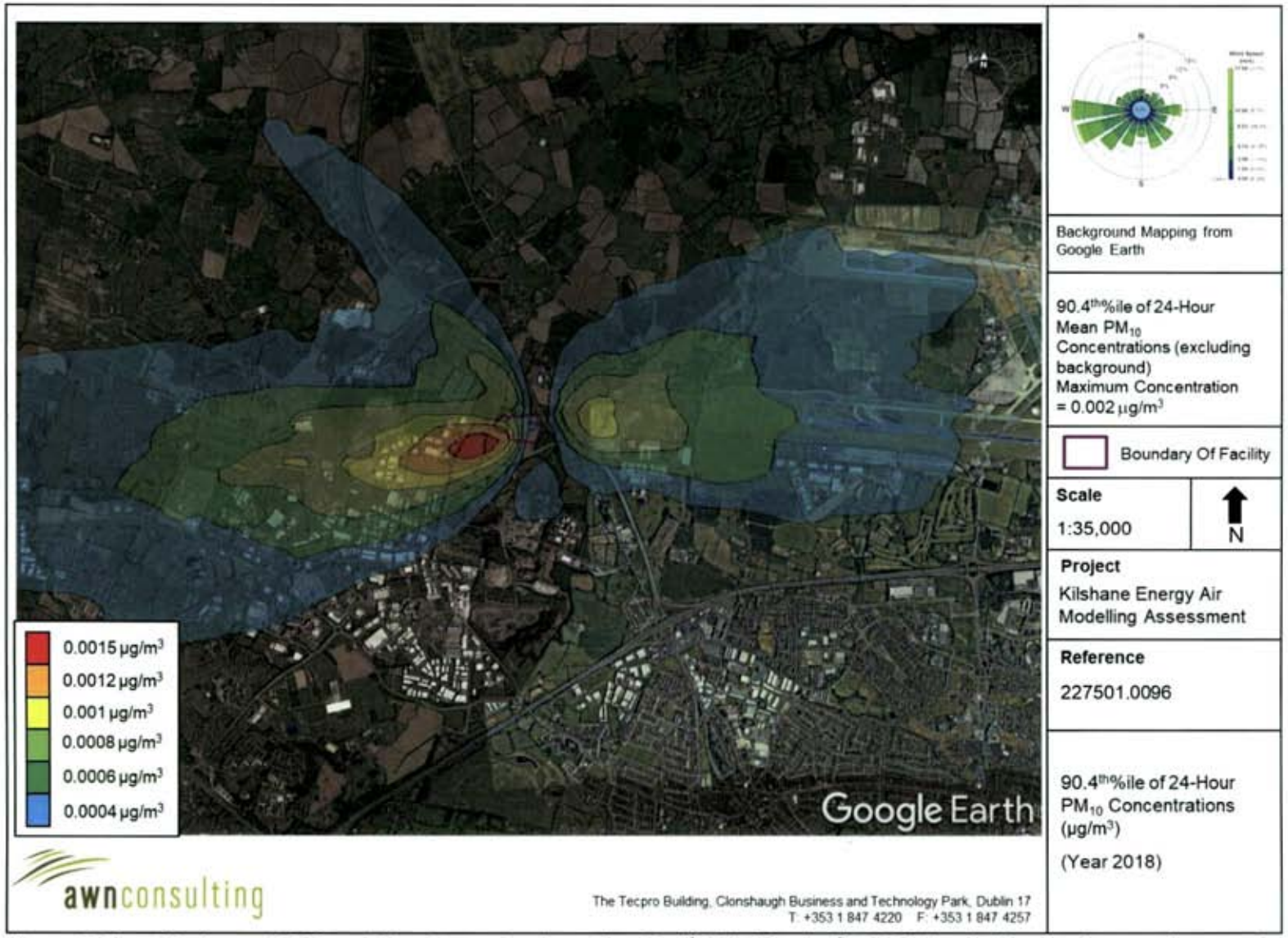


**Figure 9.7 Maximum 24-Hour $PM_{10}$ Concentrations (as 90.4$^{th}$%ile) (µg/m$^3$) 2021 (excluding background concentrations)**

