OCGT Generating Plant
Environmental Report

SSE Generation Ireland Ltd
Planning Support
IE0312377-22-RP-0016, Issue: B

Issue date: 09 Aug 2023

Document Sign Off

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CURRENT ISSUE					
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Print Name	Aoife O'Leary	AINE.MONAGHAN	PAUL.OSULLIVAN	PAUL.OSULLIVAN	
Signature	**Authorised Electronically**				
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PREVIOUS ISSUES							
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IE0312377-22-RP-0017	Rev A	EIA Screening Assessment

Attachment 2 - Predictive Noise Modelling and Impact Assessment Report

PM Deliverable No	Rev No	Deliverable Name
IE0312377-22-RP-0020	Rev A	Predictive Noise Modelling and Impact Assessment Report

Attachment 3 - Geophysical Survey Report

PM Deliverable No	Rev No	Deliverable Name
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Attachment 4 - Air Dispersion Modelling Report

PM Deliverable No	Rev No	Deliverable Name
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PM Deliverable No	Rev No	Deliverable Name
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PM Deliverable No	Rev No	Deliverable Name
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Attachment 8 – LVIA Photomontages

PM Deliverable No	Rev No	Deliverable Name
IE0312377-94-0009	Rev A	LVIA Photomontages

1 Introduction

1.1 Overview

SSE Generation Ireland Ltd. (SSE) propose to construct an Open Cycle Gas Turbine (OCGT) Generating Plant of up to 170 Megawatt (electrical output), to be located at its existing site at Carranstown, Duleek, Co. Meath. The proposed development will be a biofuel fired electrical power generating facility, as further detailed in Section 2.2.1.

The plant will consists of 3 no. OCGT units fuelled by hydrotreated vegetable oil (HVO) and will be used as a backup peaking plant - operating when demand is highest or when a shortage of supply exists on the grid. The design of the proposed development will allow for flexible operation so the OCGT Generating Plant can cater for high demand and respond quickly to fluctuations on the electricity grid with high efficiency.

The proposed site location is shown on Figure 1.1 below.

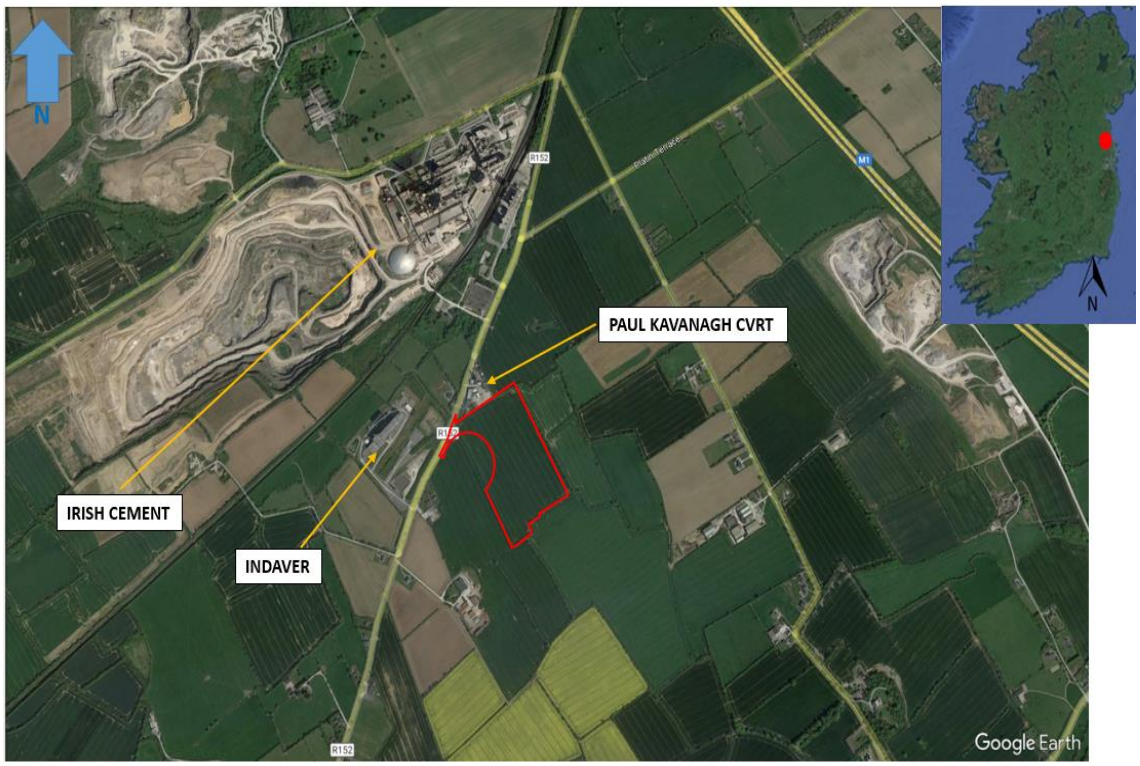


Figure 1.1: Aerial Photograph Showing Site Location

1.2 Background

In July 2018, SSE held a pre-application consultation meeting (Case Reference PL17 .302052)[1] with An Bord Pleanála (ABP) regarding whether or not a proposed distillate fired 208MW (electrical output) OCGT Generating Plant including 110kV Substation, at Platin, Carranstown, Co. Meath constitutes strategic infrastructure, as defined by the Planning and Development Act, 2000 (as amended).

ABP concluded that (a) the proposed OCGT Generating Plant did not constitute strategic infrastructure and should therefore undergo the typical planning application process via Meath County Council and (b) the 110kV transmission sub-station did constitute strategic infrastructure

[1] http://www.pleanala.ie/casenum/302052.htm

under the provisions of Section 182A and 182B of the Planning and Development Act 2000 (as amended).

A planning application for the strategic infrastructure development of the 110kV transmission sub-station at Platin, Carranstown, Co. Meath was lodged with ABP in February 2019 (Case Reference PL17 .303678)[2]. ABP granted permission for the development in January 2020.

Following the pre-application consultation with ABP, a planning application was prepared and lodged with Meath County Council for the distillate fired 208 MW OCGT Generating Plant (Planning Ref. no. LB190031) in January 2019. In July 2019, Meath County Council issued a notification of decision to grant permission for the development subject to conditions. However the decision by Meath County Council was the subject of a third party appeal to ABP (Case reference PL17.305028)[3].

In December 2019, ABP refused permission for the distillate fired 208 MW OCGT Generating Plant stating the following;

'It is considered that the proposed development in its current form with full reliance on the use of distillate oil, would conflict with national obligations relating to greenhouse gas emissions set out under the EU Renewable Energy Directive, would be contrary to national policy relating to the need for decarbonisation of the electricity sector, would not be supportive of the relevant provisions of the Meath County Development Plan 2013-2019, and through the specific use of distillate oil, and would constitute an unsustainable approach in relation to the provision of energy infrastructure to address intermittency in renewable power generation. The proposed development would, therefore, be contrary to the proper planning and sustainable development of the area.

Note: The Board considered that the use of the subject site for electricity generation would be fully consistent with the proper planning and sustainable of the area and noted the commentary from the applicant that a connection to gas supply is technically possible though challenging. However, having regard to the totality of Government policy on climate change, energy efficiency and the imperative for decarbonisation of the country's electricity generating system, it was determined that the fuelling of the proposed development by distillate oil is not supportable and that a proposal entailing the use of natural gas, or other fuel source and where distillate oil is not required or would perform a contingency function only, is warranted.'

The fuel selection was the only grounds for refusal; ABP stated that the location was appropriate for electricity generation. ABP determined that natural gas or another fuel type other than distillate oil would be an acceptable alternative.

SSE are now seeking planning permission for the construction of an OCGT Generating Plant of up to 170 MW (electrical output) primarily fuelled with hydrotreated vegetable oil (HVO) which is a biofuel. In accordance with the Commission of Utilities (CRU) requirement for 84 hours of onsite fuel storage, the plant will have HVO as its primary and only fuel source onsite. There will be 2 no. HVO tanks onsite, with a total storage capacity of 4,600m^3.

As the approved 110 kV Substation was planned to serve the proposed development, construction of this development will commence upon grant of planning permission of the proposed development and will constructed in tandem with the proposed development.

1.3 Need for the Project

1.3.1 Support for Renewables in Electricity Supply and Demand

Electricity demand in Ireland is forecast to increase significantly due to the expected expansion of many large energy users. It is necessary to have a mix of base load and flexible energy generation plant to provide a stable transmission system to meet the high levels of energy demand in Ireland.

The 2021 - 2030 National Energy and Climate Plan for Ireland sets a target to increase electricity generated from renewable sources to 70%. In June 2019, the Minister of Communications, Climate

[2] http://www.pleanala.ie/casenum/303678.htm
[3] http://www.pleanala.ie/casenum/305028.htm

Action and Environment committed to raise the amount of electricity generated from renewable sources to 70% by 2030 with no generation from peat and coal in the Climate Action Plan 2019.

The Climate Action Plan 2023 focuses on powering renewables with a target of 75% reduction in emissions by 2030 by facilitating large-scale deployment of renewables that are critical to decarbonising the power sector as well as enabling the electrification of other technologies. Other energy related targets of the Climate Action Plan 2023 include:

- Accelerate the delivery of onshore wind, offshore wind, and solar;
- Dial up to 9 GW onshore wind, 8 GW solar, and at least 7 GW of offshore wind by 2030 (with 2 GW earmarked for green hydrogen production);
- Support at least 500 MW of local community-based renewable energy projects and increased levels of new micro-generation and small-scale generation;
- Phase out and end the use of coal and peat in electricity generation; and
- New, dynamic Green Electricity Tariff will be developed by 2025 to incentivise people to use lower cost renewable electricity at times of high wind and solar generation.

The Meath County Council Climate Action Strategy was published in June 2018 to address both adaptation and mitigation of climate change. Areas of focus to deliver the plan include 'Planning' and 'Clean Energy'. Under 'Planning' the strategy recognises the need to use planning policy to promote clean energy and energy efficiency. Under 'Clean Energy' the strategy recognises the need to increase renewable energy usage.

Wind energy is the main source of renewable electricity generated in Ireland, making up 28% of all electricity in Ireland in 2021, second only to natural gas. As of September 2022, the total installed wind capacity in Ireland was 4,417 MW[4].

The proposed development is an integral part of the drive to increase the use of renewable energy in Ireland, in particular wind energy. As an OCGT Generating Plant its purpose is to support the production of renewable wind energy by providing an alternative energy supply that can react quickly to the electricity grid during periods of low wind energy availability and high user demand. Unlike base load plants it can be turned on and off within minutes so it is only operational during these periods.

Wind output is limited by the wind conditions at any particular time. Wind conditions can fluctuate greatly. Although there is sufficient base load plant on the system at the moment the proposed development will significantly satisfy the key requirement for flexible plant especially with the proposed increased penetration of wind on to the system. Similarly, the proposed development will support the upcoming provision of solar power, which is even more variable than wind.

Although the development will be run on biofuel as a primary fuel and therefore will produce greenhouse gases when operational, for the following reasons its impact will be low in terms of greenhouse gas emissions and overall it will contribute to the ability of the national electricity grid to support renewable energy generation:

- It will be operated as an OCGT Generating Plant with the purpose of supporting renewable energy generation
- It will only be operated when user demand in the region cannot be supported by the combination of base load plants and renewable energy sources. Operational hours are anticipated to be 4-6 hours per day during high demand periods (e.g. winter months)
- It is anticipated that each of the turbines will operate for between 500 and 1,800 hours each per year, with higher operating times during winter months.
- Biofuel as a fuel emits lower net greenhouse gases than traditional fossil fuels and is fully biodegradable.
- Based on the greenhouse gas (GHG) emissions assessment further detailed in Chapter 14, the likely impact of the proposed development will not be significant, as the use of HVO results in

[4] Sustainable Energy Authority of Ireland (SEAI), Energy in Ireland, 2022 https://www.seai.ie/publications/Energy-in-Ireland-2022.pdf accessed 11 January 2023

lower net GHG emissions compared to other fuel types such as natural gas or distillate oil. Using natural gas for 1800 hours per year would result in direct GHG emissions in the order of 173,214 tonnes CO2eq despite having lower transport embodied carbon as there is a gas pipeline adjacent to the project site. Comparatively, use of HVO for 1800 hours per year would result in direct GHG emissions in the order of 6,872 tonnes CO2eq.

– Use of HVO as a fuel type is a step beyond ABP's recommendation to use natural gas in its 2019 determination of the previous planning application. ABP refused grant of planning on the basis of high GHG emissions from use of distillate oil. SSE have complied with ABP's recommendation of '*the use of natural gas, or other fuel source'* and chosen the lowest available emitting option that will deliver reliable and consistent performance.

1.3.2 Operational Flexibility of OCGT Generating Plant

OCGT plants offer far quicker start-up times than Combined Cycle Gas Turbines (CCGT), which can take up to 4 hours to provide full output. The OCGT units are capable of providing full output in less than 15 minutes, offering a significant advantage in responding to sudden fluctuations in electricity demand caused by wind power variation, plant failures etc.

OCGT plants are designed for cycling duty, meaning they can come on and off load several times a day, whereas a CCGT plant is limited to twice a day.

1.3.3 National Grid Capacity

The EirGrid Transmission Access planning team performed an assessment of the suitability of the Platin Grid node location in the network to take the generation capacity associated with this development in 2018. The assessment confirmed that there is sufficient capacity at this node to take this volume of generation without extensive network upgrades. The transmission works required are exclusively to connect the proposed development into the existing overhead line (OHL) that bisects the site.

Volatility in energy supply arising from a gas supply shortage and subsequent increasing pricing due to geopolitical pressures was experienced in 2022 across Europe. The energy crisis experienced in Ireland has led to a requirement to increase energy supply to cope with the increasing energy demand on the island of Ireland and prevent a potential shortage of power.

The Proposed development is flexible generation as a backup to support the electricity grid in times of peak demand amid a shortfall in supply. A number of EirGrid 'System Alerts' were issued during 2022 in Ireland during the European wide energy crisis warning of potential for temporary electricity supply issues in the near future. A System Alert is a signal for all generators of electricity to make their facility available for use and not to put their facility at any risk of tripping. A System Alert often passes off without incident once a sufficient buffer between electricity supply and demand is restored.

Flexible generation technology will allow for increased renewable energy generation connecting to the electricity grid. These systems provide response capabilities to support the network and counteract any fluctuations in wind and solar power. Flexible generation developments have fast start-capability and can therefore provide response capabilities in a timely fashion to support sudden fluctuations in electricity demand. These fluctuations can be expected as Ireland transitions to increased amounts of renewable generation on the network. Flexible generation will allow the proposed development to operate during periods when electricity generation from renewables is low and during peak demand periods. The developments will help to maintain the long-term stability of the electricity system in Ireland and support the increased reliance of the grid on electricity generated from renewable sources on Ireland's journey to deliver Net Zero by 2040.

The EirGrid updated All Island Generation Capacity Statement 2021[5] identified a potential capacity shortfall, if no action taken, for the following winter periods of 2021/22 to 2025/26. In response to this, the CRU published a programme of work in September 2021 to increase generation capacity

[5] EirGrid, All Island Generation Capacity Statement, 2021https://www.eirgridgroup.com/site-files/library/EirGrid/208281-All-Island-Generation-Capacity-Statement-LR13A.pdf (Accessed 16 May 2023)

to provide additional stability and resilience to the Irish energy system over the next four to five years.

In May 2022, the European Commission published its REPowerEU Plan (COM/2022/230) that sets its objectives as:

– Ending the EU's dependence on Russian fossil fuels;
– Tackling the climate crisis; and
– Securing the long-term sustainability, cost effectiveness, and energy supply to the EU.

The Commission remarked that considerable challenges are ahead with such ambitions, one of which is associated with permitting and planning issues. The Commission places emphasis on streamlining permitting processes and recognises the need to "*tackle slow and complex permitting major renewable projects".*

Section 6.15.3 of the Meath County Development Plan 2021-2027 outlines the Renewable Energy strategy for the region. Regional Policy Objective (RPO) 7.34 of the Regional Spatial and Economic Strategy (RSES) sets out that the Eastern and Midlands Regional Authority (EMRA) is proposing, in conjunction within its constituent Local Authorities within the region, to identify Strategic Energy Zones (SEZ). These zones will designate areas suitable for larger energy generating projects; the role of community micro energy production in urban and rural settings will be explored and the potential for renewable energy production within areas specifically identified for industrial development will also be considered. The SEZ's for the region will ensure that all environmental considerations are taken on board at an early stage within the initial analysis prior to their identification. A regional landscape strategy is to be developed to support the delivery of projects within SEZ's. As of June 2023, SEZs have yet to be established. The proposed development will support renewables by providing additional grid security and the potential for Duleek to be considered as a SEZ.

Section 6.15.4 of the Meath County Development Plan 2021-2027 outlines the Energy Networks Infrastructure strategy for the region. This section states: "*The two main energy sources currently serving the County are electricity and gas. The County's location within the Greater Dublin Area together with the potential for significant economic and supporting residential development within the Plan period demonstrates the importance of ensuring that the existing networks can be upgraded and can provide enhanced capacity. This capacity is essential to facilitate the future development of the County in line with the Core and Settlement Strategies. The RSES highlights the importance of reducing energy consumption from fossil fuel sources and promotes the use of more sustainable sources such as wind, wave solar and biomass. The use of smart technology systems and the recognition that buildings can act as both generators and consumers of energy and the promotion of electric vehicles will all place greater pressure on the national electricity grid.*

Thus, the strengthening of the national grid is important for a number of reasons including improving security of supply for the domestic, residential and enterprise market as well as attracting high-end enterprise which often require significant energy capacity and reliability."

1.3.4 Summary

In summary, this development is needed for the following reasons:

– The energy demand on the system continues to grow substantially.
– Planned plant closures of both coal fired and heavy fuel oil power stations in the coming years will place a greater demand on the electricity transmission system.
– With the increase of wind power on the grid the proposed plant will provide additional stability to the electricity supply in the region and help to balance the overall electricity transmission network;
– The proposed development will be designed for flexible operation and rapid response to load changes on the grid which will be a key requirement in the coming years to support the fluctuating supply associated with the significant increase in wind power generation capacity in Ireland.

– Subject to a separate planning permission, the proposed development could be converted to hydrogen in the future as the OCGT technology can allow this, supporting Ireland's transition to decarbonisation. This would prolong the lifespan of the proposed development and mitigate the requirement for development of a new hydrogen power station.

1.4 Consideration of Alternatives and Site Selection Criteria

There were a number of factors that led to the selection of the preferred location in Platin, Co. Meath, for this proposed development. The site (the area upon which the proposed development is to be constructed) is currently a greenfield site and used for agricultural tillage. These are summarised here:

– Land is owned by Platin Power Ltd. which is part of SSE PLC, as is SSE Generation Ireland Ltd.
– No requirement for new overhead lines – an existing 110kV line runs across the Site and is readily available for connecting the proposed development. Discussions have been held with EirGrid regarding details of such connection and a grid offer was accepted by SSE on the basis of connecting directly to this existing line;
– The subject site is located in an area that is increasingly industrialised and thus will form part of a cluster of similar activities within the landscape. The Eastern Midlands Regional Spatial and Economic Strategy (RSES) 2019-2031 fully supports the enhancement of the agriculture, food, forestry, energy sectors in tandem with encouraging diversification in the context of landscape and heritage protection. One of the key objectives of this strategy is clustering.
– The Meath County Development Plan 2021-2027 ED POL 19 states: *To support and facilitate sustainable agriculture, agri-food, horticulture, forestry, renewable energy and other rural enterprises at suitable locations in the County.*
– As stated in INF OBJ 39, it is an objective of the Council *to support Ireland's renewable energy commitments outlined in national policy by facilitating the development and exploitation of renewable energy sources such as solar, wind, geothermal, hydro and bio-energy at suitable locations within the County where such development does not have a negative impact on the surrounding environment (including water quality), landscape, biodiversity or local amenities so as to provide for further residential and enterprise development within the county.*
– INF OBJ 41, it is an objective of Meath County Council to *promote the generation and supply of low carbon and renewable energy alternatives, having regard to the opportunities offered by the settlement hierarchy of the County and the built environment.*
– Section 6.15.4.1 of the Meath County Development Plan 2021-2027 outlines *"the two main energy sources currently serving the County are electricity and gas. The County's location within the Greater Dublin Area together with the potential for significant economic and supporting residential development within the Plan period demonstrates the importance of ensuring that the existing networks can be upgraded and can provide enhanced capacity. This capacity is essential to facilitate the future development of the County in line with the Core and Settlement Strategies*.

  The RSES highlights the importance of reducing energy consumption from fossil fuel sources and promotes the use of more sustainable sources such as wind, wave solar and biomass. The use of smart technology systems and the recognition that buildings can act as both generators and consumers of energy and the promotion of electric vehicles will all place greater pressure on the national electricity grid. Thus, the strengthening of the national grid is important for a number of reasons including improving security of supply for the domestic, residential and enterprise market as well as attracting high-end enterprise which often require significant energy capacity and reliability."
– Full planning permission has previously been granted at the site for similar developments including a larger CCGT plant on the subject development site in 2000 (MCC planning reference 992490) and in 2003 (MCC planning reference SA30213), and a smaller Open Cycle Gas Turbine in 2010 (MCC planning reference SA100263). Therefore, the land use for power generation at this site has been fully approved by both Planning Authorities on three occasions. ABP acknowledged the suitability of the site location in 2019 and refused grant of planning on the basis of fuel selection only.

In selecting a preferred layout for the site to incorporate the main elements of the proposed development, the fundamental objectives have been;

1. To minimise noise impact for local residents, the proposed development is located as far away from neighbouring residential properties as possible.
2. To minimise visual impact of the facility by positioning taller structures away from the R152 road and the nearest residential properties.
3. To minimise potential for impact on the archaeological enclosure to the west of the site by positioning all buildings and structures as far to the east of the site as possible.

1.5 Site Description

The proposed development site will be 10.55 hectares in size and is currently a greenfield site. The predominant land use in the area is agriculture, primarily high-grade/arable agriculture. A large cement manufacturing plant and its associated quarry (Irish Cement Ltd) is located in approx. 600m distance to the north of the site. In addition, Indaver Waste to Energy facility lies approx. 400m northwest of the site across the R152 road. Directly adjacent to the north of the proposed plant are a cluster of commercial and residential buildings including a service station and a Commercial Vehicle Roadworthiness Test (CVRT) centre. Residential development in the vicinity of the site is scattered, typical of the rural location. Nearest resident property is approx. 80m from the proposed site entrance. See Figure 1.1 for an aerial image of the local environment.

1.6 Governing Legislation

This Section describes the framework for the project under current planning, environmental and related legislation.

1.6.1 Environmental Impact Assessment (EIA)

Directive 2011/92/EU of The European Parliament and of The Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment, as amended by Directive 2014/52/EU of the European Parliament and of The Council of 16 April 2014, (the EIA Directive) provides that certain projects likely to have significant effects on the environment by virtue, inter alia, of their nature, size or location must be must be subject to an assessment of their likely significant environmental effects before development consent is determined.

Ireland has implemented the EIA Directive under the Planning and Development Act 2000 (as amended) in particular Part X thereof and also under the Planning and Development Regulations 2001 (as amended) (the Planning and Development Regulations).

Under the Planning and Development Act 2000 (as amended) (hereafter referred to as the Act) and the Planning and Development Regulations, EIA Screening determines whether an EIA is required for a specified project. Projects requiring mandatory EIA are listed in Schedule 5 of the Planning and Development Regulations, if the project class does not have a threshold or if the threshold is equalled or exceeded. In the case of developments which are below the thresholds of the listed projects in Part 2 of Schedule 5 of the Planning and Development Regulations, planning authorities are required under Article 103 of the Planning and Development Regulations to request an Environmental Impact Assessment Report (EIAR) where it considers that there is a real likelihood that the project is likely to have a significant effect on the environment.

The proposed development has been assessed in the context of mandatory thresholds for EIA (see EIA Screening report included as Attachment 1) as set out in Schedule 5 Parts 1 and 2 of the Planning and Development Regulations. It is considered that the proposed development does not exceed the thresholds or meet the classes of development as defined in Schedule 5. As the development is within a class of development in Part 2 of Schedule 5 but falls below the relevant threshold, further assessment has been completed considering the criteria for sub-threshold EIA as set out in Schedule 7 of the same regulations. It is concluded that an EIAR is not required as part of the planning application, however it is noted that Meath County Council is the competent authority for making such a determination.

However, in line with best practice, this non-statutory Environmental Report for the proposed development has been prepared to:

- Provide information on the project stakeholders;
- Explain the need for the proposed development;
- Describe the legislation regulating the proposed development;
- Address potential environmental concerns, so far as is practicable, associated with the construction and operation of the proposed development.

The EU Internal Electricity Directive (96/92/EC) which came into force in February 1997 has been implemented in Ireland by the Electricity Regulation Act, 1999. Complete liberalisation of the Irish electricity market was achieved at the beginning of 2005. This means that consumers are free to source their electricity requirements from different suppliers. This has been to facilitate the development of energy infrastructure.

1.6.2 Appropriate Assessment

The Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora) (as amended) is the main legislative instrument for the protection and conservation of biodiversity in the EU. Under this Directive Member States are obliged to designate Special Areas of Conservation (SACs) which contain habitats or species considered important for protection and conservation in a European Union context.

In 1997, the Habitats Directive was transposed into Irish national law in Part XAB of the Planning and Development Act 2000 (as amended) and the European Regulations, the European Communities (Natural Habitats) Regulations 1997, S.I. 94/1997. These Regulations were amended by S.I. 233 of 1998 & S.I. 378 of 2005. These were subsequently revised and consolidated in the European Communities (Birds and Natural Habitats) Regulations 2011, S.I. 477 of 2011 (as amended).

A Natura Impact Statement (NIS) detailing the results of the Appropriate Assessment is included as part of the planning application.

Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) to be considered within the Zone of Influence include: the River Boyne and River Blackwater SAC (002299), the Boyne Coast and Estuary SAC (001957), the Boyne Estuary SPA (004080), the River Boyne and River Blackwater SPA (004232) and the River Nanny Estuary and Shore SPA (004158).

This NIS has examined and analysed, in light of the best scientific knowledge, with respect to those European sites within the zone of influence of the proposed development, the potential impact sources and pathways, the manner in which these could potentially impact on the European sites' QIs/SCOs and whether the predicted impacts would adversely affect the integrity of the following European Sites that were screened in for Stage 2 assessment: River Boyne and River Blackwater SAC, River Boyne and River Blackwater SPA, Boyne Coast and Estuary SAC, Boyne Estuary SPA, River Nanny Estuary and Shore SPA. There are no other European sites at risk of effects from the proposed development.

Avoidance, design requirements and mitigation measures are set out within this NIS (and its appendices) and the effective implementation of these mitigation measures will ensure that any impacts on the conservation objectives of European sites will be avoided during the construction, operation and decommissioning phases of the proposed development such that there will be no adverse effects on any European sites.

It has been objectively concluded by Scott Cawley Ltd., following an examination, analysis and evaluation of the relevant information, including in particular the nature of the predicted impacts from the proposed development and the effective implementation of the mitigation measures prescribed, that the proposed development will not adversely affect (either directly or indirectly) the integrity of any European site, either alone or in combination with other plans or projects.

1.6.3 Planning & Development (Strategic Infrastructure) Act, 2006

The Planning & Development (Strategic Infrastructure) Act, 2006 amends the Planning and Development Act, 2000 to provide for the introduction of a 'strategic consent process' for strategic infrastructure of national importance provided by statutory bodies and the private sector.

For strategic infrastructure (as defined under the Seventh Schedule of the Act), an application for permission/approval is made directly to the An Bord Pleanála instead of the relevant local authority. As determined by ABP in a pre-application meeting for the previous application, the proposed development does not qualify as a strategic infrastructure development (SID) project.

The proposed development does not fall under the category of strategic infrastructure as defined in the Seventh Schedule of the Act, namely "A thermal power station or other combustion station installation with a total energy output of 300 megawatts or more". Hence the application for planning permission is being made to Meath County Council (MCC).

1.6.4 Industrial Emissions Directive (IED)

The proposed development will require an Industrial Emissions (IE) Licence to operate. The First Schedule to the Environmental Protection Agency (EPA) Act, 1992, as amended lists activities which require an IE Licence.

The proposed development falls into the following category of activity for which an IE Licence is required:

'2.1 Combustion of fuels in installations with a total rated thermal input of 50 MW or more'.

SSE will apply to the EPA for an IE licence, following the submission of the application for planning permission, and subject to the grant of planning permission. The IE licence will govern the environmental management of the proposed development, ensuring the operation of the plant and associated environmental emissions does not have any significant adverse impact on the environment.

1.6.5 Other Relevant Legislation

Emissions Trading

The member states of the European Union (EU) are signatories to the Kyoto Protocol, which requires reductions in emissions of greenhouse gases by specific amounts over a period from 2008 to 2012 and beyond. The EU committed to an average reduction of greenhouse gas emissions by 8% below 1990 levels. The Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC (the EU Emissions Trading Directive)) is being implemented to achieve this target; the scheme is currently in Phase 3 which covers 2013-2020.

Directive 2003/87/EC establishes an allowance-trading scheme for emissions to promote reductions of greenhouse gases, in particular carbon dioxide. Directive 2003/87/EC as amended has been implemented into Irish Law by EC (Greenhouse Gas Emissions Trading) Regulations 2012, (S.I. no. 490 of 2012) and amending Regulations.

The trading scheme applies to facilities with combustion installations with a rated thermal input exceeding 20 MW (except hazardous or municipal waste installations). The Directive requires these installations to obtain a Green House Gas (GHG) Permit from the EPA. The total rated thermal input from the proposed installations on the site will exceed the 20 MW threshold; therefore a GHG Permit will be required for the site. The GHG permitting process is separate to both the IE licensing and planning application processes.

Energy Efficiency Regulations

The European Union (Energy Efficiency) Regulations 2014 (S.I. no. 426 of 2014) states in Part 5 (11) where required to support an application to the Environmental Protection Agency under the Act of

1992, a cost-benefit analysis shall be carried out by an economic operator when the economic operator plans to carry out one of the following:

(a) to install a new thermal electricity generation installation with a total rated thermal input exceeding 20 MW that is not already a cogeneration unit;

(b) to substantially refurbish an existing thermal electricity generation installation with a total rated thermal input exceeding 20 MW and the refurbished unit will not be a cogeneration unit;

(c) to install or substantially refurbish an industrial installation with a total rated thermal input exceeding 20 MW generating waste heat at a useful temperature level and where the waste heat is not being used to satisfy economically-justified demand;

(d) to construct a new district heating and cooling network or to install a new energy production unit with a total rated thermal input in excess of 20MW in an existing district heating or cooling network or to substantially refurbish an existing such installation and waste heat is not being used from nearby industrial installations.

Part 1 (3)(5) states that these Regulations do not apply to persons holding a greenhouse gas emissions permit granted in accordance with Regulation 7 of the European Communities (Greenhouse Gas Emissions Trading) Regulations 2012 (S.I. no. 490 of 2012). SSE will be applying for a greenhouse gas permit from the EPA under the EU Emission Trading Scheme (EU ETS).

Large Combustion Plant Regulations

The Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control) (Recast) (the IED) also applies to large combustion plants designed for production of energy, the rated thermal input of which is equal to or greater than 50 MW, irrespective of the type of fuel used (Article 28 of the IED).

European Union (Large Combustion Plants) Regulations 2012, S.I. 566 of 2012, came into effect on 7th January 2013 and transposes Chapter III and Annex V of IED, revoking and replacing the Large Combustion Plant Regulations 2003 (S.I. no. 644 of 2003).

These regulations apply to the proposed development as the rated thermal input of plant is greater than 50 MW. Compliance with these regulations will be ensured through the IE Licensing process.

COMAH Regulations

EU Directive 2012/18/EU on the Control of Major Accident Hazards Involving Dangerous Substances (COMAH or Seveso III Directive) has been implemented into Irish law under S.I. no. 209 of 2015 Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances (COMAH)) Regulations, 2015 (as amended) (the COMAH Regulations). The regulations impose a number of statutory obligations relating to accident prevention and emergency response on installations which handle and store dangerous substances above specified thresholds. The regulations specify lower and upper threshold quantities for different dangerous substances with more stringent obligations on installations which exceed the upper threshold.

The normal volume of HVO stored onsite (84 hours operation supply) would be 4,600m^3 in 2 no. bunded tanks. This volume (approx. 5,897 tonnes) is above the applicable lower tier threshold of 2,500 tonnes for HVO. Therefore, the proposed Development will fall into a category of development to which the COMAH Regulations applies. The required COMAH documentation for a Lower Tier COMAH facility will be submitted to the Health and Safety Authority prior to operations commencing at the site. To assist Meath County Council and the HSA in their consideration of the proposed development, Byrne Ó Cléirigh Consulting has undertaken a COMAH land use planning risk assessment of the development in accordance with the Guidance on Technical Land Use Planning Advice for Planning Authorities and COMAH Establishment Operators [Document reference 544-

23X0154]. The HSA has set out its policy and approach to conducting land use planning assessments in its guidance, which is to adopt a conservative and consistent approach.

1.7 Environmental Report Scope and Structure

As previously described, as the development is a "sub-threshold" development an EIA Screening has been completed and concludes that there are no likely significant environmental effects. An EIA Screening Report has been completed as part of this planning application (IE0312377-22-RP-0017) and is included as Attachment 1 of this Environmental Report.

SSE respectfully submit an EIAR is not required, as good practice, this Environmental Report has been prepared to address so far as practicable any potential environmental concerns of the local authority and other relevant stakeholders. As part of the preparation of the Environmental Report, consultation was undertaken with Meath County Council to identify environmental aspects to be addressed.

The structure of the Environmental Report broadly follows that of an EIAR in that the development is described and the potential impacts on each of the environmental media is then examined in separate Chapters including Population and Human Health, Landscape and Visual, Traffic and Transportation, Land and Soils, Biodiversity, Noise and Vibration, Water and Wastewater, Air Quality, Climate, Waste Management, Material Assets and Archaeology and Cultural Heritage.

The assessment of the potential environmental impacts associated with the proposed development alone and in combination with other planned developments and existing industrial facilities in the area is also assessed.

1.7.1 The Study Team

PM Group has fulfilled the role of Lead Consultant and Project Coordinator for the preparation of the Environmental Report. The names and qualifications/experience of those involved in the Environmental Report are included in Table 1.1. PM Group has been directly responsible for the preparation of the following chapters and management of the specialist contribution from sub consultants listed:

PM Group

- Chapter 1 Introduction
- Chapter 2 Description of the Proposed Development
- Chapter 3 Population and Human Health
- Chapter 5 Traffic and Transportation
- Chapter 7 Land and Soils
- Chapter 8 Noise and Vibration
- Chapter 9 Water and Waste Water
- Chapter 10 Air Quality
- Chapter 11 Waste Management
- Chapter 12 Material Assets
- Chapter 14 Climate
- Chapter 15 Interactions and Cumulative Impacts

Specialist contributions to the Environmental Report were made as follows:

- Chapter 4 (Landscape and Visual Impact) – AOS (planning agents for this application)
- Chapter 7 (Biodiversity) – Scott Cawley Ltd
- Chapter 13 (Archaeology, Architecture and Cultural Heritage) – Margaret McCarthy Archaeology

Table 1.1: Study Team for Environmental Report

Name	Company	Title	Environmental Report Responsibility
Aoife O'Leary • MIEnvSc. Full Member of the Institute of Environmental Sciences (IES) • Chartered Environmentalist with Society of the Environment, CEnv SocEnv • BSc (Hons) Environmental Science and Sustainable Technology • MSc Occupational Health • 7 years of experience in environmental consultancy, including multiple EIAs	PM Group	Senior Environmental Consultant	Environmental Report Lead Management of specialist sub consultants Chp. 1 Introduction Chp. 2 Description of the Proposed Development Chp. 3 Population and Human Health Chp. 5 Traffic and Transportation Chp. 6 Lands and Soils Chp. 9 Water and Waste Water Chp. 11 Waste Management Chp. 12 Materials Assets Chp. 14 Climate Chp. 15 Interactions and Cumulative Impacts
Paul O'Sullivan • BEng(Hons) Civil and Environmental Engineering • ME Engineering with Business • Post Grad Diploma in Acoustics and Noise Control • Chartered Engineer with Engineers Ireland, CEng MIEI • 11 years environmental consulting experience, including multiple EIAs.	PM Group	Senior Environmental Consultant	Environmental Report Lead/Reviewer Management of specialist sub consultants Chp. 8 Noise and Vibration
David Rory Moore • MSc Spatial Planning • H.Dip Planning and Environmental Law • Member of the Irish Planning Institute • 20+ years of experience	PM Group	Principal Planner	Environmental Report Checker

Name	Company	Title	Environmental Report Responsibility
Áine Monaghan • MIEnvSc. Full Member of the Institute of Environmental Sciences (IES) • MSc (Hons) in Renewable Energy & Green Technologies • BSc (Hons) Environmental Biology • AERMOD Modelling Computer Lab training by Trinity Consultants • 10 years of experience	PM Group	Senior Environmental Consultant	Chp. 10 Air Quality & Climate Checker
Julia Carroll • Affiliate member with The Institute of Environmental Science Association of Ireland (ESAI) • BA Environmental Science • AERMOD Modelling Computer Lab training by Trinity Consultants • 2 years of experience	PM Group	Environment & Sustainability Consultant	Chp. 10 Air Quality & Climate
Conor Skehan • Charter Membership: International Association for Impact Assessment; the Irish Landscape Institute, Royal Institute of Architects of Ireland and Irish Planning Institute. • Master of Landscape Architecture • 40+ years of experience	AOS	Director	Chp. 4 Landscape and Visual
Gael Gibson • Corporate Member of Irish Planning Institute • MTCP Town and Country Planning • 20+ years of experience	AOS	Senior Planner	Chp. 4 Landscape and Visual

Name	Company	Title	Environmental Report Responsibility
Tim Ryle • MIEnvSc Full Member of the Institute of Environmental Sciences (IES) • B.Sc. (Hons) Biology • Ph.D. Ecology • 20 years of experience	Scott Cawley	Principal Ecologist	Chp. 7 Biodiversity
Síofra Quigley • BSc (Hons) Zoology & Wildlife Biology • MSc Wildlife Biology and Conservation • 5 years of experience	Scott Cawley	Senior Consultant Ecologist	Chp. 7 Biodiversity, Natura Impact Statement
Nicholas Fettes • BSc Zoology • MSc Environmental Policy • 3 years of experience	Scott Cawley	Consultant Ecologist	Chp. 7 Biodiversity
Margaret McCarthy • Member of Institute of Archaeologists of Ireland MIAI • MA Archaeology • 25+ years of experience • Fully licenced by the Department of Housing, Local Government and Heritage	Margaret McCarthy Archaeological Consultancy	Senior Consultant Archaeologist	Chp. 13 Archaeology, Architecture and Cultural Heritage

1.8 Cumulative Impacts

1.8.1 110kv Substation Development

As described in Section 1.2, SSE has been granted planning permission for the construction of a 110kV Substation strategic infrastructure development at Platin, Carranstown, Co. Meath by An Bord Pleanála in January 2020 (Case Reference PL17 .303678).

Pending approval of the proposed Development by Meath County Council, the approved 110kV substation will be constructed in conjunction with the proposed development construction.

A Construction Environmental Management Plan (CEMP) has been prepared for the proposed development of the OCGT Generating Plant and this will align with the CEMP and Traffic Management Plan (TMP) which is to be submitted to and agreed with Meath County Council for the approved 110KV Substation.

Subject to receipt of planning permission, it is anticipated that construction works on both the sub-station and proposed development will commence in Q4 2023 with a duration of approx. 30 months. The first operation of the plant is anticipated to be in Q3 2026.

The mitigation measures identified in the Environmental Report, the Natura Impact Statement and the Planning Conditions associated with both developments will be implemented in full during the construction and operational phases (as applicable) of the proposed development.

1.8.2 Other Industrial Facilities and Planned Projects

The proposed development will not have a cumulative impact with other planned projects at neighbouring facilities (Irish Cement and Indaver). These facilities have planning applications which have been granted in recent years; however the scale of these planning applications are considered minor as they are on existing industrial sites and consist only of alterations or modifications to structures. The surrounding area is established with industrial facilities. The cumulative impacts of the proposed development with other industrial facilities in the vicinity of the proposed site location are addressed throughout this report where relevant and also in Chapter 15.

1.8.3 Planning History and Adjacent Projects

The site is situated in an industrialised area with a large cement plant and waste to energy facility.

SSE have been granted planning permission for the construction of a 110kV transmission sub-station strategic infrastructure development at Platin, Carranstown, Co. Meath by An Bord Pleanála in January 2020 (Case Reference PL17 .303678).

Pending approval of the proposed OCGT Generation Plant by Meath County Council, the approved 110 kV Substation will be constructed in conjunction with the proposed development construction. It is anticipated works on both the Substation and proposed development will commence in Q4 2023, subject to planning permission.

The recent planning history in the locality of the proposed development is listed below in Table 2.1

Table 1.2: Recent planning history in the locality of proposed development

Reg. ref	Applicant	Development Summary	Decision
ABP Case Reference PL17.303678	SSE	Construction of a 110kV transmission sub-station strategic infrastructure development at Platin, Carranstown, Co. Meath	SID. Granted by An Bord Pleanála in January 2020. This approved 110kV sub-station will be constructed in tandem with the proposed development upon grant of planning. The approved 110kV substation has previously been assessed as part of the planning application and there will be a cumulative assessment in the form of visual impact.
MCC Reference LB19003, ABP Case Reference PL17.305028	SSE	Construction of a distillate oil fired 208MW (electrical output) Open Cycle Gas Turbine (OCGT) Power Plant.	The decision taken by Meath County Council to grant permission in July 2019 for the development was appealed to An Bord Pleanála. Refused by An Bord Pleanála in December 2019 on the basis of fuel selection.
ABP Case Reference	Irish Cement	10 year permission to facilitate further replacement of fossil fuels with alternative	Granted by An Bord Pleanála in April 2018.

Reg. ref	Applicant	Development Summary	Decision
PL17.PA0050		fuels and allow for the introduction of alternative raw materials in the manufacturing of cement	They are not considered to have a cumulative negative impact with the proposed development as they relate to improvement in air emissions in the locality.
MCC Case Reference FS16071, FS16072, FS18022	Indaver	Alterations to waste-to-energy facility.	Granted by Meath County Council in April and June 2018. They are not considered to have a cumulative negative impact with the proposed development as they relate to minor changes to existing operations.
ABP Case Reference PA17.307433	Indaver	Increase in annual total waste for treatment from currently permitted 235,000 tonnes to 250,000 tonnes, increase in annual amount of hazardous waste from currently permitted 10,000 tonnes to 25,000 tonnes, development of a aqueous waste tank farm, hydrogen generation unit, bottom ash storage building, development of a single storage warehouse, new concrete yard, weather canopy, demolition and rebuilding of an existing single storey modular office and ancillary site works.	Granted by An Bord Pleanála in March 2022. There will be a slight minor negative cumulative impact as there will be increased traffic on the R152, which the proposed development also utilises for construction and operational traffic.
MCC Case Reference LB171311	Paul Kavanagh Test Centre Ltd	The development will consist of the following: Building 1: Retention permission for a 1m wide external corridor to rear elevation, 4no. Exit doors and a 2.4sqm porch to the front of building together with permission for minor alterations to rear elevation. Building 2; Retention	Granted by Meath County Council in January 2018 They are not considered to have a cumulative negative impact with the proposed development as they relate to minor changes to an existing facility.

Reg. ref	Applicant	Development Summary	Decision
		permission for extension of motor factors building including for tyre store and fitting area. Total floor area to be retained = 399sqm. Together with permission for alterations to front elevation, consisting of the provision of a new exit door. Building 3; Retention of new storage & workshop building. Total area to be retained 315sqm. Retention permission is also being sought for an extension to the existing car parking area together with permission for alterations to the internal site traffic management arrangements as well as the traffic management arrangements to the R152 boundary	
MCC Case Reference LB160898, ABP Case Reference PL17248146	Highfield Solar Limited	For permission to build a solar farm on a site which was split into two sites to the northeast and southwest of the Downestown Road at Garballagh, Thomastown, Gillinstown and Downestown, Duleek, Co. Meath.	The decision taken by Meath County Council to grant permission for the development was appealed to An Bord Pleanála. In January 2019, ABP ultimately made a split decision, granting permission for the larger western solar array in the townlands of Garballagh, Thomastown and Gillinstown, and refusing permission for the smaller eastern solar array in the townland of Downestown. The 110kV substation and associated infrastructure required for Site 1 was omitted from the planning permission. This is considered not to have a cumulative impact on the proposed development

Reg. ref	Applicant	Development Summary	Decision
			on the basis of distance from the proposed development site.
ABP Case Reference PL17.306330	Highfield Solar Limited	To consider if their proposal to construct a 110 kV substation Garballagh and Commons, Duleek would fall within the scope of section 182A of the Planning and Development Act 2000, as amended (strategic development infrastructure).	The Board issued a decision in April stated that this development does fall under the scope of section 182A of the Planning and Development Act 2000, as amended. The proposed sub-station will be connected directly to the Drybridge-Baltrasna 110kV line by way of a looped in/out connection, and therefore will have no impact/connection to the proposed development or approved 110kV Substation at the SSE site.
MCC Case Reference LB200487	Highfield Solar Limited	A 10 year permission for the construction of a solar PV Energy development within a total site area of up to 81.3hA, to include solar PV panels ground mounted on steel support structures, electrical transformer/inverter station modules, battery storage modules, storage containers, CCTV cameras, access tracks, fencing and associated electrical cabling, ducting and ancillary infrastructure.	Granted by Meath County Council in February 2021. The proposed development connects directly to the Drybridge-Baltrasna 110kV line by way of a looped in/out connection, and therefore will have no impact/connection to the proposed development or approved 110kV Substation at the SSE site
MCC Case Reference 22262	Highfield Solar Limited	Council to amend the lifetime of the approved development (Planning ref: LB/160898) which comprises consent for the development of a solar farm on a site of approximately 131.37 hectares at Garballagh, Thomastown, Gillinstown, Duleek, Co Meath. Permission was sought to	Granted by Meath County Council in April 2022. They are not considered to have a cumulative negative impact with the proposed development as they relate to minor changes to existing operations.

Reg. ref	Applicant	Development Summary	Decision
		amend the operational lifespan of the consented development from 25 years to 35 years.	
MCC Case Reference 22972	Highfield Solar Limited	The development will consist of a 10-year permission for the construction of a solar PV energy development within a total site area of approximately 18.92ha, include solar PV panels ground mounted on steel support structures, IPP electrical control building and associated compound, electrical transformer/inverter station modules, battery storage modules, storage containers, CCTV cameras, access tracks, fencing and associated electrical cabling, ducting and ancillary infrastructure.	Granted by Meath County Council in May 2023. The proposed development connects directly to the Drybridge-Baltrasna 110kV line by way of a looped in/out connection, and therefore will have no impact/connection to the proposed development or approved 110kV Substation at the SSE site
MCC Case Reference LB201717	Paul Kavanagh Test Centre Ltd	For a development comprising: (i) part-demolition (totalling 390sq.m) of existing 972.5 sq.m Test Centre; (ii) construction of 1 no. single storey building (totalling 639sq.m) comprising of a new testing area with ancillary staff and customer facilities; (iii) provision of 24 no. new car parking spaces, 5 no. LCV parking spaces and 5 no. HGV parking spaces; and (iv) all ancillary works necessary to facilitate the development including drainage and site works.	Granted by Meath County Council in June 2021. They are not considered to have a cumulative negative impact with the proposed development as they relate to minor changes to an existing facility.
MCC Case Reference LB201629, ABP Case Reference	Irish Cement	20 year permission for a 13.5 hectare extension to existing Overburden Management Facility The application is accompanied by an	Granted by An Bord Pleanála in July 2021. They are not considered to

Reg. ref	Applicant	Development Summary	Decision
PL17.309308		Environmental Impact Assessment Report (EIAR). The application requires an Industrial Emissions Directive (IED) Licence and the facility operates pursuant to an existing IED Licence (EPA Ref No. P0030-05.	have a cumulative negative impact with the proposed development as they relate to minor changes to existing operations.
MCC Case Reference LB201519	Keegan Quarries Ltd	The continuation of the use and further quarrying of limestone within the 57.5Ha site, granted by Substitute consent (PL17.su0088), comprising extraction from a 20.6Ha area which includes a lateral extension of 6.2Ha, using conventional drilling and blasting techniques and mineral reduction using mobile crushing and screening to a depth of 30mAOD. The development includes some 3.4Ha of advanced woodland planting, new administration office and workshop, associated septic tank with raised sand polishing filter and an oil interceptor with soak-away trench. A weighbridge with an associated dispatch office and ancillary structures to include a wheelwash and the potential in line relocation of 110kv transmission poles and the reuse of the northern void 3.24Ha at a reprofiled level of some 40mAOD using on site overburden to provide for a new low level location for a replacement concrete batching plant for the existing plant (01/4203) and a concrete block making yard with restoration of the lands to biodiverse habitats upon completion of extraction. The	Granted by Meath County Council in June 2021. They are not considered to have a cumulative negative impact with the proposed development as they relate to a facility located 2.2km from the site.

Reg. ref	Applicant	Development Summary	Decision
		application is accompanied by an Environmental Impact Assessment Report and a Natura Impact Statement.	
MCC Case Reference 212417	Irish Cement	Permission for extension of 811.50sqm gross floor area to an existing bulk materials storage shed and ancillary site works. The maximum height of the extension will be circa 14m, which is the same height as the existing building. The 1,868sqm development is located within the existing Cement Works at Platin, County Meath. The application relates to Platin Cement Works, which is subject to an Industrial Emissions License (IE License No. P0030-60).	Granted by Meath County Council in February 2022. They are not considered to have a cumulative negative impact with the proposed development as they relate to minor changes to an existing facility.
MCC Case Reference 22480	Boann Distillery Limited	Construction of a whiskey maturation warehouse facility. The proposed development includes the construction of 1 no. warehouse building of c. 3246 sq.m for whiskey maturation and a machinery shed with solar photovoltaic (PV) panels on both buildings. The development also fire water retention pond, sewerage treatment unit and associated infrastructure, a new vehicular access to the Platin Road (R152), car parking, hard and soft landscaping and all associated site development works.	Granted by Meath County Council in September 2022. They are not considered to have a cumulative negative impact with the proposed development beyond a slight increase in traffic volume on R152.
MCC Case Reference 21663, ABP Case Reference PL17.310729	Tunis Properties LLC	The proposed development consists of the following: construction of a two storey (with mezzanine levels at both storeys) data storage	Granted by An Bord Pleanála in April 2022. The data centre is 3.3km

Reg. ref	Applicant	Development Summary	Decision
		facility building with a maximum overall height of c. 25 metres, containing data halls, associated electrical and mechanical Plant Rooms, a loading bay, maintenance and storage space, office administration areas, screened plant and solar panels at roof level, all within a building with a total gross floor area (FGA) of c. 28,566 sq.m.	from the proposed development or approved 110kV Substation at the SSE site. They are not considered to have a cumulative impact on the site on the basis of distance.
MCC Case Reference 221718	Eirgrid	An uprate of the existing Drybridge to Platin 110 kV Overhead line (OHL) {approximately 5.6 km long and comprising 33no. structures (excluding LCIM 13a and LCIM 14 which are consented under separate planning application) and 2no. gantries between the existing Drybridge 110 kV substation in the townland of Tullyallen, Co. Louth and the existing Platin 110kV substation in the townland of Platin, Co. Meath	Granted by Meath County Council in February 2023. The proposed development will not negatively impact on the existing Platin 110kV substation, and therefore will have no impact/connection to the proposed development or approved 110kV Substation at the SSE site.
MCC Case Reference 23458	Eirgrid	An Uprate Of The Existing Gorman To Platin 110 kV Overhead Line (OHL) (19.76 Km Long And Comprising 109no. Supporting Structures Between The Existing Gorman Substation In The Townland Of Caulstown, Co. Meath And The Existing Platin 110kv Substation In The Townland Of Platin, Co. Meath	Decision Pending By Meath County Council If Approved, The Proposed Development Will Not Negatively Impact On The Existing Platin 110kv Substation, And Therefore Will Have No Impact/Connection To The Proposed Development Or Approved 110kv Substation At The SSE Site.

1.8.4 Leinster Outer Orbital Route

Although the Leinster Orbital Route is referred to in the Meath County Development Plan 2021 - 2027, the Regional Spatial and Economic Strategy for the Eastern and Midlands Region (RSES), and the National Transport Authority's' (NTA) Transport Strategy for the Greater Dublin Area (2016-2035), it is not accounted for in the National Planning Framework (NPF) (Project Ireland 2040) which sets out the strategic plan for leading future growth and development of Ireland up to 2040. Furthermore, the Orbital route is also not included as part of the National Development Plan (2018-2027) which outlines investment priorities that support the implementation of infrastructural objectives in the NPF.

The RSES indicates that long term protection will remain for the outer orbital route (Leinster Outer Orbital Route) extending from Drogheda to the Naas/Newbridge area with intermediate links to Navan and other towns. The NTA Strategy for the GDA 2016 -2035 notes that while this project is not planned for implementation during the period of the Strategy, the finalisation of the route corridor and its protection from development intrusion is recommended.

MOV POL 23 of the Meath County Development Plan states it is the policy of the Council to support the delivery of the Leinster Orbital Route, which is considered to comprise important infrastructural development, and when finalised, to protect the route corridor free of developments which could interfere with the provision of the project.

MOV POL 37 of the Meath County Development Plan states it is the objective of the Council when finalised and agreed, to reserve the route corridor of the Leinster Orbital Route free of developments which could otherwise interfere with the provision of the project.

SSE understand the requirement for such route corridors in facilitating road development; however, given the urgent need and importance of the proposed development to support and reinforce the supply of electricity to the grid network in the wider area, such indicative routes should not prohibit other necessary and strategic infrastructure development from occurring..

The Leinster Orbital Route is not provided for within the government's leading strategic planning document (the NPF), nor provided for in the investment priorities set out in the National Development Plan. The route set out is also an indicative route corridor which is not finalised and may be subject to change. MOV POL 37 as stated above states it is the objective to keep the route corridor free of developments when finalised, however the route has not yet been determined and may not be determined for quite some time.

As noted in the ABP Inspector's Report (303/R303678) for the 110kV substation, the inspector stated it was not grounds for refusal due to the uncertainty of the orbital route and ultimately planning permission was granted by ABP.

1.8.5 Meath County Development Plan 2021-2027

As further detailed in the Planning Report (AOS Document ref. AOS120723-SSE-002), the proposed development has been assessed against the Meath County Development Plan 2021-2027.

Meath County Development Plan 2021-2027 Section 10.5.2 Climate Change Mitigation: *Mitigation is defined as any human intervention aimed at reducing harmful influences on the earth's climate system, including actions which actively reduce emissions and the creation or enhancement of carbon sinks. This can be achieved by using new technologies, making older equipment more energy efficient, or by changing management practices and consumer behaviour.*

However, even with significant improvements to the efficiency of technology, energy demand will still remain high. It is therefore essential to progress towards an energy system based on low or no carbon fuels. This means moving away from using conventional coal and gas-fired power to

electricity generated from renewable sources, and examining new technologies such as carbon capture and storage.

HVO is a low carbon fuel and supports the Meath County Development Plan's climate change mitigation strategy as outlined above.

The Meath County Development Plan 2021-2027 has a specific climate change policy, which the proposed development supports this policy as outlined in the below objectives and policies. The proposed development will enable a greater amount of renewables on the grid network and ensures security of supply. The relevant sections of the Meath County Development Plan 2021 - 2027 are:

- INF POL 44: To support Sustainable Energy Communities and local community group initiatives to develop clean energy opportunities within the county.
- INF OBJ 41: To promote the generation and supply of low carbon and renewable energy alternatives, having regard to the opportunities offered by the settlement hierarchy of the County and the built environment.
- ED OBJ 69: Engage with all relevant government stakeholders, enterprise agencies and sectoral representatives in pursuing 'green' approaches to economic development, and actively collaborate with key industry and educational bodies to promote Meath based initiatives across the economic sectors.
- INF OBJ 39: To support Ireland's renewable energy commitments outlined in national policy by facilitating the development and exploitation of renewable energy sources such as solar, wind, geothermal, hydro and bio-energy at suitable locations within the County where such development does not have a negative impact on the surrounding environment (including water quality), landscape, biodiversity or local amenities so as to provide for further residential and enterprise development within the county.
- INF POL 34: To promote sustainable energy sources, locally based renewable energy alternatives, where such development does not have a negative impact on the surrounding environment (including water quality), landscape, biodiversity, natural and built heritage, residential or local amenities.
- INF POL 35: To seek a reduce greenhouse gas emissions through energy efficiency and the development of renewable energy sources utilising the natural resources of the County in an environmentally acceptable manner consistent with best practice and planning principles.
- INF POL 38: To encourage that new development proposals maximise energy efficiency through siting, layout, design and incorporate best practice in energy technologies, conservation and smart technology.
- INF POL 41: To encourage the development of wind energy, in accordance with Government policy and having regard to the Landscape Character Assessment of the County and the Wind Energy Development Guidelines (2006) or any revisions thereof.
- INF POL 42: To support the identification, in conjunction with EMRA, of Strategic Energy Zones, areas suitable to accommodate large energy generating projects within the Eastern and Midlands Regional area.
- INF OBJ 47: To investigate the preparation of a Renewable Energy Strategy promoting technologies which are most viable in the County.
- HER POL 44: To require all development proposals to address the presence or absence of invasive alien species on proposed development sites and (if necessary) require applicants to prepare and submit an Invasive Species Management Plan where such a species exists to comply with the provisions of the European Communities (Birds and Natural Habitats) Regulations 2011-2015.

- HER OBJ 4: To encourage the management and maintenance of the County's archaeological; heritage, including historic burial grounds, in accordance with best conservation practice that considers the impact of climate change.

2 Description of Proposed Development

2.1 Description of Existing Environment

The proposed Open Cycle Gas Turbine (OCGT) Generating Plant & 110kV Substation site is approx. 10.55ha in size and located approx. 4.8km southwest of the centre of Drogheda, and approx. 2.7km northeast of the centre of Duleek (refer to Figure 1.1).

The site (the area upon which the proposed development is to be constructed) is currently a greenfield site and used for agricultural tillage. The land is situated approximately 450m to the south of a large cement manufacturing plant and its associated quarry (Irish Cement Ltd), at its nearest point to the site. In addition, the Indaver Waste to Energy facility lies immediately northwest of the site across the R152 road. Directly adjacent to the proposed development is a cluster of commercial and residential buildings including a commercial vehicle servicing centre and Commercial Vehicle Roadworthiness Test (CVRT) centre. Residential development in the vicinity of the site is scattered, typical of the rural location.

A site layout plan showing the layout of the buildings and structures is provided in the planning application documentation, drawing no. 60695232-PTN-DR-009 and 60695232-PTN-DR-002.

2.2 Proposed Site Operations

2.2.1 General Overview

The proposed development will consist of the construction of an Open Cycle Gas Turbine (OCGT) Generating Plant of up to 170 MW (electrical output) for SSE Generation Ireland Ltd. (SSE), to be located at a site at Carranstown, Platin, Duleek, Co. Meath.

The OCGT Generating Plant will comprise of 3 no. modular gas turbines of up to 170 MW, designed for flexible operation, allowing for fast starts, and cycling capabilities to be able to respond rapidly to load changes on the grid. The plant will only operate when demand on the electricity system is high or when there is a shortage of supply on the grid. Generating Plants such as the one proposed, facilitate the increasing amount of renewable energy on the electrical grid system as they can respond quickly to the intermittent nature of renewable energy due to their rapid response time.

The electricity generated from the proposed development will be fed up to 2 no. step-up transformers where the voltage will be stepped up for transmission from a local sub-station into the national grid at the already consented 110kV substation located on the same site.

The proposed development will be fuelled by hydrotreated vegetable oil (HVO). HVO is a biofuel that is produced by processing waste oils to create a fossil-free alternative to distillate-oil in accordance with EU sustainability standards. The plant will also have a supply of HVO onsite in accordance with the Commission for Regulation of Utilities (CRU) requirement for 84 hours of fuel storage.

Pending the grant of planning permission, construction is expected to commence in Q4 2023 with first operation of the plant in Q3 2026.

The proposed development will comprise a 170MW (electrical output) Open Cycle Gas Turbine (OCGT) Power Plant. The proposed development will comprise an electricity generating plant which will use Hydrotreated Vegetable Oil (HVO) as fuel and will be connected to a previously permitted 110kV substation (ABP-303678-19) and associated site works and improved access from the R152. The development comprises the following elements:

a) Three gas turbine buildings (each 990m^2) each housing 1 no. turbine, 1 no. generator and auxiliary equipment with a total of 269 MWth (thermal output) generating capacity all on concrete plinths.

b) The power plant will have three exhaust stacks (25m in height), one exhaust stack per OCGT. Therefore, each OCGT will comprise a standalone Large Combustion Plant. The power plant may need to utilise, selective catalytic reduction (SCR) (18m high, 4.5 width, 14m length) for nitrogen oxide (NOx) abatement.

c) Water treatment plant comprising:

- a 275m^2 Deionising Building (6m high x 11m wide x 25m long)
- a raw water treatment tank of 2,262m^3 (12.8m high)
- a deionised water tank (max. volume of 3,925m^3) 15.4m high
- a processed water tank of 450m^3 (9m high)
- 1 no. 20m^2 firefighting water tank of 45m^3 (2m high)
- 1 no. 25m^2 firewater module (4m high x 5m wide x 5m long)
- 1 no. sanitary foul water cesspool tank of 79m^3 located underground (1.98m high x 2.5m wide x 16m long)
- a bulk chemical storage area (4.75m wide x 7.75m long)

d) 2 no. HVO tanks (max. storage of 2300 m^3 of HVO per tank),13m high with a diameter of 15m and associated fuel pumping and filtering equipment and pipework, within a 43.5m L x 45.5m W x 1.5m Bund capacity is 2970m^3

e) 1 ammonia tank – (1.8m high 3.5m length with bund 2.5 m x 5 m with a height of 1.5 m)

f) 1 no. fuel polishing system (3m high x 6m wide x 24m long)

g) 2 no.110kV transformers each 160m^2, and each measuring (5m high x 10m wide x 15m long). 3 no. Lightning Masts (18m in height) and kiosks, cable gantry connection to the adjoining consented 110kV Substation.

h) a 520m^2 services building (6m high x 13m wide x 40m long)

i) a 160m^2 Switchgear (MV) building (5m high x 6.1m wide x 26.3m long)

j) all other miscellaneous and ancillary site works, including: 12 no. Car parking spaces and 1 No. fuel unloading bay, one lowered site platform area, new internal access roads and hard and soft landscaping including material berms (1.2m to 2m high), a temporary construction compound, temporary security building, and associated fencing.

k) New road markings, including deceleration lane approaching the site, on the R152

The proposed development will include connection to public water mains and wastewater provision, supplied by Uisce Éireann. There is no sewer connection required as foul and process waste will be collected in a sealed tank and emptied by a specialist waste service provider.

The proposed development will connect to a previously consented 110 kV substation which will be located adjacent and to the south-west of the proposed OCGT Power Plant.

The application relates to a development which comprises or is for the purposes of an activity requiring an Industrial Emissions Directive (IED) licence, and full details of the proposed development and its anticipated environmental impacts will be notified to the Environmental Protection Agency.

This is a site to which the Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015 (S.I. 209 of 2015) applies.

Figure 2.1 illustrates the proposed layout plan of the site for the proposed development.

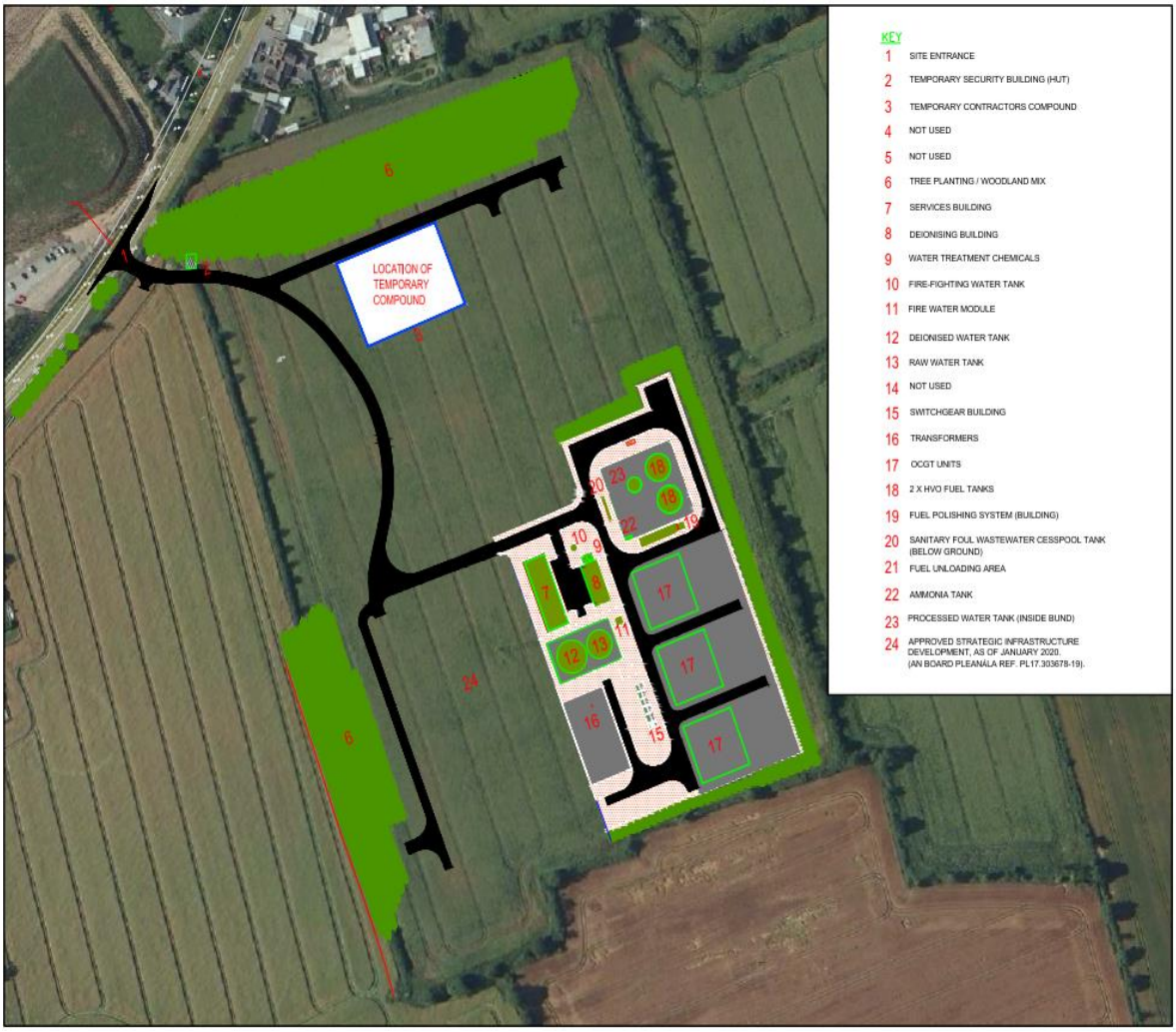


Figure 2.1: Site Key Overlay Plan of the Proposed Development (see drawing no. 695232-PTN-DR-009).

2.2.2 Operational Phases and Staffing

Normal operation of the plant will be as a backup peaking plant, i.e. it will be used to cater for peaks in national electricity demand. Electricity demand is at its highest during the evening peak around 6pm during the winter months, particularly between November and February. However, this plant will be on standby for use at any time throughout the year, as it may be required to cover electricity supply shortages or maintenance outages of other plant. Plants of this type are commonly in use throughout the world to support peak demand.

Operation over extended periods is not foreseen. The running regime, in terms of loads and runtime, will depend on the size of the peak load experienced. It is anticipated that the plant will typically operate for an anticipated maximum of 1800 hours per year with the highest expected demand during winter months.

The proposed development will generally be run under automatic control from a remote location as is the case with other similar plants. From Monday to Friday it is envisaged that up to 3 people will be on site carrying out routine management, security and maintenance with personnel ‘on call’ as required.

2.2.3 HVO Usage

The proposed development will run on Hydrotreated Vegetable Oil (HVO), which is a type of biofuel that is produced by processing waste oils to create a fossil-free alternative to distillate-oil in accordance with EU sustainability standards. Biofuels provide a transitional step away from fossil fuels and towards low-carbon hydrogen. The proposed development supports an orderly transition to a low-carbon world whilst also tackling Ireland's security of electricity supply challenges. The fuel itself is a waste by-product, it does not involve any food displacement and has a lower greenhouse gas emissions profile across its lifetime when compared to alternatives such as diesel combustion. Biofuels also provide a transitional step away from fossil fuels and towards low-carbon hydrogen.

The Developer is committed to sourcing HVO that is third party Certified to RED-II under the International Sustainability and Carbon Certification (ISCC). HVO will be sourced from 100% waste feedstocks, the raw materials for which are grown on a seasonal basis so there is no long-term "carbon debt". Supplied HVO will comply with the Renewable Energy Directive II (RED II) (Directive (EU) 2018/2001) which provides specific sustainability criteria and the carbon intensity of individual biofuels, including an assessment of the feedstocks used and the emissions from its production, processing and supply, and will be certified accordingly by a third party. There is an existing HVO supply chain and infrastructure in Ireland which the Proposed Development will utilise. The transport of HVO from this existing infrastructure to the Site has been taken into account in the delivery of HVO.

2.2.4 Description of Activities in Each Building

All proposed buildings and plant on site are depicted on planning drawing no. 60695232-PTN-DR-009.

Combustion Turbine Units (OCGT Generating Plant)

As presented in Section 2.2.1, there will be 3 no. modular Open Cycle Gas Turbines units. The principal major components for each of the 3 no. gas turbine consist of a compressor, a combustion chamber, a turbine and an electricity generator coupled together. Each unit also has a control and switchgear enclosure which contains electrical switchgear for controlling the unit as well as a protection system and control system / Human Machine Interface (HMI) for operating the unit.

The compressor draws in and compresses large quantities of air from the atmosphere. In the event of over pressurisation of the air in the compressors, the air will vent safely to atmosphere via a dedicated relief vent circa 15m high. The air is directed into the combustion chamber and mixed with fuel, after which combustion takes place. The resulting hot gases are expanded in a turbine which provides both the energy of compression and rotational energy for the generation of electrical power.

Water injection will be used for nitrogen oxide (NOx) suppression. This involves the injection of deionised water from a storage tank on site into the combustion chamber. This reduces the combustion temperature and so reduces the formation of thermally-produced NOx.

The output of hot gases is regulated by controlling the flow of fuel to the combustion chamber area.

The expansion of the hot gases through the turbine and the extraction of mechanical work via the turbine reduces the temperature of the gases. The hot gases are then cooled through the injection of ambient air before being treated with Selective Catalytic Reduction (SCR) to reduce NOx before being discharged to atmosphere via an exhaust stack.

Ignition gas, such as propane, may be required for start-up purposes. Such events would require a very small amount of ignition gas (expected to be c. 0.3kg per start-up) and the quantity of ignition gas stored onsite will be minimal. Containers for ignition gas are standard type 11kg cylinders for ease of replacement. The containers will be stored securely in a designated cabinet on the liquid fuel skid.

Water Treatment Plant

Water will be supplied from the MCC/Uisce Éireann mains supply to the water treatment plant which will produce deionised water for injection to each combustion turbine for abatement of NOx formation.

Deionisation of the water will take place on site using an ion exchange plant in the Deionisation Building. This process is in widespread industrial use for water purification. The ion exchange process is based on the principles of chemical adsorption whereby synthetic solid resin beads are used to attract ions in solution and to exchange these for ions such as hydrogen and hydroxyl ions. The adsorption sites on the resin heads are progressively occupied by target ions so that the ion removal efficiency of the resin is reduced.

It is necessary therefore to regenerate the resin to restore its ion exchange capacity at intervals depending on water throughput and the ion concentration in the feed water. Hydrochloric acid (HCl) and sodium hydroxide (NaOH) will be used for this purpose. An appropriately bunded storage area for hydrochloric acid and sodium hydroxide is located external to the water treatment plant building and will be used in the regeneration process. These chemicals will be stored and used in accordance with best practice guidance including the Storage and Transfer of Materials for Scheduled Activities (EPA Guidance Note, 2004) which outlines bunding capacity requirements and Industrial Emissions (IE) Licence conditions for the site, to ensure the safety of operating personnel and the environment.

Wastewater streams from acid and base backwashes are combined and neutralised until a pH of 6—9 is achieved in an underground processed water storage 90m^3 tank. The maximum volume of this processed water being produced will be c. 73m^3 per day. This waste water will contain the naturally occurring inert salts removed from the water supply (typically carbonates, chlorides, silicates, sulphates, calcium, magnesium or iron) concentrated to 8 to 10 times their normal levels. This tank allows suspended particles to settle out of water or waste water as it flows slowly through the tank, thereby providing some degree of purification. A layer of accumulated solids, called sludge, forms at the bottom of the tank which is periodically taken off-site to a suitably licensed waste facility. The processed waste water itself will be removed from the site as required by an appropriately licensed waste collector for treatment off-site.

HVO Storage and Transfer

HVO will be delivered by road tanker. There will be one fuel unloading point onsite. This area will be appropriately bunded in accordance with best practice (Storage and Transfer of Materials for Scheduled Activities, EPA Guidance Note) to 110% of the storage tank capacity. The HVO will be stored in two aboveground oil storage tanks with a maximum volume of fuel stored onsite of 4,600m^3. The tanks will incorporate a vent which will be fitted with an oil vapour trap.

The HVO undergoes polishing in the fuel polishing skid on site. This fuel polishing system is required to maintain the HVO within specification acceptable to the generation units. The system operates by extracting fuel oil from the tank sump, passing it through a series of filters to remove particulates and water before returning it to the tank. The separated water and particulates are stored in a separate small plastic tank for off-site disposal as required.

Services Building

There is a Services Building proposed onsite. This building will contain the site office, work permit room, meeting room, first aid room and storage facilities for parts and equipment. The provision of a control room within this building, will allow the site technicians to operate the units from this building. Welfare facilities such as toilets, showers and canteen facilities will also be included.

Control and Instrumentation

A complete control and instrumentation system will be provided to achieve effective control and monitoring of the plant operation both onsite from a central control room (CCR), and from a remote location. The system will automatically control the plant during all steady-state conditions, plant abnormalities, start-up and shutdown. Plant safety will be monitored and the system will

automatically affect an emergency shutdown in a fail-safe manner where required. All unnecessary shutdowns will be avoided.

The operating characteristics of the plant are inherently flexible, and the control system will provide for flexible operation.

Fire-Fighting System

There will be a comprehensive fire detection and fire-fighting system on the site. A fire protection design basis document containing a risk assessment will be developed and this will inform the design of the fire system as part of the proposed development's industrial emissions (IE) licence application to the EPA.

Electrical Systems (OCGT Generating Plant)

Two 11kV/110kV step-up transformers will be required on the site. One of the transformers will be a dual winding transformer connected to two generating units, while the second transformer will be connected to the other generating unit. These transformers will step up the voltage of power generated by the units to 110kV for export to the national grid. These transformers will be appropriately bunded to the required capacity as per best practice (Storage and Transfer of Materials for Scheduled Activities, EPA Guidance Note).

The electricity will be exported to the national grid via the 110kV line currently traversing the site at the 110kV substation.

Each generating unit has a control and switchgear enclosure which contains the electrical switchgear at 11kV and 400VAC level for controlling the unit as well as a protection systems and control system / HMI for operating the units.

There will also be a separate balance of plant electrical switchgear building which will contain the 11kV and low voltage (LV) electrical supplies for the site. This will also contain the control, protection and metering panels for each generating unit and a supervisory control and data acquisition (SCADA) system for remote operation of the units.

2.2.5 Decommissioning Activities

The impacts expected and mitigation measures required in the decommissioning phase are expected to be similar to those of the construction phase. Decommissioning of the proposed development would be subject to grant of approval by Meath County Council. In the event of the proposed development being decommissioned at the end of its operational lifetime (expected to be 20 years), a designated Decommissioning Management Plan will be developed which will outline the mitigation measures required, similar to those outlined in the Construction Environmental Management Plan and submitted to Meath County Council for approval.

2.2.6 Environmental Management System (EMS)

SSE commits to protecting the environment, preventing pollution and minimising adverse environmental impacts. SSE's key principle and enduring goal is to protect the environment and operate in a sustainable way and this includes but is not limited to:

- Comply with all relevant legal, regulatory, and voluntary (those determined by SSE, outside of the requirements outlined in grant of planning conditions and IE licence conditions) environmental obligations.
- Assess the environmental impact of new development projects and work to mitigate negative impacts.

The proposed development will be designed to current environmental regulations and standards and will comply with Best Available Techniques (BAT) Reference Documents (BREFs) on:

- Large Combustion Plants
- Emissions from Storage
- Energy Efficiency

– Monitoring of Emissions to Air and Water from IED Installations

The development will be designed to minimise accidental emissions and liabilities from key environmental risks and will include pollution prevention measures such as appropriate containment/bunding of all fuel and chemical storage tanks and pipelines, associated monitoring measures such as high-level alarms, leak detection alarms etc., fire detection and prevention systems, and appropriate waste storage areas.

SSE manages any environmental impacts or risks by applying and continually improving a Safety, Health and Environment (SHE) Management System. This SHE management system is accredited to international standard ISO 14001:2015 Environmental Management System.

Under this, a documented system of policies, procedures and forms are available to ensure that all activities onsite are conducted in a manner which will minimise adverse environmental impacts. All SSE staff are trained on this system to ensure that these procedures are followed in their day-to day activities and to ensure that they can identify the environmental aspects of their work and how to minimise these impacts.

The site management team will be directly responsible for the implementation of the environmental management system onsite and will ensure that adequate resources are available to establish, implement, maintain and improve the environmental management system.

There will also be an Environmental Co-ordinator designated to this site who will have the authority and responsibility for establishing, operating and maintaining the environmental management system. They will also ensure compliance with this system in addition to the Industrial Emissions (IE) licence and the greenhouse gas permit issued by the EPA.

As part of this system there is a non-conformance and corrective action procedure. This ensures appropriate and timely response to environmental incidents, hazards, near misses, etc. This procedure provides for immediate corrective action to be taken when faced with an incident. The EMS also incorporates risk-based thinking to identify risk and ensure that an incident does not recur.

There will also be an emergency response procedure developed for the site to ensure that unplanned emergency situations that may cause environmental damage are controlled and managed to ensure the impact on the environment is minimised. This includes events such as oils spills, chemical spills, fires, etc.

2.3 Construction Phase

Construction works are expected to commence on site in Q4 2023 (subject to receipt of planning permission) with a total expected duration of 30 months.

Normal construction working hours will be daytime only and it is not anticipated that any late night working will be required. Any night works will be notified to the local authority prior to its occurrence. The total number of construction staff on-site will vary during the construction phase of the development but is expected to peak at 40-60 persons.

Pending approval of the proposed development by Meath County Council, the approved 110kV substation will be constructed in conjunction with the proposed development construction. A temporary construction compound will be erected for the project within the redline boundary of the proposed OCGT Generating plant site (see Figure 2.1) for the duration of the construction works. It will be used to store equipment and supplies and will include laydown areas and provide all the necessary temporary facilities such as portacabins, staff welfare facilities, car parking etc. All areas under construction will be fenced for security and safety purposes and temporary lighting supplied as necessary.

The construction works, in summary, will involve site clearance and preparation, laying drainage and services for the site, laying of foundations for plant and buildings, installation of plant and equipment, mechanical and electrical installations, concrete works (bunds etc.), hard surfacing and paving, landscaping and fencing. Construction equipment used will include heavy duty earthmoving and excavating equipment, Heavy Goods Vehicles (HGVs) and concrete trucks, mobile cranes and hoists.

The construction phase impacts and any necessary mitigation measures are detailed in each of the relevant Chapters of this Environmental Report. A Construction Environmental Management Plan (CEMP, PM Group Document Reference No. IE0312377-22-RP-0018) has been developed to implement the mitigation measures set out in this report and any specific mitigation measures associated with the planning permission conditions to manage potential environmental impacts that could affect human health or the environment. The CEMP will be a key construction contract document, which will ensure that all mitigation measures, which are considered necessary to protect the environment, prior to construction, during construction and during operation of the proposed development, are implemented.

The plan includes the relevant dust and noise management measures, fuel and chemical storage and handling measures, storm water management, waste management, traffic management and the means to protect the public road. The CEMP will form part of the overall Construction Management Plan for the proposed development.

A suitably qualified senior member of the Construction Management Team will be assigned responsibility for its execution, maintenance and on-going review. The appointed main contractor and all sub-contractors will ensure compliance with the CEMP. Communications will be maintained with Meath County Council throughout the construction phase of the development. The final CEMP itself will be subject to ongoing monitoring (throughout the construction phase of the proposed development), through regular environmental auditing and site inspections. This will confirm the efficacy and implementation of all relevant mitigation measures and commitments identified in the application documentation.

3 Population and Human Health

3.1 Introduction

This Chapter assesses the likely impacts of the construction, operational and decommissioning phases of the proposed development on the human environment and outlines mitigation measures to minimise impacts where appropriate.

3.2 Description of Existing Environment

The proposed development is located on the boundary of Carranstown and Caulstown townlands, approx. 2.7km northeast of Duleek, County Meath. The centre of Drogheda Town is located approximately 4.8km northeast of the site. The proposed site is greenfield currently used for agricultural purposes. While much of the surrounding area is semi-rural in nature there is an existing large cement manufacturing plant and its associated quarry located approx. 600m just to the north of the site, Irish Cement Ltd. and a Waste to Energy facility, Indaver, is immediately 400m northwest of the site. In addition, Indaver Waste to Energy facility lies approx. 400m northwest of the site across the R152 road. Residential development in the vicinity of the site is scattered, typical of the rural location. Commercial activities such as a service station and Commercial Vehicle Roadworthiness Testing (CVRT) Centre are associated with the residential development. Nearest resident property is approx. 80m from the proposed site entrance.

The area in which the proposed site is located does not have any specific land zoning in the Meath County Development Plan 2021-2027. The proposed development is located between the electoral divisions (ED) of Duleek and St. Mary's Drogheda. In the 2016 Irish Census, the population of Duleek ED was 5,554 people while the population of St. Mary's ED was 11,967 bringing the overall population within the two electoral districts to 17,521. In the most recent Irish Census (2022), the population of Duleek ED was 6,250 while the population of St. Mary's ED was 23,157 bringing the overall population within the two electoral districts to 29,407. St. Mary's ED straddles the Louth-Meath county border, and is presented in two parts in the 2022 Census along the county border as St. Mary's, Meath and St. Mary's (Part), Louth.

3.3 Construction Impacts and Mitigation

As the construction of the proposed development will occur at the same time as the construction of the approved 110kV Substation development, there is potential for impacts on human population with temporary increases in traffic and noise. The mitigation measures outlined in the Environmental Reports and any relevant planning conditions for each project will be incorporated into a Construction Environmental Management Plan for each project, and these plans will align with each other and will be strictly followed to ensure there are no negative cumulative impacts.

As with any construction site there will be potential risks to the health and safety of construction personnel / visitors on site. Safety is SSE's core value and the highest safety standards will be maintained during construction. A comprehensive Health & Safety programme as set out by SSE (SSE Group Safety & Health Policy Summary PO-SHE-001 and SSE Group Health and Safety Policy PO-GRP-015) will be put in place to minimise any risks to and ensure the health and safety of construction personnel, site visitors and any local residents.

The construction of the development is not predicted to have any significant impact on the health of local residents. Individual environmental impacts on the local human environment such as noise or traffic generation are discussed in the relevant Chapters of the Environmental Report. The environmental impact of the construction activity will be minimised by specifying high standards of housekeeping, appropriate attention to environmental issues within the construction contracts, and by on-going monitoring of performance during construction. A CEMP has been developed to implement the mitigation measures set out in this report and manage potential environmental impacts that could affect human health such as dust and noise emissions, fuel and chemical storage and handling, waste management and traffic management. The CEMP sets the basis for ongoing management of construction activity.

Mitigation measures for air emissions as outlined in CEMP:

- Set requirements through CEMP goals, site inductions, toolbox talks and awareness training of staff.
- During dry periods, use dust-dampening techniques (e.g. water dampening of dust on roads, use of low speed limits onsite and use of covers on dusty materials during transport and storage).
- Ensure contractors complete pre construction checks on vehicles and have pre start checklists for daily checks and carry out service of plant to ensure there is no excessive pollution from plant and machinery.

Mitigation measures for noise as outlined in CEMP:

- Use plant and machinery with noise emissions under specified noise levels.
- Use noise-dampening measures (e.g. shields, covers, acoustic barriers) on noisy plant and machinery where appropriate.

Mitigation measures for traffic as outlined in CEMP:

- Defined route of transportation to site - the HGV route to the site during the construction phase will be from the M1 motorway exiting at Junction 8 (Lower Platin) via the R152, directly to the site. The distance from the motorway to the site is approx. 2.1km. No HGVs will be required to access Duleek village and will be prohibited from doing so. No HGV construction traffic will be permitted to approach the site on the R152 from the south and therefore there is no requirement for a right-turn lane at the site entrance. All workers for the construction and operational phases will follow this route to the site.

The construction phase of the development will last 30 months and 40 to 60 workers, both skilled and unskilled, will be employed on site at peak times. Local services and construction staff from the surrounding areas will be used where possible during the construction phase. Therefore the construction of the development will have a temporary positive impact on employment and the local economy.

With a relative small workforce and short-term construction stage, no negative effect on surrounding road network is expected as further detailed in Chapter 5.

The construction phase of the development is not predicted to have any significant adverse impacts on the population and settlements.

3.4 Operational Impact and Mitigation

The proposed development will generally be run on automatic from a remote location as is the case with other similar plants. From Monday to Friday it is envisaged that 4 no. people will be on site carrying out routine management, security and maintenance, with other personnel ‘on call’ as required.

The environmental emissions from the proposed development (e.g. emissions to atmosphere, noise etc.) are discussed in the relevant chapters of this report but are not predicted to have any significant adverse impact on the human environment. Environmental emissions from the plant during operation will comply with applicable regulatory requirements and with the terms and conditions specified in an Industrial Emission (IE) Licence to be issued by the EPA. The environmental control technologies will be designed on the basis of BAT (Best Available Techniques) to ensure the protection of human health and the environment. Adherence with BAT/BREF requirements (and associated ELVs) is built into the design of the plant. Therefore, the operation of the proposed development will not have any significant any adverse impact on human health.

As stated in Section 1.6 of this report, the proposed development will be a category of development to which the COMAH Regulations apply.

To support the planning application in the context of the COMAH Regulations, a COMAH Land Use Planning Risk Assessment of the proposed development has been completed by Byrne Ó Cléirigh and is submitted with the planning application. This report summarises the assessment of the development and conclusions as to the change in on-site and off-site risk between the existing site and planned development.

The main findings of the assessment are as follows:

– All developments or occupied areas that are inside the various Land Use Planning zones at the subject site (inner, middle and outer zones) satisfy the Health and Safety Authority (HSA)'s acceptability criteria for individual risk.
– The societal risks presented by the proposed development are broadly acceptable, based on the HSA's criteria for societal risk.

Based on the above, the Land Use Planning Risk Assessment considers that "the proposed development of a thermal plant at Platin, Co. Meath would satisfy the HSA's criteria under its land use planning guidelines and, as such, the HSA would not advise against the proposed development on that basis".

Subject to these regulations, the proposed development will be tightly controlled under specific rules for the prevention of major accidents involving dangerous substances, which will be put in place to limit as far as possible the consequences for human health and the environment of such accidents.

3.5 Decommissioning Impact and Mitigation

The impacts expected and mitigation measures required in the decommissioning phase are expected to be similar to those of the construction phase. Decommissioning of the proposed development would be subject to grant of approval by Meath County Council. In the event of the proposed development being decommissioned at the end of its operational lifetime (expected to be 20 years), a designated Decommissioning Management Plan will be developed which will outline the mitigation measures required, similar to those outlined in the Construction Environmental Management Plan and submitted to Meath County Council for approval. The decommissioning of the proposed development is not predicted to have any significant impact on the health of local residents.

3.6 Cumulative Assessment

There will be no cumulative impacts of the proposed development on the basis of strict tight controls used in the construction and operational phases and nearby industrial facilities/ planned projects on human health in the vicinity of the development.

As the construction of the proposed development will occur at the same time as the construction of the approved Indaver development (ABP case reference PA17.307433), there is potential for cumulative impacts on human population with temporary increases in traffic and noise. The mitigation measures outlined in the Environmental Report and any relevant planning conditions for each project will be incorporated into Construction Environmental Management Plan (PM Group Document no. IE0312377-22-RP-0018). This is expected to be short term in nature and occurring during the construction phase of both developments.

3.7 Conclusions

The proposed development is not predicted to have any significant adverse impact on the human environment and will significantly improve the capacity and security of electricity supply in the area. The development will have a positive impact in terms of temporary and permanent employment opportunities in the locality.

4 Landscape and Visual Impact

4.1 Introduction

This Chapter describes how the Proposed Development will affect the appearance and character of the area – both locally and the wider context. There are descriptions of the Proposed Development contained in the Planning Application Report that accompanies this application. Section 4.5 below describes the Proposed Development in more detail.

The Subject Site (Site) is located in the townlands of Carranstown and Caulstown at Platin in Co. Meath, approximately 4km north-east of the village of Duleek, and 4km south-west of Drogheda. The c.10.5hectares (ha) Site lies on the south side of the R152 road, and is currently in agricultural use.

The assessment is supported by a series of images that illustrate how the project will appear 'before' and 'after' from a number of locations. This Chapter has been prepared on the basis of visits to the Site and its surroundings, examination of relevant documentation such as the Meath County Development Plan 2021-2027 (CDP) as well as Ordnance Survey Plans and maps at various scales. The Chapter also draws on experience of addressing concerns expressed in relation to previous planning applications on and adjacent to these lands.

The EPA Advice Notes on Current Practice (in the preparation of Environmental Impact Statements) 2003, notes that Landscape has two separate but closely related aspects. The first aspect to be considered is visual impacts focusing on the extent to which new developments can be seen, the second aspect is impacts on the character of the landscape, examining responses which are felt towards the combined effects of the new development. This latter topic is complex because it encompasses many other impacts such as noise, odours, ecology, history and because attempts to scientifically measure feelings and perceptions are not reliable.

For this reason, the impacts described in this assessment primarily relate to visual impacts – except where otherwise noted. Impacts with a potential to affect the character of the landscape are described in the relevant specialist chapters such as noise, odours, ecology, and history.

4.1.1 Scoping and Screening

The 'Scope' of this section arises from consultations with Meath County Council (MCC). Prior experience together with the consultations identified that the issues arising in relation to landscape and visual impacts, specifically the location of designated and representative viewing points and the sensitivity of the UNESCO sites to the north.

4.1.2 Assessment Methodology General

The assessment follows the layout and content suggested by the Environmental Protection Agency (EPA) Guidelines on Information to be Contained in EIARs and also to the Institute of Environmental Management and Assessment (IEMA) Landscape Institute (LI) Guidelines on Landscape and Visual Impact Assessment (LVIA) (see below).

Description of the receiving environment (environs and site) having regard to:

- Context;
- Character;
- Significance (including designations); and
- Sensitivity.

Description of the proposed development including:

- Siting;
- Design; and
- Site Works.

Description of the likely significant impact including:

- Potential Impacts; and

– Residual Impacts.

Description of mitigation measures including:

– Avoidance
– Project Design, Site Layout Configuration of Structure.

4.1.2.1 Competence of Assessor

The Assessment has been carried out by Conor Skehan, a landscape architect[6] who has over 40 years of experience of Landscape and Visual Impact Assessment. Conor Skehan was a co-author of the first editions of *Guidelines for Landscape and Visual Impact Assessment* [Spons & Landscape Institute] as well as the *Guidelines on the Information to be contained in Environmental Impact Assessment Reports* EPA. He has also prepared Landscape Character Assessments for many Irish counties.

4.1.2.2 Other Forms of Assessment Considered

Other forms of assessment are available and were considered before being deemed inappropriate for the circumstances of this project.

Scale models have little predictive capacity for establishing landscape and visual effects due to the generalised nature of the representation and the inability to accurately model local effects of micro-topography, walls and vegetation which are critical determinants of visual impacts in rural settings.

'ZVI' Analysis – an assessment of the 'Zone of Visual Influence' of a project is a computer-based simulation of the theoretical extent of an area of topography that will be illuminated from a simulated point of light at the highest point of a structure. It is most effective when used to assess the theoretical maximum extent of visibility of tall single objects in large-scale open landscapes. It takes no account of the effects of vegetation. It was not deemed appropriate to use in this instance on account of the significance of the effects of mature vegetation and the screening role of tall hedgerows which cannot be modelled.

4.1.2.3 Worst Case Assessment

In accordance with EIAR methodology[7] best practice is to identify and describe 'worst case' impacts as well as providing representative views within the area likely to be affected – including indications of nearby areas from which the proposed development will not be visible. In the case of Landscape and Visual Impact Assessment this involves the following:

– Views from gates and entrances offering the most unscreened views of the development site;
– Views at locations where roadside hedges have gaps or gates offering unscreened views of the development site;
– Views from Protected Structures and Views and their context/setting; and
– Views 1 – 5 that were examined in the previous application.

Views were selected on the basis of the scoping described above, experience from previous planning applications, site visits and the consideration of 'worst case' described above.

These view locations have been selected in an attempt to satisfy the following criteria:

– To provide continuity with the relevant Viewing Points used in previous application;
– To obtain views from locations where the development would be visible from the public realm;
– To illustrate 'worst case' views;
– To examine views identified as being of concern by Meath County Council in scoping;
– Concentrations of potential viewers;
– Locations of amenity significance; and
– Locations of heritage significance.

[6] Conor Skehan has is qualified as a landscape architect [MLA *summa cum lauda* U Penn]. Dipl Arch [DIT; B Arch [Trinity]. He has been chartered as an architect [RIAI], Landscape Architect [ILI – Co-founder and Past President], Impacts Assessor [IEMA and IAIA].
[7] *Guidelines On The Information To Be Contained In Environmental Impact Assessment Reports* (EPA 2017)

On the basis of these considerations, views were examined and modelled from 12 locations. The locations are shown on the following page while the following table provides a description of each location together with the reason for the selection of each.

4.1.2.4 Limitations to methodology for describing visibility

There are limitations to descriptions of visual impacts in the wider landscape. These arise on account of the almost infinite number of potential viewing positions as well as the variability of factors at each position.

Extent of area of visibility

Theoretical visibility extends to the horizon. This is not a static property because its apparent distance arises from a number of factors that include observer height and relative topography. For a person of average height, theoretical visibility extends for a distance of 4.8km to the horizon at sea level, however this distance increases to 36 km for an observer at a height of 100m. Within these distances there are further limitations relating to discernment [the ability to detect an object diminishes with distance]; atmospheric effects [lessening of visible detail caused by light refraction, mainly due to water vapour], lighting conditions [more or less illumination due to time of day and year].

On account of these limitations, the assessment of the zone of potential visual impacts is confined to an area that is significantly less than the zone of maximum theoretical visibility.

Extent of area affected.

There are further limitations to the precision with which the extent of the area affected can be described. The locations from which a development will be wholly, or partially visible, is determined by considerations that include the location of the viewer as well as a range of factors in the vicinity.

Viewer location itself can vary according to eye-height – seated [in a car], standing or within a touring coach for example. There can also be local variability at a specific named location – say on a road or in the vicinity of a dwelling. A road can have up to 15m width of different viewing points; A rural dwelling boundary can have up to 50m of different viewing points, Finally, there can be variability in the local screening due to temporal effects - such as seasonality (annual vegetation effects); weather (rain, sun direction) and land management (annual hedge-trimming and crop height).

Approximation of location and extent of visual impacts.

Having regard to these considerations, the accuracy of visual impact descriptions needs to avoid an over-precision that is unattainable in practice. For this reason, descriptions of the location and extent of where landscape and visual impacts will occur are usually described with approximate dimensions, such as ‘affecting approximately 500m along the R152’ or ‘discernible for a distance of approximately 1.5km from the site’.

Size of photomontage images representing proposed development

Note that for ease of reproduction. The images included for illustration in Section within this Chapter are smaller views than recommended. The correctly sized A4 views are available in Attachment 8. When viewed at arm’s length, these correctly illustrate how the project will appear in reality. All images were prepared using 50mm lens with an 80 degree angle of vision – to approximate a natural view. Note that only View 1 uses a wide angle view.

4.1.3 Assessment Methodology Rationale for Selection of Views

4.1.3.1 Identification of Relevant Protected Views for Assessment

The Meath County Development Plan includes a table and maps [Map 8.6] of Protected Views and Prospects.

View ID	Direction of View	Location
01	North West	County road between Ross and Moneybeg
02	South	County road at Bellewstown
03	South	County road from R154 at Boolies
04	North	R154 between Patrickstown and Oldcastle I
05	South	R154 between Patrickstown and Oldcastle II
06	Panorama	Slieve na Calliagh
07	South East	County road between Rahaghy and Patrickstown
08	South West	County road between Skerry Cross Roads and Ballinlough
09	West	County road between Crossakeel and Magee's Cross Roads
10	North West	County road between Crossakeel and Ardglassan
11	South and West	County road between Ardglassan and Rathnikka
12	North	County road between Keeran's Cross Roads and Commons of Lloyd at Castlepole
13	Panorama	Tower of Lloyd at Kells
14	North North East	R163 between Kells and Drumbaragh
15	East	County road between Carlanstown and Ardlonan
16	North East and South West	County road to north of Moydorragh
17	North North East	County road between Mullagheven Cross Roads and Gorrys Cross Roads
18	North, North East and East	County road between Mullystaghan and Robertstown
19	East and North East	Car Park at Whitewood Lough
20	North	County road between Cormeen and Breaky Bridge
21	North	County road between Miltown Cross Roads and Ervey Cross Roads
22	North East	County road between Corratober Bridge and Rathlagan
23	North East	County road between R165 and Mullaghmore
24	West and North West	County road between Rathkenny and Parsonstown Demesne
25	North West	County road between Horistown and Creewood I
26	West	County road between Rathkenny and Dremirstown
27	South East	County road between Horistown and Creewood II
28	North East	County road between Rathkenny Cross Roads and Sallygarden Cross Roads
29	East, South East and South	Car Park at Hill of Slane
30	Panorama	Hill of Slane
31	North	County road between Boyne Canal and Roughgrange
32	East, South and West	At cross off county road to north of N51
33	East	At Proudstown Cross Roads on R162
34	North East	N2 between Slane and Balrath at McGrunder's Cross Roads
35	North West	County Road between Beaupark and Painestown
36	North West	County road to north of Brownstown Cross Roads on R153 I
37	South East	County road to north of Brownstown Cross Roads on R153 II
38	South West	At Carn Hill on county road to north of Casey's Cross Roads on R153
39	North East	At Johnstown on county road to south of Casey's Cross Roads on R153
40	South East and South	On road to south of Cannistown Church and M3
41	South	On county road between Dowdstown Bridge and Garlagh Cross Roads
42	East	On county road between Bective and Ballinter cross roads
43	East	Hill of Tara Car Park
44	Panorama	Hill of Tara
45	North East	On county road between Kilmessan and Castleboy
46	North	On county road between Balpere Hill and Tara
47	Panorama	Skryne Church
48	North East	On M3 at Baronstown
49	North West	On county road between Collierstown and Trevet
50	North West	On R154 between Trim and Scurlockstown
51	North	On R158 between Trim and Laracor
52	Panorama	Hill of Ward
53	North, North East and South	On R161 at Inchatore Bridge to west of Donore
54	East and West	On R161 at Royal Canal
55	North	On Stonyford Bridge on county road between Blackshade and Moyfin
56	South	Along Royal Canal at Boolykeagh
57	West and North West	County road between Rathcore and Clonguiffin
58	South	County road between N51 and Knowth
59	Panorama	Knowth Tumulus
60	North West	Obelisk Bridge at Oldbridge
61	North, East and West	Hill at Graveyard at Sheephouse
62	North and West	County road between Duleek and Boyne Canal I
63	North	County road between Donore and Redmountain
64	North West	County road between Duleek and Boyne Canal II
65	North	Laytown Strand
66	South West, West, North West and North	County road between Duleek and Carnes East
67	South West	County road between Carnes West and Carnes East
68	South	County road between Bellewstown and Carnes East
69	North East	County road at Bellewstown
70	East	R108 between Naul and Mullaghteelin
71	South East	County road off R108 at Snowtown
72	West and South West	County road Hawkinstown and Gilliamstown
73	North East	County road between Robinson's Cross Roads on R108 and Windmill Hill
74	East	Boyne valley from Rosnaree House
75	North	Boyne Estuary view from coast road between Mornington and Drogheda (past Grammar School)
76	East	Rathkenny Hills View from Creewood in south eastward direction
77	North East	View of Killeen Castle/Skane Valley from south- east direction of the Warrenstown college.
78	North and South	Boyne valley from Derrindaly Bridge
79	North East and South West	Boyne valley from Scarrif Bridge
80	South East	Blackwater Valley Navan from R147 Kells Road in the vicinity of Bloomsbury
81	South East and North West	Blackwater Valley from Maudlin Bridge
82	East and West	Blackwater Valley from Mabes Bridge
83	South East and North West	Clonard Blackshade
84	West	Coole Hill
85	East and West	Headford Bridge
86	North West, North East and South West	Bective Bridge
87a	East	Newgrange Passage Tomb
87b	West	Newgrange Passage Tomb
87c	North	Newgrange Passage Tomb
87d	South	Newgrange Passage Tomb
88	Panorama	Dowth Passage Tomb
89a	South	Views towards Brú na Bóinne from N51
89b	South	Views towards Brú na Bóinne from N51
89c	South	Views towards Brú na Bóinne from N51
90	South	West of crossroads at Monknewtown
91	North and North West	Views from Boyne and Towpath
92	North West	Corballis
93a	North East	Local Road L16002, 1.2km east of Fenner Cross Roads
93b	East	Local Road L16002, 0.7km west of Rossnaree
93c	East	Local road L16002, 1.65km east of Fennor Cross Roads.
94	South East	Moylagh Castle from local road to east of R195

VIEWS & PROSPECTS MAP REFERENCES

Figure 4.1: Meath County Council Table of Protected Views and Prospects

From this table, Meath County Council have identified the following views to be assessed with locations shown on extract from Map 8.6

Table 4.1: Views and Prospects referenced by Meath County Council for assessment.

Views and Prospects referenced by Meath County Council for assessment
Requested by MCC to examine potential visibility from UNESCO World Heritage Site and MCC Protected View 58 as well as potential to affect Views 89a, 89b, 89c, 90 and 59.
Requested by MCC to examine potential visibility from UNESCO World Heritage Site and MCC Protected Views87a, 87b, 87c, 97d, 31.
Requested by MCC to examine potential visibility from UNESCO World Heritage Site and MCC Protected View 91
Requested by MCC to examine potential visibility from Protected views points no. 66 SW/W, NW, N between
Requested by MCC to examine potential visibility from 69 NE Bellewstown
Requested by MCC to examine potential visibility from Protected view no.61 NewHill at Graveyard

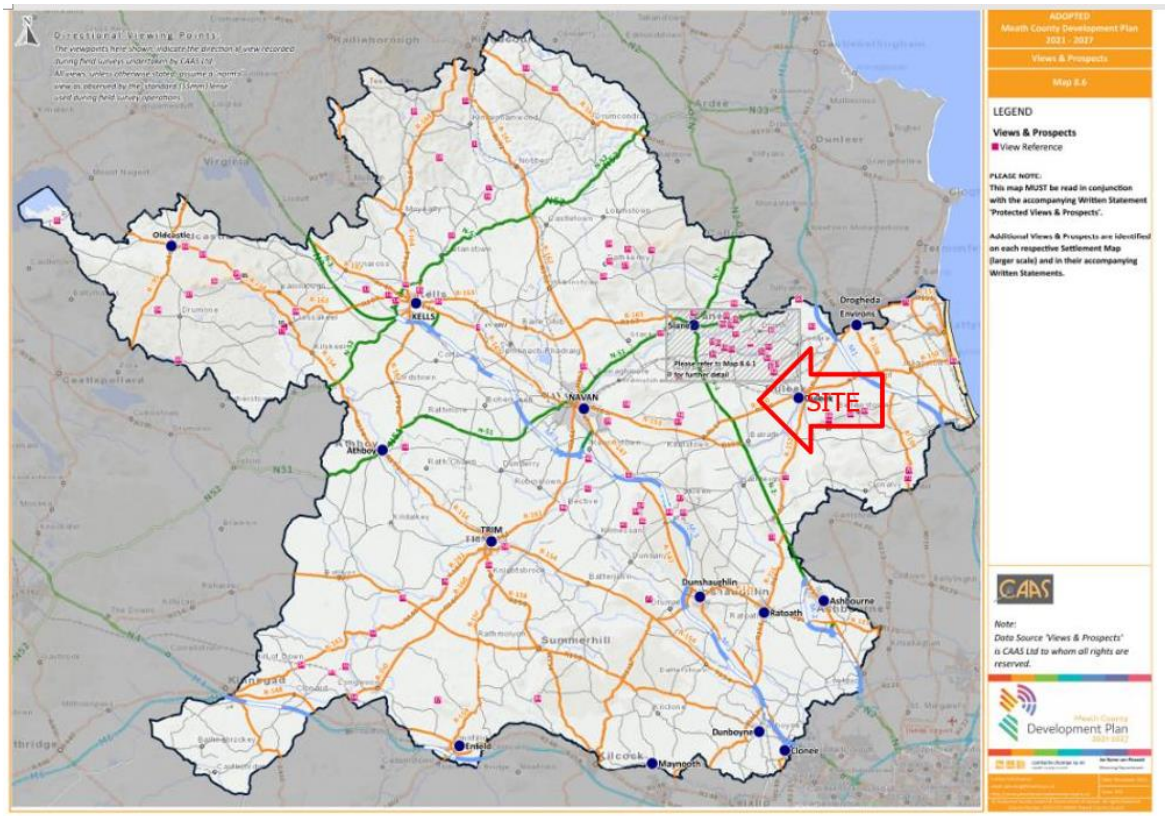


Figure 4.2: Meath County Council Map 8.6 showing location of Protected Views

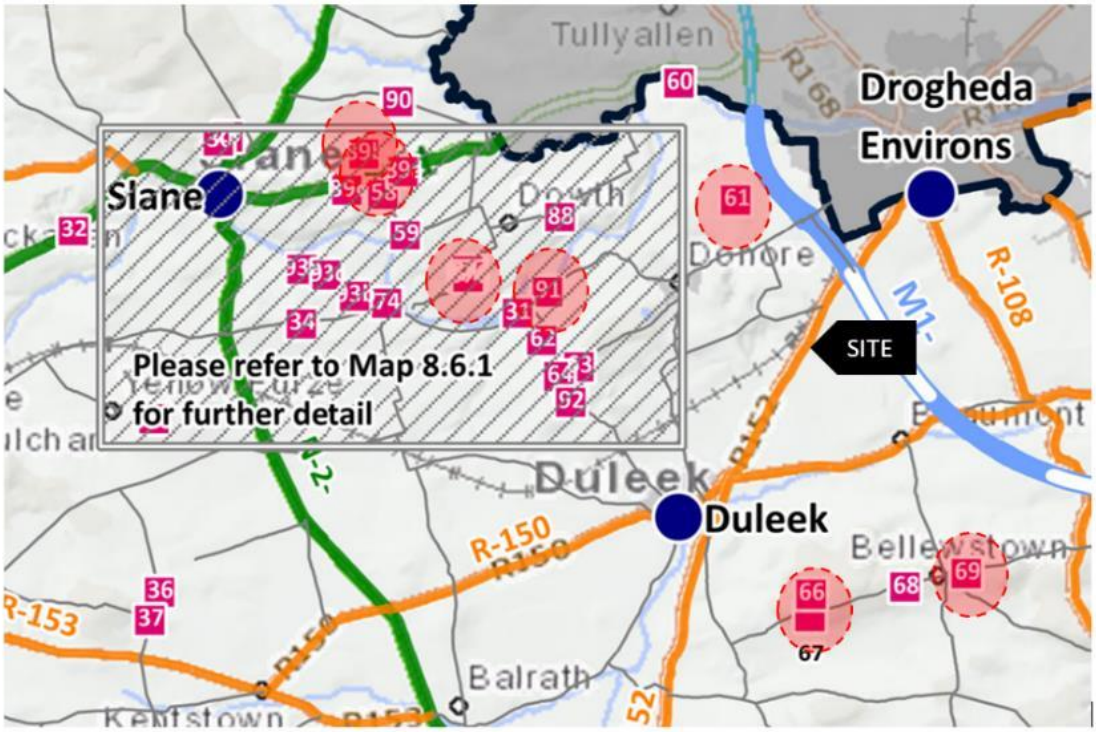


Figure 4.1: Extract from Map 8.6 highlighting Protect Views that have been assessed

4.1.3.2 LVIA Zone of Effect Rationale for Selection of Other Views

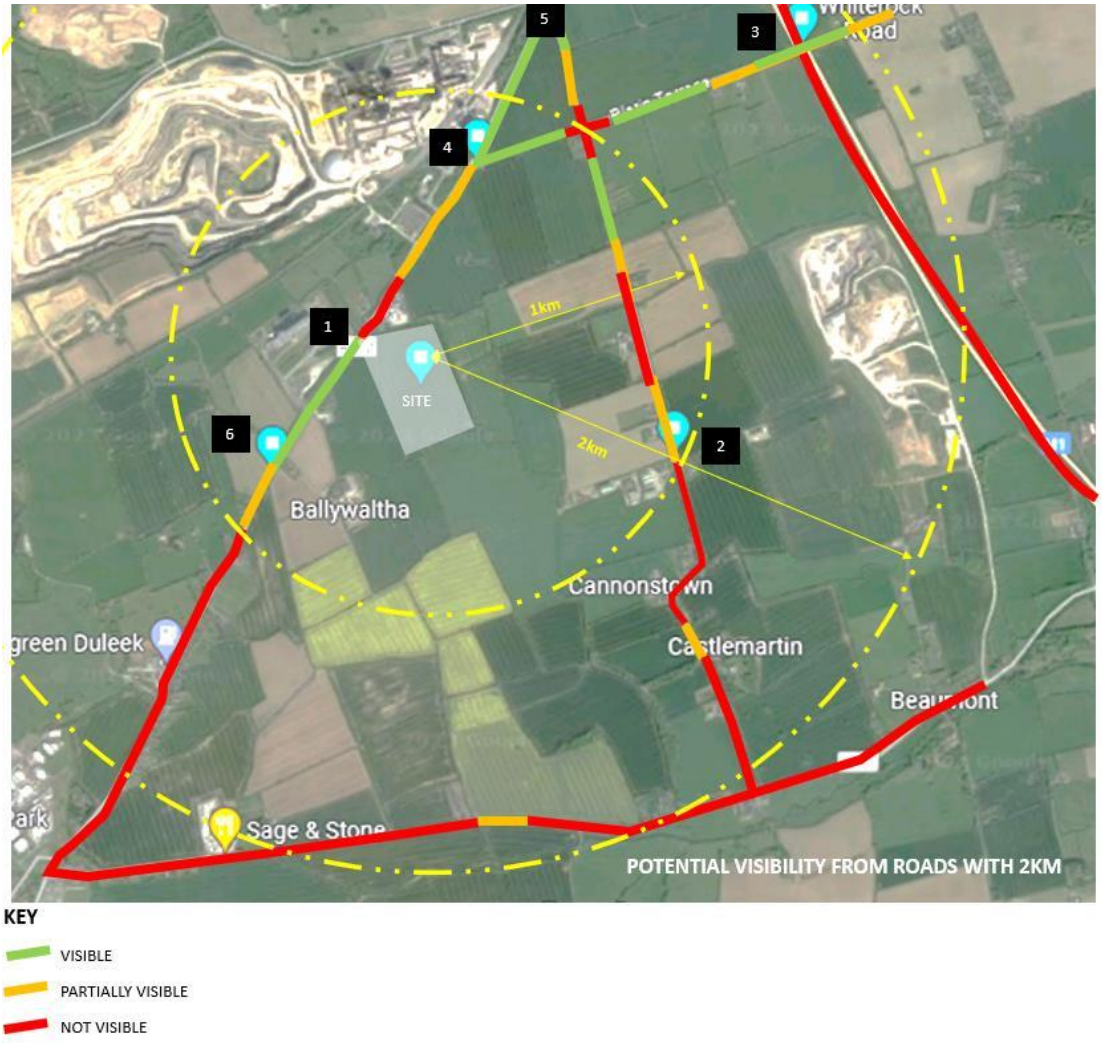


Figure 4.2: Potential Zone of Local Visibility

In addition to Protected Views, it is crucial to establish the potential for the proposed development to affect the local landscape because of sensitivity by nearby residents, landowners and land users. Assessment of local visibility is generally confined to views available from local roads. In this case the relevant distance is up to 2km on account of the tallest elevations [approximately 20m high] because it this distance the ratio of height to distance exceeds 100 which produces a visual angle of 0° 34' 0.38" – which is defined as being an insignificant visual effect in either the horizontal or vertical plane.

4.1.3.3 Survey of Potential Visibility

A 'Windshield survey' was conducted to provide a preliminary assessment of locations within 2km from which the site and environs would be visible from public roads. The presence of the tall existing Indaver and Irish Cement works provided a useful benchmark of potential visibility.

This practical method is more effective and relevant than a more theoretical 'Zone of Visual Influence' analysis, because that method is limited by the frequent tall roadside hedges and micro-topography [less than 2.5m contour interval] that are prevalent in this landscape.

The survey indicates that most visibility occurs within a distance of 1km east and north of the site and this, in turn, is most concentrated in an area around the Platin Terrace Crossroads.

This assessment of potential visibility confirms that Views 1 – 6 will provide representation of the likely typical visibility from all public roads within 2km of the proposed development.

4.1.3.4 Views Location Selection

Based on the Zone of Potential Visibility Assessment, Locations 1, 2, 3, 4, 5, 6 were selected. The suitability of these views was confirmed by Meath County Council Further Views 7 – 12 were specifically requested by Meath County Council in order to assess the potential impacts on views scheduled for protection by the Meath County Development Plan, in particular those in the vicinity of the Bru na Bóinne UNESCO World Heritage Site.

Table 4.1: View Location Selection Reasons

View Number Figure	Location	View number used in previous application	Reason for inclusion
1	At site entrance off R 152	1	Closest and most open view towards the project from a public road. Requested by MCC [See Map attached]
2	View from School	2	From the play area of the nearby school Requested by MCC [See Map attached]
3	View from Whiterock Road crossing of M1	N/A	Requested by MCC [See Map attached]
4	Junction beside R 152 NW of site	N/A	Requested by MCC [See Map attached]
5	Near junction on R 152, N of site	N/A	Requested by MCC [See Map attached]
6	R152 SW of Site	N/A	Requested by MCC [See Map attached]
7	From Knowth Approach	View 3	Requested by MCC to examine potential visibility from UNESCO World Heritage Site and MCC Protected View 58 as well as potential to affect Views 89a, 89b, 89c, 90 and 59.
8	From Newgrange Environs	View 4	Requested by MCC to examine potential visibility from UNESCO World Heritage Site and MCC Protected Views87a, 87b, 87c, 97d, 31.
9	From Dowth Environs	View 5	Requested by MCC to examine potential visibility from UNESCO World Heritage Site and MCC Protected View 91
10	From local road	N/A	Requested by MCC to examine potential visibility from Protected views points no. 66 SW/W, NW, N between
11	NE Bellewstown	N/A	Requested by MCC to examine potential visibility from 69 NE Bellewstown
12	NewHill at Graveyard	N/A	Requested by MCC to examine potential visibility from Protected view no.61 NewHill at Graveyard

Figure 4.3: Location of photomontages– as per table 1 above

Figure 4.4: Locations of Views 7, 8, 9

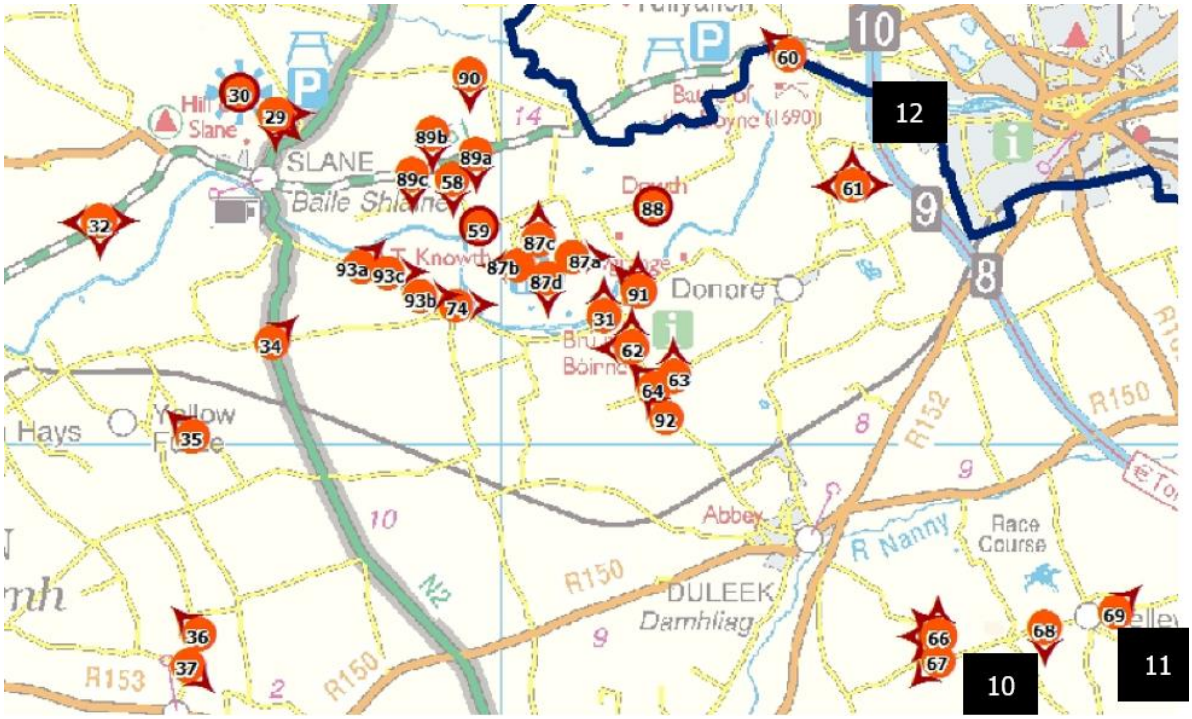


Figure 4.5: Location of Views 10, 11, 12, including the direction of each view

Figure 4.6: Identification of Protected Views that have been assessed

While MCC request that 'All protected views at Slane and Bru na Bóinne on the map attached (including Newgrange, Knowth and Dowth)' be 'taken into consideration' the detailed map of the

View Points shows that only a small number are oriented towards the proposed development. All of these are assessed.

4.2 The Receiving Environment

This section provides a description of the existing appearance and character of the area which establishes a reference - or 'baseline' against which to assess the likely effects of the project.

4.2.1 Character

Landscape impact arises from the degree to which a new development contrasts or conforms with the appearance and character of the existing landscape. For this reason, prior to assessing effects it is important to identify and assess the existing character, both in terms of the general landscape, as well as the local environment.

4.2.2 General Landscape Context

Figure 4.9: General Meath Landscape as seen from Newgrange

Figure 4.10: General Meath Landscape as seen Newhill, west of Drogheda

4.2.2.1 A Working Landscape

Meath contains some of Ireland's most productive soils. This has resulted in a pattern of larger, more regular fields and landholdings with fewer and more widely spaced roads and associated rural dwellings compared to other areas. Meath has the highest area of wheat of any Irish county.

4.2.2.2 A Developed and Urbanised Landscape

The site generally lies within an area of rolling landscape dominated by pasture and tillage. More specifically, it is located within an area of urbanisation, industry, infrastructure and extraction activities that lie between Drogheda [pop 35,090] and Duleek [pop, 4,220].

The cluster of intensive land-uses includes the Kiln of Platin Cement Factory which at 103.9 m is the 35th tallest structure in Ireland. The M1 Motorway lies about 1.5km west of the site.

4.2.2.3 A Protected Landscape

Just over 4.5 km north-west of the site is the Core Area of the UNESCO designated World Heritage Site, Archaeological Ensemble of the Bend of the Boyne, (Brú na Bóinne). The buffer area comes

to within 1.6km of the site. The site lies within the catchment of the River Nanny, separated from the Boyne by a ridge through the townland of Redmountain, west of Donore. The southern boundary of the Buffer Area generally follows this ridgeline.

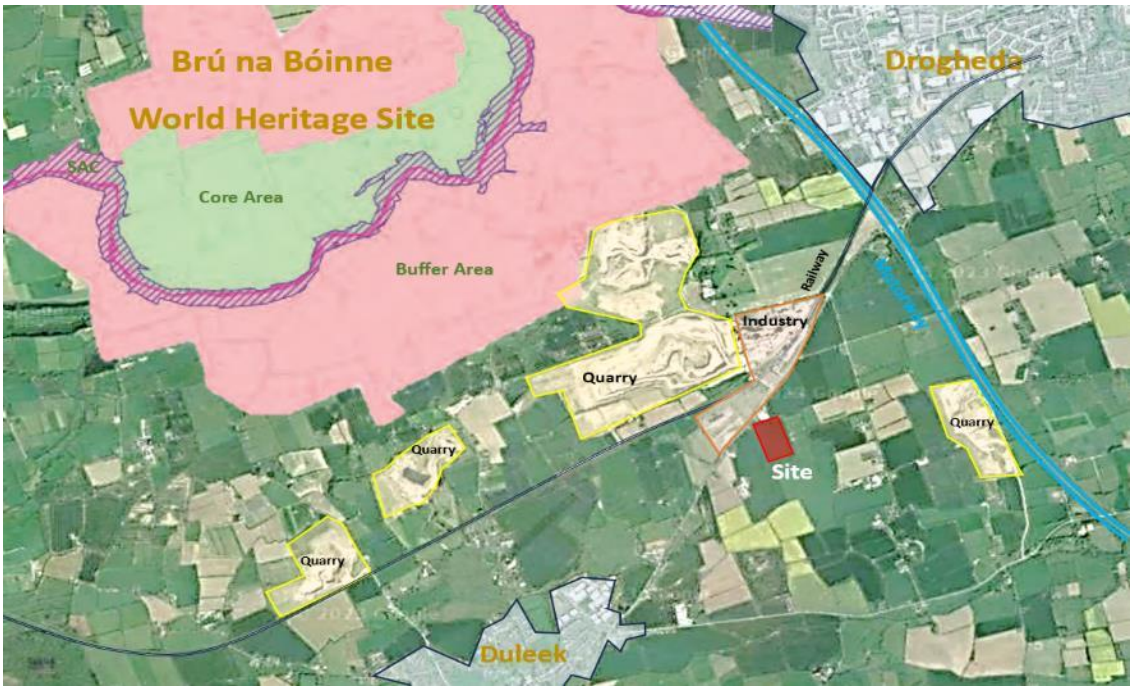


Figure 4.11: General Landscape Context

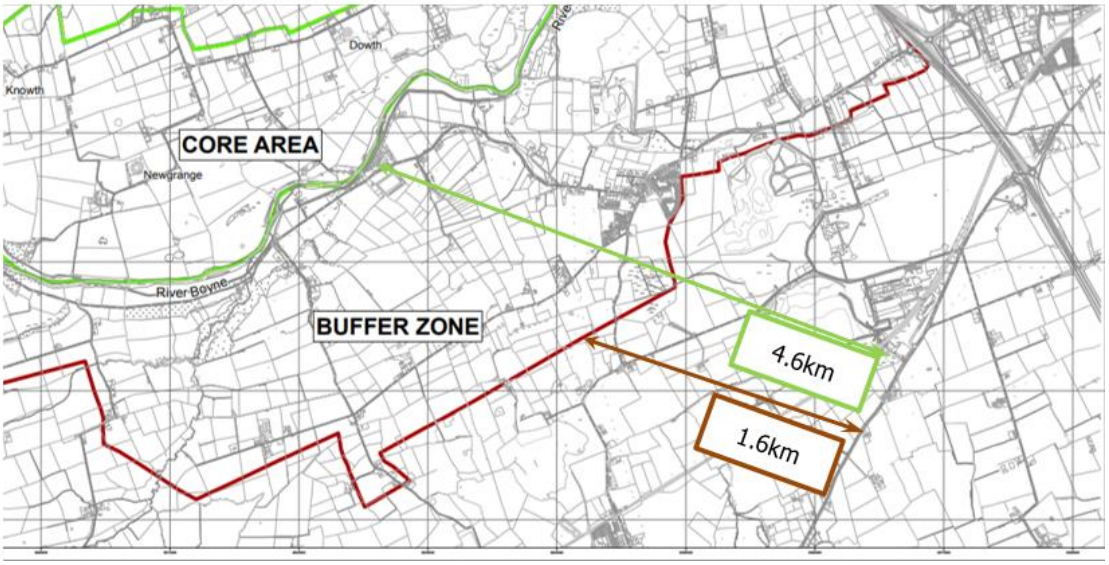


Figure 4.12: Proximity to UNESCO designated World Heritage Site, Archaeological Ensemble of the Bend of the Boyne, (Brú na Bóinne), Co. Meath, Ireland.

4.2.3 Local Character

Figure 4.13: Platin Site in Local Context

4.2.3.1 Local Landscape Character

The local landscape context consists of a much-altered area, consisting of a mixture of farming uses [mostly tillage] on large regular fields, combined with a series of developments of industrial operations as well as infrastructure that includes electricity installations as well as a motorway and railway line. The area also contains a number of dwellings set along local roads.

4.2.3.2 Local Landscape Resilience

Resilience' is a term used in landscape studies to define the ability of a landscape to accommodate change – it is the opposite of 'sensitivity'. For some types of landscape classification, the term 'Visual Absorption Capacity' (VCA) is used when identifying areas where enclosing topography or vegetation – or both – imbue an area with the capacity to accommodate development with few effects on the surrounding larger landscape.

A resilient landscape is one in which new developments are unlikely to significantly alter the character of the local area.

Relative to the surrounding plains of Meath, the site lies 3 km south-west of Drogheda and 2km north-east of Duleek, the local context has a high level of visual resilience. The landscape within 2km pf the site includes large-scale infrastructure including a motorway, railway, two quarries, a cement works, municipal incinerator as well as two business clusters. The cement works includes the tallest structure in the county. This area also includes at least 12 other smaller businesses.

Figure 4.14: Local Landscape Resilience

4.3 Significance

4.3.1 Development Plan Policies

The Meath County Development Plan 2021-2027 contains the following policies that are relevant to this assessment Policies

HER POL 6:

To protect the Outstanding Universal Value of the UNESCO World Heritage Site of Brú na Bóinne in accordance with the relevant guidelines and national legislation, so that its integrity, authenticity and significance are not adversely affected by inappropriate development or change.

HER OBJ 48:

To support the aims and objectives of the European Landscape Convention by implementing the relevant objectives and actions of the National Landscape Strategy 2015-2025 and any revisions thereof.

HER POL 52:

To protect and enhance the quality, character, and distinctiveness of the landscapes of the County in accordance with national policy and guidelines and the recommendations of the Meath Landscape Character Assessment (2007) in Appendix 5, to ensure that new development meets high standards of siting and design.

HER POL 53:

To discourage proposals necessitating the removal of extensive amount of trees, hedgerows and historic walls or other distinctive boundary treatments.

HER OBJ 49:

To ensure that the management of development will have regard to the value of the landscape, its character, importance, sensitivity and capacity to absorb change as outlined in Appendix 5 Meath Landscape Character Assessment and its recommendations.

HER OBJ 50:

To require landscape and visual impact assessments prepared by suitably qualified professionals be submitted with planning applications for development which may have significant impact on landscape character areas of medium or high sensitivity.

HER OBJ 56:

To preserve the views and prospects listed in Appendix 10, in Volume 2 and on Map 8.6 and to protect these views from inappropriate development which would interfere unduly with the character and visual amenity of the landscape.

4.3.2 Development Plan Protected Views

The Plan also designates certain Views are being Protected.

Landscape Sensitivity is defined as the extent to which a landscape can accommodate change without unacceptable loss of existing character or interference with values.