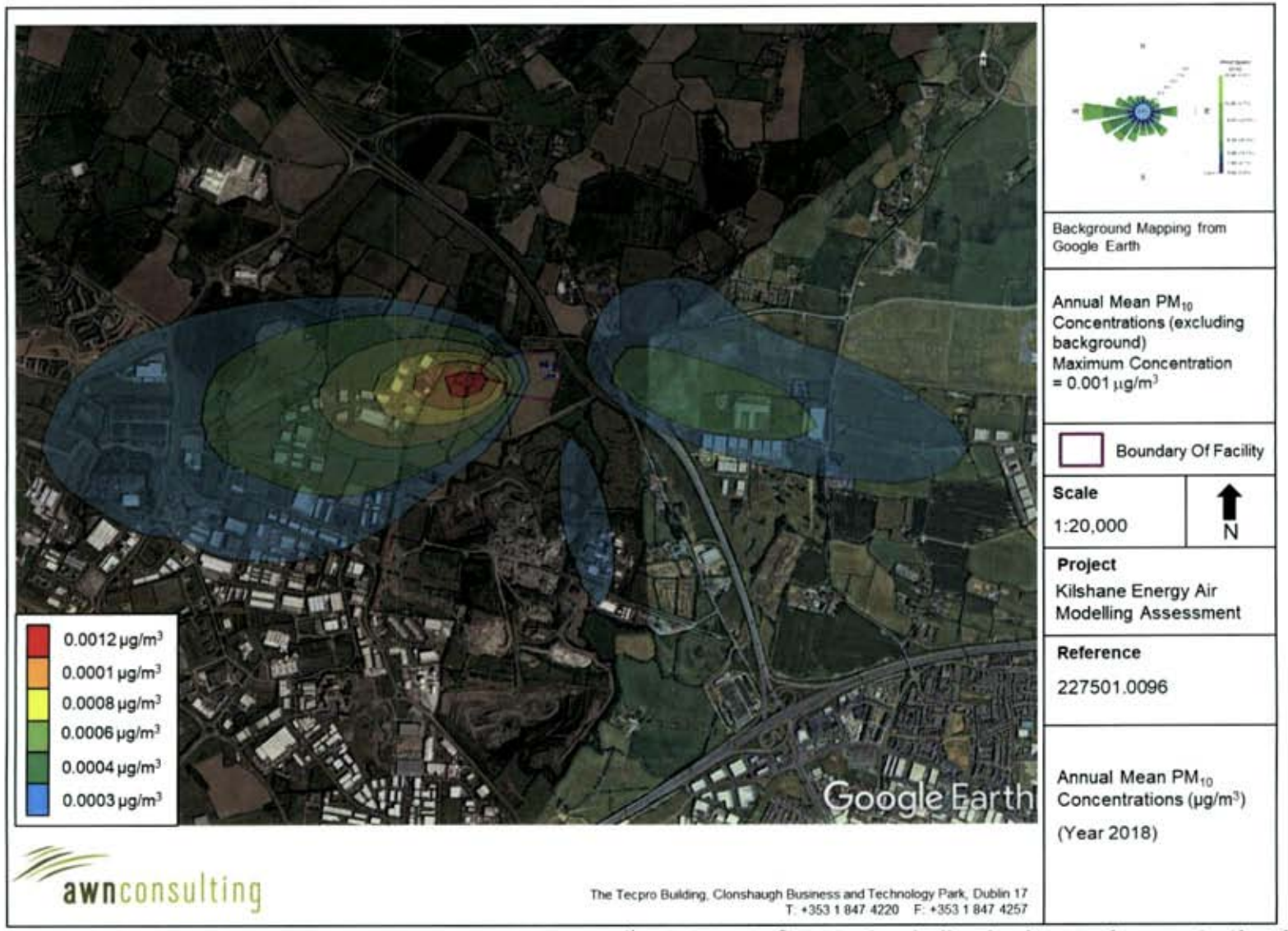


**Figure 9.8 Annual Mean $PM_{10}$ Concentrations (as 99.7$^{th}$%ile) (µg/m³) 2021 (excluding background concentrations)**

Summary of Modelling Assessment

The results of the modelling assessment based on the proposed development have found that ambient concentrations of $NO_2$, 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[1] the impacts of the prosed development on air quality are predicted to be long-term, negative and imperceptible.