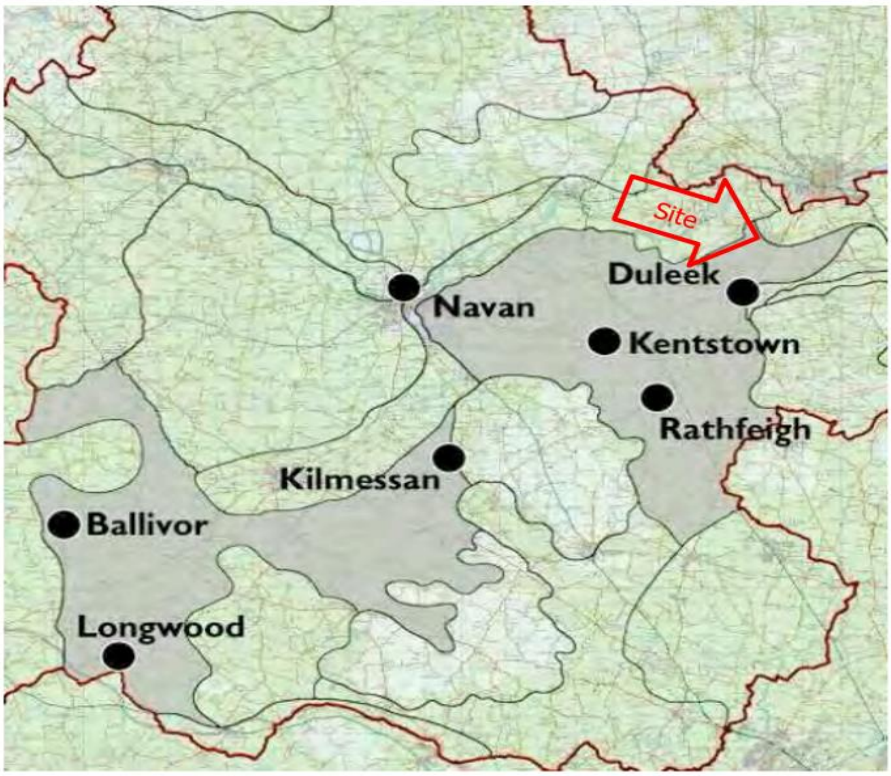


Figure 4.17: Site with LCA8

4.3.3 Sensitivity of Landscape Character Area

The site is located on the northern boundary where the Meath County Council Landscape Character Area 8. LCA 6 – Central Lowlands meets the LCA 7 – coastal plain. It is classified by this document as having a Medium Landscape Sensitivity. This unit is described, inter alia as having 'Medium potential capacity to accommodate overhead cables, substations and communication masts due to the complexity of the area, which has a variety of land uses and a robust landscape structure.

4.3.4 Existing Views

The following pages provide a description of the existing views from 12 selected locations that have been selected for the reasons set out in 4.1.3.4 above. Each view is described in terms of three considerations

1. The reason for the selection of the view
2. The significance of the View (is it affecting a Protected Structure or view)
3. The sensitivity of the View (i.e. what would be most likely to adversely affect the view)

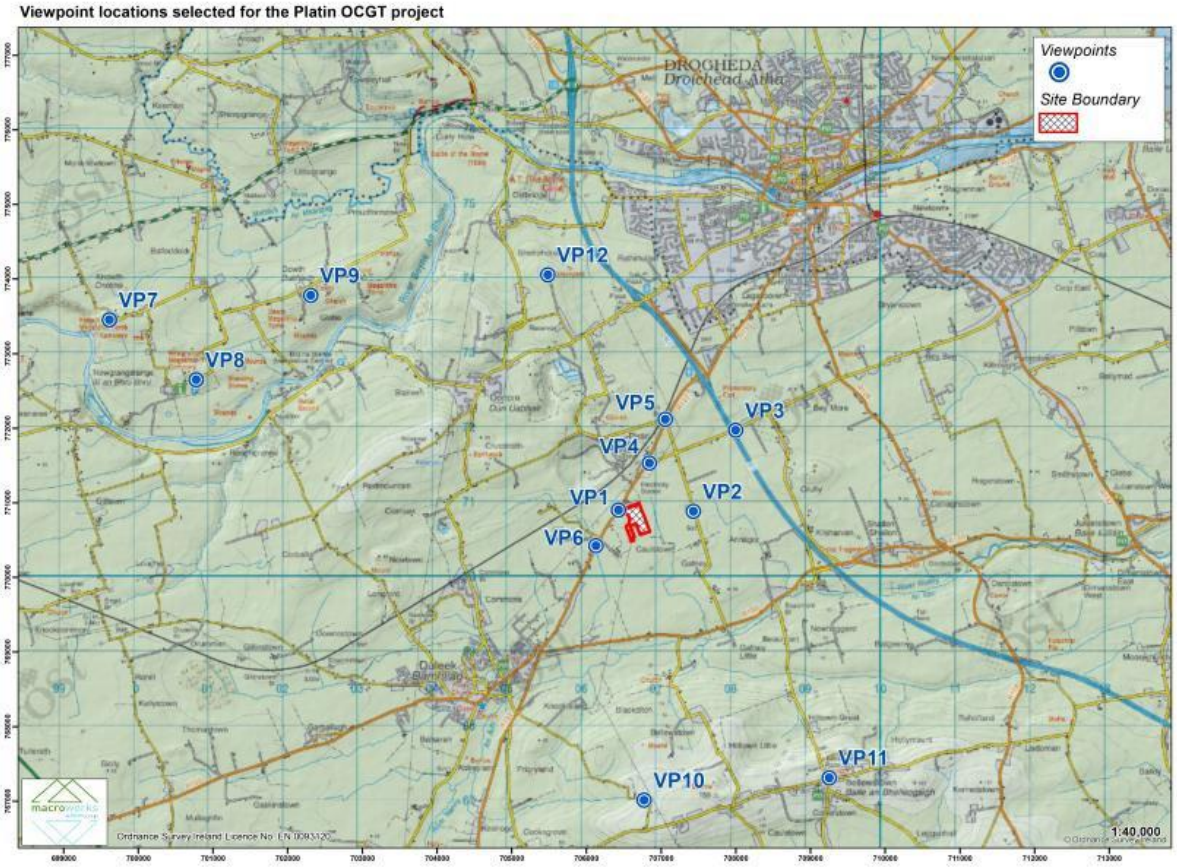


Figure 4.16: View Location Map

View 1 [Note this is a wide-angle view]	
Reasons for Selection	Requested by MCC Used in Previous Planning Application [View 1]
Significance	The closest and most open view towards the project from any public road. The R 152 is a busy regional road. A number of dwellings are located along the road. There are no formal designations of this as a scenic or touring route. There are no designated scenic resources or protected views or landscapes in the immediate vicinity.
Sensitivity	Residential properties along this road and in the general area will be sensitive to development that changes the appearance and character of the landscape setting of their home. There are no designated landscape sensitivities in the general area. There are no intrinsic landscape sensitivities in the immediate area, such as skyline ridges or open vistas.

Figure 4.17: Existing View 1 from site entrance off R 152

View 2	
Reasons for Selection	The closest and most open view towards the project from a public road to the east of the site in an area where there are roadside dwellings and a public school. Requested by Meath County Council
Significance	There are no formal designations of this as a scenic or touring route. There are no designated scenic resources or protected views or landscapes in the immediate vicinity.
Sensitivity	Residential properties along this road and in the general area will be sensitive to development that changes the appearance and character of the landscape setting of their home. There are no designated landscape sensitivities in the general area. There are no intrinsic landscape sensitivities in the immediate area, such as skyline ridges or open vistas.

Figure 4.18 Existing View 2 from Local Road in vicinity of local school and houses

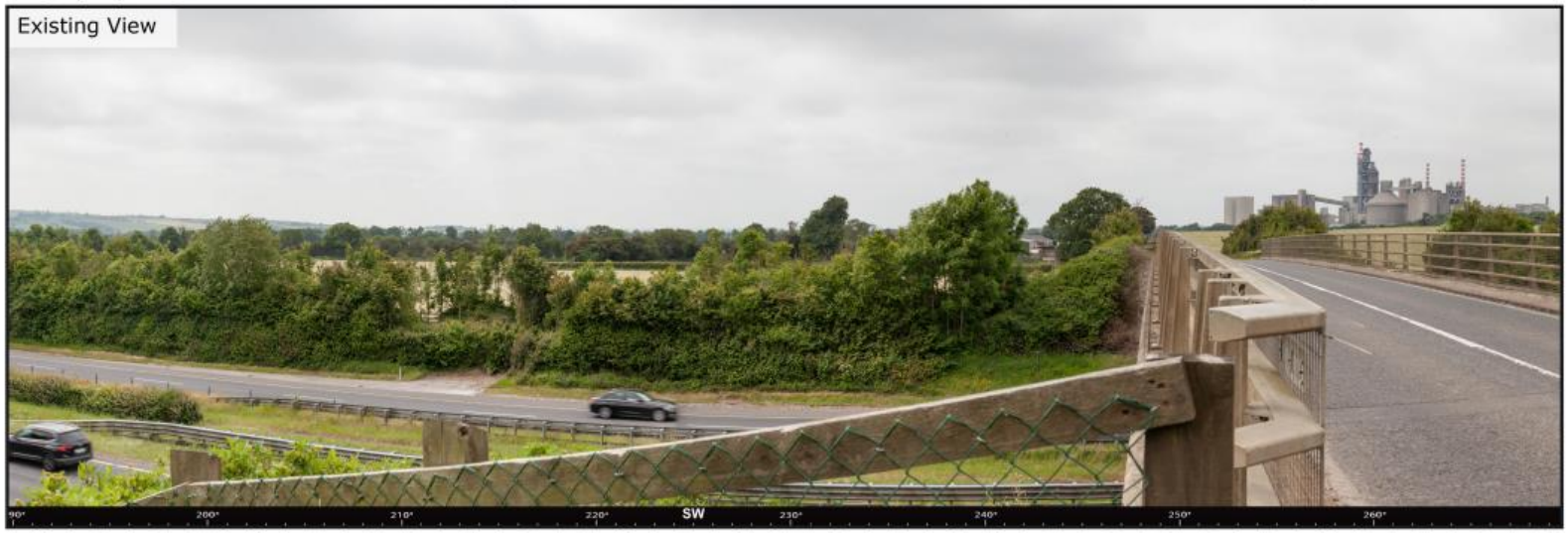
View 3	
Reasons for Selection	The location is located beside the M1. In the general vicinity of this location, the motorway lies below the level of the surrounding landscape for about 2km on either side of this location between junction 8 to the north and the North Link Toll to the south where that Motorway is relatively open and elevated. Requested by Meath County Council
Significance	The closest and most open view towards the project from a public road to the north east. A number of dwellings are located along the road. There are no formal designations of this as a scenic or touring route. There are no designated scenic resources or protected views or landscapes in the immediate vicinity.
Sensitivity	Residential properties along this road and in the general area will be sensitive to development that changes the appearance and character of the landscape setting of their home. There are no designated landscape sensitivities in the general area. There are no intrinsic landscape sensitivities in the immediate area, such as skyline ridges or open vistas.

Figure 4.19: Existing View 3 from Whiterock Road crossing of M1

View 4	
Reasons for Selection	The closest and most open view towards the project from a public road to the north of the site. Requested by MCC
Significance	There are very few dwellings are located along the road because most of the land to the west are industry or extraction. There are no formal designations of this as a scenic or touring route. There are no designated scenic resources or protected views or landscapes in the immediate vicinity.
Sensitivity	Regular users of this road and in the general area will be sensitive to development that changes the appearance and character of the landscape setting of their home. There are no designated landscape sensitivities in the general area. There are no intrinsic landscape sensitivities in the immediate area, such as skyline ridges or open vistas.

Figure 4.20: Existing View 4 from junction beside R 152 NW of site

View 5	
Reasons for Selection	Requested by Meath County Council.
Significance	The first open view towards the site from the north, There are very few dwellings are located along the road because most of the land to the west are industry or extraction. There are no formal designations of this as a scenic or touring route. There are no designated scenic resources or protected views or landscapes in the immediate vicinity.
Sensitivity	Regular users of this road and in the general area will be sensitive to development that changes the appearance and character of the landscape setting of their home. There are no designated landscape sensitivities in the general area. There are no intrinsic landscape sensitivities in the immediate area, such as skyline ridges or open vistas.

Figure 4.21: Existing View 5 from junction beside R 152 NW of site

View 6	
Reasons for Selection	Requested by Meath County Council
Significance	The closest open view towards the site from the south where there are roadside dwellings. There are no formal designations of this as a scenic or touring route. There are no designated scenic resources or protected views or landscapes in the immediate vicinity.
Sensitivity	The R 152 is a busy regional road. A number of dwellings are located along the road. Residential properties along this road and in the general area will be sensitive to development that changes the appearance and character of the landscape setting of their home. There are no designated landscape sensitivities in the general area. There are no intrinsic landscape sensitivities in the immediate area, such as skyline ridges or open vistas.

Figure 4.22: Existing View 6 from R152 SW of Site

View 7	
Reasons for Selection	Knowth is a site of international historical significance. It is critical to provide an analysis of the potential for the proposed development to be visible from this location and, if so, to examine the effect of such visibility on the context and setting of this monument as well as the surrounding archaeological landscape. Requested by MCC to examine potential visibility from UNESCO World Heritage Site and MCC Protected View 58 as well as potential to affect Views 89a, 89b, 89c, 90 and 59.
Significance	Knowth is a key site within the UNESCO World Heritage Site that lies at the heart of UNESCO World Heritage Site - Brú na Bóinne The Meath County Development Plan 2021 – 2027 at HER POL 6 seeks *to protect the Outstanding Universal Value of the UNESCO World Heritage Site of Brú na Bóinne in accordance with the relevant guidelines and national legislation, so that its integrity, authenticity and significance are not adversely affected by inappropriate development or change*. HER OBJ 11 seeks *to protect the ridgelines which frame views within and from the UNESCO World Heritage Site of Brú na Bóinne from inappropriate or visually intrusive development*.
Sensitivity	The views from this location and its vicinity are very sensitive to any intrusions that would appear on the ridgeline to the south and south-east. These locations from the view from this landscape and also play a crucial role in the sunrise during the mid-winter solstice

Figure 4.23: Existing View 7 from Knowth Approach

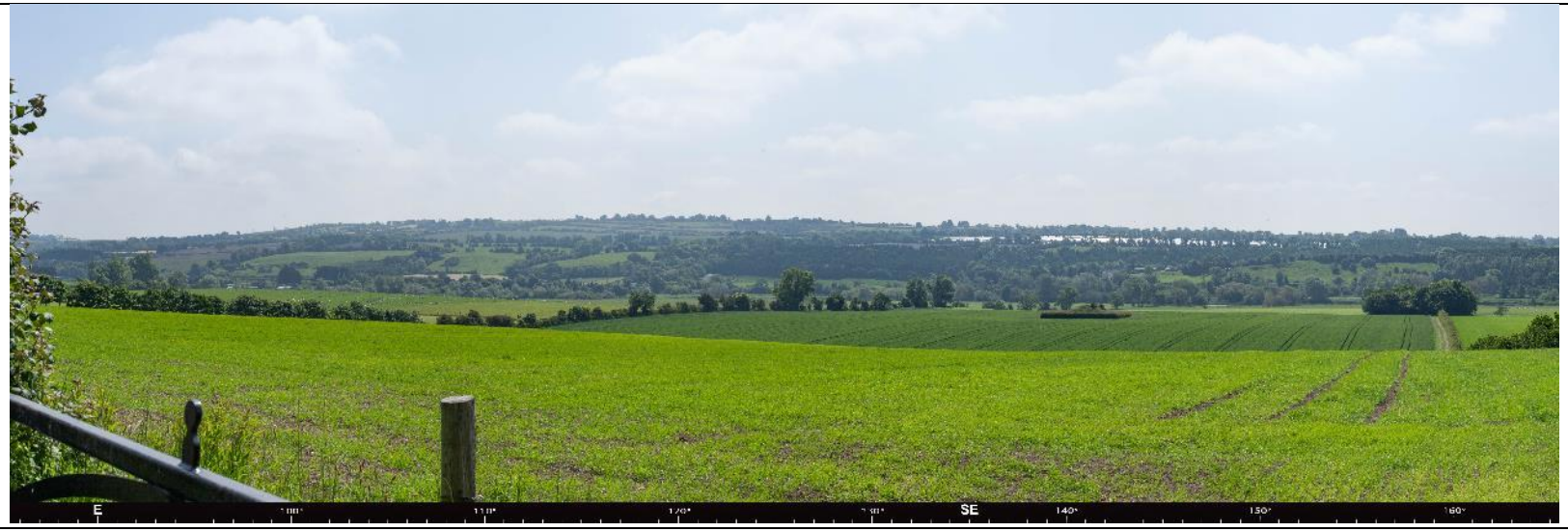
View 8	
Reasons for Selection	Newgrange is a site of international historical significance. It is critical to provide an analysis of the potential for the proposed development to be visible from this location and, if so, to examine the effect of such visibility on the context and setting of this monument as well as the surrounding archaeological landscape. Requested by MCC to examine potential visibility from UNESCO World Heritage Site and MCC Protected Views 87a, 87b, 87c, 97d, 31,
Significance	Newgrange is a UNESCO World Heritage Site that lies at the heart of UNESCO World Heritage Site - Brú na Bóinne The Meath County Development Plan 2021 – 2027 at HER POL 6 seeks *to protect the Outstanding Universal Value of the UNESCO World Heritage Site of Brú na Bóinne in accordance with the relevant guidelines and national legislation, so that its integrity, authenticity and significance are not adversely affected by inappropriate development or change.* HER OBJ 11 seeks *to protect the ridgelines which frame views within and from the UNESCO World Heritage Site of Brú na Bóinne from inappropriate or visually intrusive development.*
Sensitivity	The views from this location and its vicinity are very sensitive to any intrusions that would appear on the ridgeline to the south and south-east. These locations from the view from this landscape and also play a crucial role in the sunrise during the mid-winter solstice. A small portion of the uppermost structures [height 131m] are discernible near the left side of the image.

Figure 4.24: Existing View 8 from Newgrange Environs

View 9	
Reasons for Selection	Knowth is a site of international historical significance. It is critical to provide an analysis of the potential for the proposed development to be visible from this location and, if so, to examine the effect of such visibility on the context and setting of this monument as well as the surrounding archaeological landscape. Requested by MCC to examine potential visibility from UNESCO World Heritage Site and MCC Protected View 58 as well as potential to affect Views 89a, 89b, 89c, 90 and 59.
Significance	Knowth is a key site within the UNESCO World Heritage Site that lies at the heart of UNESCO World Heritage Site - Brú na Bóinne The Meath County Development Plan 2021 – 2027 at HER POL 6 seeks *to protect the Outstanding Universal Value of the UNESCO World Heritage Site of Brú na Bóinne in accordance with the relevant guidelines and national legislation, so that its integrity, authenticity and significance are not adversely affected by inappropriate development or change.* HER OBJ 11 seeks *to protect the ridgelines which frame views within and from the UNESCO World Heritage Site of Brú na Bóinne from inappropriate or visually intrusive development*.
Sensitivity	The views from this location and its vicinity are very sensitive to any intrusions that would appear on the ridgeline to the south and south-east. These locations from the view from this landscape and also play a crucial role in the sunrise during the mid-winter solstice

Figure 4.25: Existing View 9 from Dowth Environs

View 10	
Reasons for Selection	Requested by MCC to examine potential visibility from Protected Views points no. 66 SW/W, NW, N
Significance	This elevated area contains a Protected View on account of its elevation that provides panoramic views from the north-west to the south. From some locations near this view the cement kiln is visible and conspicuous.
Sensitivity	The view has a medium sensitivity on account of the conspicuous industrial development within the centre of the view.

Figure 4.26: Existing View 10 from local road

View 11	
Reasons for Selection	Requested by MCC to examine potential visibility from 69 NE Bellewstown
Significance	This location is an important regional amenity [the Racecourse] on an elevated location. It contains a Protected View [69]
Sensitivity	The site and environs have a low sensitivity to external landscape effects because of the surrounding tree enclosure.

Figure 4.27: Existing View 11 from local road north-east of Bellewstown

View 12	
Reasons for Selection	Requested by MCC to examine potential visibility from Protected View no.61 NewHill at Graveyard
Significance	This is Protected View No. 61 in the Meath County Development Plan
Sensitivity	This view is sensitive to the visibility of non-agricultural development. It has a high sensitivity on account of its elevation and open exposure.

Figure 4.28: Existing View 12 from NewHill at Graveyard

4.4 The Proposed Development

The proposed development is described in Chapter 2 of this Environmental Report.

4.5 Predicted Impacts

There is no single definitive visual impact of a project. Instead, there are a series of effects - each different in appearance and degree - that occur throughout the area from which the project is visible. This section describes the visual impact from a number of locations some of which are immediately adjacent (e.g. View 1), some in the locality (e.g. views 2 – 6) and some of which are at greater distances (e.g. Views 7 – 12).

This section provides a commentary to accompany the 'before and after' photographic images. In each instance, a commentary is provided on how the 'Proposed' image illustrates the visual impact of the proposed development from the selected location. Each section concludes with a description of the visual impact from that location. (Note that larger versions of each photographic image are contained in Attachment 8 – these views also contain 'Outline' versions of the photomontages to make it easier to distinguish the proposed development.)

The following pages below illustrate the predicted views. These can be compared with the existing 'do nothing' view provided in the previous section. Photomontages describe the effect of the proposed development by inserting the image of the new work into photographs of the existing view. If the new work is obscured by existing vegetation or topography then a yellow 'Outline' is shown to indicate where it is – so that viewers can satisfy themselves that it is obscured.

View 1	 
Description	The entrance and upper portions of the proposed development are partially visible along the nearby sections of the R152. The most visually dominant elements will be the wall, gates and perimeter tree and shrub planting. Upper portions of some of the plant will be intermittently visible.
Effect	The proposed development is partially visible in the context of other developments in a landscape that has local significance and sensitivity. The resultant visual impact is classified as **Significant.**

Figure 4.29: Proposed View 1 from site entrance off R 152

View 2	
Description	The proposed development is partially visible among intervening roadside vegetation and structures along approximately 600m of this road.
Effect	The proposed development is partially visible in the context of other developments in a landscape that has local significance and sensitivity. The resultant visual impact is classified as **Moderate**

Figure 4.30: Proposed View 2 from Local Road in vicinity of local school and houses

View 3	
Description	The uppermost portions of the tallest structures are discernible among the vegetation to the right of the image centre – marked in yellow on the upper image.
Effect	This is a view of limited local significance or sensitivity. The imperceptibility of the proposed development means that the impact on this view is **not significant.**

Figure 4.31: Proposed View 3 from Whiterock Road crossing of M1

View 4	
Description	The proposed development is partially visible among intervening roadside vegetation and structures along approximately 600m of this road.
Effect	The proposed development is partially visible in the context of other developments in a landscape that has local significance and sensitivity. The resultant visual impact is classified as **Moderate**

Figure 4.32: Proposed View 4 from junction beside R 152 NW of site

View 5	
Description	The uppermost portions of the tallest structures are discernible among the vegetation to the right of the image centre – marked in yellow on the upper image.
Effect	This is a view of limited local significance or sensitivity. The imperceptibility of the proposed development means that the impact on this view is **not significant.**

Figure 4.33: View 5 from junction beside R 152 NW of site

View 6	
Description	The proposed development is partially visible among intervening roadside vegetation and structures along approximately 700m of this road.
Effect	The proposed development is partially visible in the context of other developments in a landscape that has local significance and sensitivity. The resultant visual impact is classified as **Moderate**

Figure 4.34: Proposed Existing View 6 from R152 SW of Site

View 7	
Description	There is no visibility of the proposed development from this location or its environs on account of distance as well as intervening topography and mature vegetation.
Effect	The lack of any visibility means that the visual impacts on this view is classed as **imperceptible.**

Figure 4.35: Proposed View 7 from Knowth Approach

View 8	
Description	There is no visibility of the proposed development from this location or its environs on account of distance as well as intervening topography and mature vegetation.
Effect	The lack of any visibility means that the visual impacts on this view is classed as **imperceptible.**

Figure 4.36: Proposed View 8 from Newgrange Environs

View 9	
Description	There is no visibility of the proposed development from this location or its environs on account of distance as well as intervening topography and mature vegetation.
Effect	The lack of any visibility means that the visual impacts on this view is classed as **imperceptible.**

Figure 4.37: Proposed View 9 from Dowth Environs

View 10	
Description	There is no visibility of the proposed development from this location or its environs on account of distance as well as intervening topography and mature vegetation.
Effect	The lack of any visibility means that the visual impacts on this view is classed as **imperceptible.**

Figure 4.38: Proposed View 9 from Dowth Environs

View 11	
Description	There is no visibility of the proposed development from this location or its environs on account of distance as well as intervening topography and mature vegetation.
Effect	The lack of any visibility means that the visual impacts on this view is classed as **imperceptible.**

Figure 4.39: Proposed View 11 from local road north-east of Bellewstown

View 12	
Description	The uppermost portions of the tallest structures are discernible among the vegetation to the right of the image centre – marked in yellow on the upper image.
Effect	This is a view of limited local significance or sensitivity. The imperceptibility of the proposed development means that the impact on this view is **not significant.**

Figure 4.40: Proposed View 12 from NewHill at Graveyard

Table 4.5 Summary of Visibility and Significance of Effect for Viewing Points

Location	Visibility	Significance of Context	Sensitivity of Context	Significance of Effect
View 1 from site entrance off R 152	Significant	Local	Low	Moderate
View 2 from Local Road in vicinity of local school and houses	Moderate	Local	Low	Low
View 3 from Whiterock Road crossing of M1	Not Significant	Local	Low	Low
View 4 from junction beside R 152 NW of site	Moderate	Local	Low	Low
View 5 from junction beside R 152 NW of site	Not significant	Local	Low	Low
Existing View 6 from R152 SW of Site	Moderate	Local	Low	Low
View 7 from Knowth Approach	Imperceptible	Highest	Very Sensitive	None
View 8 From Newgrange Environs	Imperceptible	Highest	Very Sensitive	None
View 9 from Dowth Environs	Imperceptible	Highest	Very Sensitive	None
View 10 from local road	Imperceptible	High	Medium Sensitivity	None
View 11 from local road north-east of Bellewstown	Imperceptible	High	Low	None
View 12 from NewHill at Graveyard	Not Significant	High	Sensitive	Slight

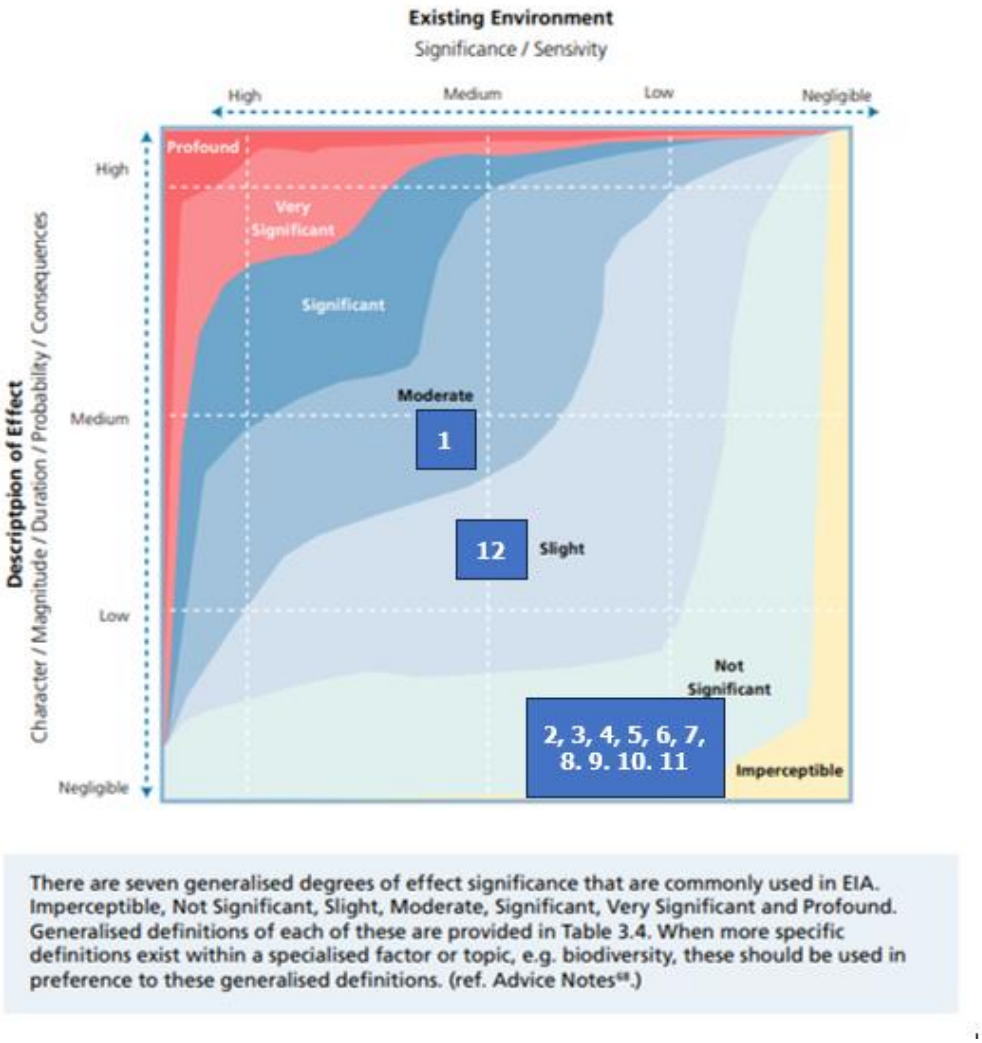


Figure 4.41 Calibration of Impact Significance against EPA Guidelines

4.6 Impacts on the Landscape

4.6.1 Landscape Impacts

The preceding table and chart demonstrate that landscape impacts will be limited in extent and significance. No designated or significant landscape resources will be affected. Locally, the development will be perceived as a minor intensification of low significance to an established pattern of non-agricultural use and development.

4.6.2 Impacts on the Local Landscape [Views 1-6]

The proposed development will give rise to effects that will be seen in the local context of a zone of established non-agricultural appearance and character. All views will be partial due to the screening afforded by local topography and vegetation.

The local impact will be an intensification of an established pattern. Most impacts in the local environs have been shown to be low of moderate.

4.6.3 Impacts on the Wider Landscape [Views 7-12]

The proposed development will give rise to no impacts or imperceptible impacts on the wider landscape. There will no visibility from any of the protected Views and no visibility from any of the sites or view points within the Bru na Bóinne complex

4.6.4 Cumulative and In-Combination Effects

In combination with existing and permitted development in the area, there will be an increased intensification of minor landscape effects on the landscape as illustrated in Figure 4.32. This effect will be localized to a concentrated area within 2km of the R152.

4.6.5 Impacts on Residents

The proposed developments will alter the views from some dwellings within 2km, where these are not screened by existing mature vegetation. All such visibility will be in the highly developed context of the existing very large-scale structures.

4.6.6 Impacts on Views To, From and Between Protected Structures or Areas

From or towards protected structures or areas, there will be no significant effects visual impacts. No part of the development will be visible from the Core Area of the UNESCO designated World Heritage Site, Archaeological Ensemble of the Bend of the Boyne, (Brú na Bóinne).

The adjacent site of archaeological potential is subterranean and its context and setting will not be materially affects.

4.6.7 Impacts during Construction

There will be visibility of cranes during the construction process. The site entrance area will be widened and will also provide increased visibility into the site during this period.

None of these effects will lead to any significant visibility from protected views or from the Brú na Bóinne complex.

All landscape and visual impacts from the construction phase will be slight and temporary in nature.

4.6.8 Impacts during Operation Stage

The visual impact of the development on the surrounding area will be as described above. Other visual impacts during operations will be confined to occasional vehicle movements - as described in the Traffic Chapter. Impacts of operational and traffic noise will have minor localised impacts on the character of the local landscape.

4.6.9 Impacts during Decommissioning

The operation lifetime of the Proposed Development is expected to be 20 years. The impacts expected and mitigation measures required in the decommissioning phase are expected to be similar to those of the construction phase. Decommissioning of the proposed development would be subject to grant of approval by Meath County Council. A designated Decommissioning Management Plan will be developed which will outline the mitigation measures required, which will be similar to those outlined in the Construction Environmental Management Plan and will be submitted to MCC Council for approval.

4.7 Mitigation and Monitoring Measures

4.7.1 Mitigation of Visual Impact

The proposed development will take place on and adjacent to lands used for industrial and infrastructural use with an established industrial/infrastructural appearance.

The location of the main buildings and structures, the selection of uniform colours and the provision of perimeter landscape screening are the principal measures utilized to limit the landscape effects of the proposed development.

4.8 Residual Impacts

There will be a further increase in localised intensification of landscape effects on nearby amenities along the R 152. These will represent a localised intensification and spatial expansion of pre-existing effects that accord with established use of these lands.

4.9 Cumulative Assessment

In conjunction with the previously permitted transmission facilitates, the proposed development will further extend the intensification of development and urbanisation of the metropolitan urbanised fringe between the outskirts of Drogheda and Duleek.

5 Traffic and Transportation

5.1 Introduction

This Chapter assesses the potential traffic impact of the proposed development for both the construction and operational phases.

All new developments will generate trips on the existing transport network, either by car, commercial vehicle, cycling, walking or public transport. This chapter aims to set out the relevant details of the proposed development in terms of the additional trips on the adjoining roads and to assess their significance.

This assessment has been completed in accordance with the Traffic and Transport Assessment Guidelines (NRA, 2014)[8]. These guidelines are intended to provide guidance to assist in scoping and conducting studies for traffic and transport assessments in relation to future development. The guidelines set thresholds at which the production of Traffic and Transport Assessments in relation to planning applications is recommended. The relevant threshold for the proposed development is 'traffic to and from the development exceeds 5% of the traffic flow on the adjoining road'.

In this chapter, the expected increase in existing traffic flows in the area as a result of the proposed development during the construction and operational phases is assessed against this threshold.

Traffic counts on the R152 are not undertaken by Transport Infrastructure Ireland (TII)[9]. Traffic counts provide information on the volume of traffic by hour of day and vehicle class, i.e., motorcycle, car, goods vehicles distinguished by number of axles etc. with up to twelve vehicle classes being identified. As a consequence of traffic counts not being carried out, accurate information on road usage on the R152 is not available.

5.2 Description of Existing Environment

The most recent data available for traffic volumes on this road are traffic counts that were carried in 2019 out for the Indaver planning application submitted in 2020 (An Bord Pleanála Case Reference PA17.307433). This study on behalf of Indaver found that the peak two-way volumes on the R152 were observed at the time to be 1,393 vehicles in the morning peak hour (8.15am to 9.15am) and 1,658 vehicles in the evening peak hour (5pm to 6pm). As there has been no significant changes in the area since this study was completed in 2019, this data is used as the best available to estimate the existing traffic volumes in the area.

There is currently road access to the northwest of the proposed development site from R152, Drogheda to Duleek road, which links to the M1 Motorway approximately 2km to the north-east of the proposed development site. The R152 is a single carriageway regional road with an 80kph speed limit. There are various local roads that feed onto the R152.

The proposed development & approved 110kV Substation will share the same site access road and junction onto the R152 which was granted planning permission by An Bord Pleanála as part of the 110kV Substation development. The junction is designed as a priority junction in accordance with *Transport Infrastructure Ireland – Geometric Design of Junctions, April 2017*[10] and is illustrated on drawing no.'s 60695232-PTN-DR-005.

A new deceleration lane is also included as part of the approved 110kV Substation development and will be constructed on the R152 to facilitate traffic that will turn left into the proposed development site from the north-east. The approach from the north will include a widening of the road from the boundary of the site to the entrance to allow for deceleration of HGVs.

The new site access and deceleration lane will be permanent and will be used during both the construction and the operational phases of the proposed development and the approved 110kV

[8] National Roads Authority (NRA) (now TII). Traffic and Transport Assessment Guidelines (2014)
[9] Transport Infrastructure Ireland (TII) Traffic Data Site. Available at: https://trafficdata.tii.ie/publicmultinodemap.asp [Accessed January 2023]
[10] Transport Infrastructure Ireland (TII), *Transport Infrastructure Ireland – Geometric Design of Junctions, April 201,* Available at: http://www.tiipublications.ie/library/DN-GEO-03060-01.pdf , (Accessed January 2023)

Substation. The existing hedge in place at the location of the deceleration lane will be reinstated following construction of the deceleration lane, ensuring that there should be no long-term impact on privacy for the nearest residential dwelling. Planned landscaping will also ensure that neighbouring sites are fully screened and that no impact to residential amenity will occur.

5.3 Construction Impacts and Mitigation

As described in Section 2.3 of this Environmental Report, construction of the proposed development and approved 110kV Substation are expected to commence on site in Q4 2023 (subject to receipt of planning permission) with an expected duration of 30 months.

The construction worker numbers and traffic flows during construction stated in this chapter are also including the scope of the approved 110kV Substation located adjacent and to the south-west of the proposed OCGT power plant which will be constructed at the same time as the proposed development.

The construction traffic volumes given below account only for the proposed development to assess the cumulative impact on traffic in the vicinity of the proposed development site. There will be one temporary construction compound on site with temporary parking for the construction workers also. This is detailed on drawing no's 60695232-PTN-DR-010.

The average on-site employment during the construction phase is expected to be 40 persons, peak of 60 persons, working within one construction shift from approximately 08:00 to 18:00. It can reasonably be expected that all site operatives' trips to the site will occur before 08:00, and that these trips will not coincide with that of delivery vehicles to / from the site. However, in the interests of robustness, this assessment conservatively assumes that 40% of the operatives will arrive during the 08:00 to 09:00 peak morning hour. It is proposed to maximise the employment of locally based workers in the project, some of whom may walk / cycle to work; however as a conservative approach it is assumed that all construction personnel will travel to the site via car, with average car occupancy of 1.2. This will result in an inbound generated flow during the 08:00 to 09:00 peak morning hour of 14 to 20 passenger car units (pcu) ($40 \times 0.4 / 1.2 = 14$) and ($60 \times 0.4 / 1.2 = 20$). This analysis covers workers commute volumes with construction traffic volume detailed further below.

The approximate cut and fill volumes for the proposed development and approved 110kV Substation are described in Section 6.3 of this report. It is currently anticipated that all excavated material during earthworks will be re-used on site as structural fill and in landscaping; therefore there will be no HGVs removing material from the site during earthworks.

There will be imported material consisting of compacted stone, gravel topping, road construction make-up, footpaths, concrete bases, etc. required for the site. The total imported material required for the platform area of the proposed development and the approved 110kV Substation will be c. 18,727m^3. This will be brought to site by approximately 16 HGVs per day over a six month period of peak construction. There will also be other construction material deliveries which are expected to be in the order of 3-5 heavy vehicles per day. This will result in a maximum total of 21 HGV visits to the site per day during peak construction.

This assessment has been based on the maximum numbers of HGV movements to and from the site in any one day which in reality are likely to be much less than this for most days as they will depend on the operational hours of the plant which will vary.

On the basis that each of the heavy delivery vehicles is the equivalent of 3 passenger car units (pcu)[11] in accordance with the guidance set out in the Transport Infrastructure Ireland 'Project Appraisal Guidelines' (Unit 5.2), which in turn refers to the Transport for London 'Traffic Modelling Guidelines' for conversion factors. This equates to an inbound daily flow of 62 pcu and an identical outbound daily flow. For the purpose of analysis, it has been assumed that 20% of these inbound and outbound trips occur during the morning peak hour, this equates to 12 pcu inbound and 12 pcu outbound. 'Passenger Car Units' in accordance with the guidance set out in the Transport

[11] Conservative assumption based on a HGV having a pcu value of 2.3 (Transport for London, September 2010; available at: http://content.tfl.gov.uk/traffic-modelling-guidelines.pdf, (Accessed January 2023)

Infrastructure Ireland 'Project Appraisal Guidelines' (Unit 5.2), which in turn refers to the Transport for London 'Traffic Modelling Guidelines' for conversion factors.

The total estimated traffic flow generated during morning peak hour during the construction phase is summarised in Table 5.1 below.

Table 5.1: Total Trips (pcu) Generated during Morning Peak Hour - Construction Phase

Description	AM in	AM out
Staff / Labour Traffic (pcu)	20	0
HGV Delivery Traffic (pcu)	12	12
TOTAL	**32**	**12**

It is also conservatively assumed that the above assumptions can be used to predict the level of traffic entering and exiting the site during the evening peak hour of 17:00 to 18:00 during the construction phase.

The total estimated traffic flow generated during evening peak hour during the construction phase is summarised in Table 5.2 below.

Table 5.2: Total Trips (pcu) Generated during Evening Peak Hour - Construction Phase

Description	PM in	PM out
Staff / Labour Traffic (pcu)	0	20
HGV Delivery Traffic (pcu)	12	12
TOTAL	**12**	**32**

The traffic levels presented in Tables 5.1 and 5.2 are not considered significant, based on road network quality and current traffic levels.

As described in Section 5.2, the data for existing traffic volumes in the area is taken from the Indaver planning application traffic counts carried out in 2019 out for the Indaver planning application submitted in 2020 (An Bord Pleanála Case Reference PA17.307433). This study on behalf of Indaver found that the peak two-way volumes on the R152 were observed at the time to be 1,393 vehicles in the morning peak hour (8.15am to 9.15am) and 1,658 vehicles in the evening peak hour (5pm to 6pm).

Therefore based on the estimated PCU's outlined in Table 5.2, the construction phase of the proposed development and the approved 110kV Substation will result in a morning peak hour increase of 2.29%, and an evening peak hour increase of 1.93%.

The Traffic and Transport Assessment Guidelines (NRA, 2014) states that a Traffic Impact Assessment (including junction assessment) should be produced where "traffic to and from the development exceeds 5% of the traffic flow on the adjoining road". As the percentage increases outlined above are less than 5%, a further assessment of the traffic impact is not required for the construction phase of the proposed development.

During construction, there will be a small number of abnormal loads delivered to the site including some of the main plant equipment. All abnormal loads would be delivered by an approved licensed specialist with the prior approval of Meath County Council, An Garda Síochána and other relevant authorities. All abnormal loads would be delivered overnight during off-peak traffic periods. The abnormal loads will follow the route from the M1 motorway exiting at Junction 8 (Lower Platin) via the R152, directly to the site.

The Construction Environmental Management Plan cross references the mitigation measures for any potential environmental effects as a consequence of traffic and transport. The following measures will be implemented: the HGV route to the site during the construction phase will be from the M1 motorway exiting at Junction 8 (Lower Platin) via the R152, directly to the site. The distance from the motorway to the site is approx. 2.1km. No HGVs will be required to access Duleek village and will be prohibited from doing so. No HGV construction traffic will be permitted to approach the site on the R152 from the south and therefore there is no requirement for a right-turn lane at the site entrance. Similarly, all workers for construction and operational phases will use this route to avoid undue traffic congestion through Duleek.

Additionally, there will be a Construction Environmental Management Plan and Traffic Management Plan for the approved 110kV substation submitted to and agreed with Meath County Council prior to the commencement of construction, as per ABP planning condition no. 6, reference ABP-303678-19: "*The construction of the proposed development shall be managed in accordance with a Construction and Environmental Management Plan and Traffic Management Plan, which shall be submitted to, and agreed in writing with, the planning authority prior to commencement of development. This plan shall provide details of intended construction practice for the proposed development, including noise and dust management measures, surface water management proposals, control and management of accidental spillages, detailed design of watercourse crossings, the management of construction traffic, the means to protect the public road and off-site disposal of construction waste."* The Traffic Management Plan will cover both developments: the proposed development and the approved 110 kV substation.

5.4 Operational Impacts and Mitigation

As previously stated, the proposed development and approved 110kV Substation share the same site access road and junction onto the R152 which was granted planning permission by An Bord Pleanála as part of the 110kV Substation development. The operational traffic is detailed further in this section.

The approved 110kV Substation will require minimal attendance during its operational phase. It is anticipated that it will be attended once per quarter for a visual inspection. No routine maintenance is envisaged.

The proposed development will run under automated control from a remote location and will be minimally attended (4 personnel). Site attendance will be limited to maintenance and occasional administrative meetings. The average anticipated number of visitors expected at the site per week is 2 no. persons. Assuming all visitors and incidental workers/contractors travel to the proposed site on the same day, the maximum traffic generated will be in the order of 4 pcu per day inbound with the same number outbound. These journeys will be made in cars or vans only. For the purposes of this assessment, as a conservative approach it has been assumed that all of these trips to the site occur during the morning peak hour, and all of these trips from the site occur during the evening peak hour.

As the actual running hours of the proposed development will vary depending on the time of year and the availability of alternative wind power, the number HGVs visiting the plant with deliveries or for waste collections per day will also vary depending on the time of year. As the proposed development not operate continuously and is expected to operate for 1800 hours of the year, the quantities of waste and process waste water is expected to fluctuate similarly. A conservative assessment is presented here with the anticipated worst case traffic volumes in the event of increased runtimes expected during the winter months.

Process waste water generated at the on-site water treatment plant will be stored in an underground 90m^3. The maximum volume of processed water output from the on-site water treatment plant would be c. 73m^3 per day. There will also be waste water collected separately from the Fuel and Water Holding Tank located beside the OCGT units which would collect HVO released from the combustion chamber after a failed start-up or from discharges or leaks of lubricating oil from the gas turbine units or generators. It is considered that a maximum of 3 tankers per day will be required to remove these process waste water streams off site for treatment at appropriately licensed waste facilities.

Transport of HVO will be by HGV and under normal predicted operating conditions is expected to be infrequent based on the low running hours and storage of HVO onsite. It is considered a maximum of 8 tankers per day will be required to deliver HVO. The carbon impact of delivering HVO to site rather than utilising natural gas from an adjacent pipeline to the site has been assessed in Chapter 14 on the basis of 1800 hours of operation per year; utilising HVO as a fuel type has far lower greenhouse gas emission comparatively to natural gas, even with transportation factored into the emissions calculation.

There will also be sanitary foul waste water generated from the site office building which will be stored in a 79m^3 underground tank pending collection by an appropriately licensed waste services provider for treatment off site. The anticipated volume of sanitary foul waste water to be produced is c. 1m^3 per day – therefore a maximum of 1 tanker per month would be required to collect this waste.

During the operational phase of the proposed development, there will be regular deliveries of water treatment chemicals for the water treatment plant and also less frequent deliveries of HVO road tankers to maintain the backup supply on site.

Based on these requirements for deliveries and collections from the proposed site, there will be an anticipated maximum of 13 no. HGVs visiting the site per day. On the basis that each of the HGVs is the equivalent of 3 passenger car units (pcu)[12], this equates to a maximum inbound daily flow of 39 pcu and an identical outbound daily flow.

Making the robust assumption that 20% of these inbound and outbound trips occur during the morning peak hour and 20% of these inbound and outbound trips occur during the evening peak hour, this equates to 8 pcu's inbound and pcu's outbound during these peak hours.

The total maximum estimated traffic flows generated during the morning and evening peak hour of the operational phase of the proposed development is summarised in Table 5.3 and 5.4 respectively.

Table 5.3: Maximum Total Trips (pcu's) Generated during Morning Peak Hour from the proposed development - Operational Phase

Description	AM in	AM out
Staff / Visitors (pcu's)	4	0
HGV Traffic (pcu's)	8	8
TOTAL	**12**	**8**

Table 5.4: Maximum Total Trips (pcu's) Generated during Evening Peak Hour from the proposed development - Operational Phase

Description	PM in	PM out
Staff / Visitors (pcu's)	0	4
HGV Traffic (pcu's)	8	8
TOTAL	**8**	**12**

The maximum traffic levels presented in Tables 5.3 and 5.4 are not considered significant, based on road network quality and current traffic levels.

When considering the peak maximum traffic levels estimated in Tables 5.3 and 5.4, the operational phase of the proposed development will result in a morning peak hour increase of 1.43%, and an

[12] Conservative assumption based on a HGV having a pcu value of 2.3 (Transport for London, September 2010; available at: http://content.tfl.gov.uk/traffic-modelling-guidelines.pdf, accessed January 2023)

evening peak hour increase of 1.2% on existing traffic volumes for the R152 (stated in the Indaver planning application submitted in 2020: this study on behalf of Indaver found that the peak two-way volumes on the R152 were observed at the time to be 1,393 vehicles in the morning peak hour (8.15am to 9.15am) and 1,658 vehicles in the evening peak hour (5pm to 6pm)).

The predicted increases in peak hour junction traffic volumes on the local road network would be less than the volumetric threshold (5%) identified by TII in its The Traffic and Transport Assessment Guidelines (NRA, 2014), therefore a further assessment of the traffic impact is not required for the operational phase of the proposed development.

All HGV deliveries/collections to and from the site during the operational phase will follow a designated HGV route to the site from the M1 motorway exiting at Junction 8 (Lower Platin) via the R152, directly to the site. No HGVs will be required to access Duleek village and will be prohibited from doing so.

5.5 Decommissioning Impacts and Mitigation

The impacts expected and mitigation measures required in the decommissioning phase are expected to be similar to those of the construction phase. Decommissioning of the proposed development would be subject to grant of approval by Meath County Council. In the event of the proposed development being decommissioned at the end of its operational lifetime (expected to be 20 years), a designated Decommissioning Management Plan will be developed which will outline the mitigation measures required, similar to those outlined in the Construction Environmental Management Plan and submitted to Meath County Council for approval. The decommissioning of the proposed development is not predicted to have any significant impact on the traffic volumes, with a marginal temporary increase similar to the construction phase.

5.6 Cumulative Impacts

A review of the following planning applications in the vicinity of the proposed SSE site, in terms of traffic numbers that will be generated, was carried out in the context of proximity to the site and expected higher road traffic volumes:

- Irish Cement (ABP Case Reference PL17 .PA0050) to facilitate further replacement of fossil fuels with alternative fuels and allow for the introduction of alternative raw materials in the manufacturing of cement;
- Indaver (MCC Case Reference FS16071, FS16072, FS18022) - Alterations to waste-to-energy facility. They are not considered to have a cumulative negative impact with the proposed development as they relate to minor changes to existing operations;
- Highfield Solar Limited (Meath County Council LB16.0898) - Construction of solar farm to include two electrical substations, transformer, inverter station and storage modules, solar panels, access roads and associated site works;
- Highfield Solar Limited (ABP Case Reference PL17.306330) - Development of 110kV infrastructure; and
- Irish Cement (ABP Case Reference PL17.309308) - 20 year permission for a 13.5 hectare extension to existing Overburden Management Facility.
- Indaver (ABP Case Reference PA17.307433) - Increase in annual total waste for treatment from currently permitted 235,000 tonnes to 250,000 tonnes, increase in annual amount of hazardous waste from currently permitted 10,000 tonnes to 25,000 tonnes, development of a aqueous waste tank farm, hydrogen generation unit, bottom ash storage building, development of a single storage warehouse, new concrete yard, weather canopy, demolition and rebuilding of an existing single storey modular office and ancillary site works.

The Indaver (ABP Case Reference PA17.307433) cited background traffic levels for 2019 being forecasted for future years by applying the following growth rates:

- For 2019-2021 – light vehicles increased by 3.5%, heavy vehicles increased by 7.4%;
- For 2019-2022 – light vehicles increased by 5.3%, heavy vehicles increased by 11.4%;
- For 2019-2027 – light vehicles increased by 14.7%, heavy vehicles increased by 33.2%; and

– For 2019-2037 – light vehicles increased by 26.8%, heavy vehicles increased by 68.8%.

It was determined in each of the planning applications that the impacts associated with those developments in terms of traffic will be low impact on the basis of marginally increased traffic volumes and will have no material impact on the existing road network. The Irish Cement development will generate increases in peak morning and evening hour traffic of less than 5% on existing numbers. Given their nature, the operational phases of the other developments listed above will not generate additional traffic.

The Indaver development will have an increase of 146 pcu's during construction each week, with an additional 176 HGVs on a weekly basis during operation. Planning permission was granted by ABP in March 2023, Phase 1 construction is expected to take 12 months and Phase 2 construction is expected to take 16 months. Subject to grant of approval, construction of the proposed development is expected to commence in Q4 2023 and is expected to take 30 months. On this basis, there will be a slight negative cumulative impact during the construction phase of the proposed development as there are increased HGV volumes on the R152. This is short term as there is an overlap in construction period of the proposed development and the approved Indaver development. During the operational phase, Indaver outline an increase in operational traffic. The predicted increases are R152 (North) of 6.8% and R152 (South) of 4.1% in the morning (06:00 to 07:00), and R152 (North) of 6.2% and R152 (South) of 7.3% in the evening (19:00 to 20:00). As all operational traffic from the proposed development will be northbound on the R152, there will be no cumulative traffic effect to the R152 (South) and a marginal increase to the R152 (North) during peak times of the day, morning and evening.

Due to this and the prediction that the proposed development to which this planning application relates will not have a significant impact on traffic volumes in the area during its construction and operational phase, respectively, it is concluded that there is no potential for significant cumulative impacts.

Construction and operations traffic estimates include the traffic associated with the approved 110kV Substation.

5.7 Conclusions

The traffic generated as a result of the proposed development will result in relatively small percentage increase in vehicles using the local road network during the construction and operational phases;

– The construction phase is of a temporary nature for both OCGT Generating Plan and 110kV substation. Traffic in this phase will result in an increase of only 3.97% and 3.82% on existing traffic levels during morning and evening peaks respectively.
– During the operational phase, the increase in traffic levels will be 2.15% and 1.8% on existing traffic levels during morning and evening peaks respectively.

Therefore the proposed development does not trigger a requirement for further assessment in accordance with the Traffic and Transport Assessment Guidelines (TII, 2014).

The likely traffic movements from the proposed development and the approved 110kV substation will not have an adverse impact on road capacity or safety on the local road network.

6 Land and Soils

6.1 Introduction

This Chapter assesses the likely impacts of the construction and operational phases of the development on the land and soils, i.e. the soil, geological and hydrogeological aspects of the site and surrounding area, during both the construction and operational phases.

K.T. Cullen & Co. Hydrogeological and Environmental Consultants undertook a full baseline hydrogeological investigation of the proposed site in 1999 as part of the original application for a 400MW CCGT power plant. The associated report was referred to during preparation of this Chapter.

An updated site investigation was carried out by Irish Drilling Limited (results are included in Appendix A). This work began on the 18th of February 2019 and was concluded by the 8th of March 2019. The site investigation involved cable percussion boreholes, rotary core boreholes, soil and groundwater sampling. This is included in this report as Appendix A.

6.2 Description of Existing Environment

6.2.1 Soils

The soil distribution at the Site is shown in Figure 6.1. This information has been taken from the Geological Survey Ireland (GSI) website[13]. The soils on the Teagasc maps on the GSI website are shown as being BminDW- deep well-drained mineral (mainly basic) for the majority of the site. The northern quarter of the site is underlain by AminDW- deep well drained mineral (mainly acidic) as described on the Teagasc map.

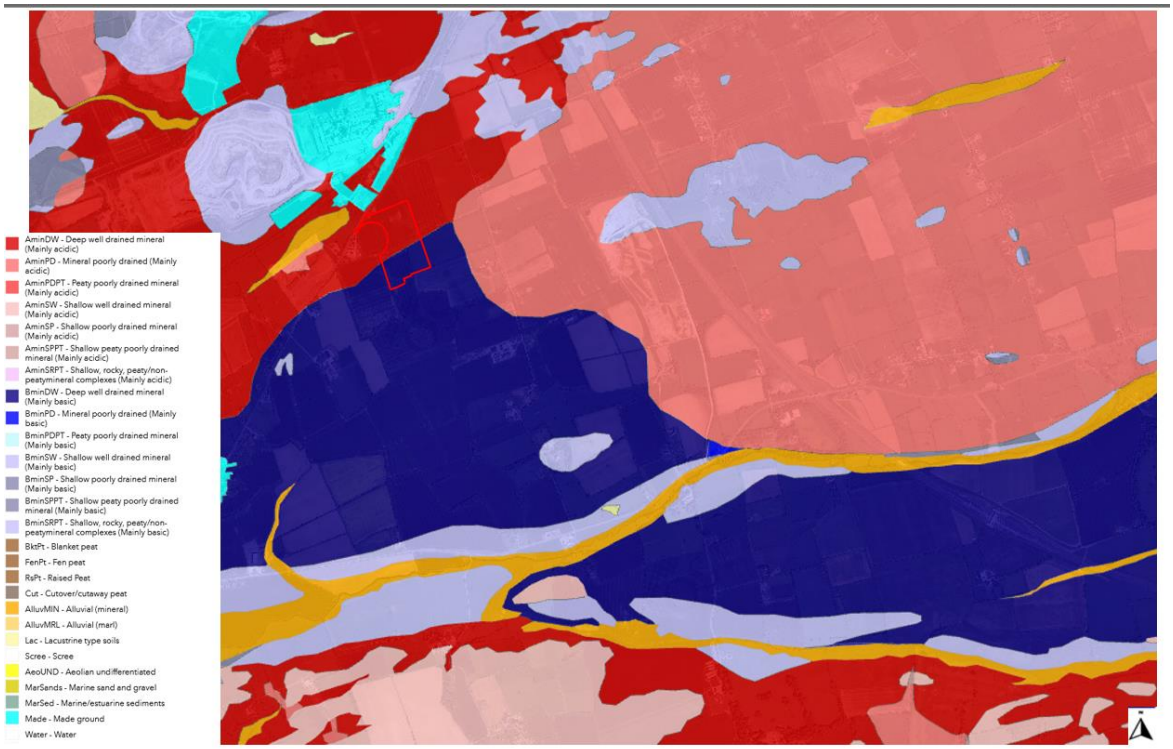


Figure 6.1: Teagasc Soils Underlying the Site and Surrounding Environment (GSI Public Data Viewer Series, annotated by PM Group)

[13] https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aaac3c228 (Last accessed 19 June 2023)

6.2.2 Subsoils

The subsoil distribution underlying the Site and its surrounding environment is shown in Figure 6.2. This information has been taken from the Geological Survey Ireland (GSI) website. The soils are described on the Teagasc Quaternary Sediments map as being TNSSs - Till derived from Namurian sandstones and shales in the northern quarter of the site. The majority of underlying soils are described as TLs- till derived from limestones.

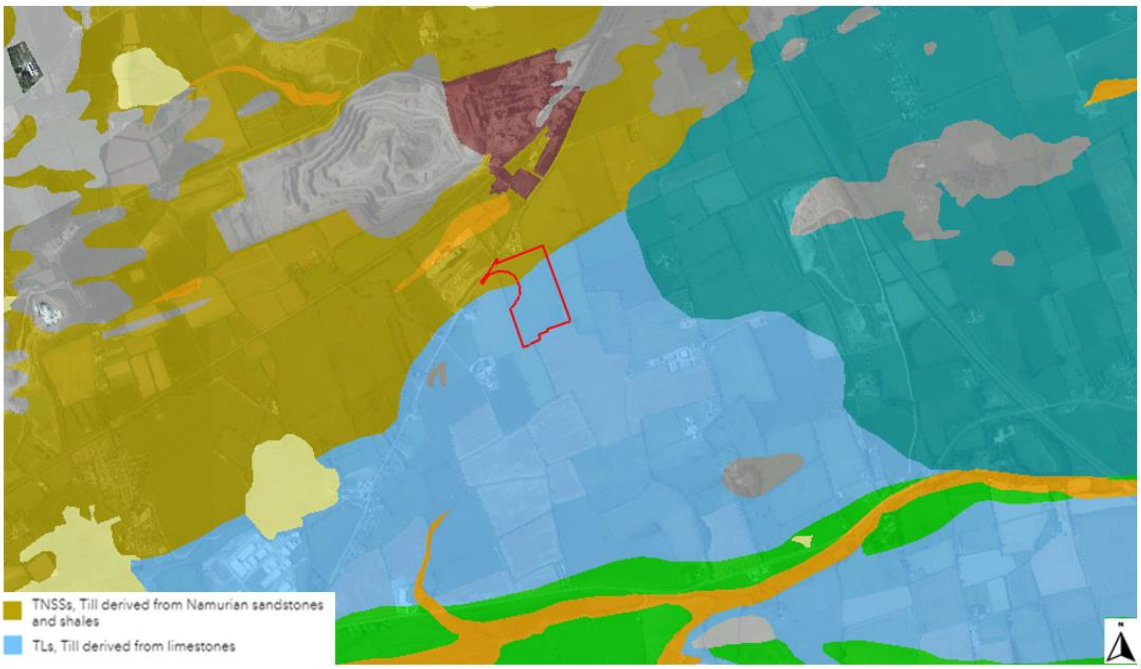


Figure 6.2: Subsoils Underlying the Site and Surrounding Environment (GSI Public Data Viewer Series, annotated by PM Group)

The site investigation carried out by Irish Drilling Limited in 2019 found that ground conditions were typical and as expected for this region and predominantly consisted of Glacial Tills. The Glacial Tills in general consisted of slightly sandy gravelly silty clay with occasional, some or many cobbles and boulders.

6.2.3 Bedrock

Bedrock Geology

Figure 6.3 shows that the Site is underlain by bedrock known as the Platin Formation. This formation is described as a crinoidal peloidal grainstone-packstone. The dominant lithology is crinoidal and peloidal grainstone, locally conglomeratic. Cherty and micritic units are also present. It is generally coarser, paler and less well-sorted than the underlying Crufty Formation. Local dolomitisation is common. This formation is from the Dinantian Series in the Carboniferous System. This formation has been estimated to be 700m thick. This information has been taken from the Geological Survey Ireland (GSI) website.

The site investigation carried out by Irish Drilling Limited did not encounter bedrock in the rotary core boreholes to a depth of 16.00m below ground level before termination.

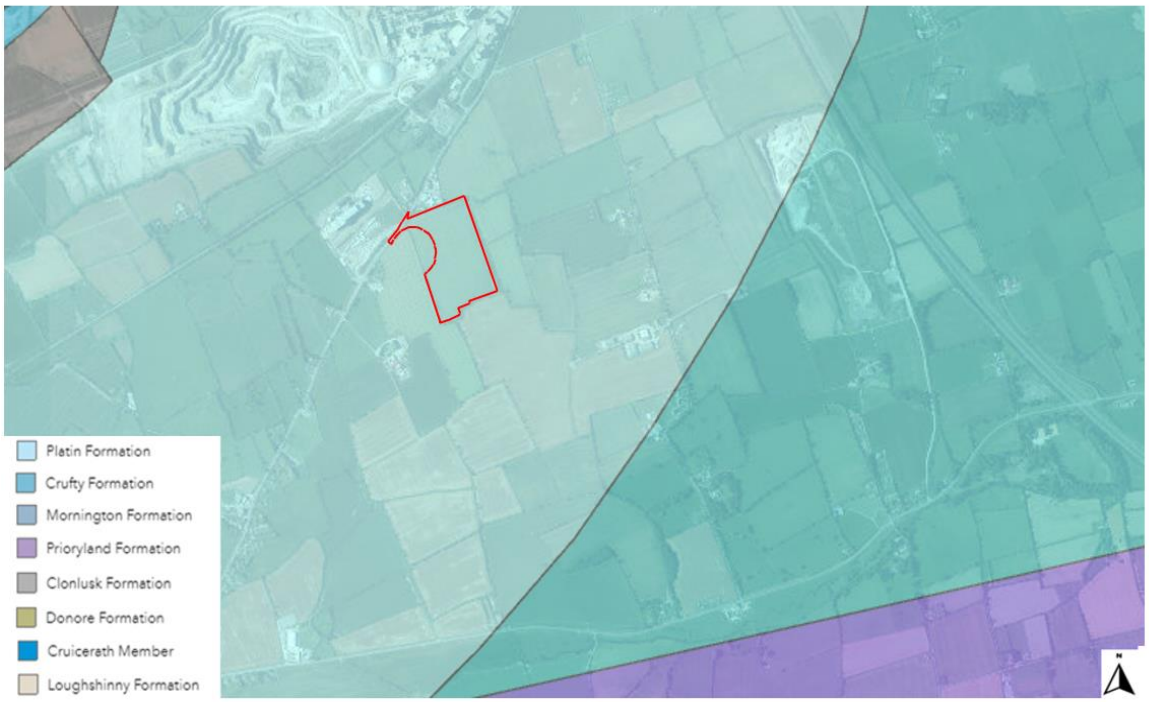


Figure 6.3: Bedrock Geology Underlying the Site and Surrounding Environment (GSI Public Data Viewer Series, annotated by PM Group).

Geological Heritage

Figure 6.4 shows that there are several geological heritage areas surrounding the SSE site. Boyne Valley lies 3.8km to the Northwest. Laytown to Gormanstown lies 4.3km to the East of the site. Bellewstown lies 3.7km to the South. Duleek Quarry is also classified as a geological heritage site and lies 3.8km to the West of the Site. The East Meath Megaflutings are also found 4.5km to the South-East. This information has been taken from the Geological Survey Ireland (GSI) website.

Figure 6.4: Geological Heritage Sites in the Surrounding Area (GSI Public Data Viewer Series, annotated by PM Group)

6.2.4 Karst Features

Figure 6.5 shows that there are 2 no. karstic features in the area of the Site. These include a Borehole which is located 1km to the North of the Site and an Enclosed Depression found 2.7km to the Northwest. This information has been taken from the Geological Survey Ireland (GSI) website.

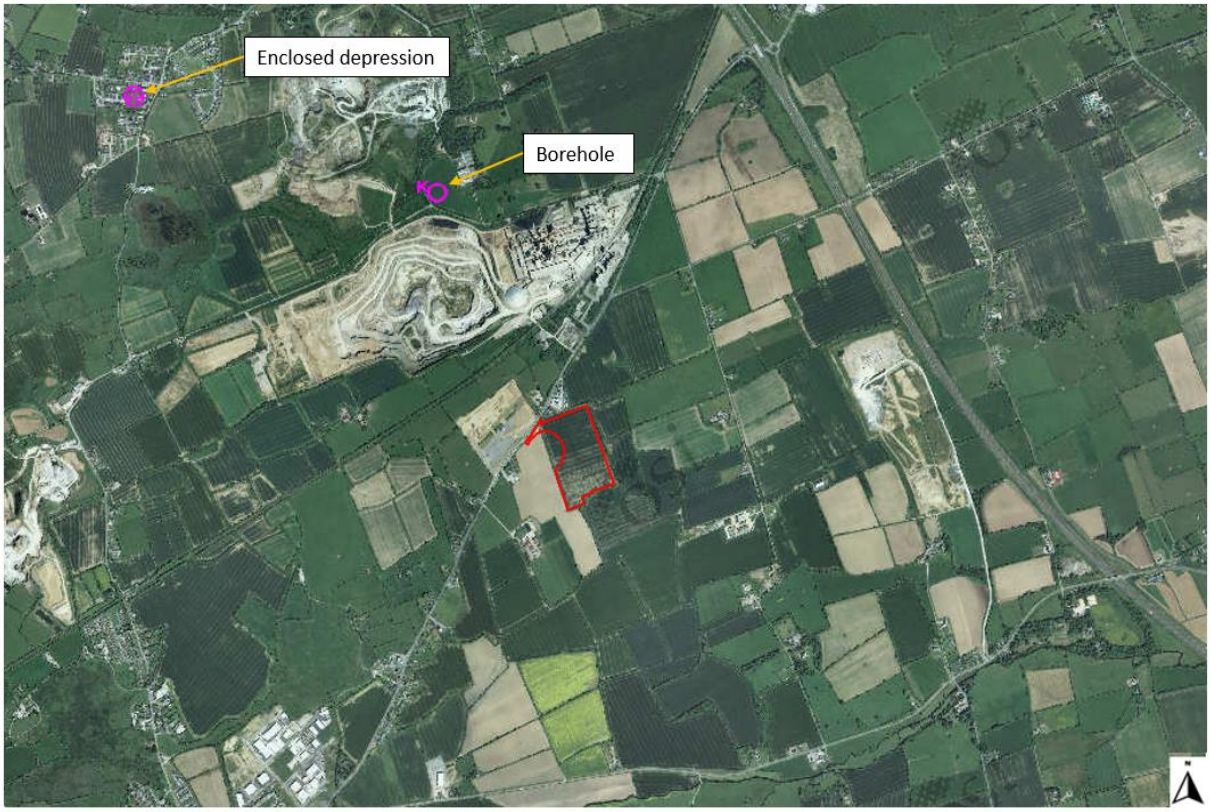


Figure 6.5: Karstic Features nearby to the Site (GSI Public Data Viewer Series, annotated by PM Group)

6.2.5 Active Quarries

Figure 6.6 shows the Active Quarries in the area of the Site. There are 4 no. quarries within a 5km radius of the site, these include:

- The Mullaghcrone Quarry
- The Annagor Quarry
- The Bellewstown Quarry
- The Duleek Quarry

This information has been taken from the Geological Survey Ireland (GSI) website.

Figure 6.6: Active Quarries near to the Site (GSI Public Data Viewer Series, annotated by PM Group)

6.2.6 Radon

Figure 6.7 which has been taken from the EPA Radon Map[14] shows that between ten and twenty per cent of homes in the same 10km grid as the Site are above the reference level of 200 Becquerel per cubic metre (Bq/m^3) of radon.

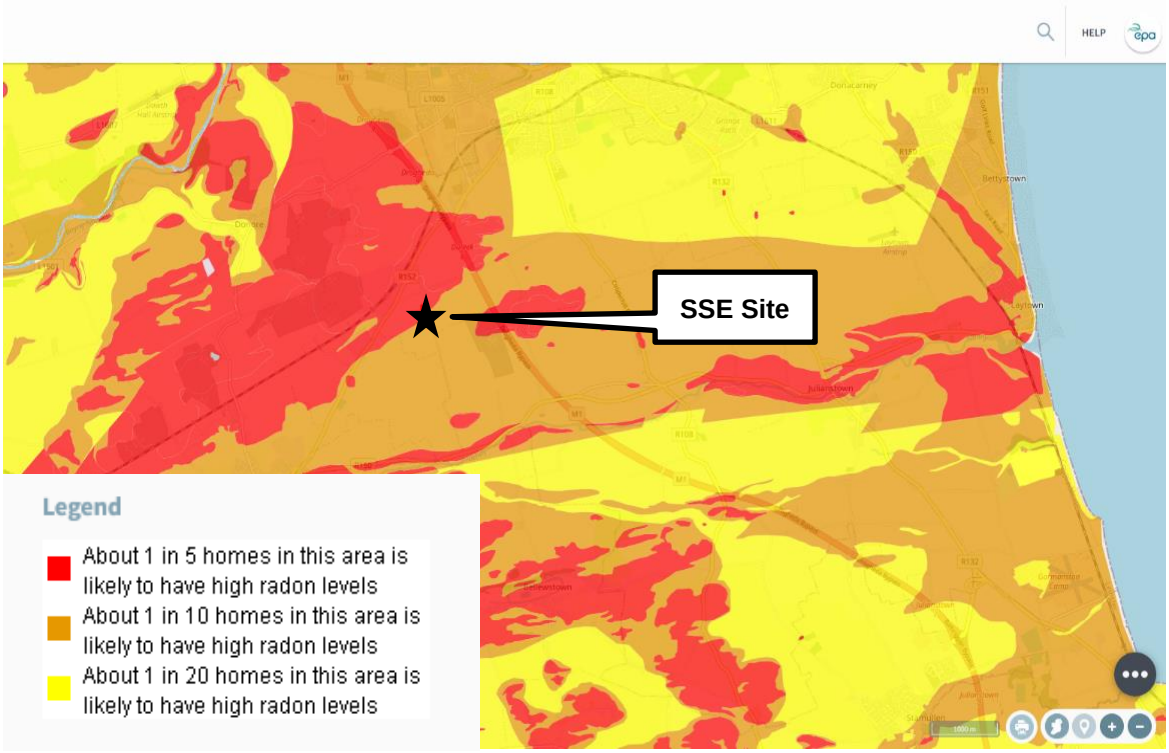


Figure 6.7: Radon Levels in the area surrounding the Site (EPA Radon Map, Annotated by PM Group)

[14] https://gis.epa.ie/EPAMaps/Radon?&lid=EPA:RadonRiskMapofIreland (Last Accessed January 2023)

6.2.7 Hydrogeology

Aquifer Classification

Aquifers are underground layers of rock which contain water and which are capable of yielding it to surface waters such as streams or rivers and groundwater-fed ecosystems. The GSI has developed a classification system for the aquifers based on the value of the resource and the hydrogeological characteristics. The bedrock beneath the Site is classified as Rkd- Regionally Important Aquifer, Bedrock which is Generally Moderately Productive. The aquifer classification is shown in Figure 6.8. This information has been taken from the Geological Survey Ireland (GSI) website.

Figure 6.8: Aquifer Classification in the area surrounding the Site (GSI Public Data Viewer Series, annotated by PM Group)

Groundwater Vulnerability

Vulnerability is defined by the GSI as the intrinsic geological and hydrogeological characteristics that determine the ease at which groundwater may be contaminated by human activities. Vulnerability categories range from Extreme (**E**) to High (**H**) to Low (**L**) and are dependent on the nature and thickness of subsoils above the water table. The GSI Vulnerability map indicates that the site is split between an area of Low vulnerability on the southern half of the site and Moderate vulnerability on the northern half of the site. The Groundwater Vulnerability map is shown in Figure 6.9 (taken from the GSI website) below and the ratings are defined in Table 6.1.

Groundwater Quality

Statutory Instrument (SI) No. 9 of 2010, EC Environmental Objectives (Groundwater) Regulations 2010 (as amended) gives effect to the criteria and standards to be used for classifying groundwater in accordance with the requirements of the Water Framework Directive (WFD). The WFD required 'Good Water Status' for all European waters by December 2015, 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 Groundwater Body (GWB) underlying the site is the Bettystown waterbody (IE_EA_G_016). The waterbody is categorised as 'poor' indicating poor groundwater quality status for the 2016-2021 period for the WFD.[15]

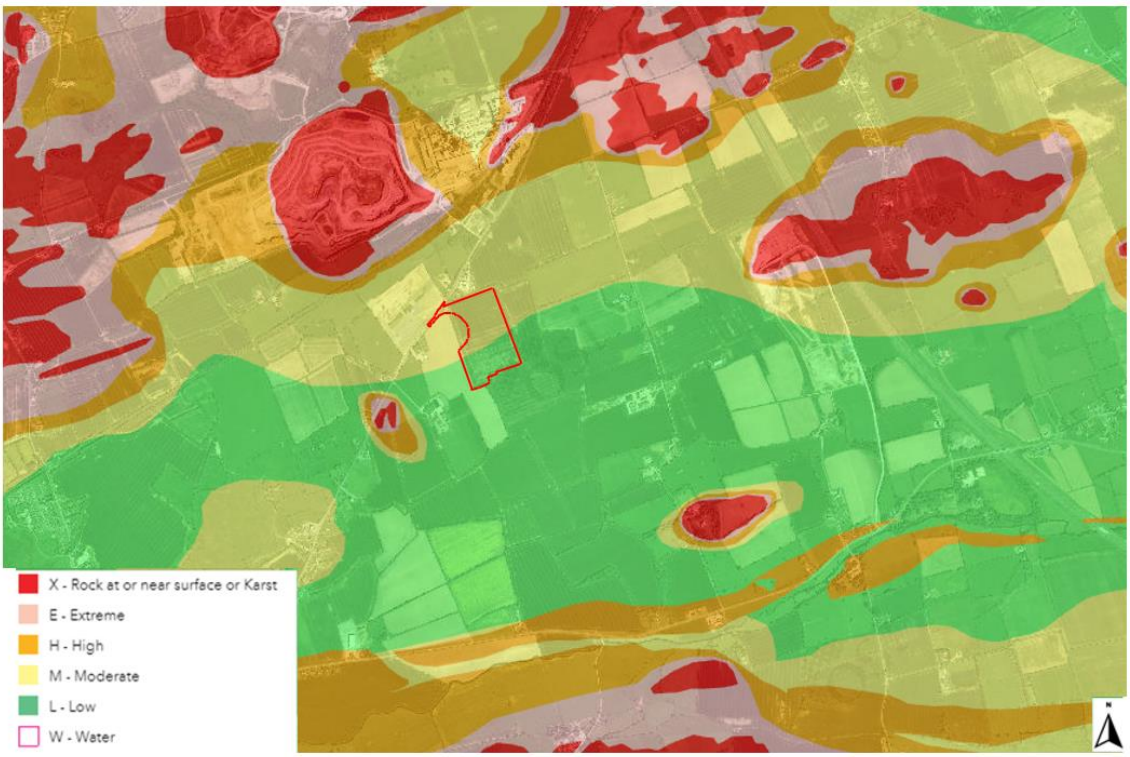


Figure 6.9: Groundwater Vulnerability in the area surrounding the Site (GSI Public Data Viewer Series, annotated by PM Group)

[15] EPA (2023). Ground Waterbody WFD Status 2016-2021. Available at https://gis.epa.ie/EPAMaps/ (Accessed 19 June 2023).

Table 6.1: Groundwater Vulnerability Mapping Guidelines[16]

Vulnerability Rating	Hydrogeological Conditions				
	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 and peat)	(Sand/gravel aquifers only)	(<30m radius)
Extreme (E)	0 – 3.0m	0 – 3.0m	0 – 3.0m	0 – 3.0m	-
High (H)	>3.0m	3.0 – 10.0m	3.0 – 5.0m	>3.0m	N/A
Moderate (M)	N/A	>10.0m	5.0 – 10.0m	N/A	N/A
Low (L)	N/A	N/A	>10.0m	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 1-2m below ground surface

Source Protection Areas

A source protection area is a land area that contributes groundwater to a borehole or spring. Figure 6.10 (which has been taken from the GSI website) shows that there are 2 no. source protections areas recorded by the GSI, an Inner Protection Area located 5.6km to the North of Drogheda town and an Outer Protection Area located 10.5km to the West of the Site.

[16] Department of the Environment, Community and Local Government (DoECLG), EPA & GSI, (1999), Groundwater Protection Scheme Guidelines

Figure 6.10: Source Protection Areas (GSI Public Data Viewer Series, annotated by PM Group) (GSI Public Data Viewer Series, Annotated by PM Group)

6.2.8 Groundwater Wells

According to the GSI website, there are 12 no. boreholes and 4 no. groundwater wells within a 3km radius of the Site (denoted by the orange dash circle) on Figure 6.11. The database with the locations of records has different accuracies depending on the source data. The location accuracy is conveyed graphically in Figure 6.11 by the size of the circle that denotes a record.

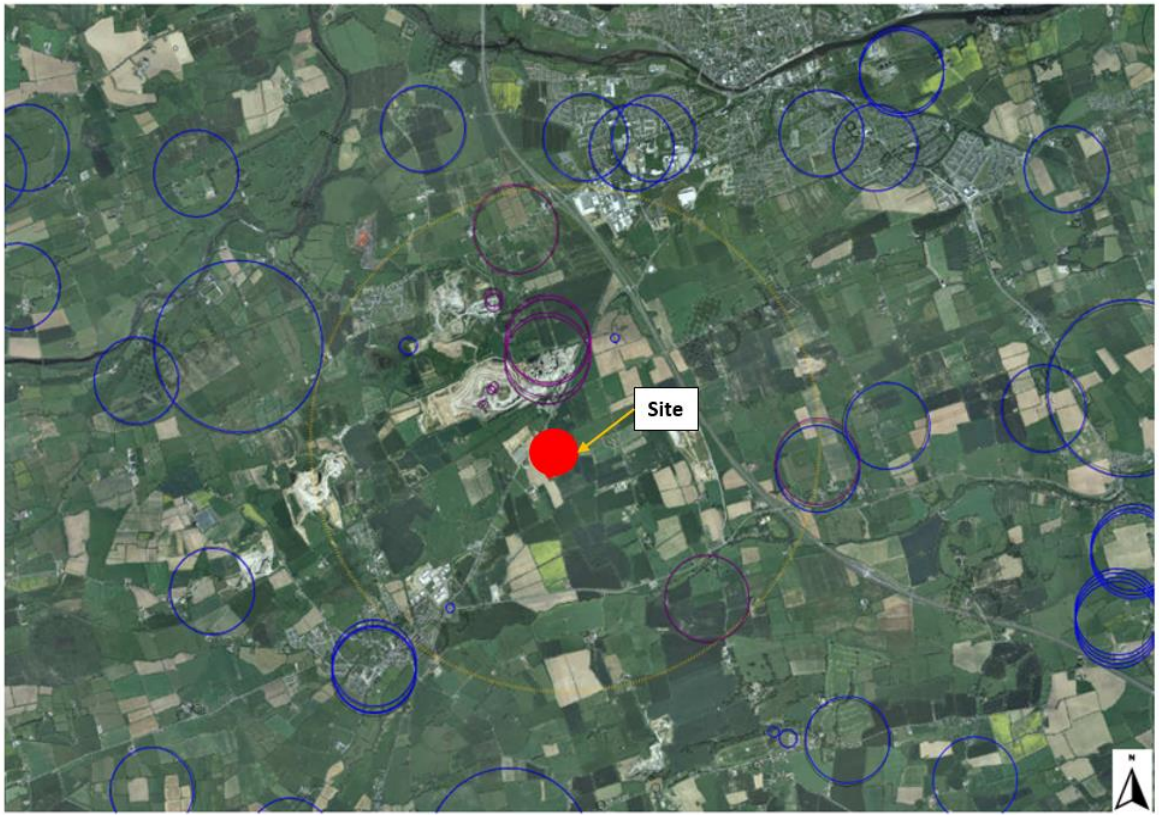


Figure 6.11: Groundwater Wells (blue circles) and boreholes (purple circles) within 3km of the Site (GSI Public Data Viewer Series, annotated by PM Group)

6.2.9 Irish Drilling Limited Site Investigation

A geotechnical investigation was carried out by Irish Drilling Ltd. in February and March 2019 to determine the baseline levels for groundwater quality and soil conditions at the Site. To provide a comprehensive determination of the groundwater and soil quality beneath the site 11 no. cable percussion (Shell & Auger) boreholes (BH), 5 no. rotary core boreholes (RC) and 14 trial pits (TP) were created across the site (See Figure 6.12). Additional testing of groundwater samples from was completed in August 2019 in 4 no. wells (RC02, RC06, RC08, and RC09).

The cable percussive boreholes were bored to ‘refusal’ or to instructed depths. The borehole depths ranged from 4.20m to 10.00m below ground level.

The rotary core boreholes in general were carried out as ‘follow-on’ boreholes adjacent to locations where the cable percussive boreholes were carried out to a depth of 16.00m below ground level.

Brown clayey sands and gravels were encountered at cable percussive borehole BH010 between 3.70m and 5.60m depth, at trial pit TP013 between 1.50m and 2.50m depth and at trial pit TP014 between 2.80m and 4.00m depth. A layer of brown fine to medium sand was also encountered at trial pit TP014 between 1.70m and 2.80m depth. Bedrock was not encountered in the rotary core boreholes to a depth of 16.00m below ground level before termination.

The interpreted direction of the groundwater flow is a general south-easterly direction based on the groundwater levels recorded as part of the 2019 Site Investigation. Based on the results of the site

investigation, it appears that generally the groundwater table is at a depth ranging between approximately 10 and 15mbgl. The shallow groundwater seepage from TP's 6 and 7 are likely to explain the high groundwater readings in BH02 as they are all in close proximity of approximately 70m and are likely to be as a result of a localised perched water table with a more granular zone of the glacial till.

The Site layout as shown in Figure 6.12 denotes the previous application in 2019 layout. The layout of the proposed development has been since amended for this application and the layout as shown in Figure 6.12 is included to demonstrate the positions of boreholes and trial pit locations only.

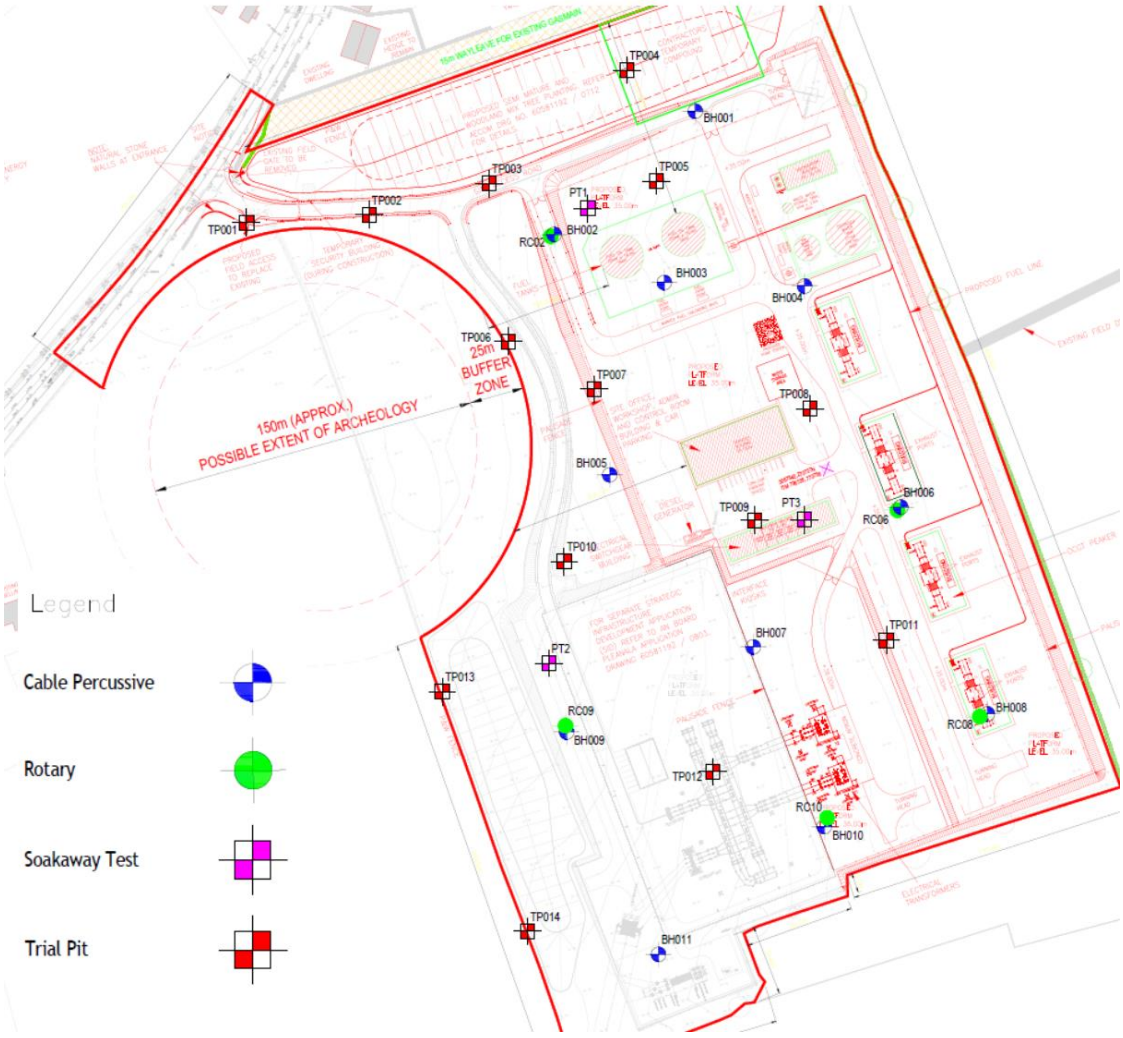


Figure 6.12: Site Layout with borehole and trial pit locations (produced by Irish Drilling Ltd. – taken from March 2019 Site Investigation Report)

6.2.10 Groundwater Environmental Testing (February/March 2019)

The quality of groundwater was determined from representative samples recovered from the rotary core boreholes (RC02, RC06, RC09 and RC10) which were analysed in an appropriately accredited laboratory for a suite of typical groundwater environmental testing parameters.

The results of the groundwater environmental testing have been compared to Groundwater Threshold Value (GTV) standards outlined in the Statutory Instrument (SI) No. 9 of 2010, EC Environmental Objectives (Groundwater) Regulations 2010 (as amended), and where standards were not available in the aforementioned regulations, standards were referenced from *Towards*

Setting Guideline Values for the Protection of Groundwater in Ireland Interim Report, EPA 2003 (EPA IGV) – see Appendix A of this Environmental Report.

The majority of groundwater quality parameter values were found to be below or within acceptable ranges of the relevant quality standards. However, there are some results which are higher than applicable guideline values;

- Manganese values detected at the site were higher than the EPA IGV Standard (50 µg/l) in 2 no. boreholes (RC06 – 121 µg/l and RC10 – 78.8 µg/l). The source is unknown. It is noted that Manganese levels at the Indaver site adjacent to the Site are also elevated – an Indaver 2019 GW monitoring report[17] available on the EPA website shows that Manganese levels at the Indaver site adjacent to the Site are elevated also, ranging from 83 µg/l to 983 µg/l from March to September 2018.
- There were exceedances in the EPA IGV standards for Total Coliforms (0 counts of colony-forming units (CFU) per 100ml) at all borehole locations and Faecal Coliforms (0 counts CFU per 100ml) at boreholes RC02, RC06 and RC09. The results for Total Coliforms ranged from 921 CFU/100ml (at RC09) to 36,500 CFU/100ml (at RCO2). The results for Faecal Coliforms ranged from 37 CFU/100ml (at RC06) to 4,900 CFU/100ml (at RC02). It is possible that this is a result of historical livestock grazing on these lands, or potentially from slurry spreading.
- Samples from RC10 also showed elevated levels of Total Organic Carbon (TOC) (63.1 mg/l) and Ammoniacal Nitrogen (1.01 mg/l) which could also be attributed to the historical livestock grazing activity on the lands. The IGV Standard for TOC is 'no abnormal change' and there is no IGV or GTV standard for Ammoniacal Nitrogen. Ground water flow is determined to be south easterly and soil conditions encountered in some of the boreholes, most notable RC 10 was brown clay, sand and gravel which would suggest it to be high permeable, at least in some parts of the site. It is possible the elevated results are as a result of historic fuel contamination though other natural sources are possible such as bog water.
- The IGV limits for Fluoride (1 mg/l) and Zinc (0.01 mg/l) were exceeded at RC10 (1.18 mg/l Fluoride and 1.63 mg/l Zinc). The source is unknown. It is worth noting that Fluoride at the adjacent Indaver site was below the IGV of 1 mg/l ranging from 0.03 – 0.15mg/l from March to September 2018.
- The result for Nitrite as N at RC10 was elevated at 0.567 mg/l and is higher than the Groundwater Threshold Value stated for Nitrite in S.I. no. 9 of 2010 (0.375mg/l).
- There was a trace amount of Mineral Oil >C10 C40 oil found in groundwater samples taken from upgradient boreholes RC02 (159 µg/l) and RC06 (416 µg/l) compared to the downgradient borehole at RC10 where the result for Mineral Oil was considerably higher at 53,000 µg/l. This is very high compared to the IGV for Total Hydrocarbons (including Mineral Oil) (10 µg/l) which is also the drinking water standard for this parameter. As there is no GTV or EPA IGV standard for mineral oil in groundwater, these results can be compared with The Dutch Target and Intervention Values[18] which give soil and groundwater remediation intervention values and indicative levels for serious contamination and target values. This standard sets a target value of 50µg/l and an intervention value of 600µg/l for Mineral Oil in groundwater. The result for Mineral Oil at RC10 is significantly above the Dutch Intervention Value. The source is not known.
- Total Aliphatics >C12-C35 for the groundwater sample taken from R09 was below the limit of detection (<10 µg/l), however there was trace amounts found in RC02 (54 µg/l) and RC06 (317 µg/l) while a higher amount was found in RC10 (44,500 µg/l). Most of the Aliphatics found in RC10 were within the Aliphatic Ranges of >C12-16 (42,300 µg/l) and >C21-C35 (1,990 µg/l). Most of the Aliphatics within RC02 and RC06 were within the Aliphatic Ranges of >C21-C35 (43 µg/l and 140 µg/l respectively) and >C12-C16 (11 µg/l and 162 µg/l respectively).
- There is no IGV for Total Aliphatics alone, however the IGV for Total Hydrocarbons is 10 µg/l. There are no guide values given for total Aliphatics in the Dutch Target and Intervention Values for comparison of these results. As with the data for mineral oil results, the source is not known.

[17] http://www.epa.ie/licences/lic_eDMS/090151b2806e45ad.pdf
[18] Dutch Target and Intervention Values, 2000 (the New Dutch List), Version, februari 4th, 2000

- Total Aromatics >EC12-EC35 were below the limit of detection in RC02, RC06 and RC09. However, the result for this parameter in the groundwater collected from RC10 was 384 µg/l, with the highest levels being within the Aromatics Ranges of >C12-16 (88 µg/l) and >C21-C35 (279 µg/l).
- There is no IGV for total Aromatics alone, however as previously stated, the IGV for Total hydrocarbons is 10 µg/l. There are no guide values given for total Aromatics in the Dutch Target and Intervention Values for comparison of these results. As with the data for mineral oil results and Aliphatics, the source is not known.
- None of the groundwater samples tested showed levels of Volatile Organic Carbons including Methyl tertiary butyl ether (MTBE) or benzene, toluene, ethylbenzene and xylene (BTEX) above the limit of detection.
- Contamination where it exists is sporadic and in hot spots. Localised oil spills from farm machinery may be the source.

6.2.11 Additional Groundwater Sampling (August 2019)

As discussed in Section 6.2.10, elevated levels of hydrocarbons were recorded within groundwater samples in March 2019. This was unexpected due to the greenfield nature of the site which has been used for agricultural purposes only for the last 20 years. It is noted that the previous site investigation carried out by K.T Cullen in 1999 found no contamination at the site.

Based on this, to re-check the March 2019 groundwater sample results, a second round of monitoring was undertaken by Irish Drilling in August 2019 - wells RC02, RC06, RC08, and RC09 were sampled as part of this monitoring. It was not possible to resample from RC10 due to the well remaining dry after purging, and so groundwater from RC08 was sampled instead which was not sampled in the March 2019 testing.

The results from the additional groundwater monitoring are summarised below with respect to elevated levels of hydrocarbons identified;

- There was no Mineral Oil >C10 C40 detected in boreholes RC02 and RC09 above the limits of detection. However, elevated levels of Mineral Oil >C10 C40 were detected at borehole RC06 (1680 µg/l) and RC08 (246 µg/l). This is a significant increase in Mineral Oil at RC06 which was at a level of 416 µg/l in the March groundwater testing.
- The level of Total Aliphatics and Aromatics >C5-35 (aq) in RC02 and RC09 were found to be below the limit of detection (<10 µg/l). This is consistent with the first set of results for RC09, but has shown a decrease in the levels in RC02 which showed trace levels ((54 µg/l) in the March 2019 testing.
- However, there were elevated levels of Total Aliphatic & Aromatic Hydrocarbons recorded in two boreholes: RC06 (1,700 µg/l) (showing an increase from the March 2019 result of 317 µg/l for Total Aliphatics only – there were no Total Aromatics recoded in the RC06 sample taken in March 2019) and RC08 (221 µg/l) (no groundwater sample taken from RC08 in March 2019 testing).
- Most of the Aliphatics & Aromatics within the RC06 sample were within the C21-C35 range (likely source from hydrocarbons, i.e. 1,210 µg/l and 111 µg/l, respectively).
- Similarly, most of the Aliphatics & Aromatics within RC08 sample were within the C21-C35 range (i.e. 196 µg/l and 25 µg/l, respectively).

6.2.12 Soil Environmental Testing (February/March 2019)

In February 2019, 6 no. soils samples were taken from trial pits TP004, 005, 006, 008, 011, 012 up to a maximum depth of 0.5m for a varied suite of environmental testing. There were no signs of visible soil contamination noted in the borehole and trial pit logs.

There were also soil samples taken from site boreholes in June 2019 (BH001, BH002, BH003, BH006 and BH008) which were tested for Moisture Content Ratio and Soil Organic Matter. In May 2019, soil samples were taken from Rotary Cores (RC02, RC08 at two levels, RC09, RC10 and Trial

Pit TP005. These samples were tested for Moisture Content, Total Sulphur, Total Potential Sulphate, Soil Organic Matter, and pH.

The pH from all soil samples at the site ranged between 7.26 (at TP12) – 8.89 (at RC02). The Moisture Content Ratio was found to range from 7.4% (at BH003) to 25% (at BH008). The Soil Organic Matter of the soil samples was found to be between 0.364% (at RC08) and 2.6% (at BH008). Total Organic Carbon results ranged from 0.79% (at TP08) to 1.68% (at TP05).

There are some elevated results for metals across the soil samples particularly with respect to Aluminium, Iron, Manganese, Calcium, and Magnesium – the reasons for these elevated levels are unknown and there are no Dutch Target and Intervention Values set for these parameters;

– Aluminium was found to range from 16,200 mg/kg in TP05 to 20,800 mg/kg in TP08.
– Iron levels ranged from 26,300 mg/kg at TP05 to 33,200 mg/kg at TP06.
– Calcium was found to be present from a level of 2,720 mg/kg at TP06 to 4,080 mg/kg at TP11.
– Magnesium levels ranged from 2,590 mg/kg at TP05 to 3,480 mg/kg at TP12.
– Manganese levels in the soil were found at levels ranging from 792 mg/kg at TP12 to 1,380 mg/kg at TP11.

There was no Mineral Oil >C10-C40 detected in any of the soil samples. However, the results for Total Aliphatics & Aromatics >C5-C44 ranged from 5,270 µg/kg in TP04 to 22,600 µg/kg in TP05 with none detected at TP11 only. There is no Dutch Target and Intervention Values set for Total Aliphatics and Aromatics in soil. Total Aliphatics & Aromatics likely stem from a historic hydrocarbon spill, resulting in pockets of onsite contamination. Additional mitigation measures to prevent worsening or reoccurrence is outlined in Section 6.3.

6.3 Construction Impacts and Mitigation

The Groundwater Body (GWB) underlying the site is the Bettystown waterbody (IE_EA_G_016). The waterbody is categorised as ‘poor’ indicating poor groundwater quality status for the 2016-2021 period for the WFD. Mitigation measures outlined in this section must be followed by the CMT to avoid any potential impacts to groundwater and to soil, to prevent further contamination. Contaminated soil cannot be reused onsite and must be disposed of as hazardous waste.

Under the source-pathway-receptor, any spill events or contamination sources may impact on the groundwater and/or soil and have a potential impact on the ‘regionally important’ aquifer located under the Site. There will be earthworks required which has a potential to impact on soil.

The earthworks aspects of the development will include the following;

– Topsoil clearance.
– A process of ‘cut and fill’ will be employed in some areas within the site in order to achieve the desired platform level from which to commence construction works in those areas. This will involve the excavation of soil/subsoils.
– Temporary storage of fuel may be required on site for construction machinery.
– Dewatering may be required during excavation works.

The construction phase of the proposed development is predicted to last approximately 30 months, starting in Q4 2023 pending receipt of planning permission.

The construction phase of the proposed development will not result in any direct discharges to soil or groundwater.

The construction phase could have a potential adverse impact on the soils and groundwater of the site in the event of:

– An uncontained spillage of pollutants, such as concrete/cement, oil or other chemicals used during construction;
– An uncontained spillage of domestic effluent generated during construction.

A Construction Environmental Management Plan (CEMP) will be implemented to manage potential environmental impacts that could affect human health or the environment and will ensure effective

soils and water management during the construction phase. The plan includes required measures to be put in place for fuel and chemical storage and handling, management etc. All relevant personnel working on the site will be trained in the implementation of the CEMP.

Given the groundwater WFD status of 'poor' and the 'regionally important' aquifer located beneath the site, robust mitigation measures will be put in place during the construction phase to prevent any adverse impacts on the soils or groundwater of the area:

Fuel and Chemical Handling, Transport and Storage

- Any potentially polluting substances such as fuel, lubricants, oil, paint etc. will be carefully handled and will be stored in a dedicated temporary bunded area which will fully contain any spillages;
- All containers will be clearly labelled so that appropriate remedial action can be taken in the event of a spillage.
- If a refuelling area is required on site, it will be a designated bunded refuelling area at the contractor's compound away from the site drainage infrastructure. Fuel leaks identified in any equipment will be reported and fixed as soon as possible.
- Spill kit facilities will be provided at the fuelling area and any other relevant area, in order to provide for any accidental releases or spillages.
- Any used spill kit materials will be disposed of using a hazardous waste contractor.
- Portable generators will be placed on suitable drip trays and any spillages should be cleaned up using spill kit materials.
- All domestic effluent generated by construction staff on site during construction will be discharged to a temporary effluent containment facility, prior to transport and treatment off-site.
- In the event of a spill on site, a chemical cleaning agent such as Bioversal will be utilised to ensure no groundwater or soil contamination, preventing a rise in hydrocarbon levels.

Dewatering

Dewatering is not expected to be required. For any dewatering operations that may be required, the water is to be pumped to a settling tank or equivalent to allow any suspended solids to settle out before the water is discharged to the surface water drainage system on site.

Concrete

The majority of concrete will be mixed off-site and imported to the site. The pouring of concrete will take place within designated areas to prevent concrete runoff into the soil/groundwater media.

Wet concrete and cement will be adequately controlled. This will include the location of concrete mixing facilities (if required for small quantities of concrete) away from the associated site drainage infrastructure and consideration of weather conditions (e.g. dry weather), allowing for sufficient curing of concrete.

Wash down and washout of concrete transporting vehicles will take place within a designated area of the site.

Regular inspections will be carried out on concrete transporting vehicles to check for defects.

Lime or cement will be stored internally away from rainfall or other water or liquid sources.

Dust

Water bowsers will be deployed for dust suppression in periods of dry weather during the construction phase.

Sources of Aggregates for the Project

The project contract and procurement procedures will be developed to ensure that all aggregates are sourced from reputable sources. Only suppliers who are in compliance with the relevant planning requirements should be considered for inclusion in the project.

Cut and Fill Volumes

Topsoil, superficial material and structural fill at the site will be excavated during the earthworks for the construction of the proposed development and approved 110kV Substation.

It is currently anticipated that all excavated material during earthworks will be re-used on site as structural fill and as part of the landscape proposals. There will be imported material consisting of compacted stone, gravel topping, road construction make-up, footpaths, concrete bases, etc. required for the completion of the earthworks of the site. The construction phase will not result in the excavation or removal of any bedrock from the development site.

The approximate overall quantities of cut and fill volumes required for the earthworks of the proposed development and the 110kV Substation are presented in Table 6.2.

Table 6.2: Summary of Approximate Soil Cut and Fill Volumes (m^3)

	Approved 110kV Substation	Proposed OCGT Generating Plant	Total
Topsoil (to be re-used in landscape berming) (m^3)	6,169	11,734	17,903
Excavated material (superficial cut) (m^3)	14,304	3,605	17,909
Structural fill material (From cut & site-won) (m^3)	1,312	21,807	23,119
Imported material required (m^3)	7,011	11,716	18,727

The material being excavated for reuse in landscaping will be used to create berms around the site. Berms will be a maximum of 1.2m to 2m in height. The berms associated with the proposed development site is depicted in planning drawings no. 60695232-PTN-DR-011 and 60695232-PTN-DR-016. Following excavation the material for reuse in landscaping will be moved directly to the berm location in order to minimise double-handling of the material. Materials for reinstatement of banks and soiling of landscape areas will be re-excavated from the berm areas before final grading.

It is not anticipated that there will be a requirement to remove any excavated material from site. In the unlikely event that any excavated material is deemed unfit for reuse on site it will be removed and disposed of appropriately by a licensed waste contractor.

Additional material for structural fill will be sourced locally where available. The impact on traffic of importing this material is discussed in Chapter 5 Traffic and Transportation.

Based on the implementation of the mitigation measures outlined above, the construction phase of the development is therefore not predicted to have any significant adverse impact on the geology, soils and hydrogeology (groundwater) of the site. As the construction of the proposed development will occur at the same time as the construction of the approved 110kV Substation development, there is potential for impacts on Land and Soils. The mitigation measures outlined in the Environmental Reports and any relevant planning conditions for each project are incorporated into a Construction Environmental Management Plan for each development, and these plans align with each other and will be strictly followed to ensure there are no negative cumulative impacts.

6.4 Operational Impact and Mitigation

The construction of the proposed development will involve the addition of hard standing areas. This will result in an increase in the proportion of rainfall that forms storm water runoff and will slightly reduce the amount of rainfall recharge to groundwater below the site.

There will be no direct discharges to ground during the operational phase of the proposed development. The principal water usage requirements of the proposed development is potable water sourced from the Uisce Éireann mains. A description of the water usage in the process is discussed in Chapter 9 Water and Wastewater and Chapter 12 Material Assets, of this report.

The cooling system employed is a closed system that will not require a constant feed of water. This reduces the water requirement for the site and also the volume of waste water to be discharged from the site.

The operational phase could have a potential adverse impact on the soils and groundwater of the site in the event of:

– An uncontained spillage of pollutants, such as hazardous materials used in water treatment;
– An uncontained spillage of HVO fuel.

The following mitigation measures are incorporated into the proposed development design to ensure that the soils and groundwater on site are protected from any accidental spillages of hazardous materials:

– The storage, containment and handling facilities for all materials at the proposed development are designed in accordance with best practice to minimise the likelihood of accidental leaks/spillages occurring and to contain any such leaks / spillages should they occur; in particular as an EPA-licensed facility the storage and containment measures are designed in accordance with the requirements set out in the EPA guidance document *IPC Guidance Note on Storage and Transfer of Materials for Scheduled Activities (2004)*, as amended.[19]
– The principal potentially hazardous material stored on site will be the HVO biofuel (approx. 4,600m^3). This will be stored in an appropriately bunded tank in an impermeable hardstanding area. Tanker unloading will take place in a dedicated tanker unloading area surrounded by a drainage channel, which will drain to a Class 1 Forecourt Separator. A standard operating procedure will be followed for filling of the tank and it will be fitted with a high level alarm to prevent overfilling. This separator will provide for full retention of any material in the event of the complete rupture and spillage of a tanker compartment. A shut-off device incorporated into the separator will close the outlet to surface water discharge point from the site, in the event of its capacity being exceeded. All oil transfer lines will be over ground and easily accessible for inspection;
– Other hazardous materials stored on site will be stored in bunded tanks, bunded areas or on spill pallets appropriate to the quantity of material stored. All transformers containing insulating oil will also be fully bunded;
– Any other potential sources of spillage (e.g. pumps, sample points, level gauges (etc) will be provided with local shelter and collection trays, sumps or interceptors as appropriate to contain any leaks/spillages;
– Good housekeeping practices including preventative maintenance and routine monitoring of tanks and equipment will minimise the likelihood of leaks/spills occurring and ensure that any leaks are quickly detected and controlled.

Various measures are incorporated into the design to prevent any contamination of surface water (rainfall) runoff from the site (refer to Chapter 9 of Environmental Report) and subsequent contamination of soils and groundwater.

Groundwater monitoring will be carried out on a set basis during the operational phase of the site.

[19] http://www.epa.ie/pubs/advice/licensee/guidancetostorageandtransferofmaterialsforscheduledactivities.html

In summary, the operational phase of the development with the deployment of mitigation measures will not result in any significant negative impacts on the geology, soils and hydrogeology of the site and mitigation measures will be put in place to prevent any negative impacts occurring.

6.5 Decommissioning Impact and Mitigation

The impacts expected and mitigation measures required in the decommissioning phase are expected to be similar to those of the construction phase. Decommissioning of the proposed development would be subject to grant of approval by Meath County Council. In the event of the proposed development being decommissioned at the end of its operational lifetime (expected to be 20 years), a designated Decommissioning Management Plan will be developed which will outline the mitigation measures required, similar to those outlined in the Construction Environmental Management Plan and submitted to Meath County Council for approval. Based on the nature of the proposed development, there is no anticipated obstacle to reinstating the site to greenfield.

6.6 Cumulative Impacts

There will be no cumulative impacts of the proposed development on the basis of strict tight controls and volume quantities used in the construction and operational phases and nearby industrial facilities/ planned projects on land and soils in the vicinity of the development.

6.7 Conclusions

There will be no direct discharges to soil or groundwater during the construction or operational phases of the proposed development other than uncontaminated rainfall runoff from the hard standing areas of the site which will be attenuated and finally discharged to a drainage ditch to the east of the site (see Chapter 9 Water and Wastewater of this report).

A number of mitigation measures will be implemented to ensure that the soils and groundwater on site are protected from any accidental contamination during the construction and operational phases of the proposed development. Therefore the proposed development is not predicted to have any significant adverse impact on geology, soils or hydrogeology. The Proposed Development will not result in a deterioration of the Water Framework Directive status of any water body and will not jeopardise any such water body achieving good status.

7 Biodiversity

7.1 Introduction

This Chapter of the Environmental Report, which has been prepared by Scott Cawley Ltd., describes the biodiversity baseline scenario and the likely significant effects on biodiversity resulting from the construction, operation and decommissioning of a proposed OCGT Generating Plant (herein referred to as "the Proposed Development", see Figure 7.1 below), on lands at Carranstown and Caulstown, Duleek, Co. Meath (herein referred to as "the Proposed Development"). Where necessary, mitigation measures will be implemented and are identified to reduce effects and the likely residual construction, operational and decommissioning effects are described.

Chapter 2 of the Environmental Report provides a description of the Proposed Development, Chapter 10 describes the Air Quality and Climate effects, and Chapter 9 describes the Water and Waste Water impacts of the Proposed Development.

The assessment undertaken for the Proposed Development identified numerous key ecological receptors (KERs) within the Proposed Development that could potentially be impacted by the Proposed Development. These Biodiversity KERs are examined in detail in this Chapter.

The methodologies used to collate information on the baseline biodiversity environment and assess the likely significant effects on biodiversity of the Proposed Development are detailed in the following sections.

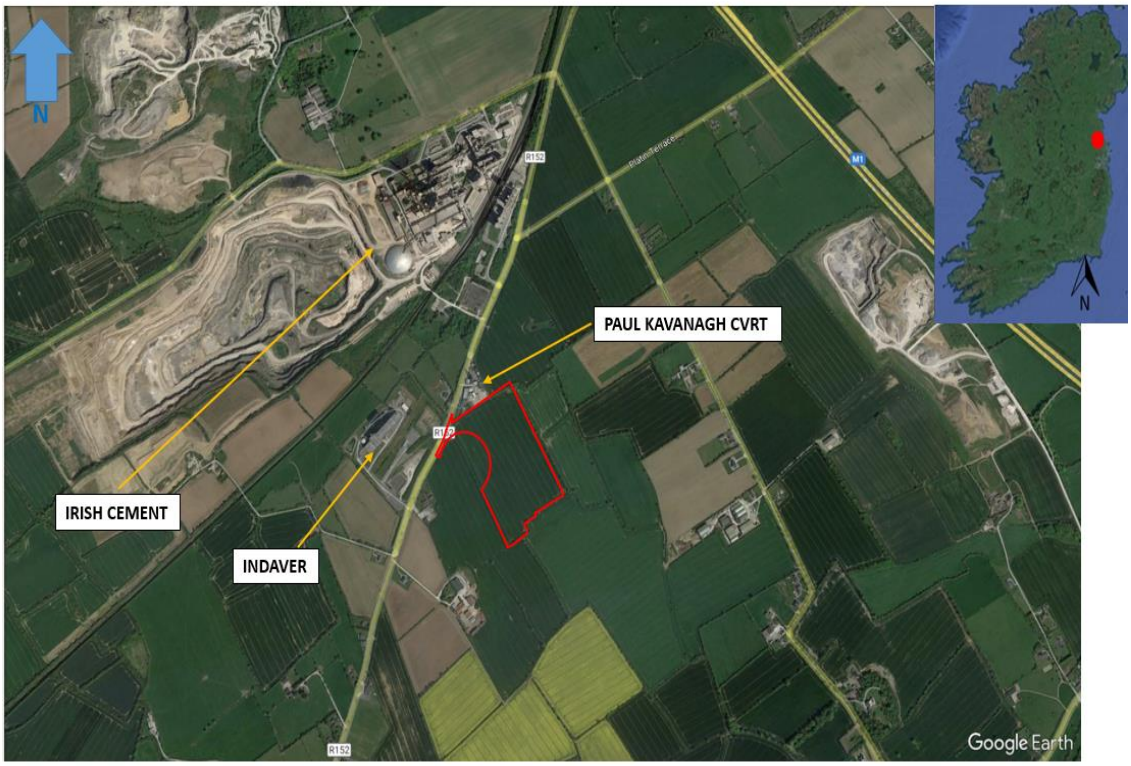


Figure 7.1: Location of the proposed development in the context of the immediate surrounding environment[20]

[20] Image taken from Construction Environmental Management Plan SSE Generation Ireland Ltd., PM Group (2023).

Purpose

The purpose of this Chapter is to:

- Establish and evaluate the baseline ecological environment as relevant to the proposed development;
- Identify, describe, and assess all potentially significant ecological effects associated with the proposed development;
- Set out the mitigation measures which will be implemented to address any potentially significant ecological effects and ensure compliance with relevant nature conservation legislation;
- Provide an assessment of the significance of any residual ecological effects; and
- Identify any appropriate compensation, enhancement, or post-construction monitoring requirements which will be implemented.

7.2 Assessment Methodology

7.2.1 General

This chapter documents the methodologies used to collate information on the baseline biodiversity environment and assess the likely direct and indirect significant impacts of the Proposed Development on biodiversity, with particular attention to species and habitats protected under both EU and Irish law.

This Chapter also makes reference to an AA Screening Report, which has also been prepared on behalf of SSE and submitted with this application for approval, so as to enable Meath County Council, the competent authority, to carry out the assessments required pursuant to Article 6(3) of Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (hereafter referred to as the “Habitats Directive”) and Directive 2009/147/EC on the conservation of wild birds (hereafter referred to as the “Birds Directive”).

The scope of this assessment has been determined by a desk study of the site, which included examination of orthophotography of the Proposed Development, and a review of data on the lands available from the National Parks and Wildlife Service (NPWS), and National Biodiversity Data Centre (NBDC) databases.

7.2.2 Statement of Competence

This Chapter was prepared by Nicholas Fettes BSc MSc, and has been reviewed by Siofra Quigley BSc MSc, and Tim Ryle BSc Ph.D. of Scott Cawley Ltd. Field surveys were undertaken by Nicholas Fettes, Wayne Daly BSc MSc, Cathal O’Brien BSc MSc, Camilla Casella BSc MSc and Sorcha Shanley BA MS.

Wayne Daly is a Consultant Ecologist with Scott Cawley. He holds an honours degree in zoology from UCD and completed his Masters in Biodiversity and conservation at Trinity College Dublin. Wayne has professional experience working in The United States and different parts of Ireland for the last five years. His work has included conducting habitat surveys, Teaching Ecology through public lectures, and leading citizen science programs involving phenology in trees. He has a great interest and enthusiasm in ecology, with a special interest towards mammals, and continues to further his skills with online courses. Since joining Scott Cawley his work has been assisting with senior ecologists on the collection of ecological data, data analysis, desktop work and preparation of Appropriate Assessment reports.

Cathal O’Brien is a Senior Consultant Ecologist with Scott Cawley Ltd. Cathal is a Qualifying Member of the CIEEM. He has 4-5 years’ experience in a range of environmental fields, including habitat assessment in terms of mammal (including bats), flora and habitats, non-native invasive species, wintering bird surveys and breeding bird surveys. Cathal has acted as Ecological Clerk of Works (ECoW) in a number of projects which have included, inspection of structures and trees identified as suitable bat roost features and the implementation of mitigation measures stipulated in derogation licences’ obtained from the NPWS on several projects. Other ECoW related work includes presence and absence surveys for nesting birds inside the breeding bird season. Cathal

has conducted fieldwork on medium to large scale developments including Strategic Housing Developments (SHDs) and infrastructure projects such as road and rail upgrade schemes and Cathal has acted as project manager on a number of small to medium scale projects which have involved liaising with the respective clients, scheduling fieldwork and as the main author of the associated reports. Cathal regularly undertakes data management tasks such preparing QField workspaces, editing and/or analysing data following fieldwork such as breeding and winter bird surveys and bat surveys. He has also mentored recent Consultant Ecologists during fieldwork for wintering bird surveys, breeding bird surveys and habitat surveys.

Sorcha Shanley is a Consultant Ecologist with Scott Cawley. She holds an honours degree in Zoology from Trinity College Dublin and a Master of Science in Marine Biology from the University of Essex. She has experience in terrestrial and aquatic ecological surveys and has volunteered with various projects in Ireland and abroad, collecting data for monitoring programs on birds, reptiles, amphibians and mammals. She is also a PADI Master Scuba Diver Trainer and has conducted underwater surveys on habitats, invertebrates and fish. She has experience in undertaking environmental sampling and in assisting in ECoW roles on several sites around Leinster. She will be undertaking further training with Scott Cawley and carrying out bird, bat and habitat surveys in the Greater Dublin Area.

Camilla Casella is a Consultant Ecologist at Scott Cawley. She is a master's student at the Technology University Dublin (TUD) in Geographic Information Science, holds a bachelor's degree in Ecology from Universidade Estadual Paulista (UNESP), and hold a technician certificate program in environmental science. Camilla has experience in working with botanical collection and taxonomy in different habitats as well as technical knowledge in data and landscape analysis using R studio, SQL and Python, and GIS systems such as ArcGIS, QGIS and ArcMap. Camilla is also part of the Speleological Union of Ireland dealing with caving conservation and surveying. With Scott Cawley she undertakes bat, bird, and habitats surveys in several sites in the Greater Dublin Area.

Nicholas Fettes is a Consultant Ecologist at Scott Cawley Ltd. He holds an honours degree in Zoology and a Master's degree in Environmental Policy, both acquired at University College Dublin. He has obtained experience working in a diverse set of environmental roles in the public, private, and charity/NGO sectors, including as a Biodiversity Conservation Officer with the IUCN where he worked on the European Red List for Bryophytes and other EU-funded projects on protected areas and invasive alien species, as an Environmental Intern with An Taisce, and as a Biodiversity Assistant to Fingal County Council's Biodiversity Officer. Nicholas has over two years' professional ecological consultancy experience, carrying out habitat and protected species surveys, including bat, otter, badger and breeding and wintering birds. Since joining Scott Cawley Ltd., he has prepared several Appropriate Assessment (AA) Screening Reports and Ecological Impact Assessments (EcIA) for a range of different development projects across the country. Nicholas has been involved in the preparation of Nature Impact Reports (NIR) for a number of local authority development plans and has also gained experience in biodiversity action plan development.

Síofra Quigley is a Senior Ecologist with Scott Cawley. She obtained an honours degree in Zoology, from National University of Ireland Galway, and a Master's degree in Wildlife Biology and Conservation from Edinburgh Napier University. She has five years' professional experience working in the UK and Ireland on a range of projects, from residential to large-scale infrastructure. Síofra is experienced in carrying out field surveys in several protected species; bat, otter, badger, birds, red squirrel, reptile, pine marten, and undertakes and manages surveys for a range of projects. She has also been involved in radio tracking mountain hares and bats, bat call analysis, badger bait marking, has acted as an Ecological Clerk of Works role on construction projects. Síofra is experienced in habitat classification (Joint Nature Conservation Committee, 2010, EU Habitats Directive and Fossitt classification) and mapping (QGIS and ArcGIS). Síofra's work in Scott Cawley involves project management, and the preparation of reports, including Ecological Impact Assessment (EcIA) Appropriate Assessment (AA) Screening reports, and Natura Impact Statements (NIS) for residential, commercial, and infrastructure projects across Ireland. Síofra has also been involved in the preparation of bat derogation licence applications, prepared habitat management plans and advised on enhancement measures for planning applications.

Tim Ryle is a Principal Ecologist with Scott Cawley Ltd. He holds an honours degree in Botany from University College Dublin and was later awarded a Ph.D. from the same institution. He is a full Member of the Institute of Environmental Scientists. Tim is an experienced ecological consultant with twenty years' experience in in private consultancy in designing, undertaking and managing a wide range of ecological surveys and in assessing effects and designing mitigation measures and biodiversity enhancements, in particular for protected species including badgers, otters, bats, birds, amphibians as well as habitats of conservation importance. He is also experienced in undertaking appropriate Assessment for small-scale development projects and larger infrastructural projects, land plans as well as national/government plans.

7.2.3 Guidance and Legislation

The collation of ecological baseline data and the preparation of this assessment has had regard to the following legislation and policy documents. This is not an exhaustive list but the most relevant legislative and policy basis for the purposes of preparing this Biodiversity Chapter.

The following international legislation is relevant to the Proposed Development:

- The Habitats Directive is the legislation under which the Natura 2000 network[21] was established and Special Areas of Conservation (SACs) are designated for the protection of natural habitat types listed in Annex I, and habitats of the species listed in Annex II, of that directive.
- The Birds Directive is the legislation under which Special Protection Areas (SPAs) are designated for the protection of endangered species of wild birds listed in Annex I of that directive.
- Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy hereafter, referred to as the 'Water Framework Directive' (WFD). The Water Framework Directive is the legislation requiring the protection and improvement of water quality in all waters (rivers, lakes, groundwater, and transitional coastal waters) with the aim of achieving good ecological status by 2015 or, at the latest, by 2027.

The following national legislation is relevant to the Proposed Development:

- *Wildlife Act 1976, as amended (the 'Wildlife Act')*. The Wildlife Act is the principal pieces of legislation at national level for the protection of wildlife and for the control of activities that may harm wildlife. All bird species, 22 other animal species or groups of species, and 86 species of flora are protected under this legislation.
- *Planning and Development Act 2000, as amended* ('the PDA'). This piece of legislation is the basis for Irish planning. Under the legislation, development plans (usually implemented at local authority level) must include mandatory objectives for the conservation of natural heritage and for the conservation of European Sites. It also sets out the requirements in relation to environmental assessment with respect to planning matters, including the transposition of the Habitats and Birds Directive into Irish law.
- *Planning and Development Regulations 2001, as amended* ('the PDRs')
- *European Communities (EC) (Birds and Natural Habitats) Regulations 2011, as amended*; hereafter the 'Birds and Habitats Regulations'. This legislation transposes the Habitats and

[21] The Natura 2000 network is a European network of important ecological sites, as defined under Article 3 of the Habitats Directive 92/43/EEC, which comprises both special areas of conservation and special protection areas. Special conservation areas are sites hosting the natural habitat types listed in Annex I, and habitats of the species listed in Annex II, of the Habitats Directive, and are established under the Habitats Directive itself. Special protection areas are established under Article 4 of the Birds Directive 2009/147/EC for the protection of endangered species of wild birds. The aim of the network is to aid the long-term survival of Europe's most valuable and threatened species and habitats. In Ireland these sites are designed as European sites - defined under the Planning Acts and/or the Birds and Habitats Regulations as (a) a candidate site of Community importance, (b) a site of Community importance, (c) a candidate special area of conservation, (d) a special area of conservation, (e) a candidate special protection area, or (f) a special protection area. They are commonly referred to in Ireland as Special Areas of Conservation (SACs) and Special Protection Areas (SPAs).

Birds Directives into Irish law. It also contains regulations (49 and 50) that deal with non-native invasive species (those included within the Third Schedule of the regulations).

- *European Communities (Water Policy) Regulations 2003*. This legislation transposes the WFD into Irish Law.
- *Flora (Protection) Order, 2022*. This lists species of plant protected under Section 21 of the Wildlife Act.
- The Environmental Impact Assessment (EIA) Directive (2014/52/EU) and Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (as amended)

The following plans are relevant to the Proposed Development:

- National Biodiversity Action Plan 2017-2021 (Department of Culture Heritage and the Gaeltacht, 2017)
- All-Ireland Pollinator Plan 2021-2025 (National Biodiversity Data Centre, 2021)
- Meath County Development Plan 2021-2027 (Meath County Council, 2021)
- County Meath Biodiversity Action Plan 2015-2020 (Meath County Council, 2015)

7.2.4 Desk Study Methodology

A desk study was undertaken in order to collate and update available information on the existing local ecological environment. Data on rare/protected/threatened species held by the National Parks and Wildlife Service (NPWS)[22] and the National Biodiversity Data Centre database (NBDC) were amongst the sources consulted, with records checked against the red lists of Irish Species.

A desk study was undertaken in July 2023 to collate available information on the local ecological environment. The following resources were used to inform the assessment presented in this report:

- Data on European sites, Natural Heritage Areas (NHAs) or proposed Natural Heritage Areas (pNHAs) as held by the NPWS3 from https://www.npws.ie/protected-sites and https://www.npws.ie/maps-and-data – refer to Appendix B and Figure 7.2 and Figure 7.3 for descriptions and locations of protected sites in the vicinity of the proposed development;
- Records of rare and protected species for the 10km grid square(s) O06 and O07, as held by the National Biodiversity Data Centre (NBDC) www.biodiversityireland.ie or the NPWS – refer to Appendix B for all desk study flora and fauna records;
- Ordnance Survey Ireland mapping and aerial photography from http://map.geohive.ie/
- Habitat and species Geographic Information System (GIS) datasets provided by the NPWS, including Article 12 and Article 17 data[23];
- Data on waterbodies, available for download from the EPA web map service. Available from https://gis.epa.ie/EPAMaps/;
- Information on soils, geology and hydrogeology in the area available from the Geological Survey Ireland (GSI) online Spatial Resources service. Available from https://www.gsi.ie/en-ie/data-and-maps/Pages/Groundwater.aspx;
- Information on the conservation status of birds in Ireland from Birds of Conservation Concern in Ireland[24];
- Publicly available information on inland feeding sites for light-bellied Brent geese in the Dublin area[25];

[22] The following SAC and SPA GIS boundary datasets are the most recently available at the time of writing: SAC_ITM_2023_05 and SPA_ITM_2023_05.

[23] Article 17 of the EU Directive on the Conservation of habitats, Floras and Fauna (Habitats Directive) requires that all member states report to the European Commission every six years on the status and on the implementation of the measures taken under the Habitats Directive. In a similar manner, there is an obligation to report on the status and trends of bird species required under Article 12 of the Bird's Directive.

[24] Gilbert, G., Stanley, A. and Lewis, L. (2021). Birds of Conservation Concern in Ireland 4: 2020-2026. Irish Birds 43: 1-22

– Information on the location, nature and design of the proposed development supplied by the applicant's design team; and
– Information from surveys undertaken in support of Screening Report & Natura Impact Statement Information For Stage 1 Screening & Stage 2 Appropriate Assessment Proposed Power Generating Facility, Platin, Co. Meath (2019)[26].

Consultation

A consultation letter was previously sent to NPWS on 30th March 2021. No response to this request was received.

7.2.5 Site Visits

This section describes the ecological surveys carried out to inform this assessment, and a summary of the surveys undertaken are presented in Table 7.1 below

Table 7.1: Ecological surveys carried out within the proposed development site

Survey	Date	Surveyor
Multidisciplinary survey (including habitats, protected flora, invasive alien plant species, mammals and preliminary ground level roost assessment of trees for bats)	12th April 2023	Nicholas Fettes (Scott Cawley Ltd.)
Breeding Bird surveys	30th March 2023	Wayne Daly (Scott Cawley Ltd.)
	12th April 2023	Nicholas Fettes (Scott Cawley Ltd.)
Wintering Birds surveys	09th December 2022	Cathal O'Brien and Wayne Daly (Scott Cawley Ltd.)
	22nd December 2022	Cathal O'Brien and Wayne Daly (Scott Cawley Ltd.)
	10th January 2023	Camilla Casella and Sorcha Shanley (Scott Cawley Ltd.)
	26th January 2023	Camilla Casella and Sorcha Shanley (Scott Cawley Ltd.)
	10th February 2023	Cathal O'Brien (Scott Cawley Ltd.)
	03rd March 2023	Shane Brien (Scott Cawley Ltd.)
	14th March 2023	Shane Brien (Scott Cawley Ltd.)
	22nd March 2023	Shane Brien (Scott Cawley Ltd.)
Bat activity surveys	16th May 2019	Colm Clarke (Scott Cawley Ltd.)
	31st May 2019	Colm Clarke (Scott Cawley Ltd.)

[25] Benson, L. (2009) Use of Inland Feeding Sites by Light-bellied Brent Geese in Dublin 2008-2009: A New Conservation Concern? Irish Birds 8: 563-570.

Scott Cawley Ltd. (2017). Natura Impact Statement – Information for Stage 2 Appropriate Assessment for the Proposed Residential Development St. Paul's College, Sybill Hill, Raheny, Dublin 5.

Enviroguide (2019) Natura Impact Statement for Proposed Strategic Housing Development at St. Paul's College, Sybil Hill Road, Raheny, Dublin.

[26] This application was submitted for planning and approved by Meath County Council and never built. It was subsequently refused by An Bord Pleanala following an appeal due to the project not supporting Ireland's emission targets or climate change obligations.

Survey	Date	Surveyor
	23rd June 2021	Wayne Daly and Lorna Gill (Scott Cawley Ltd.)

Habitats and Flora Survey

A habitat survey was undertaken of the proposed development site on the 12th April 2023 by Nicholas Fettes B.Sc. of Scott Cawley Ltd., following the methodology described in *Best Practice Guidance for Habitat Survey and Mapping*[27]. All habitat types were classified using the Guide to Habitats in Ireland[28], recording the indicator species and abundance using the DAFOR scale[29] and recording any species of conservation interest. Vascular and bryophyte plant nomenclature generally follow that of *The National Vegetation Database*[30], having regard to more recent taxonomic changes to species names after the *New Flora of the British Isles*[31] and the British Bryological Society's *Mosses and Liverworts of Britain and Ireland: A Field Guide*[32]

Fauna Surveys

Terrestrial Mammals (excluding Bats)

A terrestrial fauna survey (excluding bats) was undertaken on the 12th April 2023 by Nicholas Fettes. The presence/absence of terrestrial fauna species were surveyed through the detection of field signs such as tracks, markings, feeding signs, and droppings, as well as by direct observation. The habitats on site were assessed for signs of usage by protected/red-listed fauna species, and their potential to support these species. Surveys to check for the presence of badger setts within the study area, and to record any evidence of use, were undertaken.

Bats

The trees within the proposed development site were assessed for their potential to support roosting bats, having regard to the following guidelines:

- Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, 2016)[33];
- Bat Mitigation Guidelines for Ireland V2 (Marnell, Kelleher and Mullen, 2022)[34]; and,
- Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes (TII[35], 2006)[36].