**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.

The direct $CO_2$ emissions from electricity to operate the facility will not be significant in relation to Ireland's national annual $CO_2$ emissions. The Sustainable Energy Authority of Ireland[35] states on its website that the average $CO_2$ emission factor for electricity generated from natural gas in Ireland was 202.2 $gCO_2/kWh$ in 2020. On the basis that the proposed power generation facility will generate a maximum of 293 MW of electricity using natural gas, which equates to 2,515 GWh annually. This translates to approximately 508,603 tonnes of $CO_2eq$ per year. This scenario assumes that the facility will operate for 98% of the year, with a approx. 2% maintenance time. However, as described in Ch 4 - Project Description and Appendix 9.3 *("A comparison of future carbon emissions within the SEM with and without the Kilshane GT")*, the facility is forecast to operate considerably less than this with a projected annual average of 46 hours.

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 tones $CO_2eq$) 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 $CO_2$eq, the impact of the emissions associated with the proposed development will be less than 0.1% of the total EU-wide ETS market which will have a direct, long-term, negative and slight impact on climate.

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 $CO_2$eq 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 2019 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 0.4% of the total EU-wide ETS market which is not significant and thus an EU-wide cumulative assessment is not merited. Appendix 9.3 *("A comparison of future carbon emissions within the SEM with and without the Kilshane GT")* describes the impact of the facility on the carbon emissions associated with the Single Electricity Market (SEM). It estimates a reduction on average of 10kt $CO_2$ by 2040, as the facility is expected to replaced higher emitting power plants, particularly oil fired units.

**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.

A maximum of 293 MW electricity will be generated by the power generation facility using natural gas. The $NO_X$ emissions associated with this electricity over the course of one year (i.e. 2,515 GWh based on 293 MW for 8,585 hours per annum) will equate to 723 tonnes per annum which is 1.1% of the National Emission Ceiling limit for Ireland from 2020 onwards. Similarly, $SO_2$ emissions associated this electricity over the course of one year (2,515 GWh) will equate to 197 tonnes per annum which is

0.5% of the National Emission Ceiling limit for Ireland from 2020. Additionally, NMVOC emissions associated the natural gas usage over the course of one year (2,515 GWh) will equate to 1,038 tonnes per annum which is 1.9% of the National Emission Ceiling limit for Ireland from 2020. Thus, the $NO_X$, $SO_2$ and NMVOC direct emissions associated with the operation of the proposed power generation facility are direct, long-term, negative and slight with regards to regional air quality.

**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.

**Sensitive Ecosystems**

The potential impact to sensitive ecosystems 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 Proposed Development.

The impact of emissions of $NO_X$ within 20 km of the Proposed Development and existing emission points on ambient ground level concentrations within the following designated habitat sites was assessed using AERMOD. The 20km distance was selected based on maximum extent of the impact zone from the air emissions onsite. After 20km, the ambient air concentration of $NO_X$ due to emissions from the facility are imperceptible.

- **Proposed Natural Heritage Areas (pNHA)** – Baldoyle Bay pNHA, Bog Of The Ring pNHA, Booterstown Marsh pNHA, Dalkey Coastal Zone And Killiney Hill pNHA, Dodder Valley pNHA, Dolphins, Dublin Docks pNHA, Feltrim Hill pNHA, Fitzsimon's Wood pNHA, Glenasmole Valley pNHA, Grand Canal pNHA, Howth Head pNHA, Ireland's Eye pNHA, Knock Lake pNHA, Liffey Valley pNHA, Lugmore Glen pNHA, Malahide Estuary pNHA, North Dublin Bay pNHA, Portraine Shore pNHA, Rogerstown Estuary pNHA, Royal Canal pNHA, Rye Water Valley/Carton pNHA, Santry Demesne pNHA, Slade Of Saggart And Crooksling Glen pNHA, Sluice River Marsh pNHA, South Dublin Bay pNHA,; and
- **Special Areas of Conservation (SAC)** – Baldoyle Bay SAC, Glenasmole Valley SAC, Howth Head SAC, Ireland's Eye SAC, Malahide Estuary SAC, North Dublin Bay SAC, Rockabill to Dalkey Island SAC, Rogerstown Estuary SAC, Rye Water Valley/Carton SAC and South Dublin Bay SAC.

An annual limit value of 30 $\mu g/m^3$ for $NO_X$ is specified within EU Directive 2008/50/EC for the protection of ecosystems. The $NO_X$ limit value is applicable only in highly rural areas away from major sources of $NO_X$ such as large conurbations, factories and high road vehicle activity such as a dual carriageway or motorway. Annex III of EU Directive 2008/50/EC identifies that monitoring to demonstrate compliance with the $NO_X$ limit value for the protection of vegetation should be carried out distances greater than:

- 5 km from the nearest motorway or dual carriageway;
- 5 km from the nearest major industrial installation;
- 20 km from a major urban conurbation.

There are sections of designated sites which are near the Proposed Development that are within an urban setting, so the limit value for $NO_x$ for the protection of ecosystems is not technically applicable at these sites. Regardless, the annual average concentrations for $NO_x$ from all emission points at the Proposed Development were predicted at receptors within the designated sites for all five years of meteorological data modelled (2017 – 2021). The receptor spacing ranged from 25 m to 100 m with 1,677 discrete receptors modelled in total within the sensitive ecosystems.

The $NO_x$ modelling results are detailed in Table Table 9.12. Emissions from the facility lead to an ambient $NO_x$ concentration (excluding background) which ranges from 0.12 – 0.15% of the annual limit value at the worst-case location within the designated sites over the five years of meteorological data modelled. In addition, modelling results based on conservative assumptions indicate that the Proposed Development including background concentrations will contribute at most 63% of the limit value at the worst-case location in the worst-case year modelled.

**Table 9.16 NOx Dispersion Model Results at Worst Case Ecological Receptor – Process Contributions Under Normal Operations**

| Pollutant/ Met Year | Averaging Period | Process Contribution (µg/m³) | Annual Mean Background (µg/m³) | Predicted Environmental Concentration (µg/m³) | Standard (µg/m³) | % of Limit Value |
|---|---|---|---|---|---|---|
| $NO_x$/2017 | Annual Mean | 0.04 | 19 | 19.04 | 30 | 63% |
| $NO_x$/2018 | Annual Mean | 0.04 | 19 | 19.04 | 30 | 63% |
| $NO_x$/2019 | Annual Mean | 0.04 | 19 | 19.04 | 30 | 63% |
| $NO_x$/2020 | Annual Mean | 0.04 | 19 | 19.04 | 30 | 63% |
| $NO_x$/2021 | Annual Mean | 0.04 | 19 | 19.04 | 30 | 63% |

Note 1 Air Quality Standards 2011 (from EU Directive 2008/50/EC and S.I. 180 of 2011).

In order to consider the effects of nitrogen deposition owing to emissions from the Proposed Development on the designated habitat sites, the $NO_x$ concentrations determined above in Table 9.24 must be converted firstly into a dry deposition flux using the equation below which is taken from UK Environment Agency publication "AGTAG06 – Technical Guidance On Detailed Modelling Approach For An Appropriate Assessment For Emissions To Air" (UKEA, 2014):

Dry deposition flux (µg/m²/s) = ground-level concentration (µg/m³) x deposition velocity (m/s)

The deposition velocities for $NO_x$ are outlined in AQTAG06 (UKEA, 2014). A deposition velocity of 0.0015 m/s for grassland has been used. The dry deposition flux is then multiplied by a conversion factor of 95.9 (taken from AQTAG06) to convert it to a nitrogen (N) deposition flux (kg/ha/yr).

The N deposition flux for the worst-case year is 0.006 kg/ha/yr and is below the range in worst-case critical loads for the various vegetation types of 5-10 kg/ha/yr (UNECE, 2010). Consultation with the ecologist confirms that the effects of nitrogen deposition on designated sites due to the Proposed Development are not significant.

In accordance with the EPA Guidelines[1] the impact associated the operational phase of the Proposed Development on designated habitat sites is considered long-term, localised, negative and imperceptible.

# 9.6 MITIGATION AND MONITORING MEASURES

## 9.6.1 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.

## 9.6.2 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.

# 9.7 RESIDUAL IMPACTS

Once the mitigation measures outlined in Section 9.6 are implemented, the residual impacts on air quality or climate from the construction of the proposed development will be short-term and imperceptible and for the operational phases of the proposed development will be long-term, negative and ranging from imperceptible to slight.)