Following on from previous surveys in 2019, a number of trees located across the proposed development site were re-examined from ground level on 14th April 2023 by Nicholas Fettes BSc MSc, of Scott Cawley Ltd., for potential to support roosting bats. There was sufficient visibility to

[27] Smith, G.F., O'Donoghue, P., O'Hora, K. & Delaney, E. (2011) Best Practice Guidance for Habitat Survey and Mapping. The Heritage Council Church Lane, Kilkenny, Ireland.
[28] Fossitt, J.A. (2000) A Guide to Habitats in Ireland. Heritage Council, Kilkenny.
[29] The DAFOR scale is an ordinal or semi-quantitative scale for recording the relative abundance of plant species. The name DAFOR is an acronym for the abundance levels recorded: Dominant, Abundant, Frequent, Occasional and Rare.
[30] Weekes, L.C. & FitzPatrick, Ú. (2010) The National Vegetation Database: Guidelines and Standards for the Collection and Storage of Vegetation Data in Ireland. Version 1.0. Irish Wildlife Manuals, No. 49. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.
[31] Stace, C. (2019) New Flora of the British Isles. 4th Edition. C&M Floristics.
[32] Atherton, I., Bosanquet, S. & Lawley, M. (2010) *Mosses and Liverworts of Britain and Ireland: A Field Guide*. Latimer Trend & Co., Plymouth.
[33] Collins, J. (ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London. ISBN-13 978-1-872745-96-1
[34] Marnell, F., Kelleher, & Mullen, E. (2022) Bat mitigation guidelines for Ireland v2. Irish Wildlife Manuals, No. 134. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland
[35] Transport Infrastructure Ireland was established through a merger of the National Roads Authority and the Railway Procurement Agency under the Roads Act 2015, with effect from 01/08/15.
[36] TII (2006a) Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes

survey for potential roost features in trees within the proposed development site. They were assessed based on the presence of features commonly used by bats. Examples of such features include:

- Natural holes;
- Cracks/splits in major limbs;
- Loose bark; and,
- Hollows/cavities.

Trees were assessed against suitability categories listed in Table 7.2 below.

Table 7.2: Assessment criteria for potential suitability of proposed development sites for bats, derived from similar criteria in Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, 2016).

Suitability	Description of Roosting Habitat	Commuting and foraging habitats
Negligible	Negligible habitat features on site likely to be used by roosting bats	Negligible habitat features on site likely to be used by commuting or foraging bats
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation). A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential.	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or un vegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions, and surrounding habitat unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed)	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats in a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub, hedgerows. Linked back gardens, river valleys, streams and woodland edge. Habitat that is connected to the wider landscape that could be used by foraging bats such as trees, scrub, grassland or water. Site is close to and connected to a known roost.

A single bat activity survey was undertaken on the 23rd August 2021. This survey was undertaken at dawn and began 90 minutes before sunrise and ended approximately 20 minutes after sunrise. Echolocation recordings were later analysed using BatExplorer software. The activity surveys

covered the survey areas with a focus on hedgerows and treelines, carried out by a single surveyor. Low winds, mild temperatures (18°C) and dry conditions were experienced during the bat survey.

Two separate bat activity surveys were previously undertaken on 16th and 31st May 2019. Details of each survey are provided within (see Table 7.3 below). Both of the 2019 surveys combined a survey for roost presence/absence at a residential dwelling and associated shed immediately north of and adjacent to the subject lands (both located at O 06559 70928), both of which are outside the proposed development redline boundary of the proposed development site, followed by a walked transect of the perimeter of the lands.

The need for additional surveys beyond the 2021 season was assessed, with reference to the Chartered Institute of Ecology and Environmental Management's (CIEEM) *Advice Note on the Lifespan of Ecological Reports & Surveys*[37]. All data at the time of writing, is up to 24 months old. According to CIEEM, in most instances, data of this age is likely to be valid, with the following exceptions:

- *Where a site may offer existing or new features which could be utilised by a mobile species within a short timeframe.*
    - In this instance, the proposed development site contains several potential roost features (PRFs) for bats: A number of trees (3) were identified as having roosting potential. Their locations are shown in Figure 7.6. It also includes a building, although this is outside the boundary of the proposed development. The probability of detecting roosting bats in trees can be extremely low, and the survey effort required to confirm absence is not considered proportionate. For this reason, a precautionary mitigation strategy have been provided in Section 7.5.5 of this chapter requiring pre-felling checks of trees for roosting bats in advance of their removal. Since initial surveys in 2019 and subsequent surveys in 2021, 2022 and 2023 the site has not changed in any way, and management of the site (i.e., arable crop production) has continued since 2019.
- *Where a mobile species is present on site or in the wider area, and can create new features of relevance to the assessment.*
    - No evidence of such species (e.g. badgers, otters, which are capable of building underground resting places) was identified during surveys in 2019 or 2021 and the management of the site and surrounding have not changed substantially between the completion of surveys and the completion of this chapter.
- *Where country-specific or species-specific guidance dictates otherwise.*
    - No such guidance dictates otherwise in this instance.

[37] CIEEM (2019). *Advice Note on the Lifespan of Ecological Reports & Surveys*. Chartered Institute of Ecology and Environmental Management. Winchester, UK.

Table 7.3: Details of bat activity surveys undertaken within the subject lands.

Date	Dawn/Dusk	Start	Finish	Weather	Surveyor	Detector
16/05/2019 Sunset @ 21:20	Dusk	21:07	22:50	Cool, 9-11C no precipitation. Cloud cover 1/8	Colm Clarke	1803-3074 M
31/05/2019 Sunrise @ 05:05	Dawn	03:34	04:56	Mild, 15-16C Light precipitation at start of survey. Moderate westerly winds. Cloud cover 8/8	Colm Clarke	1803-3074 M
23/08/2021	Dawn	04:30	06:45	Mild, 18°C and dry conditions	Wayne Daly Lorna Gill	1803-3074 M

Breeding Birds

Breeding bird surveys were undertaken on the 30th March 2023 by Wayne Daly B.Sc. (Scott Cawley Ltd.) and on the 12th April by Nicholas Fettes using a methodology adapted from the *Bird Monitoring Methods - A Manual of Techniques for Key UK Species*[38]. Lands within the study area were slowly walked in a manner allowing the surveyor to come within 50m of all habitat features. Birds were identified by sight and song, and general location and activity were recorded using the British Trust for Ornithology (BTO) species and activity codes.

Wintering Birds

Wintering bird surveys were undertaken by Scott Cawley Ltd., ecologists on the following dates:

- 9th and 22nd December 2022 by Cathal O'Brien and Wayne Daly;
- 10th and 26th January 2023 by Camilla Casella and Sorcha Shanley;
- 10th February 2023 by Cathal O'Brien; and
- 3rd, 14th and 22nd March 2023 by Shane Brien.

All surveys were undertaken using a methodology based on the *Bird Monitoring Methods - A Manual of Techniques for Key UK Species*. Lands were initially surveyed visually using binoculars/scope from a vantage points at the edge of the study area followed by a walkover of the area to identify birds which may not be visible from a distance (e.g. waders) and evidence of usage by wildfowl such as swans or geese (e.g. droppings). Birds were identified by sight and general location and activity were recorded using the British Trust for Ornithology (BTO) species and activity codes.

Survey Limitations

Surveys of the lands for habitats, terrestrial mammals, breeding birds and wintering birds were undertaken within the optimal survey season for each and therefore timing was not considered to be a limiting factor.

Bat surveys were previously carried out in 2019 and 2021. The bat building inspections carried out in 2019 of the building were not repeated in 2023, as the building remains outside of the boundary of the proposed development site and so any potential bat roosts will not be destroyed or removed as a result of the proposal development. However, this is not considered to be a limitation on the

[38] Gilbert, G., Gibbons, D.W. & Evans, J. (1998) Bird Monitoring Methods - A Manual of Techniques for Key UK Species. RSPB: Sandy

bat surveys as the building was deemed to be of low suitability and no evidence of roosting bats was found in 2019 (see section 7.3.4). In addition, emergence and re-entry surveys were carried out on the building in 2019 within the active bat season and during optimal survey conditions with no evidence of roosting bats observed (see section 7.3.4). Furthermore, it is noted that conditions of the building between surveys undertaken in 2019 and the potential survey period of the 2023 have not changed and therefore the 2019 building inspection results remain valid.

In respect of bat activity surveys, it is acknowledged that bats are mobile and that the survey effort and the seasonality of same is not strictly proportionate to what might be required in respect of a robust impact assessment. However, bats are known to remain faithful to landscape features[39],[40] there has been no significant change in the landscape surrounding the proposed development - particularly the hedgerows and treelines bordering the site that was confirmed during the 2023 multidisciplinary surveys.

Therefore, it is considered that sufficient survey data was gathered to fully inform the assessment of impacts, and that where potential temporal deficiencies exist, a precautionary worst-case approach has been adopted and the mitigation measures described in this report reflect the precautionary approach.

7.2.6 Approach to Ecological Evaluation and Impact Assessment

The criteria used to assess the ecological value and significance of the development site follows *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine*[41] and the *Guidelines for Assessment of Ecological Impacts of National Road Schemes*[42].

Biodiversity receptors (including identified sites of biodiversity importance) have been valued with regard to the ecological valuation examples set out in the TII[43] guidelines[44].

In accordance with these guidelines, biodiversity features within what is referred to as the Zone of Influence (ZoI) of the proposed development which are "both of sufficient value to be material in decision making and likely to be affected significantly" are deemed to be 'Key Ecological Receptors' (KERs). These are the biodiversity receptors which may be subject to likely significant effects from the proposed development, either directly or indirectly. KERs are those biodiversity receptors with an ecological value of local importance (higher value) or greater.

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) – e.g. wetland habitats and the fauna and flora species they support

Characterising and Describing the Impacts

The parameters considered in characterising and describing the potential impacts of the proposed development are per the EPA's *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (EPA, 2022) and CIEEM's *Guidelines for Ecological Impact Assessment in the UK and Ireland* (CIEEM, 2018): whether the effect is positive, neutral or

[39] Grüebler, M.U.,Morand, M.&Naef-Daenzer, B.(2008) A predictive model of the density of airborne insects in agricultural environments. Agriculture Ecosystems & Environment,123,75–80.
[40] Marnell, F., Kelleher, C. & Mullen, E. (2022) Bat mitigation guidelines for Ireland v2. Irish Wildlife Manuals, No. 134. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland
[41] CIEEM (2018). *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine.* Chartered Institute of Ecology and Environmental Management, Winchester.
[42] NRA (2009). *Guidelines for Assessment of Ecological Impacts of National Road Schemes.* National Roads Authority, Dublin.
[43] TII was previously referred to as NRA until TII was established in 2015 with the incorporation of the NRA and the Rail Procurement Agency RPA))
[44] *Guidelines for Assessment of Ecological Impacts of National Roads Schemes: Revision 2* (National Roads Authority, 2009).

negative; the significance of the effects; the extent and context of the effect; the probability, duration and frequency of effects; and, cumulative effects.

Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location. The following development types are included in considering cumulative effects:

- Existing projects (under construction or operational);
- Projects which have been granted consent but not yet started;
- Projects for which consent has been applied for which are awaiting a decision, including those under appeal; and
- Projects proposed at a plan level, if relevant (e.g. future strategic infrastructure such as roads or greenways).

The likelihood of an impact occurring, and the predicted effects, can also be an important consideration in characterising impacts. In some cases, it may not be possible to definitively conclude that an impact will not occur. In these cases, the evaluation of significant effects is based on the best available scientific evidence but where reasonable doubt still remains then the precautionary principle is applied, and it may need to be assumed that significant effects may occur.

Professional judgement is used in considering the contribution of all relevant criteria in determining the overall magnitude of an impact.

Significant Effects

In determining whether potential impacts will result in significant effects, the CIEEM (2018) guidelines were followed. The approach considers that significant effects will occur when there are impacts on either:

- the structure and function (or integrity) of defined sites, habitats or ecosystems; or
- The conservation status of habitats and species (including extent, abundance and distribution).

Integrity

The term “integrity” may be regarded as the coherence of ecological structure and function, across the entirety of a site that enables it to sustain all of the biodiversity or ecological resources for which it has been valued (National Roads Authority, 2009).

The term ‘integrity’ is most often used when determining impact significance in relation to designated areas for nature conservation (e.g. SACs, SPAs or pNHA/NHAs) but can also be the most appropriate method to use for non-designated areas of biodiversity value where the component habitats and/or species exist with a defined ecosystem at a given geographic scale.

An impact on the integrity of an ecological site or ecosystem is considered to be significant if it moves the condition of the ecosystem away from a favourable condition: removing or changing the processes that support the sites’ habitats and/or species; affect the nature, extent, structure and functioning of component habitats; and/or, affect the population size and viability of component species.

Conservation Status

Similar definitions for conservation status given in the EU Habitats Directive 92/43/EEC, in relation to habitats and species, are also used in the CIEEM (2018) and NRA (2009) guidance which are summarised as follows:

- For natural habitats, conservation status means the sum of the influences acting on the natural habitat and its typical species, that may affect its extent, structure and functions as well as its distribution, or the long-term survival of its typical species, at the appropriate geographical scale; and
- For species, conservation status means the sum of influences acting on the species concerned that may affect the abundance of its populations, as well as its distribution, at the appropriate geographical scale.

An impact on the conservation status of a habitat or species is considered to be significant if it will result in a change in conservation status, having regard to the definitions of favourable conservation status provided in the EU Habitats Directive 92/43/EEC – i.e. into the future, the range, area and quality of habitats are likely to be maintained/increased and species populations are likely to be maintained/increased.

According to the CIEEM methodology (2018), if it is determined that the integrity and/or conservation status of an ecological receptor will be impacted on, then the level of significance of that impact is related to the geographical scale at which the impact will occur (i.e. local, county, national, international). In some cases, an impact may not be significant at the geographic scale at which the ecological feature has been valued but may be significant at a lower geographical level. For example, a particular impact may not be considered likely to have a negative effect on the overall conservation status of a species which is considered to be internationally important. However, an impact may occur at a local level on this internationally important species. In this case, the impact on an internationally important species is considered to be significant at only a local, rather than an international level.

7.3 Characteristics of Proposed Development

The proposed development is described in Chapter 2 of this Environmental Report.

Grid Connection

Power generated from the Proposed Development will feed into the national grid controlled. This will occur, with separate approval of the Commission for Regulation of Utilities (CRU) and in accordance with the requirements of Eirgrid, via a connection to the consented substation (ABP Case Reference PL17.303678) (This CRU consent process is separate from the planning process).

Estimated Construction Duration

Pending the grant of planning permission, the construction is expected to commence in Q4 2023, with a duration of 30 months and will employ 40 to 60 construction personnel.

Decommissioning

In the event the Proposed Development is decommissioned at the end of its operational lifetime (expected to be 20 years), a specific Decommissioning Management Plan will be developed which will outline the mitigation measures required, similar to those outlined in the Construction Environmental Management Plan and submitted to Meath County Council for approval. The decommissioning phase would return the area to the levels at this time, including any other changes from other plans/projects in the environment.

7.3.1 Zone Of Influence

The study area is defined by the zone of influence of the proposed development with respect to the ecological receptors that could potentially be affected.

The Zone of Influence (ZoI), or distance over which potentially significant effects may occur, will differ across the Key Ecological Receptors (KERs), depending on the potential impact pathway(s). The results of both the desk study and the suite of ecological field surveys undertaken has established the habitats and species present within, and in the vicinity of, the proposed development site. The ZoI and study area was then informed and defined by the sensitivities of each of the KERs present, in conjunction with the nature and potential impacts associated with the proposed development.

The ZoI of general construction activities (i.e. risk of spreading/introducing non-native invasive species, dust deposition and disturbance due to increased noise, vibration, human presence and lighting) is not likely to extend more than several hundred metres from the proposed development.

The ZoI of habitat loss impacts will be confined to within the proposed development boundary.

The proposed development site drains to the Platin River which is a tributary of the River Nanny and therefore, the hydrological ZoI extends downstream to the Nanny Estuary and Northwestern Irish Sea coastal waterbody.

The air quality emissions ZoI varies depending on the individual pollutant involved. In the case of the proposed development these are nitrogen dioxide (NO_2), ammonia (NH_3), sulphur dioxide (SO_2) carbon monoxide (CO), and particulate matter (PM_{10} / $PM_{2.5}$). The emission dispersal modelling for each of these components is presented in *Chapter 10 Air Quality and Climate*, which illustrates the predicted concentrations in terms of distance from the emissions source by way of contour concentration maps. Generally, the predicted emissions concentrations return to ambient levels within a short distance of the emissions source.

7.3.2 Designated European Sites

Special Areas of Conservation (SAC) are designated under the EC Habitats Directive (92/43/EEC) for the protection of habitats listed on Annex I and/or species listed on Annex II of the Directive. Special Protection Areas (SPAs) are designated under the Birds Directive (2009/147/EC) for the protection of bird species listed on Annex I of the Directive, regularly occurring populations of migratory species (such as ducks, geese or waders), and areas of international importance for migratory birds.

There are two Special Areas of Conservation (SACs) and three Special Protection Areas (SPAs), collectively referred to as European sites[45], located within the vicinity of the proposed development. The European sites are as follows:

- River Boyne and River Blackwater SAC (002299), *c.* 3.5km to the north;
    - Designated for its populations of [1106] salmon *Salmo salar*, [1099] river lamprey *Lampetra fluviatilis*, and [1355] otter *Lutra lutra*, and its examples of the habitats [7230] alkaline fens, and the priority [91E0] alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)
- River Boyne and River Blackwater SPA (004158), *c.*3.7km to the north;
    - Designated for its population of [A229] kingfisher *Alcedo atthis*.
- Boyne Coast and Estuary SAC (001957), *c.*7km to the northeast;
    - Designated for its examples of coastal and intertidal habitats, including [1130] estuaries, [1140] mudflats and sandflats not covered by seawater at low tide, [1210] annual vegetation of drift lines, [1310] *Salicornia* and other annuals colonising mud and sand, [1330] Atlantic salt meadows (Glauco-Puccinellietalia maritimae), [1410] Mediterranean salt meadows (Juncetalia maritimi), [2110] embryonic shifting dunes, [2120] shifting dunes along the shoreline with *Ammophila arenaria* (white dunes), and the priority [2130] fixed coastal dunes with herbaceous vegetation (grey dunes).
- Boyne Estuary SPA (004158), *c.*7km to the northeast.
    - Designated for its range of overwintering and passage waterfowl species.
- River Nanny Estuary and Shore SPA (004158), *c.* 7.5km to the east.
    - Designated for its nationally and internationally important populations of overwintering waterfowl

[45] Natura 2000 sites are defined under the Habitats Directive (Article 3) as a European ecological network of special areas of conservation composed of sites hosting the natural habitat types listed in Annex I and habitats of the species listed in Annex II of the Habitats Directive and Annex I of the Birds Directive. The aim of the network is to aid the long-term survival of Europe's most valuable and threatened species and habitats. In Ireland these sites are designed as *European sites* - defined under the Planning Acts and/or Birds and Habitats Regulations as (a) a candidate site of Community importance, (b) a site of Community importance, (c) a candidate special area of conservation, (d) a special area of conservation, (e) a candidate special protection area, or (f) a special protection area. They are commonly referred to in Ireland as Special Areas of Conservation (SACs) and Special Protection Areas (SPAs).

The SAC and SPA sites in the vicinity of the proposed development, their distance from the proposed development and their Qualifying Interests (QI)/Special Conservation Interests (SCI) are presented in full in Appendix B.

The European sites within the vicinity of the proposed development are illustrated in Figure 7.2, below. All other European sites shown lie outside of the ZoI of the proposed development site.

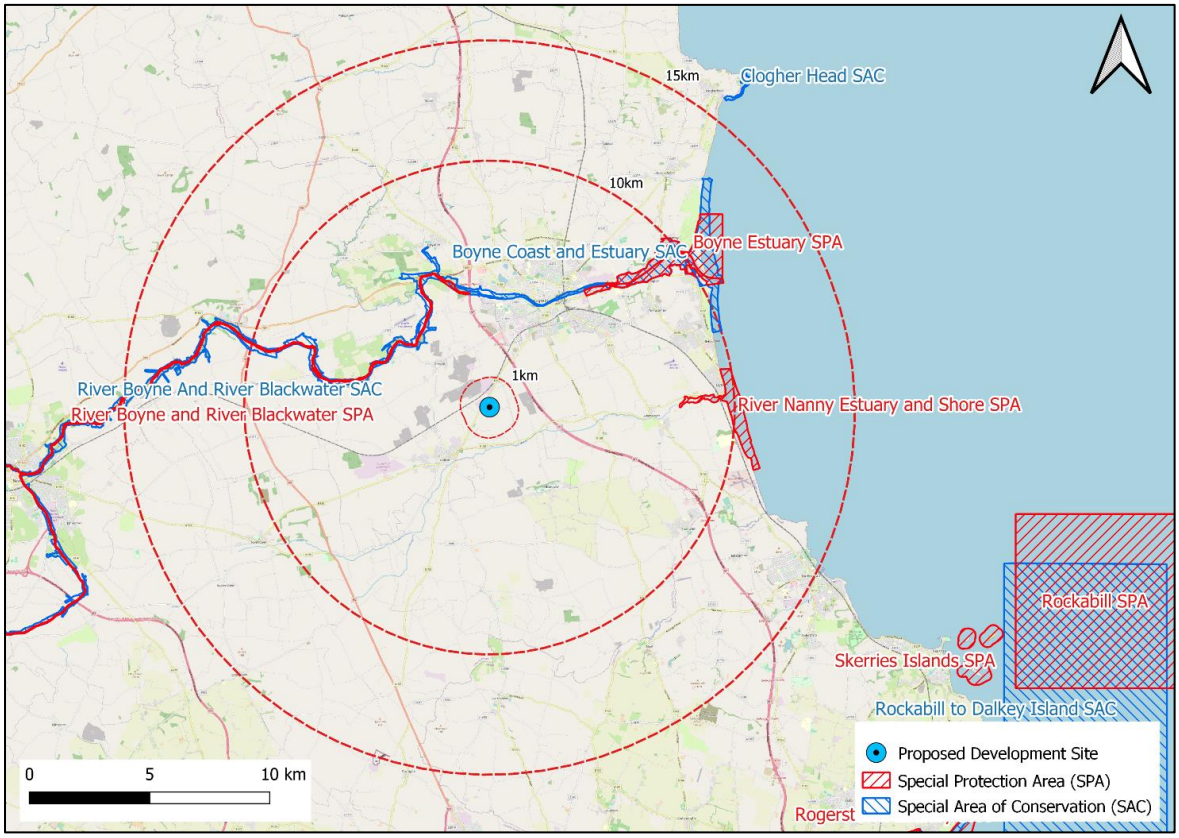


Figure 7.2: European sites within the vicinity of the proposed development

7.3.3 Natural Heritage Areas and Proposed Natural Heritage Areas

Natural Heritage Areas (NHAs) are designations under the *Wildlife Acts (as amended)* to protect habitats, species or geology of national importance. Many of the NHAs in Ireland overlap with the boundaries of European sites. In addition to NHAs, there are proposed NHAs (referred to as pNHAs), which are also sites of significance for wildlife and habitats and were published on a non-statutory basis in 1995 but have not since been statutorily proposed or designated. Proposed NHAs are typically offered protection in the interim period under county or city development plans which requires that planning authorities give due regard to their protection in planning policies and decisions, as is the case for the *Meath County Development Plan 2021-2027* through policy HER POL 32, which states:

"*To permit development on or adjacent to designated Special Areas of Conservation, Special Protection Areas, Natural Heritage Areas, Statutory Nature Reserves or those proposed to be designated over the period of the Plan, only where the development has been subject to the outcome of the Appropriate Assessment process and has been carried out to the satisfaction of the Planning Authority, in consultation with National Parks and Wildlife*".

And objective HER OBJ 34, which states:

"To protect and conserve the conservation value of candidate Special Areas of Conservation, Special Protection Areas, Natural Heritage Areas and proposed Natural Heritage Areas as identified by the Minister for the Department of Culture, Heritage and the Gaeltacht and any other

sites that may be proposed for designation during the lifetime of this Plan in accordance with the provisions of the Habitats and Birds Directives and to permit development in or affecting same only in accordance with the provisions of those Directives as transposed into Irish Law."

The proposed development site is not under any such designation. There are 16 pNHAs within the vicinity of the proposed development, as illustrated in Figure 7.1. Many of the pNHAs overlap at least partially with European site boundaries. The NHAs and pNHAs are listed by distance from the proposed development site, below, whilst their distance from the proposed development and their conservation objectives are presented in full in Appendix B:

- Duleek Commons pNHA (001578), *c.* 2km west of the subject lands. It has been designated for its marsh habitat, and as it contains the rare species slender spike-rush *Eleocharis uniglumis*.
- Dowth Wetland pNHA (001861), *c.* 4km to the north of the subject lands. The NPWS website does not include information on this site's designation, however it overlaps with the River Boyne and River Blackwater SAC boundary.
- Boyne River Islands pNHA (001862), *c.*4.5km north of the subject lands. It has been designated for its example of riparian woodland habitat. This site overlaps with the River Boyne and River Blackwater SAC boundary.
- Thomastown Bog pNHA (001593), *c*. 5.5km of the subject lands. It has been designated for its range of habitats, which include raised bog, wet grassland and wet woodland.
- King William's Glen pNHA (001804), *c*. 6km north of the subject lands. The NPWS website does not include information on this site's designation, however it overlaps with the River Boyne and River Blackwater SAC and River Boyne and River Blackwater SPA.
- Cromwell's Bush Fen pNHA (001576), *c.* 6.5km south of the subject lands. It has been designated for its wetland habitats, which, although small in area, is rare in the east of Ireland.
- Laytown Dunes/Nanny Estuary pNHA (000554), *c.*6.5km east of the subject lands. The NPWS website does not include information on this site's designation, however it overlaps with the River Nanny Estuary and Shore SPA
- Rosnaree Riverbank pNHA (001589), *c.*6.5km west of the subject lands. The NPWS website does not include information on this site's designation.
- Boyne Coast and Estuary pNHA (001957), *c*. 7km northeast. The NPWS website does not include information on this site's designation, however it overlaps with the Boyne Coast and Estuary SAC and Boyne Estuary SPA.
- Crewbane Marsh pNHA (000553), *c*. 7km northwest. The NPWS website does not include information on this site's designation, however it overlaps with the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA.
- Balrath Woods pNHA (001579), *c.*8km southwest of the subject lands. It is designated for its woodland habitat, a habitat type which is relatively rare in Meath. It also contains the flora species common wintergreen *Pyrola minor*, which is listed as "near-threatened" on the *Ireland Red List No. 10: Vascular Plants*[46]
- Boyne Woods pNHA (001592), *c*.10km west of the subject lands. The NPWS website does not include information on this site's designation, however it overlaps with the River Boyne and River Blackwater SAC.
- Melifont Abbey Woods pNHA (001464), *c.*13km northeast of the subject lands. It is designated for its woodland and infilling lake habitats, and for the presence of a notable invertebrate species, the Pyrenean snail *Semilimax pyrenaicus*.
- Blackhall Woods pNHA (001293), *c.*13km northeast of the subject lands. It has been designated for its bryophyte flora, which forms a typical Atlantic community on fallen logs in the woodland.

[46] Wyse Jackson, M., FitzPatrick, Ú., Cole, E., Jebb, M., McFerran, D., Sheehy Skeffington, M. & Wright, M. (2016). *Ireland Red List No. 10: Vascular Plants*. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin, Ireland.

– Castlecoo Hill pNHA (001458), *c*.14km northwest of the subject lands. There are no details of the reasons for designation of this site publicly available from the NPWS website. From examination of orthophotography, it appears to be at least partially wooded.
– Bog of the Ring pNHA (001204), *c*. 14.5km southeast of the subject lands. This site has been designated due to its marshy habitats, and the foraging resource they provide to overwintering bird species.

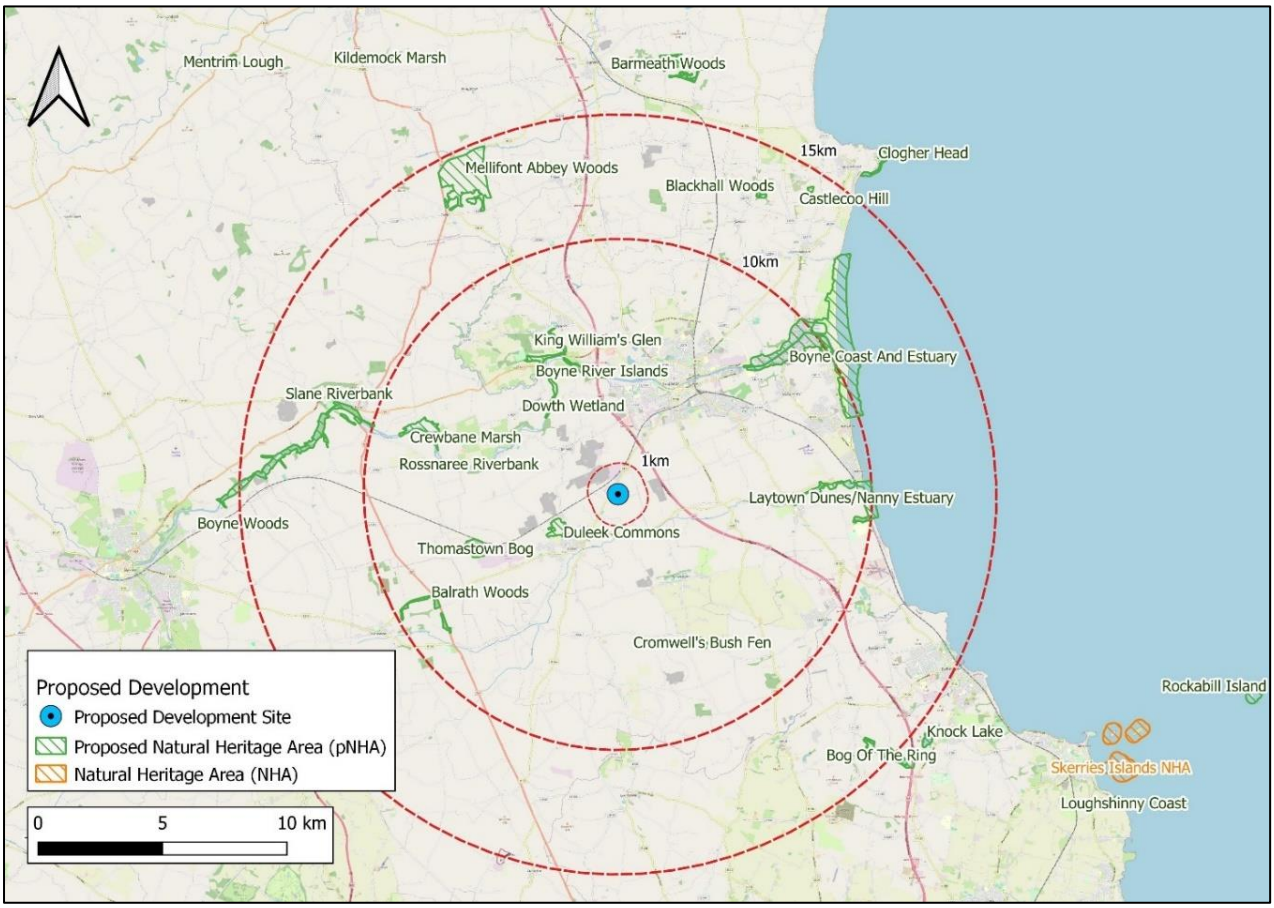


Figure 7.3: Natural Heritage Areas within the vicinity of the proposed development

7.3.4 Habitats and Flora

Protected Flora

A desk study of notable plant species carried out on the 29th June 2023 did not return any records of rare or protected flora species from within the subject lands. No rare or legally protected flora species were recorded within the lands during field surveys undertaken in April 2023. None of the flora species recorded within the lands are listed in any of the threatened categories in the *Ireland Red List No. 10: Vascular Plants*[47], or appear on the *Flora (Protection) Order 2022*.

Non-native Invasive Species

A desk study of non-native invasive species carried out on the 29th June 2023 did not return any records of invasive flora species from within the subject lands. The closest record of an invasive plant species relates to a single record of one species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (as amended), Japanese knotweed

[47] Wyse Jackson, M., FitzPatrick, Ú., Cole, E., Jebb, M., McFerran, D., Sheehy Skeffington, M. & Wright, M. (2016) Ireland Red List No. 10: Vascular Plants. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin, Ireland

Reynoutria japonica, from the L1601 road, *c.* 2km to the north of the proposed development. No invasive flora species were recorded within the lands during field surveys undertaken in April 2023, or in any of the previous years (i.e., 2019, 2021, 2022).

Habitats

The habitats within the proposed development site were classified using Fossitt (2000). Habitat types recorded within the footprint of the proposed development site discussed in this section are shown in Figure 7.4 and listed below:

- Arable crops (BC1)
- Spoil and bare ground (ED2);
- Dry meadows and grassy verges (GS2);
- Drainage ditches (FW4)
- Hedgerows (WL1); and
- Treelines (WL2).

Given the nature of the site (i.e. arable land), and the fact that it is relatively disturbed due to cultivation practices, none of the recorded habitats correspond to Annex I habitats.

Figure 7.4: Habitats within the survey area.

Arable crops (BC1)

The lands comprise a single large arable field (see **Plate 7.1**), which was under cultivation and sown with a crop of broad beans *Vicia faba* when visited in April 2023. The crop was relatively young, with a sparse sward cover and with very little occurrence of other plant species, which is not typical given that crops are regularly subject to chemical impost as part of the farming regime. This habitat type corresponds to the Fossitt category Arable crops (BC1). This is a low-species diversity

habitat that is dependent on regular human intervention and is therefore valued as of local importance (lower value).

Plate 7.1: Arable crops

Spoil and bare ground (ED2)

Spoil and bare ground habitat within the proposed development site consisted of a relatively small area of ground in the southwest and northwest of the site, where there was evidence of recently excavated soil (see

Plate 7.2). The following species occurred in very low densities and in localised areas (e.g. margins); common daisy *Bellis perennis*, ribwort plantain *Plantago lanceolata*, common dandelion *Taraxacum officinale* agg., and perennial ryegrass *Lolium perenne*.

Due to the artificial nature of this habitat and low species diversity, it is valued as local importance (lower value).

Plate 7.2: Spoil and bare ground habitat

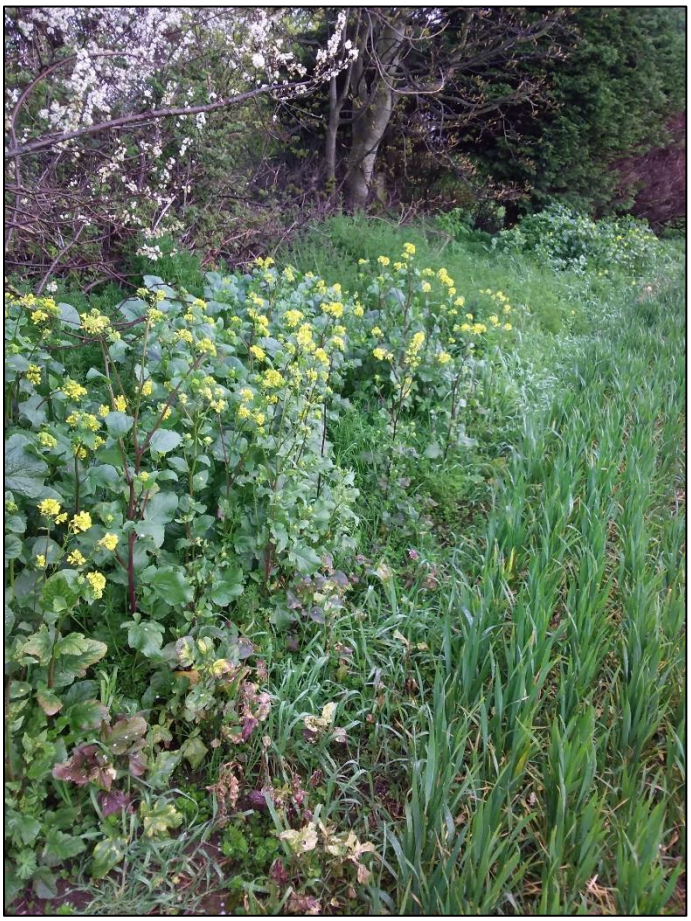
Dry meadows and grassy verges (GS2)

A narrow grassy verge (GS2) buffer separates the hedgerows/treelines at the boundaries of the site from the area of arable crop (see **Plate 7.3**). This verge is dominated by nettle *Urtica dioica*, in association with false oat-grass *Arrhenatherum elatius*, Cock's-foot *Dactylis glomerata*, Yorkshire fog *Holcus lanatus*, cleavers *Galium aparine*, broad-leaved dock *Rumex obtusifolius* and, and hogweed *Heracleum sphondylium*. This is a species-poor variant of the habitat, and it has been valued as local importance (lower value) for this reason.

Drainage ditches (FW4)

A drainage ditch (FW4) is associated with most of the hedgerows/treelines (see **Plate 7.4**). The western and most of the southern ditches were dry during visits in April 2023, while the northern and eastern ditches contained water. Water appears to enter the lands from the adjacent vehicular facility to the north of the lands. Where the ditch is not shaded by an overhanging canopy, some species of wetter conditions occur, such as great willowherb *Epilobium hirsutum.* Where the ditch is shaded by a tree canopy, little or no aquatic vegetation has developed. Botanically this habitat is a species-poor variant, and it is therefore valued of local importance (lower value) for this reason.

Plate 7.3: Grassy verges habitat



Hedgerows (WL1) and Treelines (WL2)

The lands are demarcated by boundaries of hedgerows (WL1) and treelines (WL2), which are generally associated with a drainage ditch (FW4) and a grassy verge (GS2). Together these linear habitat features form the only semi-natural vegetation within the lands (see

Plate 7.5). The hedgerows (WL1) and treelines (WL2) are relatively low and overwhelmingly dominated by hawthorn *Crataegus monogyna* with ivy *Hedera helix* and occasional elder *Sambucus nigra*. The southern and eastern boundaries contain more trees, and the hedgerows here form into treelines (WL2). The most frequently encountered tree species are ash *Fraxinus excelsior* and sycamore *Acer pseudoplatanus*. The understorey is dominated by hawthorn. The *Meath County Development Plan 2021-2027* (Meath County Council, 2021) recognises the importance of hedgerows, treelines and remnant woodland, and includes policies HER POL 37, HER POL 39, and HER POL 40, and HER POL 42 for the protection of these habitats. Native woodland covers a very small proportion of the county, and remaining hedgerows and treelines are important for this reason. The hedgerows and treelines in the subject lands are therefore valued of local importance (higher value) for these reasons.

Plate 7.4: Wet drainage ditch

Plate 7.5: Hedgerow and treeline habitat

7.3.5 Fauna

A search of the NBDC Database returned records of several species of protected fauna including three bat species listed below, badger Meles meles, Irish hare Lepus timidus subsp. hibernicus, red deer Cervus elaphus, hedgehog Erinaceus europaeus, and common frog Rana temporaria.

Bats

Bats, and their breeding and resting places, are protected under the Wildlife Act. All bat species are also listed on Annex IV of the EU Habitats Directive (with the Lesser horseshoe bat also listed on Annex II) and are afforded strict protection under the Habitats Directive and the European Communities (Birds and Natural Habitats) Regulations, 2011 (as amended).

Daubenton's bat *Myotis daubentonii*, Leisler's bat *Nyctalus leisleri*, Natterer's bat *Myotis nattereri*, and common pipistrelle bat *Pipistrellus pipistrellus* have been recorded within 2km of the Proposed Development, based on a search of the NBDC database. All of these species are widely distributed in Ireland.

Leisler's bat and common pipistrelle bat are associated with woodland edge habitats[48] and were observed foraging along hedgerows within the lands in May and June 2019, along with soprano pipistrelle bat *Pipistrellus pygmaeus*. These three species are the most commonly encountered bats on bat surveys in Ireland. While activity within the lands on both survey nights was relatively low and intermittent, a few individual bats (up to three) were observed flying back and forth along

[48] Roche, N., Aughney, T., Marnell, F., and Lundy, M (2014). *Irish Bats in the 21st Century*. Bat Conservation Ireland, Ulex House, Drumheel, Lisduff, Virginia, Co. Cavan, Ireland.

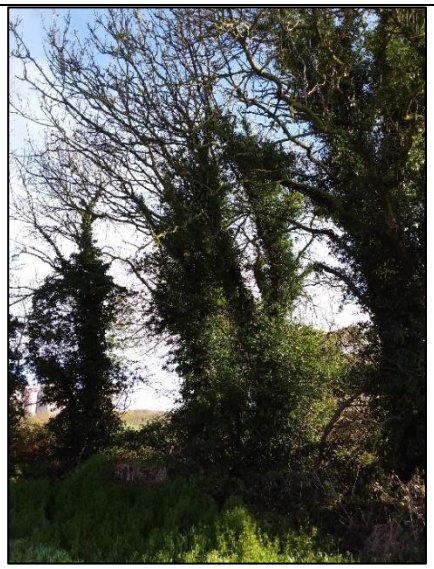
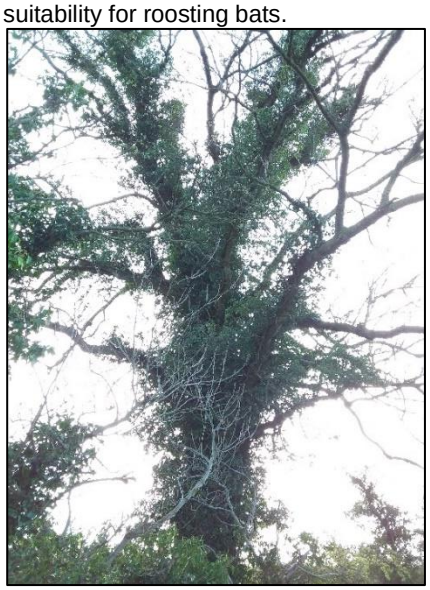
the eastern and southern hedgerows. In addition to the aforementioned species, there was a single recording of Daubenton's bat from 16th May 2019, recorded in the vicinity of several large trees in the north-eastern corner of the Proposed Development. Daubenton's bat is most frequently associated with water features such as lakes or rivers, which are bordered by woodland or scrub, but also commute and forage along hedgerows. No bats were heard during the activity survey carried out in 2021. Bat activity within the Proposed Development is illustrated in Figure 7.5 below.

The hedgerows and grassy verges within the Proposed Development provide moderate foraging and commuting habitat for bats, and three of the trees within the north-eastern part of the lands were identified as having some (low) suitability for roosting bats, based on a ground level assessment. The locations of these trees and their potential roost features (PRFs) is mapped on Figure 7.6 below, and described within Table 7.4 below.

Figure 7.1: Bat activity recorded within the Proposed Development site

Table 7.4: Locations of buildings and trees with potential roost features. The building is located outside the boundary of the proposed development site, whilst the trees are located along the proposed site boundary**.**

No.	PRF	Location	Description	Date	Surveyor
1	Building	O 06555 70927	A single-storey residential dwelling and associated outbuildings that lies outside the boundary of the proposed development site was assessed as being of low suitability for roosting bats. Refer to results of roost presence/absence surveys within the main text of this report. 	21.05.2019 14.04.2023 (Not resurveyed in 2023 as noted in Section 7.2.5)	Colm Clarke (Scott Cawley Ltd.)
2	Tree	O 06835 70811	Moderate sized ash with plentiful ivy. Cracks may be obscured by ivy. Feature with some, albeit low suitability for roosting bats. 	21.05.2019 14.04.2023	Colm Clarke (Scott Cawley Ltd.) Nicholas Fettes (Scott Cawley Ltd.)
3	Tree	O 06766 70977	Group of 3 Ivy-clad Ash. Ivy provides some potential as roost. Feature with low suitability for roosting bats.	21.05.2019 14.04.2023	Colm Clarke (Scott Cawley Ltd.) Nicholas

					Fettes (Scott Cawley Ltd.)
4	Tree	O 06754 70980	Ash with ivy infestation, which may provide opportunities for roosting bats. Feature with low suitability for roosting bats. 	21.05.2019 14.04.2023	Colm Clarke (Scott Cawley Ltd.) Nicholas Fettes (Scott Cawley Ltd.)

No bats were observed emerging from or returning a residential dwelling and associated outbuilding adjacent to and immediately north of the subject lands (outside the boundary of the proposed development site) during roost presence/absence surveys completed in May and June 2019. While the building has some suitability for roosting bats due to its age, condition and build materials, the results of roost presence/absence surveys suggest that it was not a roost at the time of the surveys.

Considering the unlit nature of the site, the presence of semi-natural linear habitats within the proposed development site and its immediate surroundings, and the connectivity these linear habitats provide for commuting and foraging bats, the site is assessed to be of moderate suitability for commuting and foraging bat species.

The proposed development site has been valued of local importance (higher value) for bats, due to the presence of suitable foraging habitats within them, and as bat species, being of least concern, as

although no bats were recorded in the August 2021 survey, they has been noted foraging and commuting through the lands in 2019, and due to the presence of potential roost features of low suitability found within the site.

Figure 7.2: Locations of trees and buildings within the lands with some potential for roosting bats within the survey area**.**

Other mammals

No evidence of badger, such as latrines, snuffle holes, or setts were recorded within the subject lands. While surveys were undertaken during the spring season when vegetation can obscure setts, the open nature and relatively sparse vegetation within the lands means that this was not a limitation to the identification of setts in this instance.

While small mammal species such as hares, hedgehog and pygmy shrew were not observed within the lands in 2023, the lands are within the current range of all of these species, and they are likely to occur within the lands. The subject lands are of local importance (higher value) for these species.

Breeding Birds

The desktop study found a total of seven birds of SCIs associated with European sites in the vicinity of the Proposed Development. These species were as follows: kingfisher *Alcedo atthis* common redshank *Tringa totanus* shelduck *Tadorna tadorna* oystercatcher *Haematopus ostralegus* golden plover *Pluvialis apricaria* herring gull *Larus argentatus* and northern lapwing *Vanellus vanellus*. With the exception of kingfisher, all of the other six species are wintering species of wader, duck, and gull which overwinter in the estuaries on the eastern coastline, *i.e.* River Boyne Estuary, and the River Nanny Estuary, and therefore the European sites therein. Whilst all of these species forage and roost within estuaries, lapwing, golden plover and herring gull can also use

agricultural grasslands and arable land for foraging[49]. Kingfisher is a SCI species for the River Boyne and River Blackwater SPA, located 3.7km north west of the Proposed Development. Kingfisher are only found along rivers, streams and canals, where they typically nest in burrows along vertical banks, and forage and commute along watercourses, rarely venturing inland [50]. The Proposed Development therefore does not have any suitable habitat for kingfisher species.

Some of the birds which have been recorded from the desk study are protected under the Wildlife Act and are listed as Birds of Conservation Concern in Ireland (BoCCI):

- BoCCI Red listed species: barn owl *Tyto alba*, quail *Coturnix coturnix*, yellowhammer *Emberiza citrinella*, kestrel *Falco tinnunculus*, common swift *Apus apus*, oystercatcher *Haematopus ostralegus*, redshank *Tringa totanus*, kittiwake *Rissa tridactyla*; and,
- BoCCI Amber listed species: shelduck *Tadorna tadorna*, great crested Grebe *Podiceps cristatus*, black-headed Gull *Chroicocephalus ridibundus*, herring Gull *Larus argentatus*, lesser black-backed gull *Larus fuscus*, common sandpiper *Actitus hypoleucos*, mute swan *Cygnus olor*, swallow *Hirundo rustica*, house martin *Delichon urbicum,* sand martin *Riparia riparia,* linnet *Linaria cannabina*, cormorant *Phalacrocorax carbo,* starling *Sturnus vulgaris,* house sparrow *Passer domesticus*, tree sparrow *Passer montanus*, skylark *Alauda arvensis*, spotted flycatcher *Musciapa striata*.

The majority of those species listed above are coastal birds that don't ordinarily venture inland. However, some typically coastal species can utilise inland terrestrial sites for feeding purposes. These are assessed under the dedicated 'Wintering Birds' section below. Red-listed species are those of highest conservation priority, being globally threatened, declining rapidly in abundance or range, or having undergone historic declines from which they have not recently recovered. Amber-listed species have an unfavourable status in Europe, have moderately declined in abundance or range, a very small population size, a localised distribution, or occur in internationally important numbers.

Two dedicated breeding bird surveys were carried out within the Proposed Development in March and April 2023. The majority of species recorded during the surveys, either visually or heard singing within hedgerows and treelines, and likely to breed in the lands, included blackbird *Turdus merula,* bullfinch *Pyrrhula pyrrhula,* blue tit *Cyanistes caeruleus,* chaffinch *Fringilla coelebs*, dunnock *Prunella modularis,* goldfinch *Carduelis carduelis*, great tit *Parus major,* hooded crow *Corvus corone,* robin *Erithacus rubecula*, song thrush *Turdus philomelos,* woodpigeon *Columba palumbus* and wren *Troglodytes troglodytes*, all of which are green-listed on the *Birds of Conservation Concern in Ireland*, and therefore of least conservation concern.

However, amber and red listed birds as per the BoCCI list were also noted during the dedicated surveys and included goldcrest *Regulus regulus* and starling *Sturnus vulgaris*, both of which are amber listed bird species. Herring Gull *Larus argentatus* which is also an amber listed bird species, were recorded flying over the Proposed Development, whilst the other bird species were recorded predominantly within the hedgerow and treeline habitats on site.

The Proposed Development are particularly notable for hosting at least two pairs of yellowhammer, a species that is strongly associated with cereal cultivation in Ireland and is included on the red list of species as per the BoCCI. Species on the red-list are those of highest conservation priority, and which have undergone a large decline in population or in range in recent times. Yellowhammer were observed singing from perches on the western and eastern boundaries of the Proposed Development.

With the exception of birds commuting over the site, bird species recorded within hedgerow and treeline habitat are considered to breed and nest within the Proposed Development. The locations of these bird species recorded within the Proposed Development are illustrated in Figure 7.7.

The lands are valued of local importance (higher value) for breeding birds, with the local population of yellowhammer being of ranked as being of County importance given its conservation red listing

[49] NPWS (2012). *River Nanny Estuary & Shore Special Protection Area, Conservation Objectives Supporting Document, Version 1.*
[50] Accessed in June 2023: https://birdwatchireland.ie/birds/kingfisher/

status reflecting its declining population mainly in the east and south of Ireland owing to losses in cereal cultivation areas.

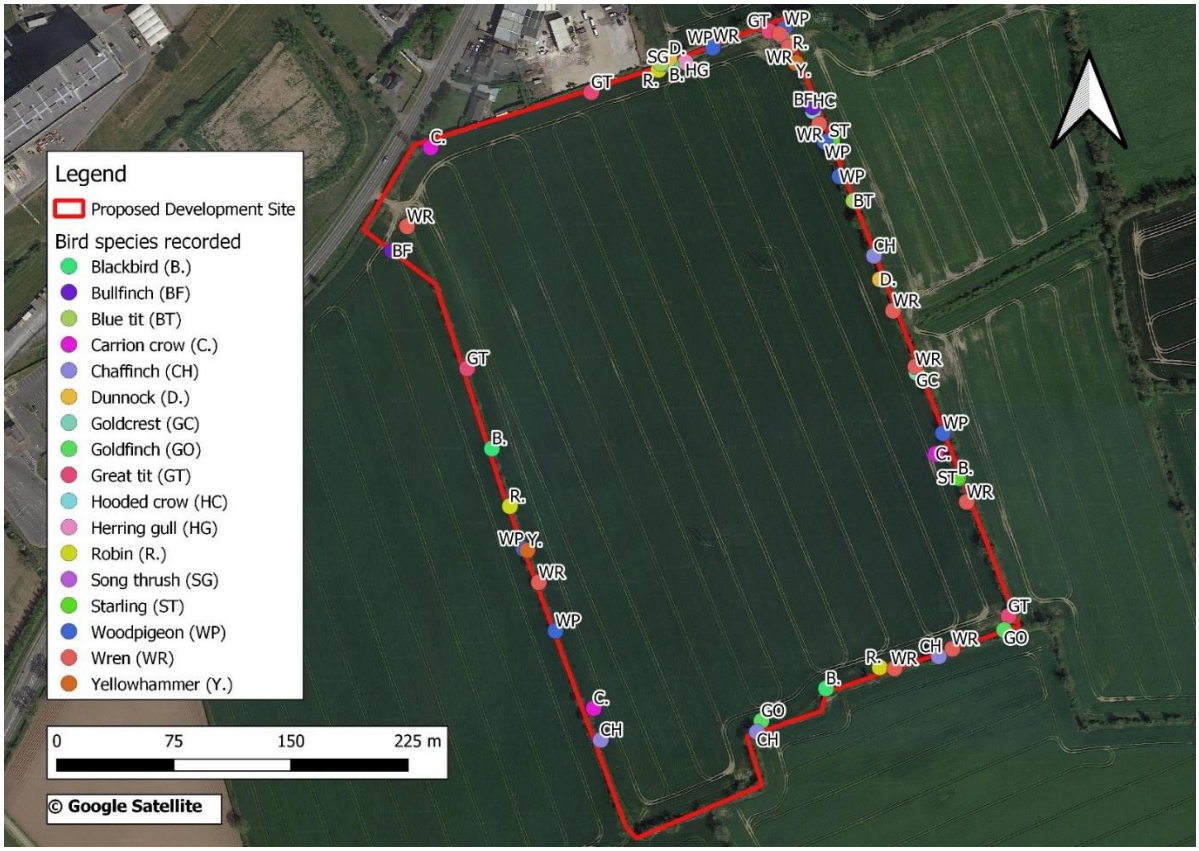


Figure 7.3: Bird species recorded within the proposed development site

Eight dedicated wintering bird surveys were carried out within the Proposed Development between December 2022 and March 2023.

Lapwing *Vanellus vanellus*, a red listed bird species, was recorded on arable crops habitat of the Proposed Development. A peak count of 12 was recorded on one occasion. Lapwing are an SCI species of Boyne estuary SPA, designated for its wintering population. During winter the Boyne estuary SPA regularly supports 1% or more of the all-Ireland population of lapwing, with the mean population for the period from 2005/06 -2009/10 being 1,936. According to IWeBS, for the period 2016/17 – 2020/21, 1% of the national population is 850. The SPA is within the normal foraging range (15-20km) of the species and therefore any individuals recorded on site during winter months may potentially belong to the wintering SPA population. However, the wintering population of lapwing in Ireland is enhanced by birds moving in from continental Europe and northern and western Britain (Wernham *et al*., 2002)[51]. They are also opportunistic and mobile birds and will readily exploit temporary food sources such as newly ploughed fields, which are plentiful in the surrounding environs. Given that only very low numbers of lapwing were recorded within the Proposed Development, and for the above reasons, lapwing are valued as being of local importance (higher value) only.

Redwing *Turdus iliacus,* a red listed bird species, was recorded within the hedgerows of the Proposed Development. A peak count of 58 was recorded on one occasion.

Amber listed bird species recorded foraging within the arable crops habitat of the Proposed Development include herring gull, with a peak count of 124 on one occasion, black-headed gull

[51] Wernham, V. V., Toms, M. P., Marchant, J. H., Clark, J. A., Siriwardena, G. M. & Baillie, S. R. (eds)(2002) The Migration Atlas: movements of birds of Britain and Ireland. T & A D Poyser. London.

Larus ridibundus, with a peak count of 43 on one occasion and common gull *Larus canus*, with a peak count of 2 on one occasion. Herring gull are an SCI species of River Nanny Estuary and Shore SPA, designated for its wintering population. During winter the SPA regularly supports 1% or more of the all-Ireland population of herring gull, with the mean population for the period from 1995/96 -1999/00 being 609. However, this has markedly decreased during the period of 2005/06 - 2009/10, down to just 51. The SPA is within the normal foraging range (15-20km) of the species and therefore any individuals recorded on site during winter months may potentially belong to the wintering SPA population. However, the herring gull population in Ireland increases in winter due to migrants from Scandinavian countries. They are also opportunistic and mobile birds and will readily exploit temporary food sources such as newly ploughed fields, which are plentiful in the surrounding environs. Given that only low numbers of herring gull were recorded within the Proposed Development, and for the above reasons, herring gull are valued as being of local importance (higher value) only.

Green-listed bird species recorded include buzzard *Buteo buteo*, with one bird being flushed from hedgerows on one occasion, and fieldfare *Turdus pilaris*, with a peak count of 42 recorded foraging on one occasion.

Gulls traversed the footprint of the Proposed Development more than other bird species recorded during the wintering bird surveys.

Although mostly associated with wetland habitats which do not occur within the Proposed Development, wintering birds like gulls, waders and waterfowl are known to utilise inland sites for terrestrial feeding purposes[52]. The Proposed Development contains arable crops habitat, which is suitable for foraging use by these species, although it is subject to regular human disturbance. Given the presence of red and amber listed wintering bird species foraging within the arable crops and hedgerow habitats found within the Proposed Development, wintering birds are valued as being of local importance (higher value).

Amphibians

No evidence of frogs or other amphibians were encountered during surveys of the lands in April 2023. The watercourses within the lands were generally heavily shaded by overhanging trees, making them less suitable as breeding sites for frogs or other amphibians. Nonetheless, there is some potential for the ditches within the lands to be of some importance to local frogs, and the lands have been assessed as local importance (higher value) for this species.

Fish

The River Nanny catchment and estuary, which is downstream from the Proposed Development, is known to support the following fish species[53]: Atlantic salmon *Salmo salar*, brown/sea trout *Salmo trutta*, eel *Anguilla anguilla*, stone loach *Barbatula barbatula*, minnow *Phoxinus Phoxinus*, three-spined stickleback *Gasterosteus aculeatus* and flounder *Platichthys flesus*. Salmon are valued as being of national importance due to its vulnerable status, whilst all other fish are valued as being of county importance.

[52] Benson, L. (2009). Use of Inland Feeding Sites by Light-bellied Brent Geese in Dublin 2008-2009: A New Conservation Concern? Irish Birds 8: 563-570
Enviroguide (2019). Natura Impact Statement for Proposed Strategic Housing Development at St. Paul's College, Sybil Hill Road, Raheny, Dublin.
[53] Inland Fisheries Ireland (2012) *Sampling fish for the Water Framework Directive*.

7.3.6 Summary of Biodiversity Evaluation

Table 7.5 below summarises the ecological evaluation of all receptors taking into consideration legal protection, conservation status and local abundance, and identifies the Key Ecological Receptors (KERs). Species, habitats and features not qualifying as KERs are not subjected to impact assessment in line with current best practice of assessing the impacts on what are determined to be important ecological or biodiversity features: CIEEM and TII guidelines (CIEEM, 2018 and National Roads Authority, 2009).

Table 7.5: Summary of the biodiversity evaluation

Biodiversity Receptor	Valuation	KER?
Designated Areas for Nature Conservation		
River Boyne and River Blackwater SAC	International importance	Yes
Boyne Coast and Estuary SAC	International importance	Yes
River Boyne and River Blackwater SPA	International importance	Yes
Boyne Estuary SPA	International importance	Yes
River Nanny Estuary and Shore SPA	International importance	Yes
All other SAC or SPA sites	International importance	No
Duleek Commons pNHA	National importance	Yes
Dowth Wetland pNHA	National importance	Yes
Boyne River Islands pNHA	National importance	Yes
Thomastown Bog pNHA	National importance	Yes
King William's Glen pNHA	National importance	Yes
Cromwell's Bush Fen pNHA	National importance	Yes
Laytown Dunes/Nanny Estuary pNHA	National importance	Yes
Rosnaree Riverbank pNHA	National importance	Yes
Boyne Coast and Estuary pNHA	National importance	Yes
Crewbane Marsh pNHA	National importance	Yes
Balrath Woods pNHA	National importance	Yes
Boyne Woods pNHA	National importance	Yes
River Boyne and River Blackwater SAC	International importance	Yes
Boyne Coast and Estuary SAC	International importance	Yes
River Boyne and River Blackwater SPA	International importance	Yes
Boyne Estuary SPA	International importance	Yes
Melifont Abbey Woods pNHA	National importance	Yes
Blackhall Woods pNHA	National importance	Yes
Castlecoo Hill pNHA	National importance	Yes
Bog of the Ring pNHA	National importance	Yes
All other NHA or pNHA sites	National importance	No
Habitats		
Arable crops (BC1)	Local importance (lower value)	No
Spoil and bare ground (ED2)	Local importance (lower value)	No
Drainage ditches (FW4)	Local importance (lower value)	No
Dry meadows and grassy verges (GS2)	Local importance (lower value)	No
Hedgerows (WL1)	Local importance (higher value)	Yes
Treelines (WL2)	Local importance (higher value)	Yes
Fauna species		
Bats	Local importance (higher value)	Yes
Other mammal species	Local importance (higher value)	Yes
Breeding birds (including yellowhammer)	Local importance (higher value) to County importance	Yes
Wintering birds	Local importance (higher value)	Yes
Amphibians	Local importance (higher value)	Yes
Fish (River Nanny downstream)	County to National importance	Yes
Bats	Local importance (higher value)	Yes

7.4 Potential Impacts

7.4.1 European Sites

This section describes and assesses the potential for the Proposed Development to result in likely significant effects on designated areas for nature conservation that lie within the ZoI of the Proposed Development. In the context of European sites this is focused on the habitats and species for which the sites are selected (QIs for SACs and SCIs for SPAs) and the conservation objectives supporting their conservation status in each site. This assessment is directly related to the assessment methodology for European sites required under the Habitats Directive, which is presented separately in the NIS (Scott Cawley Ltd, 2023) for the Proposed Development that accompanies this application.

The ZoI is a distance within which the Proposed Development could potentially affect the conservation condition of QI habitats or QI / SCI species of a European site. Considering the ZoI, in the absence of mitigation measures, the Proposed Development, individually or in combination with any other plan or project, was assessed as having the potential to adversely affect the integrity of the following European sites, namely River Boyne and River Blackwater SAC, River Boyne and River Blackwater SPA; Boyne Estuary and Coast SAC, Boyne Estuary SPA and the River Nanny Estuary and Shore SPA.

The conclusion presented in the NIS noted that the potential impacts associated with the Proposed Development do not have the potential to affect the receiving environment and, consequently, do not have the potential to affect the conservation objectives supporting the QIs or SCIs of any European sites; either alone or in combination with any other plans or projects. Therefore, there is no possibility of significant residual effects on any European sites as a result of the Proposed Development.

In summary of the NIS accompanying the Proposed Development planning application, the following impacts were identified.

Construction Phase Impacts

With regards to European sites, the potential sources of impact identified at the construction phase are:

– Habitat degradation/effects on QI/SCI species as a result of hydrological impacts

Habitat degradation as a result of hydrological impacts

Surface Waters: The Proposed Development is located upstream of the Nanny Estuary, and surface water runoff from the lands will ultimately discharge to the local surface water network (drains on the site perimeter), and to the Nanny Estuary via the Platin Stream and River Nanny. The potential ZoI for hydrological effects is confined to the aquatic/estuarine habitats downstream of the site to the Nanny Estuary, and species that utilise these habitats. Due to the assimilative capacity of the Northwest Irish Sea coastal waterbody, the zone of influence for hydrological effects will not extend beyond the Nanny Estuary. The only European site within the potential zone of influence for hydrological effects is the Nanny Estuary and Shore SPA 7.7km to the east. All other European sites fall outside of the zone of influence for hydrological effects during construction of the Proposed Development.

If a pollution event were to occur during construction, and was of sufficient magnitude to affect the reasons for designation for the Nanny Estuary and Shore SPA, e.g. arising from a large spill of deleterious materials to the drains in the construction site, the effects would be significant at the international scale.

Operation Phase Impacts

The potential sources of impact on European designated sites during the operational phase of the proposed development relate to:

– Habitat degradation/effects on QI/SCI species as a result of hydrological impacts
– Habitat degradation as a result of air quality impacts

Habitat degradation as a result of hydrological impacts

Surface Waters - The release of contaminated surface water runoff and / or an accidental spillage or pollution event into any surface water features during operation, has the potential to affect water quality in the receiving aquatic environment. Such a pollution event may include:

– The release of sediment into receiving waters and the subsequent increase in mobilised suspended solids; and
– The accidental spillage and/or leaks of containments (e.g. fuel and oils) into receiving waters.

The associated effects of a reduction of surface water quality could potentially extend for a considerable distance downstream of the location of the accidental pollution event or the discharge point and therefore impact the downstream environment of the Nanny Estuary. This potential reduction in water quality could result in the degradation of sensitive habitats present within downstream European sites, which in turn would negatively affect the SCI bird species that rely upon these habitats as foraging and / or roosting habitat. It could also negatively affect the quantity and quality of prey available to SCI population birds.

Process/Foul Waters - In the absence of any mitigation, the release of process or foul waters from the proposed development site could influence conditions in the downstream receiving environment, including the Nanny Estuary. If a release were of sufficient magnitude to affect the species for which the Nanny Estuary and Shore SPA has been designated (e.g. by negatively affecting prey abundance), the effects would be significant at the international scale.

Habitat degradation as a result of air quality impacts

The effects of sulphur and nitrogen air pollution derived from anthropogenic activities is known to have negative impacts on the environment, either directly by causing vegetation die-back, or indirectly by affecting the acidity and nutrient status of soils and waters[54]. Direct effects are limited to flora and habitats, while indirect effects for fauna may arise from changes to forage availability and habitat quality (e.g. acidification of waters).

Although Carbon Monoxide (CO) will be generated by the OCGTs, it is not currently thought to be of importance in terms of contributing to air quality impacts to vegetation[55], and is not discussed further.

A reduction in air quality within the immediate vicinity of the construction works may occur as a consequence of dust deposition associated with these construction activities. This includes reduction in photosynthesis due to smothering from dust on the plants and chemical changes such as acidity to soils. There are no European or other Designated Sites within 50m of the site boundary, which is the threshold distance for ecological sensitivity[56]. According to Chapter 5 Traffic and Transportations of the Environmental Impact Assessment Report, construction traffic associated with the Proposed Development is not significant[57]. Due to the scale and duration of the construction works, similarly no significant impacts are expected from construction machinery. Therefore associated emissions are not significant. On this basis, there is no possibility of significant effects on any European sites arising from air quality impacts during the construction-phase of the Proposed Development, and this element is not assessed further.

The impact of emissions within 20 km of the Proposed Development and existing emission points on ambient ground level concentrations within the following designated habitat sites was assessed

[54] Aherne, J., Henry, J., and Wolniewicz, M. (2017). *Development of critical loads for Ireland: Simulating impacts on systems (SIOS)*. EPA Research Report 2008-CCRP-4.1a. Prepared for the Environmental Protection Agency by Trent University. March 2017. ISBN: 978-1-84095-677-1.
[55] Bignal, K.L., Ashmore, M.R., Headley A.D., Stewart, K., & Weigert, K. (2007). *Ecological Impacts of Air Pollution from Roads on Local Vegetation*. Applied Geochemistry 22:1265-1271.
[56] Holman, *et al*. (2014). IAQM Guidance on the assessment of dust from demolition and construction. Institute of Air Quality Management, London. http://www.iaqm.co.uk/text/guidance/construction-dust-2014.pdf.
[57] Chapter 5 Traffic and Transportations Environmental Impact Assessment Report (EIAR), Platin (June 2023).

using AERMOD (a standardly used dispersion modelling software). The models contained extend to an area of 20km by 20km (coarse grid with 500m grid spacing), and 4km by 4km (fine grid with 100m grid spacing), and cover an area of 10km radius around the Proposed Development. The Air quality modelling and assessment included the following European sites:

- Special Areas of Conservation (SAC): River Boyne and River Blackwater SAC, Boyne Coast and Estuary SAC;
- Special Protection Areas (SPA): River Boyne and River Blackwater SPA, Boyne Estuary SPA, River Nanny Estuary and Shore SPA.

In the absence of any mitigation measures (in this instance including the design technology which has the result of the abatement of gases in the emissions from the Proposed Development), and adopting the precautionary principle, the potential for significant effects arising from air quality impacts during operation of the Proposed Development from sulphurous, nitrogenous, ammonia and/or particulate matter emissions, on the QIs/SCIs of the aforementioned European sites and/or their conservation objectives cannot be ruled out.

As the additional contributions from the Proposed Development fall below the Air Quality Standards for human health and the environment, and as wetland birds associated with the estuarine and coastal habitats of the Boyne Estuary and the Nanny Estuary are not sensitive to nitrogen or acid GLCs, there is no possibility of airborne emissions affecting the SCI habitats, species, or their conservation objectives for the River Boyne and River Blackwater SPA, Boyne Estuary SPA and River Nanny Estuary and Shore SPA.

Decommissioning Phase Impacts

No impacts on European sites are predicted as a result of the decommissioning phase of the development.

7.4.2 Natural Heritage Areas and Proposed Natural Heritage Areas

In the case of NHAs and pNHAs the assessment considers whether the integrity[58] of any such site would be affected by the Proposed Development with reference to the ecological features for which the site is designated or is proposed.

Construction Phase Impacts

With regards to NHAs and pNHAs, the potential sources of impact identified at the construction phase are:

– Habitat degradation as a result of hydrological impacts

As the Proposed Development do not overlap with the boundary of any NHAs or pNHAs, there is no possibility of habitat loss or fragmentation effects on these designated sites.

As the Proposed Development do not contain any plant species listed on the Third Schedule of the *European Communities (Birds and Natural Habitats) Regulation 2011 (as amended)*, there is no possibility of spreading non-native invasive species from the lands to any NHAs or pNHAs.

Habitat degradation as a result of hydrological impacts
Construction phase emissions (e.g. from the operation of plant and vehicles on-site) and dust from the Proposed Development have been noted as not significant in the Traffic and Transportation (Chapter 5), Air Quality (Chapter 10) and Climate Chapters (Chapter 14) of this environmental report. On this basis, there is no possibility of significant effects on any NHAs or pNHAs arising from air quality impacts during the construction-phase of the Proposed Development.

The potential ZoI for hydrological effects for NHAs and pNHAs is confined to the aquatic/estuarine habitats downstream of the site to the Nanny Estuary, and species that utilise these habitats. Due to the assimilative capacity of the Northwest Irish Sea coastal waterbody, the zone of influence for hydrological effects will not extend beyond the Nanny Estuary. The only NHA or pNHA within the

[58] Refer to Section 7.2.5 above for definition and impact assessment methodology

potential ZoI for hydrological effects is the Laytown Dunes/Nanny Estuary pNHA (000554), 6.5km to the east. All other NHAs and pNHAs fall outside of the zone of influence for hydrological and hydrogeological effects during construction of the Proposed Development.

If a pollution event were to occur during construction, and was of sufficient magnitude to affect the reasons for designation for the Laytown Dunes/Nanny Estuary pNHA (000554), e.g. arising from a large spill of deleterious materials to the drains in the construction site, the effects would be significant at the national scale.

Operation Phase Impacts

The potential sources of impact on designated sites during the operational phase of the Proposed Development relate to:

- Habitat degradation as a result of hydrological impacts; and
- Habitat degradation as a result of air quality impacts

Habitat degradation as a result of hydrological impacts

In the absence of any mitigation, the release of process or foul waters from the Proposed Development could influence conditions in the downstream receiving environment, including the Nanny Estuary. If a release were of sufficient magnitude to affect the habitats and/or species for which the Laytown Dunes/Nanny Estuary pNHA has been designated (e.g. by negatively affecting prey abundance), the effects would be significant at the national scale.

Habitat degradation as a result of air quality impacts

The effects of sulphur and nitrogen (including ammonia) air pollution derived from anthropogenic activities is known to have negative impacts on the environment, either directly by causing vegetation die-back, or indirectly by affecting the acidity and nutrient status of soils and waters (Aherne *et al*., 2017, Guthrie *et al*., 2018[59]). Ammonia (NH_3) is one of the main sources of nitrogen pollution, alongside nitrogen oxides (NO_2). Direct effects are limited to flora and habitats, while indirect effects for fauna may arise from changes to forage availability and habitat quality (e.g. acidification of waters). In Ireland, sulphur (SO_2) and nitrogen-containing air pollutants (such as ammonia) are mostly associated with agriculture and fossil fuel combustion, the latter being relevant during the operation of the Proposed Development.

Although Carbon Monoxide (CO) will be generated by the generators, it is not currently thought to be of importance in terms of contributing to air quality impacts to vegetation (Bignal *et al.*, 2007); Natural England, 2017) and is not discussed further.

Based on the air quality and climate model prepared by PM group and presented within the Air Quality and Climate Chapter of this report, the maximum predicted ground level concentrations of NO_2, NH_3 and SO_2 arising from the Proposed Development will be well below the relevant air quality standards for both human health and the environment. For this reason, effects on NHAs and pNHAs will not be significant.

Decommissioning Phase Impacts

No decommissioning phase impacts are predicted as a result of the Proposed Development.

7.4.3 Habitats

Construction Phase Impacts

Habitat Loss

The majority of the habitats within the Proposed Development boundary are of local biodiversity importance (lower value) and predominantly comprised of arable crops with drainage ditches and grassy verges around the margins. The habitat types within the Proposed Development boundary

[59] Guthrie, Susan, Sarah Giles, Fay Dunkerley, Hadeel Tabaqchali, Amelia Harshfield, Becky Ioppolo, and Catriona Manville, Impact of ammonia emissions from agriculture on biodiversity: An evidence synthesis. Santa Monica, CA: RAND Corporation, 2018. https://www.rand.org/pubs/research_reports/RR2695.html.

that are considered to be of a local biodiversity importance (higher value) are hedgerows and treelines.

The hedgerows and treelines in the land will be retained.

An accidental pollution event affecting surface water quality in the receiving environment

During construction, contaminated surface water runoff and/or an accidental spillage or pollution event into any surface water feature has the potential to have a significant negative impact on water quality and consequently affect aquatic and wetland habitats in the receiving environment. The effects of frequent and/or prolonged pollution events in a river system have the potential to be extensive and far-reaching and could potentially have significant long-term effects. In a worst-case scenario, and estuarine habitats 25km downstream could also be affected.

However, it is considered unlikely that a pollution event of such a magnitude would occur during construction, operation or decommissioning or be any more than temporary in nature. Nevertheless, a precautionary approach is being taken in assuming a level of risk of water quality impacts. Consequently, detailed mitigation measures are required to further minimise the risk of the Proposed Development having any perceptible effect on water quality.

Habitat degradation as a consequence of effects on surface water quality has the potential to affect the conservation status of aquatic, wetland or estuarine/marine habitats downstream and therefore, has the potential to result in a significant negative effect at geographic scales ranging from local to international.

Operational Phase Impacts

Air quality effects

The habitats present in the surrounding area, outside of the designated areas for nature conservation, are predominantly comprised of intensively managed agricultural fields amongst a network of hedgerows and treelines. Nitrogen deposition is not believed to have a direct negative effect on tree growth[60], therefore there are not likely to be any effects on trees or hedgerows locally as a result of air emissions. From the results of the air emissions modelling (Chapter 10, Air Quality of this Environmental Report), the Proposed Development will not contribute significantly to background levels of either nitrogen dioxide, ammonia or sulphur dioxide that would be likely to adversely affect the surrounding habitats.

However, according to the Article 17 report[61], the Annex I habitat Alkaline Fen [7230] is located 2.4km south west of the Proposed Development. Although at a substantial distance away from the Proposed Development, emissions such as NOx, SO_2, NO_2 and Ammonia have the potential to affect the conservation status of this habitat. This has the potential to result in a significant negative effect at a national level. However, air abatement measures which are a requirement of the design of the Proposed Development, will be in place. The cumulative maximum predicted ground level concentrations (GLCs) of NO_2, SO_2, CO, $PM_{10/2.5}$ and NH_3 arising from the operation of the Proposed Development and neighbouring facilities are well below the relevant Air Quality Standards (AQSs) and Environmental Assessment Levels (EALs). Furthermore, the PECs are also below the relevant AQSs and EALs.

Furthermore, given the intensive agricultural management of the surrounding lands, they are likely to presently be, and will likely continue to be, subject to large inputs of nitrogen-based fertiliser for agricultural use. With regards to sulphur dioxide, crop removal depletes soil sulphur levels, so that croplands may in fact be short of sulphur[62], therefore, significant impacts are also not likely at any geographic scale.

An accidental pollution event affecting surface water quality in the receiving environment

[60] Air Pollution Information System (APIS). Nitrogen Deposition: broadleaved, mixed and yew woodland. Accessed: 05/06/2023. Available: http://www.apis.auk/node/965
[61] The Status of EU Protected Habitats and Species in Ireland, National Parks and Wildlife Service, 2019
[62] Air Pollution Information System (APIS). Sulphur Dioxide: arable and horticultural. Accessed: 05/06/2023. Available: http://www.apis.auk/node/910.

During operation, contaminated surface water runoff and/or an accidental spillage or pollution event into any surface water feature has the potential to have a significant negative impact on water quality and consequently affect aquatic and wetland habitats in the receiving environment. The effects of frequent and/or prolonged pollution events in a river system have the potential to be extensive and far-reaching and could potentially have significant long-term effects. In a worst-case scenario, estuarine and coastal habitats 25km downstream could also be affected.

However, it is considered unlikely that a pollution event of such a magnitude would occur during construction or operation or be any more than temporary in nature. Nevertheless, a precautionary approach is being taken in assuming a level of risk of water quality impacts. Consequently, detailed mitigation measures are required to further minimise the risk of the Proposed Development having any perceptible effect on water quality.

Habitat degradation as a consequence of effects on surface water quality has the potential to affect the conservation status of aquatic, wetland or estuarine/marine habitats and therefore, has the potential to result in a significant negative effect at geographic scales ranging from local to international.

Decommissioning Phase Impacts

No impacts on habitats are predicted as a result of the decommissioning phase of the Proposed Development.

7.4.4 Fauna

Bats

Construction Phase Impacts

Roost Loss

The Proposed Development will not directly, or indirectly, affect any known bat roosts, due to the lack of confirmed bat roosts within the Proposed Development.

Habitat Loss

It is anticipated that there will be no tree removal from the Proposed Development. The trees shown on **Figure 7.6** have some potential to support roosting bats. Accidentally destroying a bat roost, particularly if the affected roost was a significant maternity or hibernation roost, has the potential to have long-term negative effects on the local bat population of the species concerned.

Bats, and their breeding and resting places, are strictly protected under the Birds and Habitats Regulations, and under the Wildlife Act, and it is an offence under the Wildlife Act to intentionally kill or injure bats or to interfere with or destroy their breeding or resting places. Therefore, mitigation measures are included that will be implemented to ensure that in the unlikely event that tree removal works be required, do not accidentally result in the permanent loss of tree roosting sites or result in bats being accidentally killed or injured during construction.

Disturbance and Displacement

The Proposed Development will not result in a loss of bat foraging habitat as no hedgerow removal is proposed for the development. All of the species encountered in the lands are listed as being of “least concern” in Marnell *et al.* (2019), and in the unlikely event that small amounts of hedgerow removal is required, the loss of habitat arising from the Proposed Development will not affect their conservation status in Ireland.

The hedgerow network (e.g., the bat foraging and commuting network) will not be affected by the Proposed Development as no hedgerow removal is required, and they will continue to provide foraging habitat for local bat species.

Indirect Disturbance of Flight Patterns Due to Construction Lighting

The introduction of lighting to the lands has the potential to result in displacement of some more light-sensitive species from the Proposed Development. However the effects of lighting will not extend significantly beyond the boundary of the Proposed Development, as is reported in the

lighting assessment report prepared by Aecom Limited[63] for the Proposed Development which notes minimal light disturbance. The following was described:

Security lighting will be installed around the Proposed Development and in the construction compounds and will be in operation (when on) for the duration of construction (i.e., 30 months) thereby temporarily increasing the level of artificial lighting in these areas. While sensor activated lighting will be used at site compounds, artificial lighting within suitable habitat may result in avoidance behaviour by bats, and could prevent bats from accessing foraging areas or roosts and / or result in bats taking more circuitous routes to get to foraging areas, hence potentially depleting energy reserves and result in abandonment of nearby roosts. Security lighting will not involve high intensity lighting (e.g. floodlighting), so the impact of increased artificial lighting at construction compounds is considered to be significant at the local level only.

Construction works will be undertaken during normal daylight working hours, and therefore the requirement for lighting to accommodate construction works during night-time, where existing light levels are low, will be limited.

Therefore, the effect of temporary lighting effects associated with the construction phase of the Proposed Development is significant at the local level only.

Operational Phase Impacts

Indirect Disturbance of Flight Patterns Due to Operational Lighting

Bat activity was recorded, typically around the peripheral locations of the Proposed Development lands. Additional permanent lighting features within suitable habitat may result in avoidance behaviour by bats. Such displacement (which would be a matter of metres) could prevent bats from accessing foraging areas or roosts and / or result in bats taking more circuitous routes to get to foraging areas and hence potentially depleting energy reserves and / or abandoning nearby roosts. Given the rural environment of the Proposed Development, and the fact that artificial lighting is locally present in the vicinity of the Proposed Development, the effects of displacement as a result of increased artificial lighting along the peripheral boundary are not significant at any geographic scale. This is because the lighting strategy involves the use limited lighting infrastructure in the central parts of the Proposed Development away from identified commuting features.

As the lighting assessment report prepared for the Proposed Development notes minimal light disturbance:

"*Results show that light levels on a vertical calculation surface at a 2 metre height on the closest hedge (E3) on the east of the plant boundary, a maximum of 1.22 lux may occur. Toward the south boundary of the Site, the hedge trees (E4) saw a maximum of 0.9 lux. In all cases, this is considered within thresholds detailed within GN08 guidance (maximum of 3 lux*)". Thus as light spill from the Proposed Development at operational phase will be within recommended good practice guidelines, The effects of operational artificial lighting on bat species for Proposed Development is therefore not considered to be significant at any geographic scale and it is anticipated that bats will continue to utilise hedgerows and treelines in the surrounding landscape for forage and commuting.

Other mammals

Habitat Loss & Mortality

The habitats present on, and surrounding (over 500ha within 2km^2), the Proposed Development are likely to support small mammal species, such as pygmy shrew or hedgehog. Given the Proposed Development will largely only affect the arable crops habitat, and that they are highly mobile species, low numbers of individuals of small mammal species are likely to be affected.

[63] Platin OCGT Power Plant Lighting Assessment, AECOM (July 2023)

Therefore, site clearance will not result in a level of mortality that would affect the species' conservation status, and result in a significant negative effect, even at a local geographic scale.

Disturbance and Displacement

In conjunction with any displacement effects associated with habitat loss, increased human presence and/or noise and vibration associated with construction works, has the potential to displace mammal species from both breeding/resting places and from foraging habitat. However, given that disturbance will be short-term, it is extremely unlikely to result in any long-term effects on the local mammal population or their conservation status. Particularly considering the retention of the hedgerows, trees, and grassy verges. Therefore, disturbance/displacement during construction is unlikely to result in a significant negative effect, at any geographic scale.

Decommissioning Phase Impacts

No impacts on fauna are predicted as a result of the decommissioning phase of the Proposed Development.

Breeding birds

Construction Phase Impacts

Habitat Loss and Loss of Breeding/Resting sites/Mortality/Collision Risk

Any removal of hedgerow vegetation could potentially result in the mortality of birds and their young, particularly if undertaken between 1st March and 31st August, i.e. during the breeding bird season. All birds, their nests, eggs, and young are protected under the Wildlife Act (as amended). Therefore, mitigation measures are included to ensure that vegetation clearance, if required, does not result in damaging or destroying nest sites or result in birds being killed or injured during construction. However, no removal of hedgerows will be carried out as part of the proposed development.

The removal of arable land will result in a loss in foraging habitat for yellowhammer. However, according to the desktop search of NBDC for records of yellowhammer in the surrounding area, there are a multitude of records of this species in all 2km Grid Squares near the Proposed Development. In the context of the local area there is an abundance of alternative foraging habitat in the form of arable crop fields and farming (i.e. over 500ha of suitable habitat in the surrounding 2km^2 area), and as the surrounding lands are zoned as RA-Rural Area "To Protect and promote in a balanced way the development of agriculture, forestry and rural-related enterprise, biodiversity, the rural landscape, and the built and cultural heritage" (Meath County Development Plan 2021-2027), the loss is unlikely to result in a significant negative effect on the local yellowhammer population.

Disturbance and Displacement

The noise, vibration, increased human presence and the visual deterrent of construction traffic associated with site clearance and construction will disturb breeding bird species and is likely to temporarily displace breeding birds from habitat areas adjacent to the Proposed Development boundary. Although it is not possible to quantify the magnitude of this potential impact (or the potential effect zone) it could potentially extend for several hundred metres from the Proposed Development[64]. Given the short-term nature of the construction works (18-months), disturbance or displacement effects will also be over the short-term and are therefore not likely to affect the conservation status of the local breeding bird populations.

[64] Goodship, N.M. and Furness, R.W. (MacArthur Green) Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species. NatureScot Research Report 1283.

Overall, the site clearance and physical disturbance associated with the Proposed Development is not likely to result in long-term effects on local breeding bird populations and will not result in a likely significant negative effect, at any geographic scale.

There is, however, in the absence of specific mitigation measures, the potential for the Proposed Development to affect water quality in the Platin Stream, the River Nanny and downstream in the Nanny Estuary which could affect breeding and wintering birds in those sites; particularly species that depend on the aquatic environment for food. This has the potential to result in effects on breeding and wintering bird populations downstream, from short-term to long-term in duration, and has the potential to result in a likely significant negative effect, at a local geographic scale (outside of the designated sites for nature conservation which are discussed separately above in Section 7.4.1).

Habitat Degradation – Surface Water Quality

The construction phase of the Proposed Development could potentially result in contamination of receiving water bodies, with a consequent effect on breeding birds either directly (e.g. acute or sub-lethal toxicity from pollutants) or indirectly (e.g. affecting their food supply or supporting habitats).

However, it is considered unlikely that a pollution event of such a magnitude would occur during the construction phase or be any more than temporary in nature. Nevertheless, a precautionary approach is being taken in assuming a level of risk of water quality impacts and detailed mitigation measures are required to further minimise the risk of the Proposed Development having any perceptible effect on water quality during construction.

Habitat degradation as a result of effects on surface water quality during construction has the potential to affect the species' conservation status and result in a likely significant negative effect, at a local geographic scale.

Operational Phase Impacts

Disturbance / Displacement

Increases in noise levels, associated with the increased frequency of plant operation, as well as increased human presence and occasional traffic, may have a negative effect on bird abundance and occurrence in the locality. Increased noise levels, as well as causing disturbance to birds in the locality, may also affect the breeding success of local bird populations as bird mating calls would become drowned out by traffic noise.

The displacement of breeding birds from the centre Proposed Development boundary is likely to result in an increase in competition for resources (e.g. nesting habitat or prey / food sources) both between and amongst breeding bird species, which in turn would have negative impacts on local breeding bird populations in the long-term. In particular the permanent loss of arable habitat for use by Yellowhammer is considered locally significant, although there is an abundance of similar suitable habitat in the wider locale.

Although the Proposed Development is predicted to have a long-term effect on local breeding bird populations particularly yellowhammer owing to landscape changes, even at a local level this is not predicted to affect the ability of local breeding bird species to persist within their current ranges or to maintain their populations long-term. Therefore, in consideration of these factors, the loss of suitable foraging habitat within the Proposed Development boundary that is utilised by wintering birds and an increase in short-term disturbance or displacement effects will not affect the conservation status of any wintering bird species and will not result in a likely significant negative effect, at any geographic scale.

Decommissioning Phase Impacts

No impacts on breeding birds are predicted as a result of the decommissioning phase of the Proposed Development.

Wintering birds

Construction Phase Impacts

Habitat Loss and fragmentation

Several wetland SCIs of European sites and non-SCI bird were recorded in the vicinity of the Proposed Development and are known to regularly utilise terrestrial grassland and arable sites for supplementary forage. Wintering bird species are mobile and can regularly travel up to 20km between roosting and feeding sites[65]. The species (as described in Section 7.3.5) have been identified foraging within the Proposed Development, and / or are known to forage in habitats such as those within the Proposed Development, e.g. arable fields

There is no significant direct loss of habitats associated with SCI bird species and non-SCI wintering bird species. Many of the wintering birds species are strongly associated with aquatic or estuarine habitats that do not occur within the Proposed Development and are therefore not at risk of any effects of habitat loss.

In terms of *ex-situ* foraging sites for wintering birds, there is considerable suitable territory between the Proposed Development and coastal sites, where most wintering birds are associated. However, SCI lapwing and herring gull were identified feeding within the lands on one occasion, in this context, the loss of the Proposed Development (8.7ha) would not result in population level effects on SCI bird number and would not adversely affect the integrity of SCI species from distal SPAs identified as being within the ZoI of the Proposed Development.

Thus the loss of suitable foraging habitat within the Proposed Development boundary that may be utilised by wintering birds and an increase in short-term disturbance or displacement effects will not affect the conservation status of any wintering bird species and will not result in a likely significant negative effect, at any geographic scale.

Habitat degradation as a result of hydrological impacts

During construction, hydrological impacts are not predicted to cause discernible affects in waters beyond the Nanny Estuary as any pollution event would be temporary in nature, and would be imperceptible considering the dilution factor in the Northwest Irish Sea Coastal Waterbody[66]. Therefore, habitat degradation as a result of hydrological impacts would be limited to European sites located in the Nanny Estuary, i.e. the River Nanny Estuary and Shore SPA and the SCI species therein. In the absence of mitigation, Habitat degradation as a result of effects on surface water quality during construction has the potential to result in a likely significant negative effect, at a local geographic scale.

Disturbance and Displacement

Noise generated from the Proposed Development (during the winter months) does not have the potential to affect SCI or non SCI birds as it is separated from European sites by a minimum distance of 3.5km, far beyond the typical 300mtres range recognised as the effective noise ZoI for wintering birds[67].. Noise generated from the Proposed Development will attenuate to background

[65] Scottish Natural Heritage (2016). *Guidance: Assessing connectivity with Special Protection Areas (SPAs). Version 3.*
[66] See also, Chapter 9 Water and Waste Water Environmental Impact Assessment Report, 2023. AECOM.
[67] The disturbance zone of influence for waterbirds is based on the relationship between the noise levels generated by general construction traffic/works (BS 5228:2009 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1 Noise) and the proximity of those noise levels to birds – as assessed in Cutts, N. Phelps, A. & Burdon, D. (2009) *Construction and Waterfowl: Defining Sensitivity, Response, Impacts and Guidance*, and Wright, M.,

levels before reaching European sites. In the event that the lands or fields within approximately 300m of the Proposed Development (e.g. the potential zone of influence of disturbance or displacements impacts) act as *ex-situ* foraging habitat for wintering bird SCIs of European sites, there is no possibility of significant effects, as there is an abundance of alternative suitable habitat for wintering wetland bird species in the surrounding area.

For wintering birds foraging inland and no longer able to access the Proposed Development, which is 8.7ha in area and an additional buffer of approximately 300m radius around the Proposed Development, the impact would not be significant in the context of the wider environment. As outlined in Section 7.3.3, field parcels will change in rotation between grassland, winter crops, stubble et, year on year, and this would constitute "natural patterns of variation". The fact that these field parcels are constantly changing from season to season and year to year, means that wintering birds using land in the area are habituated to these changes and are accustomed to moving from field to field in order to find suitable foraging habitat. In this context, the loss of the Proposed Development and the approximately 300m radius surrounding is not considered significant.

In view of the loss of potential suitable foraging habitat from within the Proposed Development boundary that may be utilised by wintering birds and an increase in short-term disturbance or displacement effects will not affect the conservation status of any wintering bird species and will not result in a likely significant negative effect, at any geographic scale.

Operational Phase Impacts

Habitat Loss and fragmentation

At the operational phase, there would be no additional loss of habitat, the Proposed Development having been completed. Wintering birds including SCI species venturing into the area would, as already described previously in this chapter, have free access to plentiful similar *ex-situ* foraging territory. Therefore, any displacement of birds from habitat areas lost during the construction of the Proposed Development and no longer available at the operational phase is not likely to affect the conservation status of wintering bird species and will not result in a likely significant negative effect, at any geographic scale.

Disturbance and Displacement

In a similar manner as construction related impacts, increases in noise levels, associated with the increased frequency of plant operation, as well as increased human presence and occasional traffic, may have a negative effect on bird abundance and occurrence in the locality. Increased noise levels, as well as causing displacement to wintering birds in the locality, Noise generated from the operational development does not have the potential to affect any QI or SCI of any European sites as the proposal is separated from European sites by a minimum distance of 3.5km. Noise generated from the Proposed Development will attenuate to background levels before reaching European sites. In the event that the lands or fields within approximately. 300m of the Proposed Development (e.g. the potential zone of influence of disturbance or displacements impacts) act as *ex-situ* foraging habitat for wintering bird SCIs of European sites, there is no possibility of significant effects, as there is an abundance of alternative suitable habitat for wintering wetland bird species in the surrounding area. The loss of the Proposed Development, which is 8.7ha in area and an additional buffer of approximately. 300m radius around the Proposed Development, would not be significant in the context of the wider environment. The fact that these field parcels are constantly changing from season to season and year to year, means that wintering birds using land in the area are habituated to these changes and are accustomed to moving from field to field in order to find suitable foraging habitat. In this context, the loss of the Proposed Development and the 300m radius surrounding it is not significant. Therefore, any displacement of

Goodman, P & Cameron, T. (2010) Exploring Behavioural Responses of Shorebirds to Impulsive Noise. *Wildfowl* (2010) 60: 150–167. At 300m, noise levels are below 60dB or, in most cases, are approaching the 50dB threshold below which no disturbance or displacement effects would arise.

birds from habitat areas lost during the construction of the Proposed Development and no longer available at the operational phase is not likely to affect the conservation status of wintering bird species and will not result in a likely significant negative effect, at any geographic scale

Habitat degradation as a result of hydrological impacts

Habitat degradation as a result of effects on surface water quality during operation has the potential to affect the conservation status of wintering birds and could result in a likely significant negative effect, at a local geographic scale. This is in consideration of the temporary nature and scale of the proposed impact, the inclusion of design measures Sustainable Drainage Systems (SuDS) which would have been constructed and in operation, the availability of suitable habitat for wintering birds in the wider vicinity and the relative abundance of wintering birds across the wider environment, as demonstrated in the results of the desk study.

Collision Risk

The power plant will have 3 exhaust stacks, all 25m in height. There will also be 3 gas turbine buildings of 16.9m in height. All other buildings within the site are at a lower height. Therefore, as the surrounding landscape is generally flat, there is potential for direct collision of bird species from the exhaust stacks. However; the Proposed Development will be screened by the existing treelines and hedgerows, and the development is also not on a known flight path for wintering bird species, with gull species typical flying height range up to 250m above sea level while foraging and travelling[68]. Other wintering bird species that were identified during surveys were not found in large numbers. It is predicted that there is no potential for the Proposed Development to significantly increase the collision risk to mobile wintering bird species which are present in the area. Therefore, there is no potential for the Proposed Development to result in significant effects which could have implications for the conservation status local wintering bird species.

Decommissioning Phase

No impacts on wintering birds are predicted as a result of the decommissioning phase of the Proposed Development.

Common frog

Construction Phase Impacts

Habitat degradation as a result of hydrological impacts

During construction, an accidental spillage or pollution event into the drainage ditches, or wetland habitats downstream, supporting Common frog would probably have a negative impact. The magnitude and significance of such an impact would be entirely dependent on the nature, scale and duration of the pollution event. Although unlikely, in a worst case scenario this could result in extensive degradation of amphibian habitat and/or the mortality of amphibians in affected habitats. There is the potential for such impacts to have short-term effects on the local Common frog population and result in a likely significant negative effect, at the local geographic scale.

Habitat Loss/ Mortality

The Proposed Development will not result in the loss of any confirmed breeding habitat for the common frog. The most suitable habitat areas with the potential to support common frog in the

[68] Thaxter, , Ross-Smith, V., & Cook, A. (2015). How high do birds fly? A review of current datasets and an appraisal of current methodologies for collecting flight height data: Literature review. British Trust for Ornithology Research Report No. 666.

vicinity of the Proposed Development are the drainage ditches along the site boundary. Although the drainage ditches will not be removed as part of the Proposed Development they may be directly affected to a minor degree during construction as part of the drainage works, which will discharge to the drainage ditches. If common frog are present at the time construction works are being undertaken there is a risk that frogs could be killed or injured.

Given the legal protection afforded to amphibian species under the Wildlife Act, which prohibits their intentional killing or injury, or the wilful interference with an amphibian breeding or resting places, a mitigation strategy has been developed.

Operational Phase Impacts

Habitat degradation as a result of hydrological impacts

There will be outfall points to the drainage ditches from the proposed drainage network during operation. An accidental spillage or pollution event into the drainage ditches, or wetland habitats downstream, supporting Common frog would probably have a negative impact. The magnitude and significance of such an impact would be entirely dependent on the nature, scale and duration of the pollution event. Although unlikely, in a worst case scenario this could result in extensive degradation of amphibian habitat and/or the mortality of amphibians in affected habitats. There is the potential for such impacts to have short-term effects on the local Common frog population and result in a likely significant negative effect, at the local geographic scale.

Decommissioning Phase

No impacts on amphibians are predicted as a result of the decommissioning phase of the Proposed Development.

Fish

Construction Phase Impacts

Habitat degradation as a result of hydrological impacts

An accidental pollution event during construction, of a sufficient magnitude, has the potential to affect water quality in the Platin Stream and the River Nanny downstream, either alone or cumulatively with other pressures on water quality within the catchments. This could have long-term effects on the quality of the receiving river systems and the populations of fish species they support and has the potential to result in a likely significant effect, at the local to County geographic scale.

Operational Phase Impacts

Habitat degradation as a result of hydrological impacts

Notwithstanding the design mitigation measures constructed as part of the Proposed Development, habitat degradation as a result of effects on surface water quality during operation, albeit limited, has the potential to affect the conservation status of fish species in the Platin Stream and the River Nanny downstream and result in a likely significant negative effect, at a Local to County geographic scale. This is in consideration of the temporary nature and scale of the potential impact.

Decommissioning Phase

No impacts on Fish are predicted as a result of the decommissioning phase of the Proposed Development.

7.5 Mitigation Measures

This section presents the mitigation measures that will be implemented during construction, operation and decommissioning to avoid or reduce the potential impacts of the Proposed Development on biodiversity. These mitigation measures are in addition to the extensive and stringent environmental control measures that have been incorporated into the design of the Proposed Development, as detailed in *Chapter 2, Description of the Proposed Development*. All of the mitigation measures will be implemented in full and are best practice, and tried and tested, effective control measures to protect the receiving environment. A summary of the mitigation measures is presented in Table 7.8.

7.5.1 Construction Phase Mitigation – Measures To Minimise Habitat Loss and To Reduce the Potential for Impacts on Vegetation to Be Retained

Any vegetation (including trees, hedgerows or scrub adjacent to, or within, the proposed development boundary) which is to be retained will be afforded adequate protection during the construction phase in accordance with the Landscape Plan (Drawing no. 60695232-PTN-DR-011).

- All trees along the Proposed Development boundary that are to be retained, both within and adjacent to the Proposed Development boundary (where the root protection area of the tree extends into the Proposed Development boundary), will be fenced off at the outset of works and for the duration of construction to avoid structural damage to the trunk, branches or root systems of the trees. Temporary fencing will be erected at a sufficient distance from the tree so as to enclose the Root Protection Area (RPA) of the tree. The RPA will be defined based upon the recommendation of a qualified arborist;
- Where fencing is not feasible due to insufficient space, protection for the tree/hedgerow will be afforded by wrapping hessian sacking (or suitable equivalent) around the trunk of the tree and strapping stout buffer timbers around it;
- The area within the RPA will not be used for vehicle parking or the storage of materials (including soils, oils and chemicals). The storage of hazardous materials (e.g. hydrocarbons) or concrete washout areas will not be undertaken within 10 m of any retained trees, hedgerows and treelines;
- A qualified arborist shall assess the condition of, and advise on any repair works necessary to, any trees which are to be retained or that lie outside of the Proposed Development boundary but whose RPA is impacted by the works. Any remedial works required will be carried out by a qualified arborist; and,
- A buffer zone of at least 5m will be maintained between construction works and retained hedgerows to ensure that the root protection areas are not damaged.

7.5.2 Construction Phase Mitigation – Habitat Replacement

No hedgerows will be removed during the construction of the proposed development.

In terms of further enhancing the proposed development site, the bulk of the soft landscaping specification is for native species. This is notwithstanding the accepted value of some non-native or landscape flowering herb and shrubs to attract pollinator species. Thus, although the proposed development will result in the loss of part of a species-poor arable field, the planting regime which is proposed for the site landscaping will result in an increase the floral diversity of the site, as demonstrated on Proposed Soft Landscape Plan (Drawing no. 60695232-PTN-DR-011) and Proposed Material Storage Area (Drawing no. 60695232-PTN-DR-016).

7.5.3 Construction Phase Mitigation – Measures To Protect Surface Water Quality during Construction

The mitigation measures to protect surface water in the receiving environment during construction are detailed in Environmental Report *Chapter 9 Water & Wastewater*, and in the outline Construction Environmental Management Plan (CEMP). The mitigation measures have been

developed in consideration of the following standard best international practice including but not limited to:

- Construction Industry Research and Information Association (CIRIA) (2005) Environmental Good Practice on Site (C741);
- Construction Industry Research and Information Association (2001) Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors (C532);
- Construction Industry Research and Information Association (2000) Environmental Handbook for Building and Civil Engineering Projects (C512);
- Environmental Protection Agency (2018) List of Waste and Determining if Waste is Hazardous or Non-Hazardous; available at: https://www.epa.ie/publications/monitoring--assessment/waste/2019--FULL-template.pdf; and
- Environment Agency (2015) Guidance on the Classification and Assessment of Waste, Technical Guidance WM3;
- Environmental Protection Agency (2013) Guidance (and Templates) on the Management of Contaminated Land and Groundwater at EPA Licensed Sites
- Environment Agency (2020) Land Contamination risk management (LCRM). Available at: https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm

The following mitigation measures are prescribed to protect surface water quality during construction:

- The Silt traps shall be placed in drains to capture any excess silt in the run-off;
- Good housekeeping (daily site clean-ups, use of disposal bins, etc.) will be maintained on the proposed development site during construction, and the proper use, storage and disposal of construction materials and their containers will prevent contamination;
- For all activities involving the use of potential pollutants or hazardous materials, such as concrete, fuels, lubricants and hydraulic fluids, there will be a requirement to ensure that material will be carefully handled and stored to avoid spillages. Potential pollutants shall also be adequately secured against vandalism and will be provided with proper containment according to codes of practice. Any spillages will be immediately contained, and contaminated soil removed from the site by an appropriately licensed contractor and disposed of to a licensed facility;
- Water pollution will be minimised by the implementation of good construction practices. Such practices will include adequate bunding for silos, oil containers, wheel washers and dust suppression on site roads, and regular plant maintenance. The Construction Industry Research and Information Association (CIRIA) provides guidance on the control and management of water pollution from construction sites (Masters – Williams et al., 2001).
- In accordance with the CIRIA document which recommends that a contingency plan for pollution emergencies will be prepared which will address the following:
    - containment measures;
    - emergency discharge routes;
    - list of appropriate equipment and clean-up materials;
    - maintenance schedule for equipment;
    - details of trained staff, location and provision for 24-hour cover;
    - details of staff responsibilities;
    - notification procedures to inform the Environmental Protection Agency (EPA) or environmental department of the Dublin City Council;

- audit and review schedule;
- telephone numbers of statutory water consultees; and
- list of specialist pollution clean-up companies and their telephone numbers.

7.5.4 Construction Phase Mitigation – Measures to Protect Air Quality during Construction

Chapter 10 Air Quality prescribes the following good site practice mitigation measures to minimise emissions to air during the construction phase. The following mitigation measures will be in place to minimise any construction related emissions to air and thus prevent any significant impact on air quality.

- Good housekeeping and site management including the proper storage of spoil / loose materials on site;
- Hard surfaced roads will be swept to remove mud and aggregate materials from their surface and any un-surfaced roads will be restricted to essential site traffic only with speed restrictions;
- Water bowsers will be deployed for dust suppression in periods of dry weather during the construction phase;
- Wheel washing of construction vehicles leaving site will be implemented as necessary;
- Public roads outside the site will be regularly inspected and cleaned as necessary;
- Provision of an adequate water supply for effective dust/particular matter suppression/mitigation; and
- All vehicles and equipment used in relation to the site will be: mechanically sound; operated and maintained in accordance with the manufacturer's recommendations and switched off when not in use.

7.5.5 Construction Phase Mitigation – Measures to Protect Bats during Vegetation Clearance

The following mitigation measures will be implemented in relation to those tree groups identified as having the potential to support roosting bats (Figure 4). Bats could occupy suitable roosting features at any time prior to the commencement of works. Although tree removal is not currently proposed, should any tree removal be required due to unforeseen circumstances (e.g. health and safety reasons), there is an inherent risk that bats could be affected by any felling works. The following mitigation procedures will be followed:

- Felling of potential tree roosts will be undertaken during the periods April – May or September – October as during this period bats are capable of flight and may avoid the risks from tree felling if proper measures are undertaken, but also are neither breeding nor in hibernation;
- Where trees are to be removed to facilitate construction and/or in the interest of health and safety, they will first be checked for the presence of bats by an appropriately qualified, experienced, and licensed professional. Confirmatory checks of trees will involve the investigation of all cavities with potential to host roosting bats. These checks will likely require access at height to the cavities, which may be facilitated with a mobile elevated working platform or through tree climbing with appropriate equipment. Cavities may be inspected with endoscope or torch, under licence from the NPWS;
- In the case that potential roost features are examined in trees during checks in advance of felling, but these features are too large to examine thoroughly, a series of surveys will be carried out to remove any doubt over the presence of roosting bats. The scope and number of surveys required will be determined by the scale, nature and location of the potential roost feature(s).
- In the case that potential roost features are examined and the surveyor is confident that bats are not using the feature as a roost, or where no bats are observed emerging from or returning

to roost in the tree following detector surveys, felling will take place immediately after the completion of surveys;

- Where bats are confirmed to use the tree as a roost, the local NPWS Conservation Ranger of the NPWS will be contacted, and a mitigation strategy will be prepared to facilitate an application for a derogation to legally remove the roost. The mitigation strategy will be prepared by an appropriately qualified, experience and licenced ecologist. The preparation of a mitigation strategy will ensure no significant effects on bats and may require compensatory measures for the replacement of the lost roost(s);
- Where remedial work (e.g. pruning of limbs) is to be undertaken to trees deemed to be suitable for bats, the affected sections of the tree will be checked by a bat specialist (using endoscope under a separate derogation licence held by that individual) for potential roost features before removal. For limbs containing potential roost features high in the tree canopy, this will necessitate the rigging and lowering of the limb to the ground (with the potential roost feature intact) for inspection by the bat specialist before it is cut up or mulched. If bats are found to be present, they will be removed by a bat specialist licenced to handle bats and released in the area in the evening following capture.

7.5.6 Construction Phase Mitigation – Measures To Protect Breeding Birds during Vegetation Clearance

Vegetation (*e.g.* hedgerows, trees, scrub and grassland) removal should be avoided where at all possible between the 1st March and the 31st August, to avoid direct impacts on nesting birds.

7.5.7 Construction Phase Mitigation – Measures To Protect Amphibians during Construction

Habitat Loss, Disturbance & Mortality Risk

If site clearance works are to begin during the season where frogspawn or tadpoles may be present (February – mid-summer) and will impact on the drainage ditches present around the margins of the proposed development site, a pre-construction survey will be undertaken to determine whether breeding common frogs are present.

Any frog spawn, tadpoles, juvenile or adult frogs present will be captured and removed from affected habitat by hand net and translocated to the nearest area of available suitable habitat, beyond the ZoI of the proposed development. Any capture and translocation works shall be undertaken immediately in advance of site clearance/construction works commencing.

7.5.8 Operational Phase Mitigation – Measures To Protect Surface Water Quality during Operation

The design maximises the use of sustainable urban drainage systems (SuDS) to minimise the impact on the surface water system. This is in compliance with the Greater Dublin Strategic Drainage Study (GDSDS) (DDS 2005). The storm water design of the proposed development is described in detail in Chapter 9 of this Environmental Impact Assessment Report, notes that storm waters will be discharged from the site at two outfall points: one at the eastern boundary toward the north of the proposed development site, and a second at the eastern boundary in the middle of the site. The storm water system include the provision of a hydro brake to limit the volume of discharge to the receiving drainage ditch to 1.24 l/s and 7.33 l/s, respectively. All storm water runoff from hard-standing areas will pass through a full retention oil separator. The proposed development site will include 6 no. full retention separators

In addition to the OCGT Generating Plant, the proposed development will include the provision of a water treatment plant on site which includes a deionising facility. This plant will include a raw water treatment tank of 2,262m^3 volume, to store water supplied by the Uisce Éireann mains supply, and a deionised (treated water) water storage tank with a maximum volume of 3,925m^3. This plant will also include a bunded storage area for hydrochloric acid and sodium hydroxide which are stored in Intermediate Bulk Carriers (IBCs). These chemicals will be used in the water treatment plant process for pH balancing of the processed waste water and will be appropriately bunded to minimise the impact of spills to the environment. A waste water storage tank (450m^3) will also be included. The water treatment plant will produce deionised water for use in a water injection

abatement system within the OCGT unit to minimise nitrogen oxide (NOx) air emissions during fuel combustion.

The agent responsible for the collection of the process and foul water effluent will be required to comply with the terms of their licence from the EPA and which will be subject to its own consent process requiring an appropriate assessment.

7.5.9 Operational Phase Mitigation – Measures To Protect Air Quality during Operation

The air dispersion models were calculated on the basis of the inclusion of air abatement measures, which are a requirement of the design of the Proposed Development. As such, they can be considered 'design measures' for the purposes of the Environmental Report and the NIS. From a practical point of view, it would not be a realistic scenario to model the air dispersion from the plant in the absence of the air abatement measures as in respect of licenced emissions by the EPA, the Proposed Development would not be consented nor constructed without their inclusion. Therefore, no additional mitigation measures are required for the protection of sensitive habitats and species.

Table 7.8: Summary of the Mitigation Measures

Mitigation Measures / KERs	7.5.1 Minimise habitat loss and vegetation impacts during construction	7.5.2 Replacement planting	7.5.3 Protect receiving surface water environment during construction	7.5.4 Measures to protect air quality during construction	7.5.5 Protect bats during vegetation clearance	7.5.5 Protect breeding birds during vegetation clearance	7.5.7 Protect amphibians during construction	7.5.8 Protect receiving surface water environment during operation	7.5.9 Protect air quality during operation
SAC/pNHA	-	-	✓	✓	-	-	-	✓	✓
Hedgerows (WL1)	✓	✓	-	✓	-	-	-	-	✓
Treelines (WL2)	✓	✓	-	✓	-	-	-	-	✓
Bats	✓	-	-		✓	-	-	-	-
Other mammal species	-	-	-		-	-	-	-	-
Breeding birds	✓	✓	-		-	✓	-	-	-
Wintering birds			✓					✓	
Fish (River Nanny downstream)	-	-	✓	✓	-	-	-	✓	✓
Common frog	-	-✓	✓		-	-	✓	✓	-

7.6 Cumulative Impacts

This section of the report presents the assessment carried out to examine whether any other Proposed Developments have the potential to act cumulatively with the Proposed Development to give rise to likely significant effects on biodiversity.
Much of the surrounding area is semi-rural in nature with the only other major developments likely to give rise to significant impacts on the receiving biodiversity being: an industrialised area 500m to the north-west of the site involving a quarry and cement plant (Irish Cement Ltd.); and, the Indaver Waste Energy Facility, 200m away from the Proposed Development.

Table 7.9 provides a pairwise in combination assessment of the proposed development with recently consented project in the locale.

Table 7.9 In combination assessment of Projects

Application Reference	Applicant for 'Other Development' and Brief Description	Decision	Conclusion regarding In combination effect Will the project act in combination with the Proposed Works to adversely affect the integrity of European sites?
ABP 307433	Alterations to waste-to-energy facility. The applications relate to minor changes to existing operations	Consented (with conditions) – 30/03/2022	No in combination effect. The proposed development must comply with all applicable planning and environmental approval requirements and be in accordance with the objectives and policies of the relevant land use plans (Development Plans.). These land use plans contain objectives and policies to ensure the protection of biodiversity. The proposed project was subject to planning consent. In granting permission for the proposed project, it would have been necessary to determine that the project will not result in adverse effects biodiversity, including from the impact pathway of surface water networks, either alone or in combination with the proposed development. The environmental protection policies included within the relevant land use plans, the range of mitigation measures included in the proposed works to avoid significant impacts and that alone the proposed works will not adversely affect biodiversity, the consented project will not act in combination with the proposed works to have an adverse effect on biodiversity. The consented Indaver project will not adversely affect the integrity biodiversity, in its own right, nor in combination with other projects, including the proposed works and has included mitigation in that regard to prevent any such adverse effects.
ABP 309308	20 year permission for a 13.5 hectare extension to existing Overburden Management Facility.	Consented (with conditions) – 08/07/2021	No in combination effect. The proposed development must comply with all applicable planning and environmental approval requirements and be in accordance with the objectives and policies of the relevant land use plans (Development Plans.). These land use plans contain objectives and policies to ensure the protection of biodiversity. The proposed project was subject to planning consent. In granting permission for the proposed project, it would have been necessary to determine that the project will not result in adverse effects on biodiversity, including from the impact pathway of surface water networks, either alone or in combination with the proposed development.

Application Reference	Applicant for 'Other Development' and Brief Description	Decision	Conclusion regarding In combination effect Will the project act in combination with the Proposed Works to adversely affect the integrity of European sites?
			There is no physical overlap between the proposed works and the consented Development. The environmental protection policies included within the relevant land use plans, the range of mitigation measures included in the proposed works to avoid significant impacts and that alone the proposed works will not adversely affect biodiversity, the consented development will not act in combination with the proposed works to have an adverse effect biodiversity. The consented development will not adversely affect biodiversity in its own right, nor in combination with other projects, including the proposed works at a single location along the railway viaduct and has included mitigation in that regard to prevent any such adverse effects.
ABP 303678	A 110kV Substation strategic infrastructure development adjacent to the proposed development site	Consented (with conditions) – 17/01/2020	No in combination effect. The proposed development must comply with all applicable planning and environmental approval requirements and be in accordance with the objectives and policies of the relevant land use plans (Development Plans.). These land use plans contain objectives and policies to ensure the protection of biodiversity. The proposed project was subject to planning consent. In granting permission for the proposed SID project, it would have been necessary to determine that the project will not result in adverse effects on biodiversity, including from the impact pathway of surface water networks, either alone or in combination with the proposed development. The proposed works and the consented SID are within the same site. The environmental protection policies included within the relevant land use plans, the range of mitigation measures included in the proposed works to avoid significant impacts and that alone the proposed works will not adversely affect biodiversity, the consented development will not act in combination with the proposed works to have an adverse effect on biodiversity. The consented SID will not adversely affect biodiversity in its own right, nor in combination with other projects, including the proposed works at a single location along the railway viaduct and has included mitigation in that regard to prevent any such adverse effects.

Application Reference	Applicant for 'Other Development' and Brief Description	Decision	Conclusion regarding In combination effect Will the project act in combination with the Proposed Works to adversely affect the integrity of European sites?
ABP 307433	Increase in annual total waste for treatment from currently permitted 235,000 tonnes to 250,000 tonnes, increase in annual amount of hazardous waste from currently permitted 10,000 tonnes to 25,000 tonnes, development of a aqueous waste tank farm, hydrogen generation unit, bottom ash storage building, development of a single storage warehouse, new concrete yard, weather canopy, demolition and rebuilding of an existing single storey modular office and ancillary site works.	Consented (with conditions) – 30/03/2022	No in combination effect. The proposed development must comply with all applicable planning and environmental approval requirements and be in accordance with the objectives and policies of the relevant land use plans (Development Plans.). These land use plans contain objectives and policies to ensure the protection of biodiversity. The proposed project was subject to planning consent. In granting permission for the proposed project, it would have been necessary to determine that the project will not result in adverse effects on biodiversity, including from the impact pathway of surface water networks, either alone or in combination with the proposed development. There is no physical overlap between the proposed works and the consented Development. The environmental protection policies included within the relevant land use plans, the range of mitigation measures included in the proposed works to avoid significant impacts and that alone the proposed works will not adversely affect biodiversity, the consented development will not act in combination with the proposed works to have an adverse effect biodiversity. The consented development will not adversely affect biodiversity, in its own right, nor in combination with other projects, including the proposed works at a single location along the railway viaduct and has included mitigation in that regard to prevent any such adverse effects.
ABP 310768	Continuation of the use and further quarrying of limestone within the site which was granted by Substitute Consent	Consented (with conditions) – 03/03/2023	No in combination effect. The proposed development must comply with all applicable planning and environmental approval requirements and be in accordance with the objectives and policies of the relevant land use plans (Development Plans.). These land use plans contain objectives and policies to ensure the protection of biodiversity. The proposed project was subject to planning consent. In granting permission for the proposed project, it would have been necessary to determine that the project will not result in adverse effects on biodiversity, including from the impact pathway of surface water networks, either alone or in combination with the proposed development.

Application Reference	Applicant for 'Other Development' and Brief Description	Decision	Conclusion regarding In combination effect Will the project act in combination with the Proposed Works to adversely affect the integrity of European sites?
			There is no physical overlap between the proposed works and the consented Development. The environmental protection policies included within the relevant land use plans, the range of mitigation measures included in the proposed works to avoid significant impacts and that alone the proposed works will not adversely affect the integrity of biodiversity, the consented development will not act in combination with the proposed works to have an adverse effect on biodiversity. The consented development will not adversely affect biodiversity in its own right, nor in combination with other projects, including the proposed works at a single location along the railway viaduct and has included mitigation in that regard to prevent any such adverse effects.

Theoretically, there is potential for any plans or projects within the River Nanny Catchment, to act cumulatively with the proposed development and affect water quality within the River Nanny catchment and the Nanny Estuary downstream. However, the mitigation measures outlined within Section 7.5 of this report, fully addresses potential impacts on water quality arising from the proposed development. As the proposed development will not negatively affect water quality on its own, there is no potential for it to act cumulatively with any other plans or projects to negatively affect the receiving aquatic environment within the zone of influence.
Cumulative effects arising from airborne emissions from the proposed development in conjunction with other plans or projects are discussed within Section 7.4.1 of this report, and in the NIS in relation to European sites. No likely significant cumulative effects on designated sites are predicted to occur. Impacts of air quality on NHAs and pNHAs, habitats and fauna are discussed within Section 7.4.2, Section 7.4.3, and Section 7.4.4, respectively. There will be no significant effects on any KERs either alone or cumulatively arising from the proposed development.

There are general overarching policies in the *Meath County Development Plan 2021-2027* to ensure that proposals for development integrate the protection, conservation and enhancement of biodiversity (Policy NH POL 1) and measures are promoted to protect biodiversity in the development management process by creating and improving habitats, where possible (Policy NH POL 2).

There are specific objectives and policies in the Meath County Development Plan 2021-2027 to protect biodiversity, and specifically European sites. Policies HER POL 32, HER POL 33 and HER POL 34 relate to the protection of European sites, the statutory requirement to undertake AA and commitments to prohibiting projects giving rise to adverse effects on the integrity of any European sites without demonstrating there are no alternatives, there are imperative reasons of overriding public interest, and undertaking all compensation measures necessary to ensure the overall coherence of the network of European sites. The Meath County Development Plan 2021-2027 also includes policies to protect (from risk of pollution), manage and enhance the counties' surface water and groundwater resources (INF 8, INF 13, INF 15, INF 16, INF 17).

Land use plans for the other proximal local authority, e.g. Fingal County Council (FCC 2023-2029), whose functional areas also include the River Nanny catchment, was also examined and analysed and that land use plan also includes protective environmental policies to protect biodiversity, designated sites for nature conservation and the receiving surface water environment.
Considering the predicted impacts associated with the proposed development, the mitigation measures proposed to protect the local biodiversity resource and the receiving environment, and the protective policies and objectives on the land-use plans that will direct future development locally, significant cumulative negative effects on biodiversity are not predicted.

7.7 Conclusions

The assessment, presented in the NIS, of the potential for the Proposed Development to impact upon European sites concluded that, with the implementation of the mitigation measures proposed, the Proposed Development does not pose a risk of adversely affecting (either directly or indirectly) the integrity of any European sites either alone or in combination with other plans or projects.

The effects on biodiversity in general are not significant. The Proposed Development has the potential to negatively affect the Laytown Dunes/Nanny Estuary pNHA (000554), which lies downstream of the Proposed Development, due to the potential for effects on the receiving aquatic environment during construction and operation. The Proposed Development also has the potential to affect aquatic habitats and fauna (e.g. birds, fish and amphibians) downstream of the Proposed Development as a result of hydrological impacts via the existing network of perimeter drainage ditches which drain to the Platin Stream and River Nanny downstream.

A comprehensive suite of mitigation will be implemented, in addition to the extensive and stringent environmental control measures that have been incorporated into the design of the Proposed Development. All of the mitigation measures will be implemented in full and are best practice, and tried and tested, effective control measures to protect biodiversity and the receiving environment.

Considering the elements included within the design of the Proposed Development (as described in the Project Description), and the implementation of the mitigation measures proposed in this Environmental Report and the associated planning application documents to avoid or minimise the effects of the Proposed Development on the receiving environment, no likely significant residual effects on biodiversity are predicted.

8 Noise and Vibration

8.1 Introduction

This Chapter assesses the impact of noise emissions and vibration from the Proposed Development on the existing environment. Baseline sound pressure levels of the area surrounding the site were measured and prediction modelling of the proposed on-site activity was carried out to determine the expected development emissions at the nearest noise sensitive locations during operations. The potential construction noise and vibration impacts have also been assessed. Based on these assessments, necessary mitigation measures will be implemented during the construction, operational and decommissioning phases, thereby avoiding any adverse impact or non-compliance in relation to noise emissions.

8.1.1 Effects of Noise

While the effects of noise are subjective, it can affect human receivers both behaviourally and physiologically. As described in Guidelines for Environmental Noise Impact Assessment (Institute of Environmental Management and Assessment, November 2014)[69], the behavioural affect can be described over three levels of increasing response:

1. Noise disturbance which causes distraction of physically interfering with human activity (speech interference, disruption of work, disruption of mental ability, sleep disturbance);
2. Noise disturbance can be experienced as annoyance (or an indirect response to the first level of physical disturbance) and;
3. Overt reaction (complaints).

8.1.2 Effects of Vibration

Vibration is a related issue that can also adversely affect people and structures in the vicinity of a vibration source. Humans can perceive vibration at levels of low magnitude, typically from 0.14mm/s to 0.3mm/s[70]. At vibration levels greater than this and similarly to noise, vibration can cause the same levels of response such as distraction, leading to annoyance and disturbance. Greater levels of vibration (a minimum of 15mm/s) are required to cause structural damage.

During the construction phase of the development, it is anticipated that there will be no rock breaking, but there may be piling. The requirement for piling will be confirmed during design development of the project. The potential impacts of piling activities during the construction phase have been assessed in this Chapter.

There will be no vibration associated with the operation of the proposed facility which could impact on the environment. On this basis, an assessment of potential vibration impacts during the operational phase is not considered relevant for inclusion.

8.2 Assessment Methodology

8.2.1 General

In order to assess the potential impact of noise from the Proposed Development on the surrounding area, sound pressure levels were assessed (either through measurement or prediction) for the following development stages:

– Pre-development Stage / Baseline Assessment – current sound pressure levels at nearby noise sensitive locations (NSLs)[71] were measured to provide background baseline data to which

[69] IEMA (2014). Guidelines for Environmental Noise Impact Assessment. Available at: https://www.iema.net/download-document/236678 [accessed May 2023]
[70] British Standards Institute (2014). British standard BS 5228-2: 2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites- Part 2: Vibration*
[71] Noise Sensitive Location (NSL) defined as "*any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or other area of high amenity which for its proper*

predicted future noise levels for the area can be compared. Baseline noise measurements were carried out on the 27th and 28th March 2023 during day, evening and night-time periods, in accordance with *EPA Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4) (2016)*[72] .

– Construction Stage – potential sound pressure levels and associated impacts arising from construction activities were considered, in order to develop sufficient noise mitigation measures for the construction phase.
– Operational Stage – sound pressure level emissions from future Site operations were predicted in order to assess the impact on the existing noise levels in the environment in terms of subjective impact. The model results were combined with the ambient baseline noise levels to assess the impact of the Proposed Development, and to determine appropriate mitigation measures as required.
– Decommissioning Stage – the potential impacts of the future decommissioning of the Proposed Development at the end of its lifetime has been assessed.

Measurement Parameters and Terminology

Sound pressure is measured in terms of decibels (dB). The various measurement parameters and noise terminology are defined below:

– **Decibel (dB)**

  Decibel (dB) is the standard unit for expressing the noise level (sound pressure level). It is calculated as a logarithm of the intensity of sound. It is derived from the logarithm of the ratio between the value of a quantity and a reference quantity. For sound pressure level the reference quantity is 20μPa which is the threshold of normal hearing and equates to 0dB. At the upper end of the scale 140dB is the threshold of pain.

– **Weighted Decibel (dB(A))**

  Decibels measured on a sound level meter incorporating a frequency weighting (A-weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. This takes account of the fact that the human ear has different sensitivities to sound at different frequencies.

– **L_{eq} (dB)**

  The equivalent continuous sound level – the sound pressure level of a steady sound having the same energy as a fluctuating sound over a specified measuring period. It can be considered similar to an average level. The L_{Aeq} value is the A-weighted L_{eq}.

– **L_{A90} and L_{A10} Values (dB(A))**

  The L_{A90} and L_{A10} values represent the A-weighted sound pressure levels exceeded for a percentage of the instrument measuring time. The L_{A90} represents the sound pressure level exceeded for 90% of the monitoring period and is a good indicator of the background noise level excluding peak noise events. L_{A10} indicates the sound pressure level exceeded for 10% of the monitoring period and is a good parameter for expressing event noise such as passing traffic.

– **L_{AMax} (dB(A))**

  The maximum instantaneous value recorded over the monitoring period including A-weighting.

– **$L_{Ar,T}$ (dB(A))**

  The Rated Noise Level, equal to the L_{Aeq} during a specified time interval (T), plus specified adjustments for tonal character and/or impulsiveness of the sound.

enjoyment requires the absence of noise at nuisance levels" (EPA Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4) (2016))

[72] EPA (2016). Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4). Available at: https://www.epa.ie/publications/monitoring--assessment/noise/NG4-Guidance-Note-(January-2016-Update).pdf (accessed January 2023)

– **Tonal Noise**

According to the EPA NG4 Guidance Note, Section 5.1, a tone can be objectively identified where the time-averaged sound pressure level in the one-third octave band of interest exceeds the time-averaged sound pressure levels of both adjacent one-third octave bands by a constant level difference.

The appropriate level differences vary with frequency. They should be greater than or equal to the following values in both adjacent one-third octave bands:

- 15dB in low-frequency one-third octave bands (25Hz to 125Hz);
- 8dB in middle-frequency one-third octave bands (160Hz to 400Hz), and;
- 5dB in high-frequency one-third octave bands (500Hz to 10,000Hz).

– **Impulsive Noise**

A noise that is of short duration (typically less than one second), the sound pressure level of which is significantly higher than the background e.g. hammer blow to metal sheet.

8.2.2 Assessment of Construction Phase Noise

There is no statutory legislation or guidance relating to the maximum permissible sound pressure level that may be generated during the construction phase of a project. Planning authorities typically control noise from construction activities by restricting hours of operation and may consider, at their discretion, the imposition of emission limits.

Best practice limits are available from the Transport Infrastructure Ireland (TII) publication (formerly the National Roads Authority) *Good Practice for the Treatment of Noise During the Planning of National Road Schemes* (March 2014) for permissible construction sound pressure levels at noise sensitive locations (NSLs) during construction of public road schemes. Table 8.1 states the maximum construction permissible levels at the façades of the nearest dwellings as per the TII guidelines.

Table 8.1: Maximum Permissible Construction Sound Levels at the Façade of Dwellings

Days	Times	Noise Levels (dB re. $2x10^{-5}$ Pa)	
		$L_{Aeq\ (1\ hr)}$	L_{Amax}
Monday to Friday	07.00-19.00	70	80
Monday to Friday	19.00-22.00*	60[1]	65[1]
Saturdays	08.00-16.30	65	75
Sundays and Bank Holidays	08.00-16.30	60[1]	65[1]

Note 1: Construction activity at these times, other than that required for emergency works, will normally require the explicit permission of the relevant local authority.

Additional guidance in relation to construction noise is available in Annex E of *BS 5228:1 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise+A1:2014* (British Standards Institute, 2014). Residential sound pressure threshold limits based upon ambient levels are described as the '*ABC method*'. Table 8.2 states these threshold limits, which if exceeded, represent a potential significant effect on the dwelling (receiver).

Table 8.2: BS 5228-1 Construction Threshold Limits

Assessment category & threshold value period	Threshold value, (dB $L_{Aeq,T}$)		
	Category A (1)	Category B (2)	Category C(3)
Night-time (23.00-07.00)	45	50	55
Evenings and weekends (Note 4)	55	60	65
Daytime (07.00-19.00) and Saturdays (07.00-13.00)	65	70	75

Note 1: Threshold values to use when ambient noise levels (rounded to nearest 5 dB) are less than these values

Note 2: Threshold values to use when ambient noise levels (rounded to nearest 5 dB) are the same as category A values

Note 3: Threshold values to use when ambient noise levels (rounded to nearest 5 dB) are higher than category A values

Note 4: 19.00-23.00 hrs weekdays, 13.00-23.00 hrs Saturday and 07.00-23.00 hrs Sundays

8.2.3 Assessment of Construction Phase Vibration

There are two types of vibration standards: those dealing with human perception/comfort and those dealing with cosmetic or structural damage to buildings. In both instances, the magnitude of vibration is expressed in terms of Peak Particle Velocity (PPV) in millimetres per second (mm/s).