# 9.8 CUMULATIVE IMPACT

## 9.8.1 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.

## 9.8.2 OPERATIONAL PHASE

### Air Quality

The cumulative impact of $NO_2$ emissions from proposed normal operations and emissions from existing licenced facilities within 1 km of the proposed facility are detailed in Table 9.17. The results indicate that the ambient ground level concentrations are below the relevant air quality standards for $NO_2$. Emissions from the existing and proposed emission points lead to an ambient $NO_2$ concentration (including background) which is 37% of the maximum ambient 1-hour limit value (measured as a 99.8$^{th}$%ile) and 42% of the annual limit value at the worst-case receptor (see Figure 9.2 and Figure 9.3). The locations of the maximum concentrations for $NO_2$ are close to the boundary of the site with concentrations decreasing with distance from the facility.

In accordance with the EPA Guidelines[1] the impacts to air quality are predicted to be long-term, negative and imperceptible.

**Table 9.17 Dispersion Model Results for Nitrogen Dioxide ($NO_2$) – Cumulative Assessment**

| Pollutant/ Year | Averaging Period | Process Contribution $NO_2$ (µg/m³) | Background Concentration (µg/m³) | Predicted Environmental Concentration $NO_2$ (µg/m³) | Limit Value (µg/m³) Note 1 | PEC as a % of Limit Value |
|---|---|---|---|---|---|---|
| $NO_2$ / 2017 | Annual Mean | 0.4 | 16 | 16.4 | 40 | 41% |
| | 99.8$^{th}$%ile of 1-hr means | 29.5 | 32 | 61.5 | 200 | 31% |
| $NO_2$ / 2018 | Annual Mean | 0.7 | 16 | 16.7 | 40 | 42% |
| | 99.8$^{th}$%ile of 1-hr means | 42.7 | 32 | 74.7 | 200 | 37% |
| $NO_2$ / 2019 | Annual Mean | 0.3 | 16 | 16.3 | 40 | 41% |
| | 99.8$^{th}$%ile of 1-hr means | 26.7 | 32 | 58.7 | 200 | 29% |
| $NO_2$ / 2020 | Annual Mean | 0.4 | 16 | 16.4 | 40 | 41% |
| | 99.8$^{th}$%ile of 1-hr means | 20.6 | 32 | 52.6 | 200 | 26% |
| $NO_2$ / 2021 | Annual Mean | 0.5 | 16 | 16.5 | 40 | 41% |
| | 99.8$^{th}$%ile of 1-hr means | 30.4 | 32 | 62.4 | 200 | 31% |

Note 1 Air Quality Standards 2011 (from EU Directive 2008/50/EC and S.I. 180 of 2011).

**Sensitive Ecosystems**

The $NO_X$ modelling results are detailed in Table 9.18. Emissions from the facility lead to an ambient $NO_X$ concentration (excluding background) which ranges from 0.5 – 3.4% of the annual limit value at the worst-case location within the designated sites over the five years of meteorological data modelled. In addition, modelling results based on conservative assumptions indicate that the Proposed Development including background concentrations will contribute at most 67% of the limit value at the worst-case location in the worst-case year modelled.

**Table 9.18 NOx Dispersion Model Results at Worst Case Ecological Receptor – Process Contributions Under Normal Operations**

| Pollutant/ Met Year | Averaging Period | Process Contribution (µg/m³) | Annual Mean Background (µg/m³) | Predicted Environmental Concentration (µg/m³) | Standard (µg/m³) | % of Limit Value |
|---|---|---|---|---|---|---|
| $NO_X$/2017 | Annual Mean | 0.17 | 19 | 19.17 | 30 | 64% |
| $NO_X$/2018 | Annual Mean | 1.03 | 19 | 20.03 | 30 | 67% |
| $NO_X$/2019 | Annual Mean | 0.18 | 19 | 19.18 | 30 | 64% |
| $NO_X$/2020 | Annual Mean | 0.16 | 19 | 19.16 | 30 | 64% |
| $NO_X$/2021 | Annual Mean | 0.15 | 19 | 19.15 | 30 | 64% |

Note 1 Air Quality Standards 2011 (from EU Directive 2008/50/EC and S.I. 180 of 2011).

The N deposition flux for the worst-case year is 0.148 kg/ha/yr and is below the range in worst-case critical loads for the various vegetation types of 5-10 kg/ha/yr (UNECE, 2010). Consultation with the ecologist confirms that the effects of nitrogen deposition on designated sites due to the Proposed Development are not significant.

In accordance with the EPA Guidelines[1] the impact associated the operational phase of the Proposed Development on designated habitat sites is considered long-term, localised, negative and imperceptible