British standard BS 5228-2: 2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites- Part 2: Vibration* (British Standards Institute, 2014) states that the threshold of human perception being typically in the range of 0.14 mm/s to 0.3 mm/s, with a vibration level of 1.0 mm/s in residential environments are likely to cause complaint. Beyond 10 mm/s, vibration is likely to be intolerable for any more than a brief exposure period.

BS 5228-2: 2009+A1:2014 also outlines transient vibration threshold criteria for cosmetic damage, which are shown in Table 8.3.

Table 8.3: Transient vibration guide values for cosmetic damage (BS 5228-2: 2009+A1:2014)

Type of Building	Peak component particle velocity in frequency range of predominant pulse[1]	
	4 Hz to 15 Hz	15 Hz and above
Reinforced or framed structures Industrial and heavy commercial buildings	50 mm/s at 4 Hz and above	50 mm/s at 4 Hz and above
Unreinforced or light framed structures Residential or light commercial type buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above

Note 1 Important buildings that are difficult to repair might require special consideration on a case-by-case basis

The TII guidelines (*Good Practice for the Treatment of Noise during the Planning of National Road Schemes*, 2014) recommend that vibration from road construction activities is limited to the values shown in Table 8.4 and that compliance with these limits should ensure there is little to no risk of cosmetic damage to buildings.

Table 8.4: Allowable vibration during road construction in order to minimise the risk of building damage

Allowable vibration velocity (Peak Particle Velocity) at the closest part of any sensitive property to the source of vibration, at a frequency of;		
Less than 10 Hz	**10 to 50 Hz**	**50 to 100 Hz (and above)**
8 mm/s	12.5 mm/s	20 mm/s

The sources of potential construction vibration were assessed based on the proposed construction methodologies and the distances to the nearest vibration sensitive receivers.

8.2.4 Assessment of Operational Phase Noise

Predicative Noise Modelling

The sound levels associated with proposed stationary external sources at the Site were predicted according to the International Standard ISO 9313-2: 1996 *Acoustics -Attenuation of sound outdoors-Part 2: General Method of Calculation* (ISO, 1996) using Brüel & Kjær *Predictor* software (Version V2023). The details of the predictive noise modelling that was carried out is included in a Predictive Noise Modelling and Impact Assessment Report in Attachment 2 of this Environmental Report.

Industrial Emission Licence Conditions

In order to negate the potential effects from noise, the EPA sets noise emission limits, for noise from EPA licensed sites[73] at boundary, noise sensitive locations or a combination of both. The limits expected to be applied to the Site at off-site noise sensitive locations as part of its Industrial Emission Licence are as follows:

- Daytime (07:00-19:00): 55dB(A) L_{Ar}
- Evening time (19:00-23:00): 50dB(A) L_{Ar}
- Night-time (23:00-07:00): 45dB(A) L_{Aeq}

The predicted levels are used for compliance analysis with the relevant sound level criteria specified in the EPA's 2016 *Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4).*

Guidelines for Noise Impact Assessment

The Guidelines for Noise Impact Assessment[74] (Institute of Environmental Management and Assessment (IEMA)) are generally recognised as established good practice standards for scope, content, and methodology of noise impact assessment.

These Guidelines address the key principles of noise impact assessment and are applicable to all development proposals where noise effects are likely to occur. These Guidelines state that for any assessment, the noise level threshold and significance should be determined by the assessor, based upon the specific evidence and likely subjective response to noise. An example impact scale offered by the IEMA guidelines is shown in Table 8.5.

[73] WHO (2000). Guidelines for Community Noise
[74] *Guidelines for Environmental Noise Impact Assessment* (Institute of Environmental Management and Assessment, November 2014)

Table 8.5: Example Impact Scale from the Change in Sound Levels (IEMA)

Long-term Classification	Short-term Classification	Sound level change dB L_{pAeqT} (positive or negative) T = either 16hr day or 8hr night
Negligible	Negligible	≥ 0 dB and < 1 dB
	Minor	≥ 1 dB and < 3 dB
Minor	Moderate	≥ 3 dB and < 5 dB
Moderate	Major	≥ 5 dB and < 10 dB
Major		≥ 10 dB

The criteria above reflect the key benchmarks that relate to human perception of sound. A change of 3 dB is generally considered to be the smallest change in environmental noise that is perceptible to the human ear under most normal conditions. A 10 dB change in noise represents a doubling or halving of the noise level. The difference between the minimum perceptible change and the doubling or halving of the noise level is split to provide greater definition to the assessment of changes in noise level.

To determine the overall noise impact, taking account of both the magnitude of noise increase and receptor sensitivity, indicative Noise Effects Descriptors are presented in Table 8.6.

Table 8.6: Noise Effect Descriptors (IEMA)

Magnitude	Sensitivity
Very Substantial	Greater than 10 dB L_{Aeq} change in sound level perceived at a receptor of great sensitivity to noise
Substantial	Greater than 5 dB L_{Aeq} change in sound level at a noise-sensitive receptor, or a 5 to 9.9 dB L_{Aeq} change in sound level at a receptor of great sensitivity to noise
Moderate	A 3 to 4.9 dB L_{Aeq} change in sound level at a sensitive or highly sensitive noise receptor, or a greater than 5 dB L_{Aeq} change in sound level at a receptor of some sensitivity
Slight	A 3 to 4.9 dB L_{Aeq} change in sound level at a receptor of some sensitivity
None/Not Significant	Less than 2.9 dB L_{Aeq} change in sound level and/or all receptors are of negligible sensitivity to noise or marginal to the zone of influence of the proposals

8.2.5 Assessment of Operational Phase Vibration

There are no expected sources of operational vibration from the Proposed Development.

8.2.6 Cumulative Impacts

In order to determine if there are any developments in the nearby area which have potential to cause a cumulative effect on noise emissions in the vicinity of the Proposed Development, a search was completed[75] on the Meath County Council (MCC) and An Bord Pleanála (ABP) websites for active planning applications yet to be determined and recently granted planning applications. The following applications and permissions have been reviewed as part of this noise impact assessment to determine their relevance for inclusion in a cumulative impact assessment with the Proposed Development, as they are considered to have the potential to cause noise emissions due to their nature, and have the potential to cause cumulative noise effects with the Proposed Development due to their proximity to the Proposed Development Site. All other recent developments in the area as

[75] A search of the MCC and ABP websites for active and recently granted planning applications was carried out in May 2023.

described in the Environmental Report which accompanies this planning application are considered to be a sufficient distance from the Proposed Development Site to rule out the potential for cumulative effects.

- Indaver (MCC Case Reference FS16071, FS16072, FS18022) - Alterations to waste-to-energy facility. The applications relate to minor changes to existing operations, and there are no details in relation to proposed noise emissions in the relevant planning applications.
- Irish Cement (ABP Case Reference PL17 .PA0050) to facilitate further replacement of fossil fuels with alternative fuels and allow for the introduction of alternative raw materials in the manufacturing of cement. The Environmental Impact Assessment (EIA) Report which was submitted to ABP states that there are no major new noise sources proposed as part of this development, and therefore no noise data associated with this development was provided in the Environmental Report and no detailed modelling or calculations were carried out.
- Irish Cement (ABP Case Reference PL17.309308) - 20 year permission for a 13.5 hectare extension to existing Overburden Management Facility. A detailed noise impact assessment was completed as part of the EIA Report submitted with the planning application which determined the potential for noise effects from the development on the surrounding environment.
- Irish Cement (MCC Case Reference 212417) - an extension to an existing bulk materials storage shed and ancillary site works. The cover letter accompanying this planning application stated that an EIA was not required to be submitted with the planning application, and no details in relation to potential noise emissions from the facility were provided with the application.
- Indaver (ABP Case Reference PA17.307433) – an extension of the facility to allow an increase in the waste treatment capacity of the site. A detailed noise impact assessment was completed as part of the EIA Report submitted with the planning application which determined the potential for noise effects from the development on the surrounding environment.

It is noted that SSE has permission for a 110kV Substation strategic infrastructure development adjacent to the Proposed Development Site (ABP Case Reference PL17.303678). The construction of the Substation is dependent on the receipt of planning permission for the Proposed Development for which this planning application relates. The construction and operational phases of the Substation will coincide with the construction and operational phases of the Proposed Development; therefore the Substation is being included in the main assessment of potential affects alongside the Proposed Development, and not part of the cumulative assessment.

For the reasons stated under each of the bullet points above, it is concluded that only the Irish Cement development (ABP Case Reference PL17.309308) and Indaver development (ABP Case Reference PA17.307433) need to be considered as part of an operational cumulative noise impact assessment with the Proposed Development to which this planning application relates.

In addition, the Proposed Development will be assessed with all other existing activities and developments in the area by combining the background noise monitoring results with the predicted noise impacts from the Proposed Development (see Section 8.5).

8.3 Receiving Environment

8.3.1 Existing Site

Much of the surrounding area is semi-rural in nature with an industrialised area to the north-west of the Site involving a quarry and cement plant approximately 500m away, and Indaver Waste to Energy Facility 200m away from the Proposed Development Site. The Paul Kavanagh Vehicle Test Centre is adjacent to the northern boundary of the Site. The ambient noise levels in the area are likely to be influenced by the existing industrial development and also road traffic noise from the nearby R152 regional road and the M1 motorway. Residential development in the vicinity of the Site is scattered, typical of a rural location. There is a cluster of houses located to the north and west of the Site consisting of three houses and a cluster of businesses immediately north, two houses on the northern side of the public road, two houses to the west and one farm to the South West of the Site. To the east one farm is present and to the southeast are two houses and a school.

The Site boundary for the purposes of the planning application, and surrounding environment are depicted in Figure 8.1.

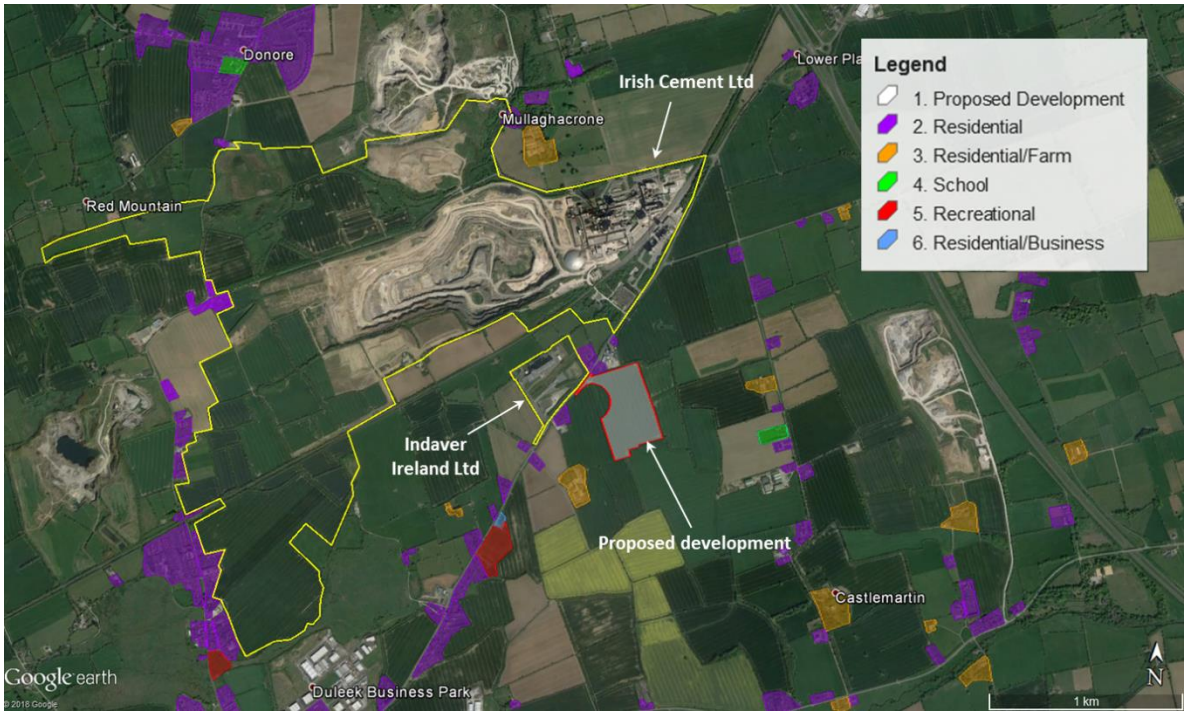


Figure 8.1: Site Boundary (shown with red edging around white area) and Surrounding Receptors (Base Map: Google Earth, Annotated by PM Group)

8.3.2 Baseline Noise Survey

The scope of the baseline noise survey was to establish the baseline environmental noise levels during the day, evening and at night at the six off-site noise sensitive locations (NSLs) as described in Table 8.7 and illustrated in Figure 8.2 (at the time of monitoring there was no access to NSL 6 which is a private farmyard).

Further details on the baseline noise survey are included in the Predictive Noise Modelling and Impact Assessment Report in Attachment 2 of this Environmental Report.

Table 8.7: Description of Noise Sensitive Locations

Noise Monitoring Point (NMP)	Location Description	Irish Grid Co-ordinates
NSL1	5m from the main road behind hedge/wall near a double storey residential dwelling house approx. 400m southwest from closest point of Site boundary.	306245E, 270489N
NSL2	7m from the main road at the side boundary of a field at the closest accessible point to a nearby single storey residential dwelling house within the proposed Site boundary.	306460E, 270809N
NSL3	Adjacent to northern Site boundary, a single storey residential dwelling house and the Paul Kavanagh Vehicle Test Centre.	306572E, 270917N

NSL4	Approx. 500m west of closest point of the Site boundary. 2m from the edge of the road at a gate 70m from a nearby double storey residential dwelling house.	307447E, 271021N
NSL5	Location on the edge of a main road between two double storey residential dwellings approx. 700m southeast of closest point of Site boundary.	307591E, 270534N
NSL6	To rear of residential property to the southwest approx. 200m from Site boundary **Note:** Noise monitoring was not undertaken at this location as access was not available. However this location is included in the assessment of operational noise impacts, with baseline noise levels for NSL1 used as best available representative information for NSL6.	306522E, 270381N

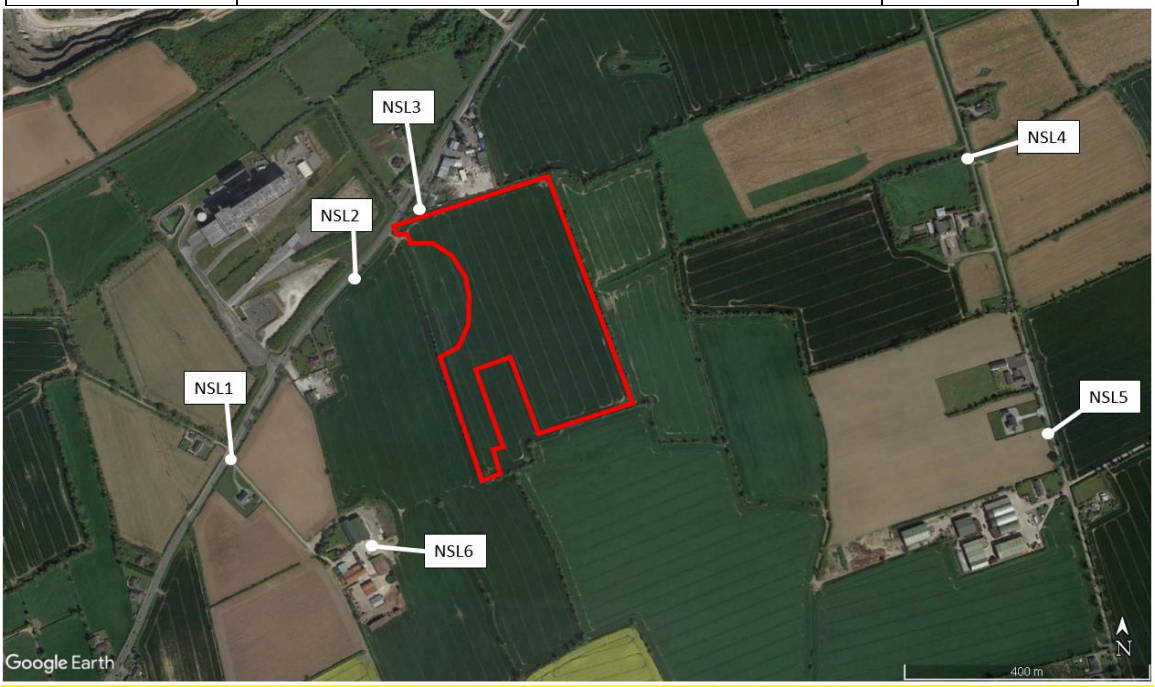


Figure 8.2: Proposed Development Site & Nearest Noise Sensitive Locations in the Vicinity (Annotated by PM Group)

A summary of the results of the baseline noise survey is included in Table 8.8. Further details on the results of the baseline noise survey are provided in Attachment 2 of this Environmental Report.

Table 8.8: Summary of Baseline Noise Survey

NSL	NSL Description	Average Daytime dB L_{Aeq} (dB L_{A90})	Average Evening Time dB L_{Aeq} (dB L_{A90})	Average Night-time dB L_{Aeq} (dB L_{A90})
NSL1	5m from the main road behind hedge/wall near a double storey residential dwelling house approx. 400m southwest from closest point of Site boundary.	79 (55)	75 (46)	65 (38)
NSL2	7m from the main road at the side boundary of a field at the closest accessible point to a nearby single storey residential dwelling house within the proposed Site boundary.	67 (48)	60 (43)	55 (37)
NSL3	Adjacent to northern Site boundary, a single storey residential dwelling house and the Paul Kavanagh Vehicle Test Centre.	64 (49)	58 (41)	55 (39)
NSL4	Approx. 500m west of closest point of the Site boundary. 2m from the edge of the road at a gate 70m from a nearby double storey residential dwelling house.	64 (45)	60 (44)	43 (40)
NSL5	Location on the edge of a main road between two double storey residential dwellings approx. 700m southeast of closest point of Site boundary.	64 (46)	62 (43)	52 (43)
NSL6*	To rear of residential property to the southwest approx. 200m from Site boundary	79 (55)	75 (46)	65 (38)

* Note: Noise monitoring was not undertaken at this location as access was not available. However this location is included in the assessment of operational noise impacts. It is assumed that the measurements at NSL1 will be the same at NSL6.

There were no tones identified in any of the measurements during any of the monitoring periods during the daytime, evening time or night-time surveys. In addition, there was no impulsive noise observed during any of the monitoring periods during the daytime, evening time or night-time surveys.

8.4 Construction Impacts and Mitigation

8.4.1 Construction Noise

The construction of the Proposed Development will involve the use of heavy vehicles and construction equipment including trucks, excavators, drills, piling equipment, etc., all of which will generate noise which could impact on residential dwellings or other noise sensitive locations in the immediate vicinity.

The construction of the Proposed Development and the approved Substation strategic infrastructure development adjacent to the Proposed Development Site (ABP Case Reference PL17.303678) will be carried out concurrently.

Further details on the predicted sound pressure levels from the plant and equipment expected to be used during the construction phase are provided in the Predictive Noise Modelling and Impact Assessment Report in Attachment 2 of this Environmental Report.

During the construction phase of the Proposed Development, every effort will be made to minimise the impact of construction noise on noise sensitive receptors. The Best Practice limits as outlined in Section 8.2.2 of this report will be adhered to at all times during the construction phase.

Throughout the entire construction phase, reference will be made to *BS 5228-1:2009+A1:2014: Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise*. In particular, the following practices will be adopted during the construction phase and included in the Construction Environmental Management Plan for the Proposed Development;

– Control of Working Hours – Normal construction hours will be Monday to Friday 10 hours a day (08:00-18:00) with extended periods under stricter noise limits to 21:00hrs when required and approved, and a half day on Saturdays (08:00hrs-15:00hrs).

– Limiting the hours during which site activities that are likely to create high levels of noise or vibration are permitted.

– Channels of communication will be established between the Contractor / Developer, Local Authority, and residents.

– A site representative will be appointed who will be responsible for matters relating to noise.

– Noise levels will be monitored during critical periods and at sensitive locations.

Furthermore, following noise control measures will be employed:

– Selection of plant with low inherent potential for generation of noise and/or vibration;

– All construction equipment used will comply with the relevant regulations on plant and equipment noise, namely the *European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations, 1988 (SI No. 320 of 1988) as amended (SI No. 359 of 1996)* and the *European Communities (Noise Emission by Equipment of Use Outdoors) Regulations, 2001 (SI No. 632 of 2001), as amended (SI No. 241 of 2006)*;

– All plant and equipment will undergo regular maintenance in accordance with manufacturer recommendations, be switched off if not in use, and be appropriately fitted with silencers or contained in acoustic enclosures as necessary;

– Minimisation of impulsive noise sources and activities, including reduction of material drop heights, minimising hammering activities together with regular checks during impulsive noise generating activities at the nearest noise sensitive locations such as the national schools and the nearest residential properties;

– Erection of barriers as necessary around noisy processes and items such as generators, heavy mechanical plant or high duty compressors;

– Keeping all Site access roads even so as to mitigate the potential for vibration from lorries.

In summary, construction noise will be generated for a limited period (ca. 30 months) during the construction phase of the proposed development. The level of construction noise during the

daytime will be minimised as much as practicable to limit the impact on ambient noise levels and noise sensitive receptors (e.g. residential dwellings) in the vicinity. It is not anticipated that any night working will be required, but if it is necessary it will be kept to a minimum, and managed to ensure that noise levels do not significantly impact on nearby noise sensitive receptors.

Cumulative Impacts

There will be a potential for adverse cumulative impacts should there be an overlap of the construction phases of the permitted Irish Cement development (ABP Case Ref. PL17.309308), the permitted Indaver development (ABP Case Ref. PA17.307433), and the Proposed Development (and the approved SSE substation development (ABP Case Reference PL17.303678) which will be constructed at the same time as the Proposed Development for which this planning application relates); however this will be temporary to short-term in duration. Given the temporary or short-term nature of these impacts, they are considered to be potentially significant but temporary to short-term. However these will be mitigated to a moderate level by implementation of good construction Site practices as outlined above.

8.4.2 Construction Vibration

Ground improvement and foundation works will be required with piling in the south-eastern corner of the Proposed Development Site for the OCGT units, tanks, buildings, etc. No rock breaking is proposed as part of the construction works. The piling activities are commonly attributed sources of construction ground-borne vibration with the possibility of vibration being felt off-site at sensitive receivers.

For this project, rotary-bored piling or driven piling is proposed. The type of piling to be carried out will be confirmed during design development.

The closest sensitive receptor to any of the proposed piling works will be ca. 200m (refer to Table 8.5 – NSL3 to the north of the Site).

Reference has been made to historic case data for rotary-bored piling included in Annex D of BS 5228-2: 2009+A1:2014 to determine what levels of vibration may be felt at the nearest sensitive locations. The furthest distance from piling works for which vibration data is provided in Table D.6 of the BS standard is a vibration of 0.03 mm/s at a distance of 30m, which is well below the level of vibration detectable by humans of 0.14-0.3 mm/s (refer to Section 8.2.3 of this Environmental Report).

Reference has also been made to historic case data for driven piling included in Annex D of BS 5228-2: 2009+A1:2014 to determine what levels of vibration may be felt at the nearest sensitive locations should driven piling be required. According to Table D.5 of the BS Standard, the vibration measured at a distance of 30m from driven piling in fills/gravel/clay was 0.8mm/s. Based on this data it is expected that the vibration levels at the nearest receptors (minimum 200m from piling activities) will be below the level of vibration detectable by humans of 0.14-0.3 mm/s (refer to Section 8.2.3 of this Environmental Report).

Given the type of piling being proposed for the Proposed Development, together with the distances to the sensitive receivers from the proposed piling works, the vibration causing aspects of bored piling will be insignificant and the piling activities will be imperceptible at sensitive locations.

Cumulative Impacts

Given that the potential vibration effects of the Proposed Development will be imperceptible at sensitive locations, there is no potential for cumulative construction vibration impacts with the other developments listed in Section 8.2.6 of this Environmental Report.

8.5 Operational Impacts and Mitigation

8.5.1 Operational Noise - Potential Impacts

There will be a number of noise generating equipment items and activities associated with the operation of the Proposed Development, as shown in Figure 8.3.

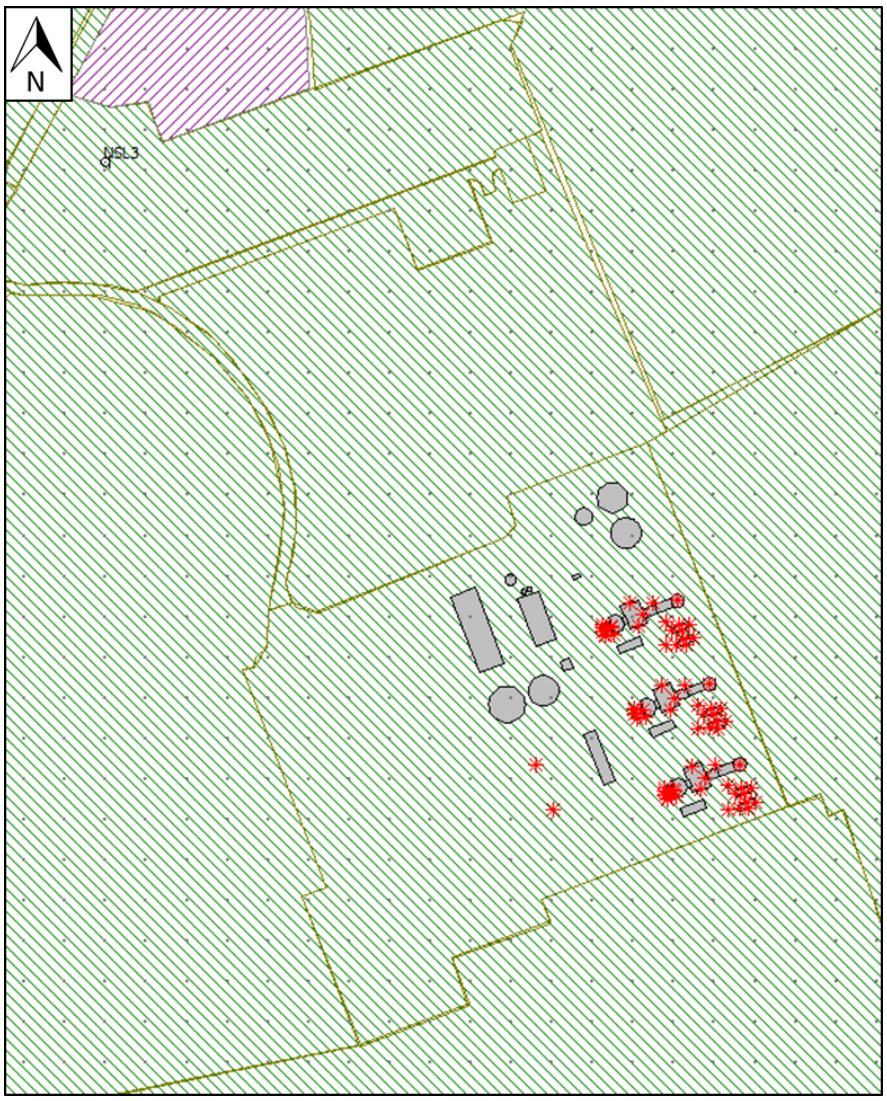


Figure 8.3: Predictive Noise Model with 3 no. OCGT Units located in the South-Eastern Corner of the Site

An assessment was carried out modelling the predicted operational sound pressure levels at the nearest noise sensitive locations where the baseline noise survey was carried out (see Figure 8.2).

The sound levels associated with proposed stationary external sources at the Site were predicted according to the International Standard ISO 9313-2: 1996 *Acoustics -Attenuation of sound outdoors-Part 2: General Method of Calculation* (ISO, 1996) using Brüel & Kjær Predictor software (Version V2023). Details of the noise levels from the plant associated with the Proposed Development are provided in the Predictive Noise Modelling and Impact Assessment Report in Attachment 2 of this Environmental Report.

As mentioned previously, SSE has planning permission for a 110kV Substation strategic development infrastructure development adjacent to the Proposed Development Site (ABP Case Reference PL17.303678). The Environmental Report which was submitted as part of the planning application states that there are no major new operational noise sources proposed as part of this development; therefore there was no requirement to add noise sources to the assessment for the Proposed Development for which this planning application relates to account for the Substation development.

The maximum predicted contribution from the operational phase of the Proposed Development at the NSLs under consideration in this assessment is presented in Table 8.9. A contour plot of the contribution from the Proposed Development is provided in Figure 8.4.

Table 8.9: Maximum Predicted Contribution from the Proposed Development at the NSLs (Day, Evening and Night-time Operation)

Noise Sensitive Location (NSL)	Maximum Predicted Contribution at NSL (dB(A))
NSL1 (at 1.5m)	40
NSL1 (at 4m)	42
NSL2 (at 1.5m)	42
NSL3 (at 1.5m)	44
NSL4 (at 1.5m)	38
NSL4 (at 4m)	40
NSL5 (at 1.5m)	35
NSL5 (at 4m)	37
NSL6 (at 1.5m)	44
NSL6 (at 4m)	45

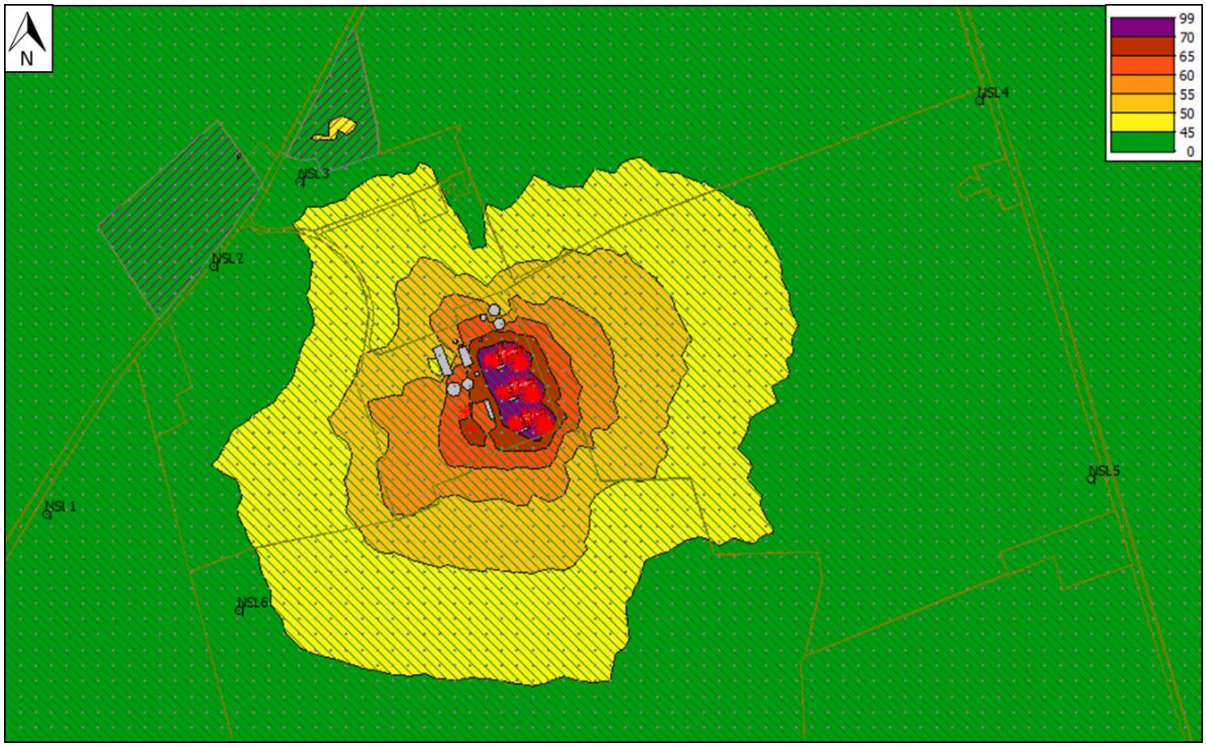


Figure 8.4: Predicted Noise Contour Plot for the Proposed Noise Sources Associated with Proposed Development at a Receptor Height of 1.5m

As can be seen from Table 8.9, the maximum sound pressure level predicted at the NSLs included in this assessment for the Proposed Development comply with the most stringent limit expected to be included in the Site's Industrial Emissions Licence of 45 dB(A) at night-time. As discussed previously the IE Licence limits are set by the EPA in order to negate the potential effects from noise.

It is further noted that there is a very low possibility of the facility operating at night (i.e. between the hours of 23.00 and 07.00) as these hours are outside peak electricity demand periods.

8.5.2 Operational Noise - Cumulative Impacts

As described in Section 8.2.6, detailed noise impact assessments were completed as part of the EIA Reports (EIAR) submitted for the Irish Cement planning application (ABP Case Reference PL17.309308)[76], and the Indaver planning application (ABP Case Reference PA17.307433)[77]. A review of these EIARs has been completed, and the cumulative impacts of these developments with the Proposed Development to which this planning application relates has been completed

Full details of the Cumulative Impact Assessment are provided in the Predictive Noise Modelling and Impact Assessment Report in Attachment 2 of this Environmental Report, while the following is a summary of the results of the Cumulative Impact Assessment.

– **Daytime -** The Proposed Development is not predicted to cause an increase in noise levels at any NSL when operational during the daytime period. It is noted that nearly all operational periods will occur during daytime hours (07.00-19.00) as peak demand periods generally occur within daytime hours.

[76] Brady Shipman Martin (Nov 2020). Proposed Extension to Platin Overburden Management Facility (OBMF) Environmental Impact Assessment Report (EIAR) Volume 2. Available at: https://www.eplanning.ie/MeathCC/AppFileRefDetails/lb201629/0 [accessed May 2023]

[77] Arup (2020). Meath Waste-to-Energy Site Sustainability Project 2020 - Environmental Impact Assessment Report Vol 2: Main Text. Available at: https://www.pleanala.ie/en-ie/case/307433 [accessed June 2023]

A small amount of additional noise will be generated on Site periodically during the day as a result of site activity, delivery vehicles etc. However the existing daytime noise levels at the nearest NSLs are far in excess of the predicted contribution from the fixed plant (at least 20 dB(A)). Therefore any small increase in noise levels from general site activity will not be perceptible. No out of hours activities (e.g. tanker deliveries, heavy maintenance) with a potential noise impact will be undertaken at the facility.

– **Evening Time -** The Proposed Development is not predicted to cause an increase in noise levels at any NSL when operational during the evening time period (19.00-23.00).
– **Night-time -** Slight increases in noise levels are predicted at NSL4 in the night-time period (23.00-07.00), however with reference to Tables 8.5 and 8.6, it is considered that these increases will not be significant and will represent a negligible change.

It is further noted that there is a very low possibility of the facility operating at night (i.e. between the hours of 23.00 and 07.00) as these hours are outside peak electricity demand periods.

8.5.3 Operational Vibration – Potential Impacts

There are no expected sources of operational vibration from the Proposed Development; therefore there is no potential for off-site impacts, when the Proposed Development is assessed alone, or cumulatively with other developments in the area.

8.5.4 Mitigation Measures

An Industrial Emissions Licence application will be submitted to the EPA following the granting of planning permission. This licence will be granted prior to operation of the OGCT Generating Plant. The Site will then be governed by the conditions set out in this licence which will include noise emission limits and noise monitoring requirements.

The following mitigation measures will be implemented:

– Design, procurement and installation of new equipment to relevant industry standards (IS, EN etc.);
– Specification of maximum noise limit criteria for new equipment in procurement contracts to ensure that the sound pressure levels predicted by this assessment will be met at NLSs, including the absence of tonal/impulsive components in external equipment;
– Inspection and maintenance of equipment as part of preventive maintenance programme to ensure continued normal operation and minimise any noise issues occurring;
– Restricting any specific noisy activities which could impact on ambient noise levels (e.g. heavy goods deliveries, heavy maintenance) to daytime hours only;
– Periodic noise monitoring will be carried out in accordance with the Site's Industrial Emissions Licence, when granted.

8.6 Decommissioning Impacts and Mitigation

The decommissioning phase was not assessed as part of the predictive operational phase noise model. The impacts expected and mitigation measures required in the decommissioning phase are expected to be similar to those of the construction phase. In the event of the Proposed Development being decommissioned at the end of its operational lifetime (expected to be ca. 20 years), a designated Decommissioning Management Plan will be developed which will outline mitigation measures appropriate to the works required and best practice guidance at the time of decommissioning, inclusive of a noise model.

8.7 Conclusions

With the employment of the mitigation measures as detailed above for operational phase, and given the temporary nature and mitigation measures detailed for the construction phase, it is not expected that the Proposed Development will have any significant adverse residual impact on the local environment during the construction or operational phases.

9 Water and Waste Water

9.1 Introduction

This chapter assesses and evaluates the potential impacts of the proposed development on the surrounding water environment. This chapter should be read in conjunction with the Description of the Proposed Development (Chapter 2), Land and Soils (Chapter 6) and Biodiversity (Chapter 7) of this report.

The potential impacts of the construction and operational phases of the development on surface water quality are assessed and mitigation measures are outlined to eliminate / minimise any significant impacts.

9.2 Assessment Methodology

This assessment has been carried out in accordance with the following legislation, guidance and information sources:

- EU Water Framework Directive 2000/60/EC
- (S.I. No. 722 of 2003) European Communities (Water Policy) Regulations 2003;
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (Environmental Protection Agency (EPA)), 2022);
- Advice Notes on Current Practice (in the Preparation of Environmental Impact Statements) (EPA), 2003
- River Basin Management Plan for Ireland 2018 – 2021, (2018); (Note: the Draft River Basin Management Plan for Ireland 2022-2027 is available, the official River Basin Management Plan for Ireland has not yet been published as of 20th June 2023);
- Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors' (Construction Industry Research and Information Association (CIRIA) 532, (2001);
- The Sustainable Urban Drainage Systems (SUDS) Manual, CIRIA 697 (2007);
- Guidelines on protection of fisheries during construction works in and adjacent to waters, Inland Fisheries Ireland, 2016;
- Current EPA online database - EPA Geoportal (http://gis.epa.ie/);
- Latest EPA (2022) Mapping & Envision water quality monitoring data for watercourses in the area;
- The Planning System and Flood Risk Management, Guidelines for Planning Authorities (Department of the Environment, Heritage and Local Government (DoEHLG) and the Office of Public Works (OPW 2009);
- Flood plans and flood maps – OPW floods website (www.floodinfo.ie);
- Geological Survey of Ireland (GSI) - on-line mapping (www.gsi.ie); Ordnance Survey Ireland - aerial photographs and historical mapping

9.2.1 River Nanny

The site is located within the Nanny-Delvin river basin catchment (EPA Catchment Code 08) which includes the area drained by the Rivers Nanny and Delvin. The main hydrological feature in the vicinity of the site is the River Nanny.

The River Nanny (River Water Body (RWB) code Meath_050) flows in an easterly direction approx. 1.5km south of the site. The River Nanny drains approximately 182km[78] and rises in the east of County Meath near Navan before flowing through Duleek to discharge into the Irish Sea at Laytown, a distance of 10.8 km from the proposed development.

Figure 9.1 shows;

[78] O'Loughlin, Fiachra & Bruen, Michael & Wagener, Thorsten. (2013). Parameter sensitivity of a watershed-scale flood forecasting model as a function of modelling time-step. Hydrology Research. 44. 334. 10.2166/nh.2012.157.

a) The location of the subject site in relation to the River Nanny
b) Drainage pathway from the subject site to the River Nanny
c) EPA Monitoring locations

The EPA monitors the water quality of the River Nanny at a number of locations as follows:

– (Station Code - 0400) Upstream Br. Duleek (X:305047 Y:268344) – (Map Location ML1)
– (Station Code - 0500) Br. NE of Bellewstown House (X:307323 Y:269156) - (Map Location ML2)
– (Station Code - 0550) Upstream Beaumont Bridge (X:307974 Y:269238) - (Map Location ML3)
– (Station Code - 0600) Beaumont Bridge (X:308592 Y:269623) - (Map Location ML4)

The most recent EPA EU Water Framework Directive 2000/60/EC data available for the River Nanny is from the year 2020 and is available on the EPA Maps[79]. The River Nanny is the only river in the same catchment as the proposed development, as identified on the EPA Maps. The EPA Maps indicate the overall river water quality status of the River Nanny for the 2016-2021 monitoring is "Poor". The river water quality status is based on the least status for the six water quality elements monitored (fish, general physic-chemical, hydromorphology, macroinvertebrates-margaratifera and plants).

The River Nanny is described by the EPA as unsatisfactory along the entire length surveyed. The nearest monitoring locations to the discharge location are described as 'Poor' (Q3) to 'Moderate' (Q3-4) based and slight to moderately polluted. The River Nanny waterbody has been assigned an 'At Risk' status as a river at risk of not achieving Good water quality status in the future, under the Water Framework Directive monitoring programme. Table 9.1 states the historical Q ratings of the River Nanny at these locations from 1991 – 2020.

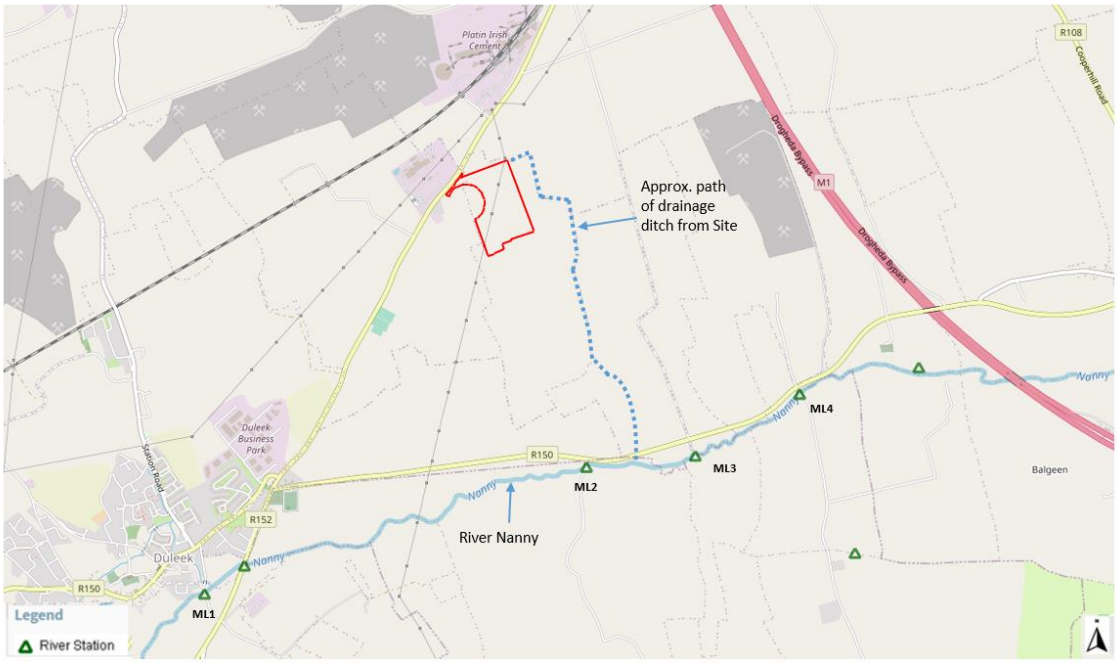


Figure 9.1: Site Proximity – Nanny River and EPA Monitoring Locations (Source: EPA Maps, annotated by PM Group)

[79] (2023) EPA Maps https://gis.epa.ie/EPAMaps/, accessed 20th June 2023

Table 9.1: River Nanny Biological Quality Ratings (EPA, 2020)

	Biological Quality Rating (Q Values)											
EPA ML	Station	Year										
		1991	1996	1998	2001	2005	2008	2010	2014	2017	2018	2020
ML1	0400	3	-	-	-	-	-	-	-	-	-	-
ML2	0500	3-4	3	3-4	3-4	3-4	3	3-4	3-4	3-4	3-4	3
ML3	0550	-	-	-	-	-	-	-	3	3	3	3
Ml4	0600	-	-	-	-	-	-	-	3	3	-	-

9.2.2 Chemical Analysis of Surface Water

Chemical and physical water quality analysis of the River Nanny was completed circa 400m upstream (ML2) and circa 275m downstream (ML3) (see Figure 9.1) of the entry point of the drainage ditch from the Platin site to the River Nanny in August 2018 by the EPA. The sampling locations are upstream and downstream from the Irish Cement discharge point into the River Nanny. The results of the analysis are presented in Table 9.2. The results were compared to EPA surface water standards 2001[80] and European surface water standards 2013[81] where available.

The tables below show very little difference in the upstream and downstream results, demonstrating consistency between sample events. Trace levels of Total Petroleum Hydrocarbons (TPH) were detected both upstream and downstream of the site. The presence of TPH is most likely due to the River Nanny drains both urban areas and public roads. The closest petrol station is based in Duleek approximately 2.7km away. The concentration of other parameters were similar or below guideline values.

Table 9.2: Surface Water Monitoring

Sample no.	Units	888529	888530	Environmental Guideline Value	Environmental Guideline Source
Sample Date		22/08/2018	22/08/2018	N/A	N/A
Sample ID		SW1 (ML2)	SW2 (ML3)	N/A	N/A
Sampling Point Relative to Discharge Point		Approx. 400m Upstream	Approx. 275m Downstream	N/A	N/A
BOD	mg/l	<1	<1	1.5 (Good Status)	S.I. 272 of 2009
TON as N	mg/l	3.06	3.03	2.0	EPA (2001)
pH	pH Units	8.0	7.9	6.0 – 9.0	S.I. 272 of 2009
Copper, total	ug/l	<1	<1	5 / 30	S.I. 272 of 2009
Dissolved Oxygen (%)	%Sat	68.1	71.3	N/A	N/A
Cyanide, total low level (non-potable waters)	ug/l	<0.009	<0.009	10	S.I. 272 of 2009
Sulphate	mg/l	31.3	32	200	EPA (2001)
Chromium hexavalent	mg/l	<0.003	<0.003	0.05	S.I. 272 of 2009

[80] EPA (2001). Parameters of Water Quality ''Interpretation and Standards''.
[81] European Communities Directive 2013/39/EU. Directive 2013/39/EU updated the EQSs for seven of the 33 original priority substances, in line with the latest scientific and technical knowledge concerning the properties of those substances.
The revised EQSs for those seven existing priority substances had to be taken into account for the first time in Member States' river basin management plans from 22 December 2015, with the aim of achieving good surface-water chemical status for those substances by 22 December 2021.

Sample no.	Units	888529	888530	Environmental Guideline Value	Environmental Guideline Source
in water					
Ammonia as N	mg/l	0.033	0.078	0.065	S.I. 272 of 2009
Arsenic, total	ug/l	1	1	25	S.I. 272 of 2009
Zinc, total	ug/l	<5	<5	40	S.I. 272 of 2009
Nickel, total	ug/l	1	1	20	S.I. 272 of 2009
Lead, total	ug/l	<0.5	<0.5	7.2	S.I. 272 of 2009
Cadmium, total	ug/l	<0.5	<0.5	≤0.08 – 0.25	S.I. 272 of 2009
BTEX (Benzene, Toluene, Ethylbenzene, m,p- & o-Xyl	ug/l	<10	<10	N/A	N/A
Pyrene	ug/l	<0.05	<0.05	N/A	N/A
Benzo(a)pyrene (SW)	ug/l	<0.01	0.02	0.05	S.I. 272 of 2009
Benzo(b)fluoranthene	ug/l	<0.01	<0.01	∑=0.03	S.I. 272 of 2009
Benzo(k)fluoranthene	ug/l	<0.01	<0.01		
Acenaphthylene	ug/l	<0.05	<0.05	N/A	N/A
Indeno(1,2,3-cd)pyrene	ug/l	<0.01	<0.01	∑=0.02	S.I. 272 of 2009
Benzo(g,h,i)perylene	ug/l	<0.01	0.06		
Naphtalene	ug/l	<0.05	<0.05	2.4	S.I. 272 of 2009
Acenaphthene	ug/l	<0.05	<0.05	N/A	N/A
Fluorene	ug/l	<0.01	<0.01	N/A	N/A
Phenanthrene	ug/l	<0.05	<0.05	N/A	N/A
Anthracene	ug/l	<0.01	<0.01	0.1	S.I. 272 of 2009
Fluoranthene	ug/l	<0.01	<0.01	0.1	S.I. 272 of 2009
Benzo(a)anthracene	ug/l	<0.01	<0.01	N/A	N/A
Chrysene	ug/l	<0.01	<0.01	N/A	N/A
Dibenzo(a,h)anthracene	ug/l	<0.01	0.04	N/A	N/A
DIN (TON as N + Ammonia as N)	mg/l	3.09	3.11	N/A	N/A
Boron, total (mg/l)	mg/l	0.018	0.020	N/A	N/A
Chromium III	mg/l	<0.003	<0.003	00.047	S.I. 272 of 2009
Phenols suite for waters RL: 1- 5ug/l	ug/l	<5.00	<5.00	8.0	S.I. 272 of 2009
Molybdate Reactive Phosphorus (MRP unfiltered) as PO4-P	mg/l	0.038	0.043	≤0.045	S.I. 272 of 2009
Fluoride by IC	mg/l	<0.2	<0.2	0.5	S.I. 272 of 2009
TPH (>C5 - C44) by GC-FID	ug/l	115	93	N/A	N/A
Mercury, total (in water)	ug/l	<0.01	<0.01	0.05	S.I. 272 of 2009
Temperature (Field Measurement)	°C	16.1	16.5	N/A	N/A

9.2.3 Recent Ecological Study of the River Nanny

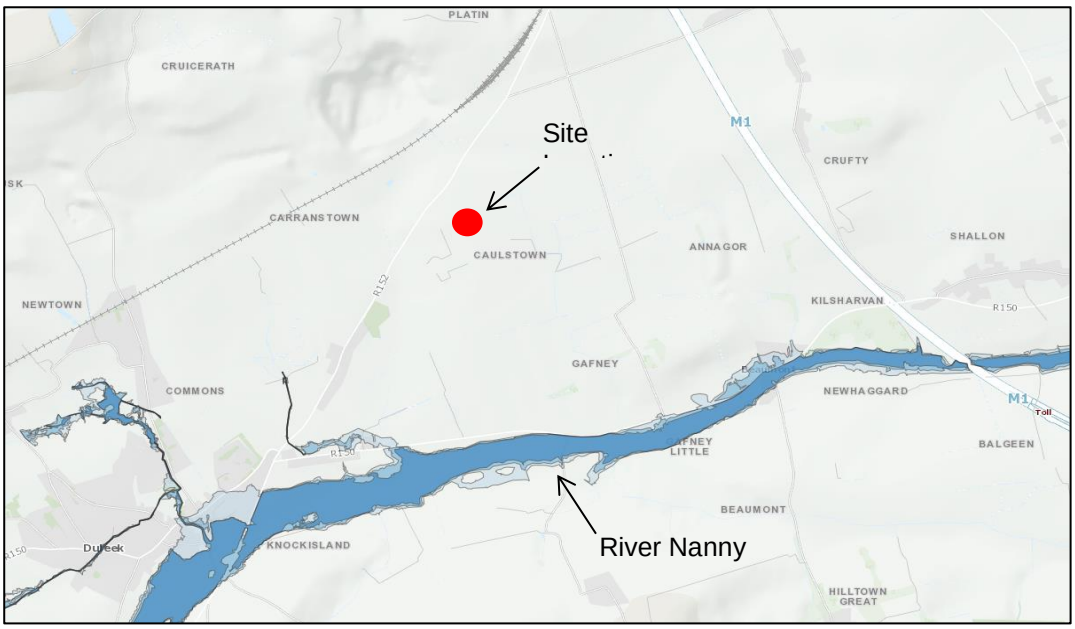
Irish Cement undertook an ecological and sediment survey upstream and downstream of their discharge point in the River Nanny as part of a planning application submitted in 2017[82]. The survey monitored three locations upstream and three locations downstream of the Irish Cement discharge point and Platin site drainage ditch entry point to the River Nanny. All monitoring locations were classified as Q3-4 of moderate water quality status. The study identified the problems in the River Nanny are of high nutrient concentration (Phosphorus, Ammonia, issues with level of oxygen in water) resulting in low ecological rating. The causes of these pressures have been identified as agriculture, waste water and industrial discharges, and septic tanks. The diversity and abundance levels of macroinvertebrates recorded at all sites were considered to be typical of an organically polluted lowland Irish river.

In the 3rd Cycle Draft Nanny Delvin Catchment Report published by the Catchment Science & Management Unit of the EPA published in 2021[83], the main significant issues are impacts from nutrient pollution, followed by organic pollution, morphological impacts and sediment issues. The main significant pressures are agricultural pressures followed by hydromorphological pressures urban waste water, domestic waste water and urban run-off.

Within the vicinity of the site, morphological issues are impacting 2 waterbodies (Nanny (Meath)_040 & Nanny (Meath)_050). Agriculture is also a significant pressure point for Nanny (Meath)_040and Nanny (Meath)_050.

9.2.4 Flooding Risk

During the design phase of the proposed development the potential for pluvial and fluvial flooding was considered and the flood maps available of www.floodinfo.ie was reviewed. Figure 9.2 depicts the River Nanny flood potential in the vicinity of the site. The southern edge of the site is approx. 1.4km north of the River Nanny and at an elevation approx. 15m above the ground level at the river and is therefore not subject to Fluvial flooding from this source.



[82] EIS Irish Cement Planning Application to ABP 2017 - Development for further replacement of Fossil Fuel with Alternative Fuels and for use of Alternative Raw Materials

[83] (2021) EPA Catchment Science & Management Unit, 3rd Cycle Draft Nanny Delvin Catchment Report, https://catchments.ie/wp-content/files/catchmentassessments/08%20Nanny-Delvin%20Catchment%20Summary%20WFD%20Cycle%203.pdf (Accessed 20th June 2023)

Figure 9.2: Flood Risk Map for Environs of the Site (taken from www.floodinfo.ie/map/floodmaps/ - accessed 20th June 2023 and annotated by PM Group)

Slight pluvial flooding occurs along part of the eastern boundary of the site as indicated by the Draft OPW Flood mapping (as shown in Figure 9.3 below). Notwithstanding this, no past flood event, comprising either a single flood event or recurring flood event, has been recorded on the site according to the OPW Flood Maps website (http://www.floodinfo.ie/map/floodmaps/). In addition to this, the structural and key features of the proposed development are situated outside the area subject to pluvial flooding risk which is located to the eastern boundary of the site.

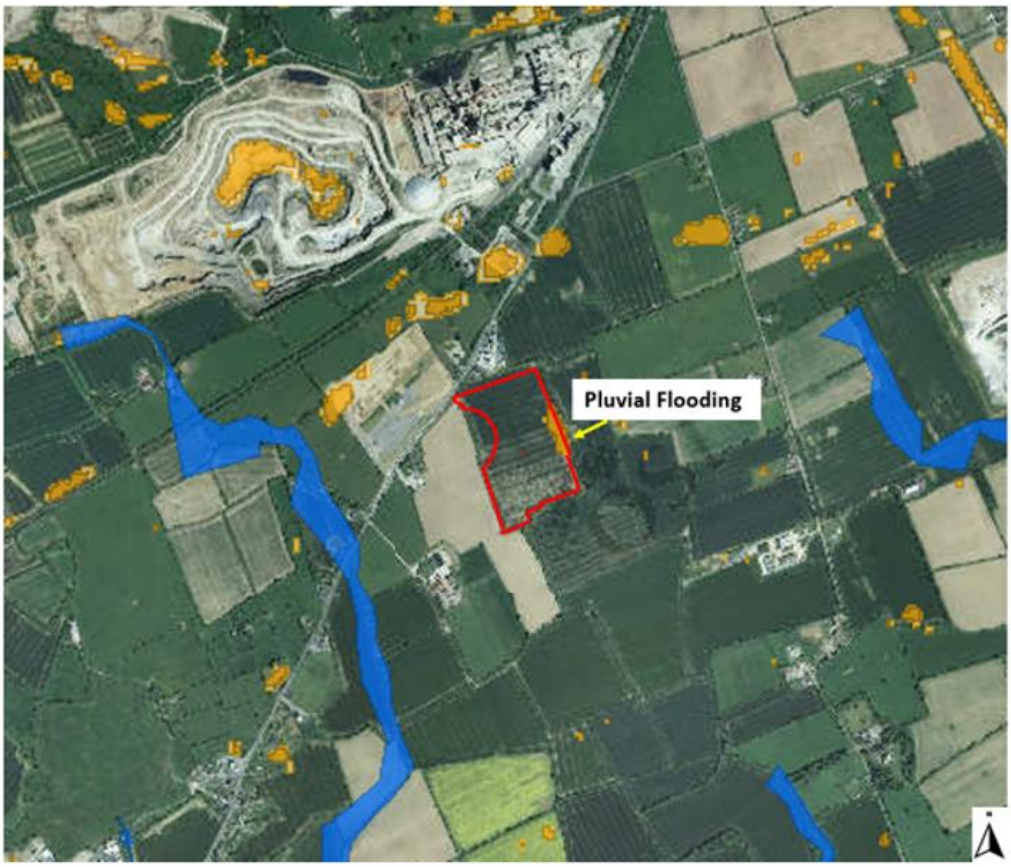


Figure 9.3: *Pluvial Flooding along eastern boundary of the site (source: myplan.ie)*

9.3 Construction Impacts and Mitigation

Waste Water

Waste water generated during the construction phase, will be confined to foul waste water arising from the construction personnel on the site during the 30 month construction period. Effluent loading will arise from toilets and associated welfare facilities provided for the temporary construction staff. It is considered that waste water during the construction phase of the proposed facility will have a short-term, imperceptible – neutral effect on the environment.

Storm Water Runoff

Given the hydrological connection to of the River Nanny with the proposed construction works, the potential risk of such events occurring needs particular attention in terms of planned mitigation measures.

In the absence of adequate management and mitigation measures the construction phase of the development could have an adverse impact on the surface water environment in the event of storm water runoff from the site becoming contaminated by:

– the discharge of high levels of suspended solids as a result of silt / mud being washed off the site
– the discharge of raw or uncured concrete
– the discharge of wash-down water from construction vehicles
– an uncontained spillage of pollutants, such as fuel, oil or hazardous chemicals used during construction, or
– an uncontained spillage of domestic/foul effluent generated during construction

It is considered that storm water runoff during the construction phase of the proposed development will have a medium-term, significant – negative effect on the environment in the absence of mitigation measures.

A Construction Environmental Management Plan (CEMP) has been developed to manage potential environmental impacts that could affect human health or the environment during the construction phase. The plan includes the following mitigation measures that will implemented during the construction phase of the proposed development to prevent/contain any accidental discharges of potentially polluting substances to surface waters, via the storm water outfall from the site:

– It will be a condition of the construction contract that the appointed contractor will take all necessary measures to ensure that there is no discharges of hazardous materials to or contamination of watercourses during construction;
– Appropriate containment measures will be used to retain solids/silt present in storm water runoff (e.g. silt traps / settlement ponds);
– The amount of exposed ground and soil stockpiles will be minimised and stockpiles will be covered as necessary to minimise silt levels in storm water run-off;
– Stock piles will be shaped at regular intervals to ensure appropriate compaction and gradient formation to prevent soil creep. Unstable areas will be protected until they have stabilised and/or vegetation has established. No materials or spoil produced during construction are to be stockpiled within or adjacent to site drainage channels.
– Adequate environmental protection measures e.g. silt fences, or similar; will be used in the control of suspended solids run-off during construction. Silt fences to be used in sloped areas to retain soil onsite and prevent run-off, and near any water sources such as the Platin River stream.
– Concrete, cement and associated waste materials will be carefully handled and disposed of appropriately and in a manner that will not impact on surface waters;
– Any potentially polluting substances such as fuel, lubricants, oil, paint etc. will be carefully handled and will be stored in temporary bunded areas which will fully contain any spillages;
– All domestic effluent generated by construction staff on site will be discharged to a temporary effluent containment facility, prior to transport and treatment off-site.

Taking into account the above mitigation measures the construction phase of the development is not predicted to have any significant adverse impact on surface waters.

9.4 Operational Impacts and Mitigation

9.4.1 Waste Water

AECOM has prepared a Drainage Engineering Report (Attachment 6).

The proposed development will not include a direct waste water connection to any public sewer. Waste water produced at the site will be managed as follows;

Process Waste Water

Processed water from water treatment plant

The operation of the proposed development requires water to control pollutant emissions to atmosphere from the combustion process. The formation of NO_x is controlled by injection of water into the combustor which reduces the peak flame temperature which will in turn reduce the formation of NO_x. Water for the process will be potable water supplied from Uisce Éireann. Before water can be used to control NO_x levels, it must be treated for the removal of natural salts in a Water Treatment Plant (WTP).

Waste water from the WTP will contain dissolved salts removed from the potable water supply. This waste water stream is neutralised and stored onsite in a 450m^3 underground waste water storage tank. The amount of waste water produced will depend on the operational hours of the plant which will be governed by electricity demand. It is expected the maximum volume that may be produced is c. 73m^3 per day (to be confirmed at detailed design). The processed waste water will be collected as required by an appropriately licensed waste collector for treatment off-site in an appropriately licensed waste facility.

It is anticipated that 3 tankers per day will be required to remove these types of process waste water from the site.

Foul Waste Water

Foul water generated by the Proposed Development is anticipated to be less than 1m^3 per day from the Services building sinks/toilets and will be stored in a separate c. 79m^3 underground tank (subject to detailed design) pending collection by an appropriately licensed waste collector for treatment off-site. With 1m^3 of waste being produced each day it is estimated a maximum of 1 tanker per month should be adequate to remove the foul waste water from the site.

All underground waste water storage tanks will be supplied by a specialist manufacturer and installed with a concrete surround to the manufacturer's specification. The waste will be transported by a specialist waste contractor to a suitable licensed waste facility for treatment.

9.4.2 Storm Water (Rainfall) Runoff and Accidental Discharges

The following mitigation measures will be implemented to prevent any accidental contamination of storm water (rainfall) runoff from the site and prevent/contain any accidental discharges of hazardous substances:

– The drainage and paving design has been developed to ensure no emissions to groundwater. Storm water (rainfall) runoff from hard-standing areas will be collected through a series of drainage networks and will be discharged via one of two outfalls from the eastern boundary of the site to a drainage ditch to the east of the site. From there a series of drainage ditches lead to the River Nanny 1.5km away as indicated in Figure 9.1.

– All storm water runoff from hard-standing areas with the potential to become contaminated e.g. fuel oil tanks, offloading bays, transformer bays, etc. will pass through a full retention oil separator which will treat the full flow of surface. There will be six full retention separators on site. There will be one full retention separator to contain oil spills or leaks in each of the following areas; 1 no. adjacent to the fuel unloading area, 1 no. adjacent to the transformers, 1 no. adjacent to the car park area, and 1 no. smaller separator adjacent to each of the three OCGT units. The proposed size of these interceptors is included within the drainage layout plan

drawing no. 60695232-PTN-DR-020 and detailed further in the AECOM drainage report (Attachment 6).

- These separators will retain any hydrocarbons present in the storm water (e.g. as a result of spills or leaks). The separators will be inspected regularly and if required the collected oil/water mixture will be pumped out by an appropriately licensed waste contractor and taken offsite for recovery at an appropriately licensed waste facility.
- The separator at the fuel unloading area will be sized to contain the full contents of a tanker cell should it rupture, resulting in an oil spill. The gradients of the pavements in the fuel unloading area will fall towards a channel drain, which will then be directed into the separator.
- The separators will be installed with an automatic closure device which will prevent flow passing through the separator when the quantity of oil in the separator exceeds the oil storage volume. The separator will also feature an automatic warning device to provide a visual and audible warning when the level of oil reaches 90 per cent of the oil storage volume under static liquid level conditions. Should a spillage occur at the proposed biofuel tank, the same principle with respect to the automatic closure of the separator will apply. Additional storage will be provided within the confines of the tank bunding walls.
- Storm water will be discharged from the site at two outfall points – one at the eastern boundary toward the north of the site and one at the eastern boundary in the middle of the site. A hydrobrake will be utilised for each of these outfalls to limit the discharge to the existing drainage ditches to 1.24 l/s and 7.33 l/s respectively in line with greenfield run-off rates (see drawing no. 60695232-PTN-DR-020 being submitted with this application) detailed further in the AECOM drainage report (Attachment 6).
- The storage, containment and handling facilities for all materials at the proposed development will be designed in accordance with statutory requirements and best practice outlined in IPC Guidance Note on Storage and Transfer of Materials for Scheduled Activities(EPA, 2004) to minimise the likelihood of accidental leaks/spillages occurring and to contain any such leaks / spillages should they occur;
- The biofuel tank and water treatment chemical storage tanks will be appropriately bunded. The emptying of liquids from the bund will be controlled by a permit to work procedure. The contents of the bund will be regularly inspected and any rainwater accumulating in the bund that is free of obvious contamination will be discharged through a sump to the storm water drainage line which has a full retention separator. This will ensure the full working capacity of the bund is maintained. Any contaminated oil in the bund will be treated/disposed of off-site by a licensed waste contractor;
- A standard operating procedure will be followed during tanker unloading and filling of the bulk tanks and the tanks will be fitted with a high level alarm to prevent overfilling;
- There will be a dedicated tanker unloading area surrounded by a drainage channel, which will drain to oil interceptors. This separator will provide for full retention of any material in the event of the complete rupture and spillage of a tanker compartment. A shut-off device incorporated into the separator will close the outlet in the event of its capacity being exceeded;
- All fuel transfer lines will be over ground and easily accessible for inspection;
- All oil filled transformers containing insulating oil will also be fully bunded;
- Any other potential sources of spillage (e.g. pumps, sample points, level gauges etc.) will be provided with local shelter and collection trays, sumps or interceptors as appropriate to contain any leaks/spillages;
- All storm water gullies will have silt traps, which will be inspected and emptied at regular intervals and any silt collected will be disposed of off-site by a licensed waste contractor;
- Good housekeeping practices including preventative maintenance and routine monitoring of tanks and equipment will minimise the likelihood of leaks/spills occurring and ensure that any leaks are quickly detected and controlled.

The above mitigation measures will ensure that only uncontaminated storm water (rainfall) is discharged from the site to the stream (and consequently the River Nanny) and that any spills/leaks

of potentially polluting substances are contained on site and not discharged to the stream and River Nanny.

There will be no potential for water/waste water emissions from the approved 110kV Substation, and rainfall runoff from the 110kV Substation hard-standing areas will be attenuated as part of the overall storm water attenuation design for both projects. Mitigation measures outlined in the Environmental Report submitted with the planning applications for the approved 110kV Substation and the proposed development are included in the Construction Environmental Management Plan (CEMP) and are aligned.

9.5 Decommission Impacts and Mitigation

The impacts expected and mitigation measures required in the decommissioning phase are expected to be similar to those of the construction phase. Decommissioning of the proposed development would be subject to grant of approval by Meath County Council. In the event of the proposed development being decommissioned at the end of its operational lifetime (expected to be 20 years), a designated Decommissioning Management Plan will be developed which will outline the mitigation measures required, similar to those outlined in the Construction Environmental Management Plan and submitted to Meath County Council for approval.

9.6 Cumulative Impacts

There will be no potential cumulative impacts of the proposed development and nearby industrial facilities/ planned projects in the absence of hydrological connection in relation to water and waste water in the vicinity of the development as all will be managed within the confines of the site.

There will be no sewer connection from the proposed development and consequentially will not be contribution of additional loadings to municipal wastewater treatment plants in the vicinity.

9.7 Conclusions

A number of mitigation measures will be implemented during the construction and operational phases of the proposed development to ensure all discharges to surface waters are carefully managed and controlled and that there are no discharges of potentially polluting materials to surface waters.

Storm water from the site will be discharged to the existing drainage ditch at green field rates. The proposed development is therefore not predicted to have any significant adverse impact on the hydrology surface waters.

Waste water generated at the proposed development will be stored on site in dedicated storage tanks for each waste water stream and will be collected by appropriately licensed waste contractors for treatment off-site at appropriately licensed waste facilities. This together with associated controls and proposed mitigation will ensure no additional adverse impact of the adjacent stream and drainage network.

The Proposed Development will not result in the deterioration of any water body's status under the WFD and will not jeopardise the achievement by any water body of good status

10 Air Quality

10.1 Introduction

This Chapter assesses the potential impacts of the construction and operational phases of the proposed development on ambient air quality and outlines mitigation measures as appropriate to minimise any potential impacts.

Air dispersion modelling has been carried out to assess the potential environmental impact of atmospheric emissions generated during the operational phase of the proposed development to be located in Caulstown, Duleek, Platin, Co. Meath.

The purpose of the modelling was to ensure that atmospheric emissions from the proposed development do not cause a contravention of applicable European and Irish Air Quality Standards (AQSs). The modelling assessment was carried out using BREEZE air dispersion modelling software which implements US EPA AERMOD software version 19191.

All emissions data for the proposed development has been provided by the SSE design team. Building and tank dimensions were taken from project drawings together with an electronic site plan imported into BREEZE AERMOD.

10.2 Description of Existing Environment

The proposed development is to be located in a greenfield setting approximately 4.5 km south-west of the Drogheda town centre. There are two Industrial Emission (IE) licensed facilities within close proximity (See Figure 1.1 in Section 1.1 of this report). The boundary of Indaver Ireland Ltd. (IE Licence no. W0167-03) is located approximately 50m northwest of the proposed development site and the boundary of Irish Cement Ltd. (IE Licence no. P0030-06) is approximately 200m north of the proposed development. The air quality impact assessment has included the emission contributions from Indaver Ireland Ltd. and Irish Cement Ltd. as part of a cumulative impact assessment.

10.2.1 Air Quality Zones and Ambient Air Quality

The EPA produces an annual report on air quality[84], which details the results from monitoring stations throughout the various Air Quality Zones within Ireland.

The proposed development site is located within Air Quality Zone D: Rural Ireland, however it is very close to Air Quality Zone C: Other Cities and Large Towns. Adopting a conservative approach, the monitoring results for Zone C were used to determine background concentrations of air pollutants in the vicinity of the proposed development.

The background concentrations for Ammonia were gathered from the EPA[85] which collected data from various monitoring stations located around the island of Ireland in the years 2013 and 2014. This is the most recent data available for ambient ammonia in the study area.

The upper average concentrations for the Zone C stations were used to give a conservative estimate of background concentrations shown in Table 10.1. These background concentrations are used in determining the predicted environmental concentrations of pollutants in the atmosphere when added to the process emissions generated in the air dispersion model. Table 10.2 summarises the background concentrations for ammonia for the area surrounding the proposed development.

[84] The issued EPA report available at the time of completing the air dispersion modelling and impact assessment in May 2023 was *Air quality in Ireland 2021* (2022)*'*

[85] EPA Research report *Ambient Atmospheric Ammonia in Ireland 2013-2014* (2017)

Table 10.1: Annual Mean Ambient Air Quality Data (Upper Average Zone C station readings during period 2017 to 2021)

Pollutant Parameter	Resultant Estimated Background Concentration
Nitrogen Dioxide (NO_2) Hourly - Annual Mean	**12.05 µg/m^3**
Nitrogen Dioxide (NO_2) Hourly - 99.8th Percentile	**24.10 µg/m^3**
Sulphur Dioxide (SO_2) Hourly – Annual Mean	**2.85 µg/m^3**
Sulphur Dioxide (SO_2) Hourly – 99.7th Percentile	**5.7 µg/m^3**
Sulphur Dioxide (SO_2) Daily – 99.2th Percentile	**5.7 µg/m^3**
Carbon Monoxide (CO) 8-Hour – Annual Mean	**0.22 mg/m^3**
Particulate Matter (PM_{10}) Daily – Annual Mean	**13.8 µg/m^3**
Particulate Matter ($PM_{2.5}$) Daily – Annual Mean	**8.4 µg/m^3**

Table 10.2: Background Ammonia (NH_3) concentrations (µg/m^3) for period 2013 to 2014

Pollutant Parameter	Resultant Estimated Background Concentration
Ammonia (NH_3) Hourly mean	**3.2 µg/m^3**
Ammonia (NH_3) Hourly – Annual Mean	**1.6 µg/M^3**

10.2.2 Air Quality Standards

Air Quality Standards (AQSs) for the protection of human health and the environment have been developed at European level and implemented into Irish legislation for a number of air pollutants. AQSs set limit values for Ground Level Concentrations (GLCs) of certain pollutants for both the short term (hourly, daily) and long term (annual averages). The Air Quality Standards Regulations 2022 (S.I. No. 739/2022) replaces S.I. No. 180/2011 which implemented EU Directive 2008/50/EC on ambient air quality and cleaner air for Europe. The relevant AQSs for this air quality assessment are detailed in Table 10.3. To assess the modelling results for Ammonia, Environmental Assessment Levels (EALs) were used as specified in EPA's Guidance Note (AG4).

Table 10.3: Relevant Air Quality Standard Limit Values

Pollutant	Limit Type	Limit Value
Nitrogen Dioxide	Hourly Average for protection of human health – not to be exceeded more than 18 times per year (99.8%ile)	200 µg/m^3
	Annual Average for protection of human health	40 µg /m^3
	Annual Average for protection of vegetation	30 µg /m^3
Sulphur dioxide	Hourly Average for protection of human health – not to be exceeded more than 24 times per year (99.7%ile)	350 µg /m^3
	Daily Average for protection of human health – not to be exceeded more than 3 times per year (99.2%ile)	125 µg /m^3
	Annual & Winter (1 Oct – 31 Mar) Average for the protection of ecosystems	20 µg /m^3
Particulate Matter less than 10 µm	Daily Average for protection of human health – not to be exceeded more than 35 times per year (90.4%ile)	50 µg /m^3
	Annual Average for protection of human health	40 µg /m^3
Particulate Matter less than 2.5 µm	Annual Average for protection of human health	20 µg /m^3
Carbon Monoxide	Maximum daily 8-hour mean	10 mg/m^3
Ammonia	NH_3 hourly mean	2,500 µg /m^3
	NH_3 Annual mean	180 µg /m^3

10.3 Construction Impacts and Mitigation

Construction activities including excavation and earthmoving, could result in the generation of dust which adversely impact ambient air quality. Transportation of loose materials that are not properly contained on or off site could also result in dust generation as would the transfer of mud/soil from the wheels of construction traffic onto surrounding roads.

A number of factors will affect the extent of dust generation and potential impacts on air quality including wind speed and direction, the dryness of the soil, and the proximity of sensitive receptors to the site.

Emissions to air will also arise from construction machinery and construction traffic. As discussed in Chapter 5 Traffic and Transportation of this Environmental Report, construction traffic associated with the proposed development is not considered significant hence the associated emissions are not considered significant. Due to the scale and duration of the construction works, similarly no significant impacts are expected from construction machinery.

The following mitigation measures will be in place to minimise any construction related emissions to air and thus prevent any significant impact on air quality:

- Good housekeeping and site management including the proper storage of spoil / loose materials on site
- Hard surfaced roads will be swept to remove mud and aggregate materials from their surface and any un-surfaced roads will be restricted to essential site traffic only with speed restrictions
- Water bowsers will be deployed for dust suppression in periods of dry weather during the construction phase
- Wheel washing of construction vehicles leaving site will be implemented as necessary
- Public roads outside the site will be regularly inspected and cleaned as necessary
- Provision of an adequate water supply for effective dust/particular matter suppression/mitigation
- All vehicles and equipment used in relation to the site will be: mechanically sound; operated and maintained in accordance with the manufacturer's recommendations and switched off when not in use.

Taking the above mitigation measures into account, the construction phase of the development is not predicted to have a significant adverse impact on ambient air quality.

10.4 Operational Impacts and Mitigation

The principal emissions to atmosphere during the operation of the proposed development will be combustion by-products from the OCGT unit combustion chambers. It is proposed to install 3 no. HVO fuelled OCGT units. Each unit has 1 no. exhaust stack 25m in height.

The OCGT units will operate using HVO as the only fuel source for a maximum of 1,800 hours annually with the highest demand occurring during the winter months.

The combustion by-products if not properly controlled could impact ambient air quality and consequently human health and the environment. Mitigation measures to address this include the setting of emission limit values (ELVs) for the OCGT unit combustion by-products which will comply with those specified in the Industrial Emissions Directive 2010/75/EU and Best Available Techniques (BAT) Conclusions for Large Combustion Plants[86], as applicable. Atmospheric emissions from the proposed development will be subject to the conditions (i.e. emission limit values and monitoring requirements) of an Industrial Emissions (IE) Licence from the EPA, which will ensure operation of the proposed development does not have any significant adverse impact upon ambient air quality.

Other storage vessels' breathing and operating losses include those associated with the fuel oil and caustic storage tanks. These emissions to air will be minor in nature. There will also be potential emissions from a small diesel backup generator that will provide emergency power for the site's essential systems in the event of a power outage on the national grid. Due to the minor nature of these air emissions, it is considered these emissions will not have any significant adverse impact upon ambient air quality and therefore they have not been considered in the air dispersion modelling described in the following section of this report.

10.5 Operational Impacts - Air Dispersion Modelling

Air dispersion modelling has been carried out to assess the potential environmental impact of atmospheric emissions from the operation of proposed development.

The air dispersion modelling input data consists of meteorological data, detailed information on the physical environment (including building dimensions and terrain features) and design details from all emission points on-site. Using this input data, the model predicts ground level concentrations of pollutants beyond the site boundary for each hour of the modelled meteorological years. The model post-processes the data to identify the location and concentration of the worst-case ground level concentrations.

[86] Commission Implementing Decision (EU) 2017/1442 of 31st July 2017 establishing best available techniques (BAT) conclusions, under Directive 2010/75/EU of the European Parliament and of the Council, for large combustion plants

Emissions from the proposed development have been modelled using BREEZE AERMOD software (Version 19191), which has been developed by the U.S. Environmental Protection Agency (US EPA). The model is a steady-state Gaussian plume model used to assess pollutant concentrations associated with industrial sources. The model has been designated the regulatory model by the US EPA for modelling emissions from industrial sources in both flat and complex terrain. The modelling and reporting methodology was carried out based on the Irish Environmental Protection Agency (EPA) document *Dispersion Modelling from Industrial Installations Guidance Note* (AG4) (2020)'.

10.5.1 Meteorological Data

The meteorological data required by the dispersion model is wind speed, wind direction, Pasquill-Gifford stability category, boundary layer height and ambient temperature. The stability category and boundary layer height are used to characterise the turbulence within, and the height of the lower levels of the atmosphere.

Extremely unstable conditions can cause plume looping and elevated concentrations close to the stack. Under stable conditions elevated concentrations can occur due to the emissions being trapped below the boundary layer. Neutral conditions, characterised by cloudy skies and strong winds, are most favourable for dispersion due to the mechanical mixing of the lower atmosphere. The wind direction determines the direction in which the plume is blown, and for a particular stability, higher wind speeds will result in reduced plume rise so causing the plume to reach ground level closer to the stack with elevated emission concentrations. The boundary layer height determines the total vertical distance over which the plume may spread.

The model has been run for each pollutant using five years of meteorological data (2017-2021) from Dublin Airport Meteorological Station. This is considered representative and appropriate data for use in the model and also satisfies the requirement of the Irish EPA AG4 Guidance Note. The meteorological windroses for the years 2017 to 2021 are presented in Figure 10.1.

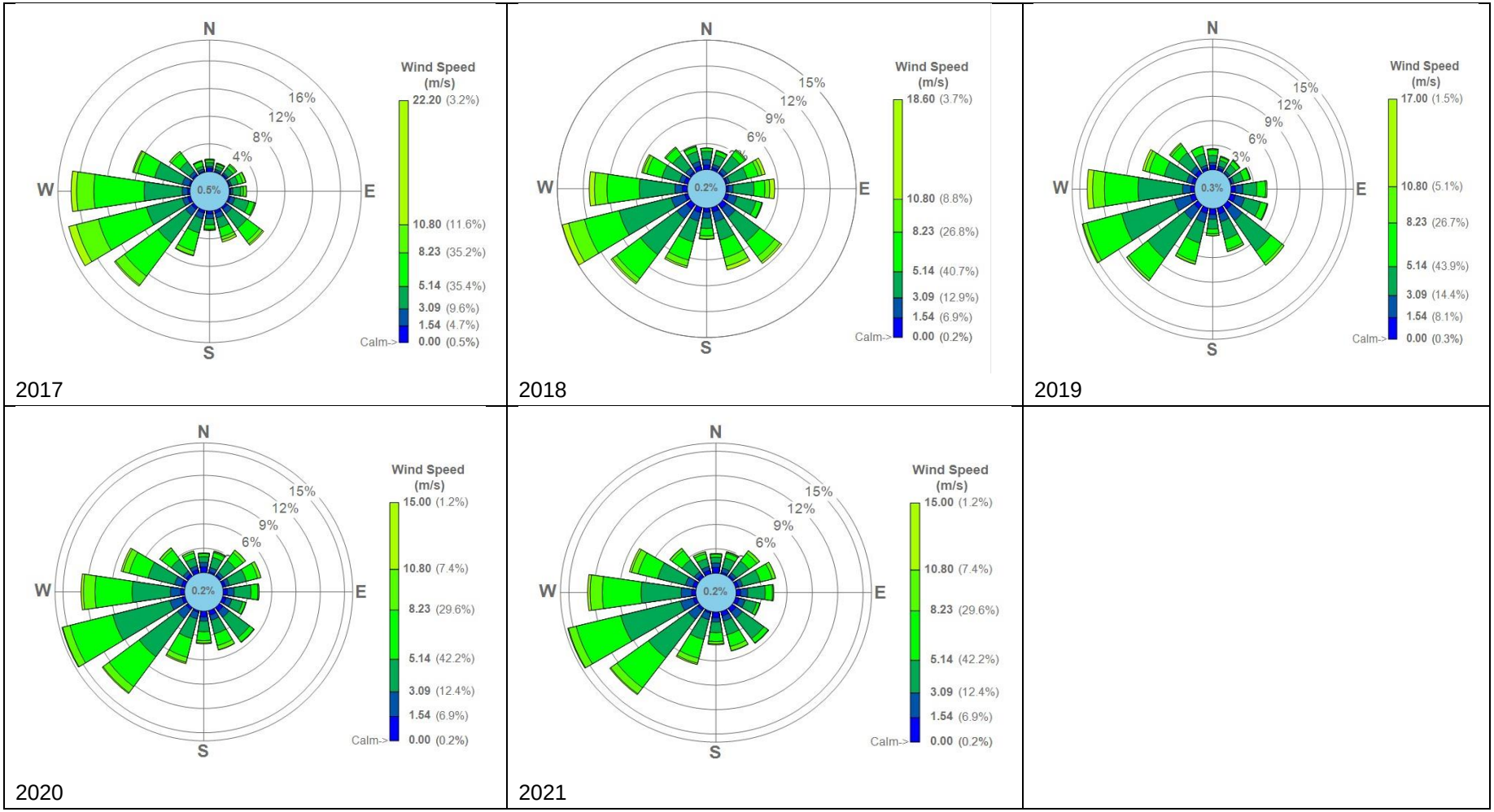


Figure 10.1: Meteorological Windrose for Dublin Airport Station 2017 to 2021

10.5.2 Building Downwash

Air streams blowing across buildings can become disrupted, with turbulent eddies occurring downwind in the building wake. If an emission point is sufficiently close to a building, then the plume may become entrained in the turbulent eddies of the building wake.

This entrainment can cause plume downwash resulting in elevated emission concentrations close to the emission point.

The AERMOD model interprets the influence zone of each building for a given wind direction using the Building Profile Input Program (BPIP).

10.5.3 Model Receptor Points

The model was set up to examine the impact of emissions on the area surrounding the proposed development using a series of receptors. A receptor is a location at which the model will calculate maximum process contributions (PCs). A Cartesian co-ordinate receptor grid system was established centred on the area of the emission stacks. Grid convergence was performed to determine the optimum configuration, which was a nested grid consisting of:

– **Coarse grid**: Area of 20 km by 20 km with 500 m grid spacing
– **Fine grid**: Area of 4 km by 4 km with 100 m grid spacing

Receptors points were also established around the site boundary (spaced every c. 100m). Figure 10.2 shows a screenshot of the build model and receptor grids.

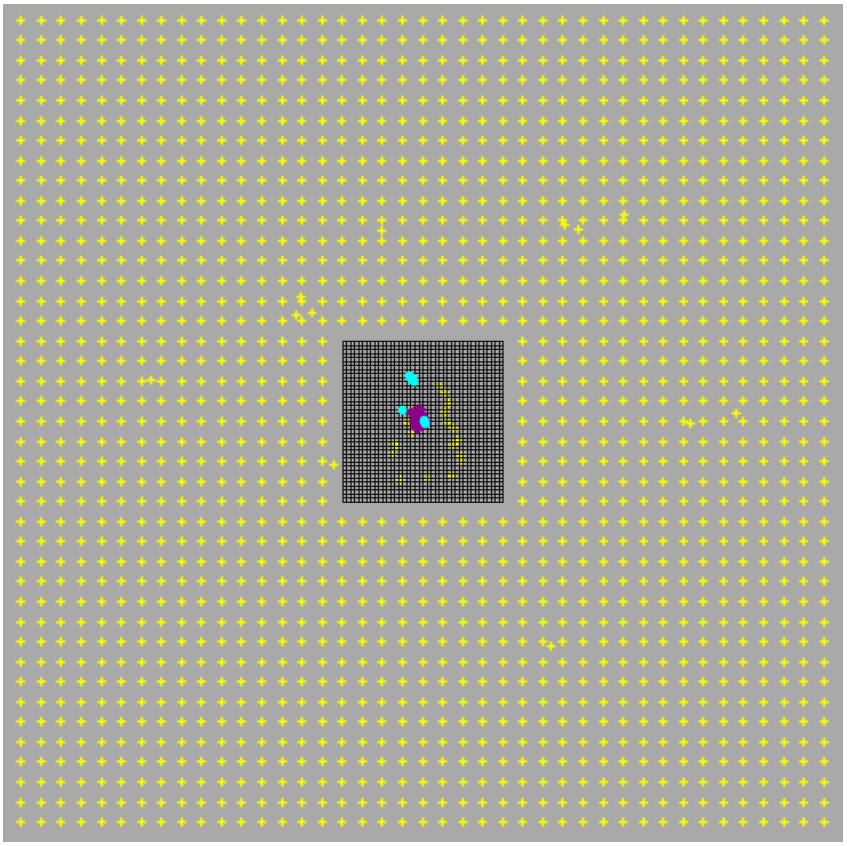


Figure 10.2: Built Model including Receptor Grids

10.5.4 Terrain Data

A terrain height for each of the receptors on the grid was input to the model in order to accurately represent the changing elevations of the surrounding landscape. Digitised terrain data was incorporated into the model using a Digital Elevation Model (DEM) file and the AERMAP function of

the AERMOD software. It is noted that the development objects, i.e. the buildings and the stacks were set at the floor levels indicated on the planning drawings, i.e. the DEM file was only used to give the elevations of the off-site receptors.

10.5.5 Cumulative Assessment and Off-Site Stack Emissions Data

As discussed in Section 10.2 of this report, there are two IE Licensed sites, namely Irish Cement Ltd. and Indaver Ireland Ltd., near the proposed development. Both of these sites have the potential to emit more than 100 tonnes per annum of some (in the case of Indaver) or all (in the case of Irish Cement) of the pollutants being assessed as part of this air dispersion model. Hence the relevant stack emissions for both of these sites were included as part of the air dispersion model. The stack discharge parameters and emissions data used are outlined in Appendix B of the air dispersion modelling report which is included as Attachment 4 of this environmental report.

10.5.6 Operational Load Sensitivity Analysis

To determine the worst case modelling scenarios for the air dispersion modelling, sensitivity analysis was performed on the operational load and associated varying discharge parameters.

The emission flowrate, temperature and velocity vary depending upon the load. Air emissions data was provided by the vendor for the OCGTs for the proposed development running at 100% load, 70% and 35% load. Modelling was completed at 100%, 70% and 35% to identify the sensitivity of the ground level concentrations of pollutants generated by the model depending on the operational load.

10.5.7 Model Accuracy

Models are subject to both reducible and inherent (non-reducible) uncertainties. The reducible uncertainties for this model have been addressed using the following measures in accordance with the EPA AG4 Guidance;

- All input parameters have been confirmed and verified;
- The EPA Guidance (AG4) states that the process contribution from a site plus background concertation of pollutants should be below 75% of the Air Quality Standards. This allows for an appropriate “window” reserved between the predicted environmental concentration (PEC) (background (BC) plus process contribution (PC)) and the ambient air quality standard (AQS) necessary due to the inherent uncertainty of the model accuracy.
- A sensitivity study has been completed using emissions data for the OCGT units operating at 100% load, 70% and 35% load.

10.5.8 Stack Discharge Parameters and Emissions Data

Figure 10.3 shows the locations of the stacks within the model. The emissions data used are set out in Table 10.4 below:

Table 10.4: 3 No. Turbine Stacks Discharge Parameters and Emissions Data (identical for each stack)

Operation Fuel:	Hydrotreated Vegetable Oil		
Item	**100% Load**	**70% Load**	**35% Load**
Stack Heights (m)	25		
Ground Level above OD (m)	34.5		
Stack internal diameter (m)	3.541		
Exit Gas Temperature (°C)	454	454	454
Volumetric Flow rate Nm^3/hr	459,549	384,950	297,573
Exit Gas Velocity m/s	34.51919	28.91594	22.35207
NO_x mg/Nm^3	50	50	50
SO_x mg/Nm^3	5	5	5
CO mg/Nm^3	100	100	100
$PM_{(10/2.5)}$ mg/Nm^3	5	5	10
NH_3 mg/Nm^3	10	10	10
NO_x max emission rate (g/s)	6.38	5.35	4.13
SO_x max emission rate (g/s)	0.64	0.53	0.41
CO max emission rate (g/s)	12.77	10.69	8.27
Particulates max emission rate (g/s)	0.64	0.53	0.83
Ammonia max emission rate (g/s)	1.28	1.07	0.83

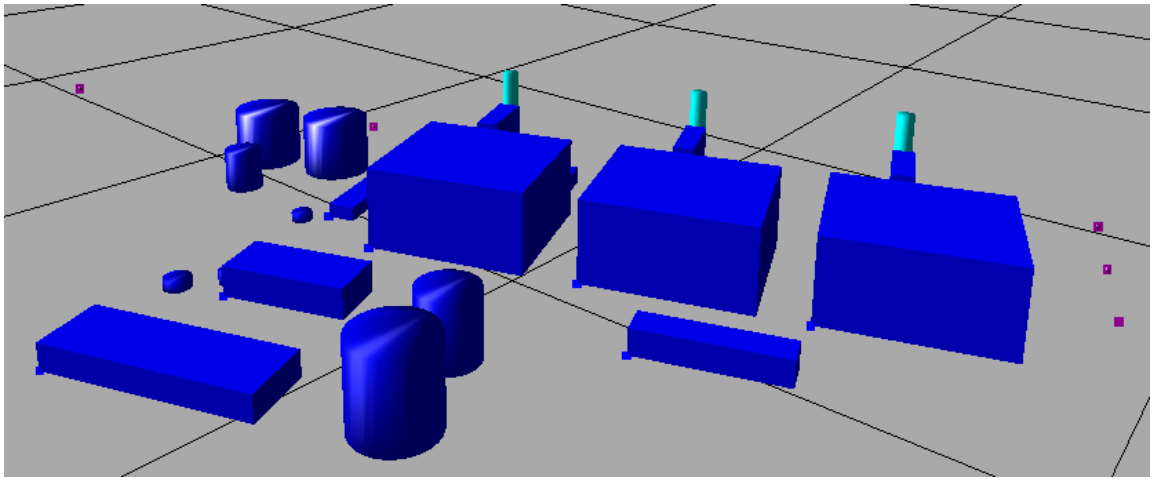


Figure 10.3: Image showing buildings and tanks included in model (also shown in turquoise are the turbine emission stacks)

NO_2/NO_x Chemistry

During combustion, a mixture of both nitric oxide (NO) and nitrogen dioxide (NO_2) is released. Once released, a series of complex chemical reactions take place during which a portion of the NO is converted into NO_2.

In accordance with the EPA's AG4 Guidance, the following default factors were used to covert the NOx modelled to NO_2 for comparison with the relevant Air Quality Standard Limits:

– annual NO_2/NO_X ratio of 1.00;
– 1-hour NO_2/NO_X ratio of 0.50.

10.5.9 Modelling Results and Predicted Environmental Concentrations

The predicted environmental concentrations (PECs) (i.e. background concentrations plus modelled process contributions) were calculated for each parameter and averaging time, for comparison to AQS and EAL limit values. This assessment ensures that both the modelled emission and the existing background concentrations are taken into account when determining the possible overall ambient air quality once the proposed development is operational.

The estimated background concentrations at the proposed site location are described in Section 10.2.1 and are based on Air Quality Monitoring data provided by the EPA.

In relation to annual mean values the background concentrations were added directly to the maximum annual predicted concentrations for human health. This is also the case for the daily PM_{10} values and the 8 hour CO. In relation to combining the short term (relevant to hourly NO_2 and SO_2) peak contributions with background concentrations, guidance from the Appendix E of the 'EPA AG4 Guidance Note' advises that the background concentration should be twice the annual mean value added to the short term process contribution.

These background concentrations have been combined with the predicted ground level concentrations (GLCs) in order to determine the PECs, as summarised in the dispersion modelling results tables (Table 10.5). Contour plots have also been produced to illustrate the results of the air dispersion models when the OCGT units are fuelled by HVO using the BREEZE 3D Analyst software tool and Google Earth Pro and are included in Attachment 4 of this Environmental Report.

The results presented in Table 10.5 are those for the worst case modelling scenarios (i.e. 100%, 70% or 35% operational load) with the OCGT units at the proposed development utilising HVO fuel. The predicted maximum Process Contributions (PC) quoted in Table 10.5 are the cumulative effect of the proposed development and nearby facilities. The full results of the operational load sensitivity analysis are included in Attachment 4 of this Environmental Report and illustrate that there is a minimal difference in the results of the air dispersion models when the OCGT units were modelled at 100% load, 70% load and 35% load.

Table 10.5: Air Dispersion Modelling Results

Pollutant	Averaging Period	Predicted Max. Process Contribution (PC) (µg/m³)	Predicted Max Occurred at Location (UTM Coords.)	Predicted Max Occurred in Year	Background Conc.[1] (µg/m³)	PEC: Background + Process Contribution (µg/m³)	Air Quality Standards/ Limit Value (µg/m³)	Predicted PC as Percentage of Limit	PEC as Percentage of Limit
Nitrogen Dioxide (NO_2)	99.8th Percentile of 1 hr means	42.93	671862.9, 5951938	2021	24.1	67.03	200	21.47%	33.52%
	Annual Mean (Human Health Protection)	4.03	673662.94, 5952337.48	2017	12.05	16.1	40	10.07%	40.20%
	Annual Mean (Protection of Vegetation)						30	13.43%	53.59%
Sulphur Dioxide (SO_2)	99.7th Percentile of 1 hr means	22.60	669762.9, 5951538	2021	5.69	28.30	350	6.46%	8.08%
	99.2th Percentile of Daily Means	7.04	672262.9, 5951938	2021	5.69	12.74	125	5.63%	10.19%
	Annual Mean (Protection of Vegetation)	0.998	673162.94 5952037.48	2017	2.85	3.84	20	4.99%	19.22%
Carbon Monoxide (CO)	8 hr Mean	234.91	671862.94 5952337.48	2018	220	454.9	10,000	0.563%	4.55%

Pollutant	Averaging Period	Predicted Max. Process Contribution (PC) (µg/m^3)	Predicted Max Occurred at Location (UTM Coords.)	Predicted Max Occurred in Year	Background Conc.[1] (µg/m^3)	PEC: Background + Process Contribution (µg/m^3)	Air Quality Standards/ Limit Value (µg/m^3)	Predicted PC as Percentage of Limit	PEC as Percentage of Limit
Particulate Matter less than 10 µm (PM_{10})	90.4th Percentile of Daily Means	0.63	671762.9, 5952238	2019	13.8	14.4	50	1.26%	28.86%
	Annual Mean	0.196	673262.94 5950837.48	2017	13.8	14.0	40	0.49%	34.99%
Particulate Matter less than 2.5 µm ($PM_{2.5}$)	Annual Mean	0.196	673262.94 5950837.48	2017	8.4	8.6	20	0.98%	42.98%
Ammonia (NH_3)	Hourly mean	13.63	672762.94 5950337.48	2019	3.2	16.8	2,500	0.55%	0.67%
	Annual Mean	0.28	673662.94 5952437.48	2017	1.6	1.9	180	0.16%	1.04%

NOTES (1)

1. From EPA Guidance document AG4:
   - the 99.8th percentile NO_2 PEC is equal to 99.8th percentile concentration plus twice the annual mean background NO_2;
   - the 99.7th percentile of 1-hr SO_2 PEC is equal to 99.7th percentile concentration plus twice the annual mean background SO_2;
   - the 99.2th percentile of daily SO_2 PEC is equal to 99.2th percentile concentration plus twice the annual mean background SO_2;
   - the 90.4th percentile PM_{10} daily PEC is equal to 90.4th percentile concentration plus the annual mean background PM_{10}

The process contributions for each pollutant parameter indicated in Table 10.5 are the sum of contributions from both the proposed development and offsite emission stacks. The breakdown of these process contributions between on-site and off-site emissions is shown in Table 10.6. It is clear from the results that the proposed development will have a minimal contribution to the maximum cumulative ground level concentrations from air emissions sources in the area. The largest contributions to the cumulative ground level concentrations are from off-site sources not related to the proposed development.

Table 10.6: Breakdown of Total Process Contribution between Proposed Development and Off-Site Emissions

Pollutant	Averaging Period	Predicted Max. Process Contribution (PC) (µg/m^3)	Proposed Development PC as % of Total PC	Off-Site PC as % of Total PC
Nitrogen Dioxide (NO_2)	99.8th Percentile of 1 hr means	42.93	25%	75%
	Annual Mean (Human Health Protection)	4.03	15%	85%
	Annual Mean (Protection of Vegetation)			
Sulphur Dioxide (SO_2)	99.7th Percentile of 1 hr means	22.60	6%	93.7%
	99.2th Percentile of Daily Means	7.04	5.9%	94.1%
	Annual Mean (Protection of Vegetation)	0.998	6%	94%
Carbon Monoxide (CO)	8 hr Mean	234.91	24.0%	76.0%
Particulate Matter less than 10 µm (PM_{10})	90.4th Percentile of Daily Means	0.63	51%	49%
	Annual Mean	0.196	67%	33%
Particulate Matter less than 2.5 µm ($PM_{2.5}$)	Annual Mean	0.196	67%	33%
Ammonia (NH_3)	Hourly Mean	13.63	99.97%	0.03%
	Annual Mean	0.28	44%	56%

10.6 Decommission Impact and Mitigation

The air dispersion modelling has not assessed the decommission phase.

The impacts expected and mitigation measures required in the decommissioning phase are expected to be similar to those of the construction phase. Decommissioning of the proposed development would be subject to grant of approval by Meath County Council. In the event of the proposed development being decommissioned at the end of its operational lifetime (expected to be 20 years), a designated Decommissioning Management Plan will be developed which will outline the mitigation measures required, similar to those outlined in the Construction Environmental Management Plan and submitted to Meath County Council for approval.

10.7 Discussion and Conclusions

As can been seen from Table 10.5, the maximum cumulative predicted ground level concentrations (GLCs) of NO_2, SO_2, CO, $PM_{10/2.5}$ and NH_3 arising from the operation of the proposed development and neighbouring facilities are well below the relevant Air Quality Standards (AQSs). Furthermore the PECs are also below the relevant AQSs. It is noted that in the cumulative modelling, the contribution from the proposed development is minimal compared to that of the other facilities included in the model.

It is also noted that the air dispersion modelling has conservatively considered the proposed development to be operational 24 hours a day, 7 days a week. As stated in this report, it is intended that the plant will operate for no more than 1,800 hours annually, therefore the air emissions generated by the operation of the facility will be less than stated in Table 10.5.

It is therefore concluded that atmospheric emissions from the proposed development will not have a significant impact on ambient air quality.

11 Waste Management

11.1 Introduction

This Chapter describes the anticipated types and quantities of wastes that will be generated from the proposed development during the construction and operational phases. This chapter should be read in conjunction with Chapter 2 (Description of the Proposed Development), Chapter 6 (Land and Soils) and Chapter 9 (Water and Wastewater) of this Environmental Report.

11.2 Construction Phase Waste

The proposed development is situated on a greenfield site. Initial site development will include cut and fill works. This will be followed by the installation of the facility itself. Construction works are expected to commence on site in Q4 2023 (subject to receipt of planning permission) with an expected total duration of 30 months.

The proposed development will involve the excavation of soils (topsoil and subsoil). It is anticipated that this material can be reused elsewhere on site as part of the landscaping design and therefore will not constitute a waste stream. Berms will be formed as part of the landscaping and planted with native species.

The construction involves the installation of equipment, tanks and modular control facilities on pre-constructed hard standing surfaces. Therefore it is expected that the construction phase will not result in the amounts of waste generated from the typical construction sites. Construction volumes are set out in Appendix B of the CEMP.

The CEMP has been developed to include a construction waste management plan which will be generated in accordance with the Resource and Waste Management Guidelines[87]. It is noted that the proposed development site is currently greenfield therefore there will be no demolition waste. The CEMP will include specific details on waste segregation and management. The CEMP may be revised subject to engagement and approval of Meath County Council. The CEMP includes specific details on the projected waste types and subsequent management of this waste.

Provisions will be put in place for designated, contained concrete wash out areas and a contained waste area, details of which are provided within the CEMP prior to construction activities commencing. The Construction Management Team will ensure that all construction waste generated onsite will be segregated where possible. Each contractor company will be required to provide suitable waste receptacles for the nature of work being undertaken and resulting waste. Contractors will be required to segregate waste prior to placing into waste skips for removal off site.

The quantities of waste generated will be relatively small amounts of plastics, cardboard packaging, canteen waste etc. Contractors will segregate waste prior to placing into waste skips for removal off site. Provisions will be put in place for designated, contained concrete wash out areas for trucks prior to leaving the site.

11.3 Operational Phase Waste

There will not be significant quantities of waste generated during the operational phase of the proposed development as there are very few process wastes associated with the operation of an OCGT Generating Plant. The principal types of waste generated by the proposed development will include waste from periodic plant maintenance and cleaning activities, used packaging/containers, general office/domestic waste, landscaping waste etc. There should be adequate capacity in existing local off-site waste disposal and treatment facilities to accommodate the quantity of waste generated by the proposed development.

There will also be process waste water generated at the Water Treatment Plant and sanitary foul waste water generated by toilets/sinks in the services building – the management of these waste waters is described under section 9.4.1 of this Environmental Report.

[87] Best practice guidelines for the preparation of resource & waste management plans for construction & demolition projects (EPA, 2021)

An SSE Waste Management Programme will be implemented during the operation of the proposed development to ensure the proper management of waste on site. Waste minimisation will form an important part of the programme which will be based on the waste management hierarchy (prevention, minimisation, re-use, recycling, recovery, and disposal). The programme will form part of an Environmental Management System to be implemented on the site. All waste generated on site, both hazardous and non-hazardous, will be handled, stored, transported off-site and treated / disposed of in accordance with statutory requirements and in a manner that minimises any risk to persons and/or the environment.

SSE commits to protecting the environment, preventing pollution and minimising adverse environmental impacts. SSE's key principle and enduring goal is to protect the environment and operate in a sustainable way and this includes but is not limited to:

– Applying the waste hierarchy to reduce, reuse and recycle our waste.
– Complying with all relevant legal, regulatory and voluntary environmental obligations
– Managing, protecting and enhancing biodiversity.

SSE will manage any environmental risks by applying and continually improving its Safety, Health and Environment (SHE) Management System.

11.3.1 Waste Hierarchy

In accordance with Article 4 (1) of the Waste Framework Directive, the waste hierarchy will be applied in the prevention and management of waste generated at the proposed development.

Measures to prevent waste generation in the first instance will be adopted onsite, for example measures such as separating as much water as possible from waste oil/water solutions minimises the amount of waste oil/water removed off-site for treatment. Where the prevention of waste generation cannot be avoided, waste will be source separated for re-use, recycling or recovery. Where waste cannot be recycled or recovered it is disposed of appropriately to ensure a minimum impact on the environment.

11.3.2 Waste Storage

There will be dedicated waste storage areas onsite and appropriate waste bins will be provided for each source separated waste type. This will ensure that waste is contained to avoid litter blow and minimise any impact to the environment. All bins will be labelled for the waste stream it collects and will be emptied regularly to prevent build-up of waste.

11.3.3 Waste Records

All wastes collected for recycling/recovery or disposal from site will be collected by waste operators with valid waste collection permits and will be transferred to permitted/licensed waste management facilities to process the waste.

Waste records such as collection/dispatch dockets, waste transfer forms for hazardous waste and final disposal/recovery certificates will be held onsite and all wastes generated will be reported in the annual Environmental Report to the Environmental Protection Agency.

Due to the limited quantities of waste generated and careful management of all waste generated on site it is not anticipated that waste generation on site will have any significant adverse impact with respect to off-site waste infrastructure.

11.4 Decommissioning Phase Waste

The anticipated waste streams from the decommission phase are expected to be of a similar nature to those generated in the construction phase in order to reinstate the site to greenfield. The impacts expected and mitigation measures required in the decommissioning phase are expected to be similar to those of the construction phase. Decommissioning of the proposed development would be subject to grant of approval by Meath County Council. In the event of the proposed development being decommissioned at the end of its operational lifetime (expected to be 20 years), a designated Decommissioning Management Plan will be developed which will outline the mitigation measures

required, similar to those outlined in the Construction Environmental Management Plan and submitted to Meath County Council for approval.

11.5 Cumulative Impacts

There will be no cumulative impacts of the proposed development on the basis of strict tight controls and volume of waste quantities generated in the construction and operational phases and nearby industrial facilities/ planned projects in the vicinity of the development.

11.6 Conclusions

The waste generated during the construction and operational phases of the proposed development will be relatively small as outlined above. Construction waste will be managed under the CEMP. Operational waste will be managed under the IE Licensing process. No significant adverse impacts are therefore anticipated with respect to waste.

12 Material Assets

12.1 Introduction

Material assets comprise the physical resources in the environment, which may be of human or natural origin, that are valued and intrinsic to specific places. The objective of this assessment is to ensure that these assets are used in a sustainable manner with respect to the proposed development. This Chapter assesses the impacts of the development on a number of different material and infrastructural assets, namely electricity, water supply, wastewater and telecommunications.

12.2 Electricity

During operation the proposed development will be self-sufficient in providing electricity for site consumers including office buildings and ancillary systems. During plant downtime (e.g. plant maintenance) power to the site will be supplied by the national grid. In the event of a power outage on the grid, an on-site diesel generator will provide backup power to the site to maintain operation of essential systems.

The proposed development will generate power for export to the national grid and provide additional capacity in this area of the network to meet growing demand, contributing to the security of electricity supply. The proposed development will greatly improve the electrical infrastructure in the local area and therefore will have a positive impact with respect to electrical infrastructure.

12.3 HVO Biofuel

The proposed development will be fuelled by HVO biofuel through 2 no. HVO fuel tanks (total capacity 4,600m^3).

12.4 Water Supply

A potable water supply for the site will be taken via a new supply pipeline from an existing local authority trunk main servicing the local area. It is estimated that approx. 1m^3/day will be required for domestic use (sinks, toilets etc.) on the site.

In March 2019 and December 2022, Uisce Éireann confirmed that a connection to the existing water network for the site can be facilitated based on a maximum instantaneous flow of 3 l/s. Based on this, SSE have requested a quotation from Uisce Éireann for a potable water connection with a maximum instantaneous flow of 3l/s for the site. This supply will cover the potable water requirement and the water treatment requirement for the site. Water will be stored in a deionised water tank and a raw water storage tank, with combined capacities of 72 hours running time backup in the event of water restrictions.

12.5 Waste water

The maximum anticipated process waste water output from the on-site water treatment plant would be c. 73m^3 per day (to be confirmed at detailed design). This will be stored on site in a 90m^3 waste water tank pending collection as required by an appropriately licensed waste collector for treatment off-site.

Foul water produced will be less than 1 m^3/day from the Administration building sinks/toilets and will be stored in a c. 79m^3 underground tank (subject to detailed design) pending collection by an appropriately licensed waste collector for treatment off-site.

12.6 Telecommunications

The proposed site is currently well serviced in relation to telecommunication lines for telephone and broadband services. The proposed development will be operated remotely. Adequate telecommunications will be maintained for the operation which may benefit the area.

12.7 Conclusions

Chapters 3-11 and Chapter 13 of this Environmental Report have identified mitigation measures relevant to various assessment topics.

There will be an interface established with Meath County Council, Gas Networks Ireland, Uisce Éireann, Eir and other relevant service providers within the locality during the construction planning phase of the project. This interface will be managed in order to ensure a smooth construction schedule without disruption to the residential and business community.

In relation to the use of natural resources there will be a comparatively low use of fuel, electricity, HVO biofuel and potable water during the construction phase. Resources consumed will mainly include use of fossil fuels for construction related machinery, electricity to light the construction site and power construction tools and gas to heat the buildings.

On-site segregation of all waste materials will take place. It will be a priority to source materials from locations close to the site, where possible, in order to reduce transport distances.

During the operational phase there will be resource requirements for potable water and HVO biofuel. In this regard the proposed development is being designed to incorporate energy efficiency and sustainable measures.

The proposed development will not have a significant adverse impact on the material assets and utilities of the region such as electricity supply, natural gas supply, water supply, waste water, and telecommunications. The regional infrastructure and utilities have adequate capacity to accommodate the requirements of the proposed development without adversely affecting other users.

The proposed development will have a positive impact with respect to electricity supply in that it will provide additional capacity to meet growing demand, contributing to the security of electricity supply and will greatly improve the electrical infrastructure in Duleek and the surrounding area and secure power for future development.

13 Archaeology, Architecture and Cultural Heritage

13.1 Introduction and Terms of Reference

This archaeological impact assessment was completed by Margaret McCarthy, Consultant Archaeologist and forms part of an Environmental Report for the proposed development at Carranstown & Caulstown, Platin, Duleek, Co. Meath for the previous application in 2018. The report is being submitted to accompany a planning application to Meath County Council to develop a 10.55ha site by SSE Generation (Ireland) Ltd. The assessment is based on both a desktop review of available archaeological resources and information available from the field survey and archaeological test excavation undertaken in 2018 and 2019 respectively as part of a pre-planning investigation for the previously proposed distillate fired 208 MW OCGT Generating Plant at the subject site (Planning Ref. no. LB190031) (see Section 1.1 of this Environmental Report for background on this application).

This chapter includes a general introduction to the study area and the recorded archaeological sites that are located both within and in the locality of the proposed development site. Using this information, the likely impact of the development in respect of the receiving archaeological environment is assessed. Finally, the assessment identifies appropriate mitigation measures, which should be implemented to minimise these potential impacts.

13.2 Assessment Methodology

The assessment was prepared using desk-based research and a field survey. It was undertaken in order to assess the archaeological potential of the proposed development site and to identify constraints or features of archaeological significance within or adjacent to the subject lands. The assessment was carried out according to the methodologies specified in Environmental Protection Agency (EPA) guidance documents[88].

The TII (Transport Infrastructure Ireland)[89] criteria for rating the magnitude and significance of impacts at EIA stage on cultural heritage sites are also relevant in determining impact assessment and are presented in Table 13.1. This table provides the baseline criteria used to describe the impacts that potential developments can have on cultural heritage sites.

Table 13.1: Criteria Used to Determine Impacts on Cultural Heritage Sites

Magnitude of Impact	Direct	Indirect
Severe	Cultural Heritage site is within a proposed development area. Construction work will entail the removal or part of the entire cultural heritage.	Cultural Heritage site is within a proposed development area. Construction works will entail the destruction of the visual context of the site or isolate it from associated groups or features.
Potentially Severe	Cultural Heritage site is adjacent to a proposed development area. There is potential for related remains being affected by development works.	Cultural Heritage site is adjacent to a proposed development area. Construction works will greatly injure the visual context of the site or isolate it from associated groups or features.

[88] EPA (2002) Advice Notes on Current Practice in the preparation of EISs; EPA (2015) Consultation on draft revised guidelines on information to be contained in Environmental Impact Statements; EPA (2017) Guidelines on the information to be contained in Environmental Impact Assessment Reports Draft August 2017; EPA (2022) Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR)
[89] NRA (2003) Guidelines for the assessment of Archaeological Heritage Impacts of National Road Scheme

Magnitude of Impact	Direct	Indirect
Moderate	Existing access to a cultural heritage site will be severed. Development works will affect the context of a cultural heritage site.	N/A
No Predicted	The Proposed Development Will Have No Predicted Impact.	N/A

13.2.1 Legislative Framework

Ireland has committed to the protection of its archaeological and architectural heritage by being a signatory to two international conventions that aim to protect cultural heritage. These are:

- The 1985 European Convention on the Protection of Architectural Heritage (The Granada Convention), which aims to make provision for the protection of monuments, groups of buildings and sites that are of 'historical, archaeological, artistic, scientific, social or technical interest'
- The 1992 European Convention on the Protection of the Archaeological Heritage (The Valetta Convention), which aims to 'protect the archaeological heritage as a source of the European collective memory and an instrument for historical and scientific study'
- Provisions made in these conventions have been written into Irish Law via the National Monuments (Amendments) Acts 1930-2004, the Heritage Act 1995, the Cultural Institutions Act 1997, the Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999, Architectural Heritage Protection Guidelines 2004 and the various Planning and Developments Acts 2000 (as amended). The policy of the Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs in relation to the protection of our archaeological and architectural heritage is set out in the Frameworks and Principals for the Protection of the Archaeological Heritage (Government Publication 1999) which may be downloaded from the departmental website www.archaeology.ie. The National Monuments Act 1930 and its subsequent amendments of 1954, 1987, 1994 and 2004 provide for the protection of the archaeological heritage which includes monuments, buildings, ship-wrecks and archaeological artefacts. A level of universal protection is afforded to all monuments listed in the Record of Monuments and Places (RMP) which was established under Section 12 of the National Monuments (Amendment) Act 1994. While all known monuments are included on the RMP, a lesser number are entered on the Register of Historic Monuments established under Section 5 of the National Monuments (Amendment) Act 1987. Monuments that are considered to be of national significance are afforded the highest level of protection and are referred to as National Monuments.

13.2.2 Meath County Development Plan 2021-2027

The Meath County Development Plan 2021-2027 outlines a number of policies and objectives relating to archaeological and architectural heritage. The Council is committed to the preservation and protection of its rich archaeological and architectural resource and has regard to the recommendations of the Department of Culture, Heritage and the Gaeltacht (DCHG) when considering proposals with potential to affect that heritage. The Planning Authority recommends that potential developers consult as early as possible with the relevant agencies, such as the National Monuments Service of the DCHG and the Planning Section of Meath County Council, in order to ensure that archaeological and architectural concerns can be integrated into development proposals at as early a stage as possible. The principal policies and objectives of Chapter 9 of the plan are outlined below.

The principal policies relating to archaeological heritage include:

- **HER POL 1:** To protect sites, monuments, places, areas or objects of the following categories:
  - Sites and monuments included in the Sites and Monuments Record as maintained by the National Monuments Service of the Department of Culture, Heritage and the Gaeltacht;

  - Monuments and places included in the Record of Monuments and Places as established under the National Monuments Acts;
  - Historic monuments and archaeological areas included in the Register of Historic Monuments as established under the National Monuments Acts;
  - National monuments subject to Preservation Orders under the National Monuments Acts and national monuments which are in the ownership or guardianship of the Minister for Culture, Heritage and the Gaeltacht or a local authority;
  - Archaeological objects within the meaning of the National Monuments Acts; and Wrecks protected under the National Monuments Acts or otherwise included in the Shipwreck Inventory maintained by the National Monuments Service of the Department of Culture, Heritage and the Gaeltacht.
- **HER POL 2:** To protect all sites and features of archaeological interest discovered subsequent to the publication of the Record of Monument and Places, in situ (or at a minimum preservation by record) having regard to the advice and recommendations of the National Monuments Service of the Department of Culture, Heritage and the Gaeltacht and The Framework and Principles for the Protection of the Archaeological Heritage (1999).
- **HER POL 3:** To require, as part of the development management process, archaeological impact assessments, geophysical survey, test excavations or monitoring as appropriate, for development in the vicinity of monuments or in areas of archaeological potential. Where there are upstanding remains, a visual impact assessment may be required.
- **HER POL 4:** To require, as part of the development management process, archaeological impact assessments, geophysical survey, test excavations or monitoring as appropriate, where development proposals involve ground clearance of more than half a hectare or for linear developments over one kilometre in length; or developments in proximity to areas with a density of known archaeological monuments and history of discovery as identified by a suitably qualified archaeologist**.**
- **HER POL 5:** To seek guidance from the National Museum of Ireland where an unrecorded archaeological object is discovered, or the National Monuments Service in the case of an unrecorded archaeological site.

The principal objectives relating to archaeological heritage include:

- **HER OBJ 1:** To implement in partnership with the County Meath Heritage Forum, relevant stakeholders and the community the County Meath Heritage Plan and any revisions thereof.
- **HER OBJ 2:** To ensure that development in the vicinity of a Recorded Monument or Zone of Archaeological Potential is sited and designed in a sensitive manner with a view to minimal detraction from the monument or its setting.
- **HER OBJ 3:** To protect important archaeological landscapes from inappropriate development.
- **HER OBJ 4:** To encourage the management and maintenance of the County's archaeological heritage, including historic burial grounds, in accordance with best conservation practice that considers the impact of climate change.
- **HER OBJ 5:** To promote awareness of, and encourage the provision of access to, the archaeological resources of the county.
- **HER OBJ 6:** To work in partnership with key stakeholders to promote County Meath as a centre for cultural heritage education and learning through activities such as community excavation and field/summer schools.

The policies relating to Architectural and Cultural Heritage include:

- **HER POL 14:** To protect and conserve the architectural heritage of the County and seek to prevent the demolition or inappropriate alteration of Protected Structures.
- **HER POL 15:** To encourage the conservation of Protected Structures, and where appropriate, the adaptive re-use of existing buildings and sites in a manner compatible with their character and significance. In certain cases, land use zoning restrictions may be relaxed in order to secure the conservation of the protected structure.

- **HER POL 16:** To protect the setting of Protected Structures and to refuse permission for development within the curtilage or adjacent to a protected structure which would adversely impact on the character and special interest of the structure, where appropriate.
- **HER POL 17:** To require that all planning applications relating to Protected Structures contain the appropriate accompanying documentation in accordance with the Architectural Heritage Protection Guidelines for Planning Authorities (2011) or any variation thereof, to enable the proper assessment of the proposed works.

The objectives relating to architectural heritage include:

- **HER OBJ 15:** To review and update the Record of Protected Structures on an on-going basis and to make additions and deletions as appropriate.
- **HER OBJ 16:** To identify and retain good examples of historic street furniture, e.g. cast-iron post boxes, water pumps, light fixtures and signage, as appropriate.
- **HER OBJ 17:** To promote best conservation practice and encourage the use of appropriately qualified professional advisors, tradesmen and craftsmen, with recognised conservation expertise, for works to protected structures or historic buildings in an Architectural Conservation Area.
- **HER OBJ 18:** To require that in the event of permission being granted for development within the curtilage of a protected structure, any works necessary for the survival of the structure and its re-use should be prioritised in the first phase of development.
- **HER OBJ 19:** To commission a study over the lifetime of the Plan to assess the significance of the Mass Rocks and Holy Wells throughout County Meath.

13.2.3 Desktop Assessment

This is a document and cartographic survey utilising a number of sources in order to identify all known archaeological sites and other monuments of historical interest within the study area. The principal sources used for identifying archaeological monuments are listed below.

- Record of Monuments and Places for Co. Meath (RMP)
- Sites and Monuments Record for Co. Meath (SMR)
- National Museum of Ireland Topographical Files
- Townland search of the annual Excavations bulletin (www.excavations.ie)
- All three editions of the OS 6" scale sheets
- Down Survey map for Co. Meath
- Meath County Development Plan 2021-2027
- Drogheda Local Area Plan (LAP) 2004
- National Inventory of Architectural Heritage (NIAH)
- Aerial photographs Ordnance Survey of Ireland (www.osi.ie)
- Heritage Council Map Viewer

The Record of Monuments and Places

This is a list of archaeological sites known to the National Monuments Service of the Department of Culture, Heritage and the Gaeltacht with accompanying RMP maps, based on OS 6" Sheets, which indicate the location of each recorded site. The list is based on the Sites and Monuments Record (SMR) files which are kept in the National Monuments Service and are updated on a regular basis. The Sites and Monuments Records (SMR) are lists with accompanying maps and files of all known archaeological sites and monuments mainly dating to before 1700AD. These lists were initially compiled from cartographic, documentary and aerial photographic sources.

National Museum of Ireland Topographical Files

This is the national archive of all known antiquities recorded by the National Museum and consists of a catalogue of objects reported to that institution since 1928. These files mostly contain information on finds but there are also references to monuments and sites of archaeological significance. A

record of all previous archaeological excavations undertaken in Ireland is also available from the National Museum.

County and City Development Plans

County, Town and City Development Plans are made in accordance with the requirements of the Local Government (Planning and Development) Act 2000 (as amended). The plans set out each council's policy for the conservation and enhancement of a county's natural and built environment and list items of special environmental or archaeological interest. The Meath County Development Plan 2021 - 2027 outlines a number of objectives and policies with regard to archaeology and heritage and was consulted in the preparation of this impact assessment report. It also includes a Record of Protected Structures (RPS), which is a list of buildings which may not be altered or demolished without grant of permission under the Local Government (Planning and Development) Acts, 2000 (as amended).

The Department of Culture, Heritage and the Gaeltacht has published Architectural Heritage Protection, Guidelines for Planning Authorities (2004) and A Government Policy on Architecture 2009-2015, which contains policy and advice for the protection of architectural heritage, including protected structures and architectural conservation areas. Each Local Authority has a legal responsibility to include a Record of Protected Structures (RPS) in its Development Plan.

Cartographic Sources and Aerial Photography

The 1st and 2nd editions (6"and 25") of the Ordnance Survey maps for the area were consulted as well as the OSI aerial photography which can be accessed online at www.osi.ie.

Excavation Bulletins

Excavation Bulletins are annual bulletins which contain summaries of all licensed archaeological excavations undertaken in Ireland from 1985 to 2018. The database is available at www.excavations.ie.

The National Inventory of Architectural Heritage (NIAH)

The National Inventory of Architectural Heritage is a state initiative under the administration of the Department of Culture, Heritage and the Gaeltacht. The database has been compiled and published on a county by county basis and it lists some of the architecturally significant buildings and items of cultural heritage significance. The National Inventory of Architectural Heritage for Co. Meath (www.buidlingsofireland.ie) was consulted for townlands within and in the environs of the study area.

13.2.4 Consultation

Dr Stephen Davies, Department of Archaeology, University College Dublin was consulted as part of the research for this impact assessment report as he has carried out a geophysical survey and LiDAR (Light detection and radar) imagery of the field proposed for development in 2016. This work was completed by Dr. Davies as part of his research into the ritual landscape of Co. Meath. Dr Davies supplied the Light Detection and Ranging (LiDAR) image of the large embanked enclosure that was recently detected in the lands proposed for development.

13.3 The Receiving Environment and Field Survey

The proposed development site is located in Carranstown and Caulstown townlands 2.7km northeast of Duleek in Co. Meath in lands to the south of the R152 (Figure 13.1). The site is located on the opposite side of the public road to Irish Cement and Indaver and comprises a single field of 10.55ha (Figures 13.1 and Figure 13.2). The site is surrounded on all sides by well-wooded hedgerows and the terrain is smooth and level (Plates 13.1-13.3). The townland boundary for Caulstown/Carranstown forms the western boundary to the site (Plate 13.4). The general landscape character surrounding the proposed development site comprises a mixture of industrial development and agricultural land of arable and pastoral fields together with some detached residential housing along both sides of the R152. Views to the north are obscured by Irish Cement in the Platin townland and the Indaver Incinerator facility in the adjacent townland of Carranstown. There are pleasant rural views to the south, east and west across the open and well managed agricultural landscape of east Co. Meath.

Figure 13.1: Aerial image with proposed development site outlined in red

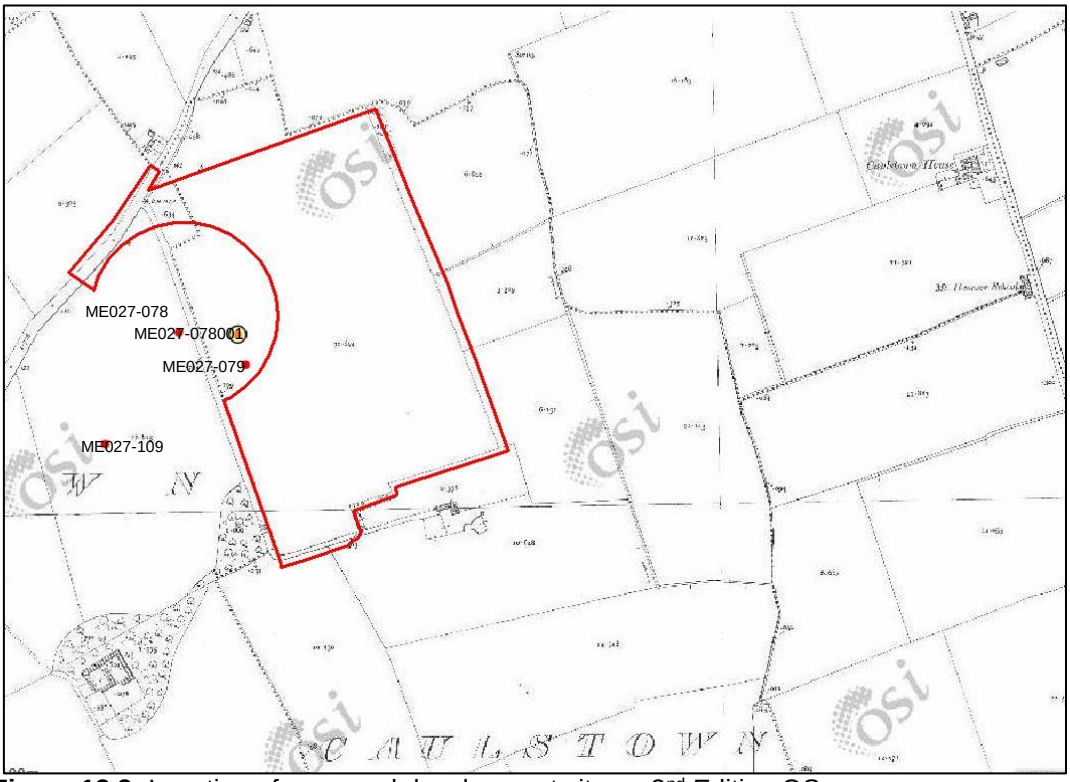


Figure 13.2: Location of proposed development site on 2nd Edition OS map

Plate 13.1: Proposed development site looking north from SW corner of site boundary towards Irish Cement

Plate 13.2: SW portion of proposed development site - looking south

Plate 13.3: E side of portion of proposed development site - looking east from western boundary of site

Plate 13.4: Townland boundary between Carranstown and Caulstown forming W boundary of proposed development – looking N towards Indaver Incinerator Facility

13.4 Archaeological Background

13.4.1 Recorded Archaeological Monuments within the Environs of the Subject Lands

Two redundant archaeological monuments were originally recorded for the proposed development lands; one (ME027-079) located within the boundary of the proposed development, the other (ME027-078) in a field to the immediate northwest.

As part of his research into the ritual landscape of Co. Meath, Dr Stephen Davis, Department of Archaeology, University College Dublin has carried out a geophysical survey and LiDAR (Light detection and radar) imagery of the field proposed for development in 2016. The results of the survey combined with a high-resolution LiDAR image of the field has shown that a substantial embanked enclosure exists at the location of the two sites (ME027-078 and ME027-079) that were registered in the Record of Monuments and Places (RMP) in 2018 as redundant records (Figure 13.3). While the results of the geophysical survey did not reveal the circuit of the enclosure in its entirety, the LiDAR image clearly shows that a substantial henge-type monument (c. 120m internal diameter) survives beneath the surface almost half of which extends into the northwest side of the lands owned by SSE (Figure 13.4; Davis, pers. comm.). The sites were originally described by the National Monuments Service as potential large enclosures from an inspection of aerial images but subsequent field survey in 1987 indicated that there was no evidence of an enclosure at either site and they were subsequently listed as redundant records (www.archaeology.ie). Since then, the use of detection methods including geophysical survey and LiDAR technology demonstrates beyond doubt that a significant embanked enclosure similar to many other prehistoric ritual monuments in the Boyne valley survives beneath the ground at this location. Dr Davis notified the National Monuments Service of the existence of the monument and it has now been classified as an embanked enclosure (ME027-078) defined by a broad bank feature with an external diameter of 200m.

The LiDAR image also shows a linear feature extending in a north-south direction across the central area of the development site. This may represent an early field boundary as it is aligned with an

existing field boundary to the north. The possible boundary is not shown on the 1st edition of the Ordnance Survey map indicating that it had been removed from the landscape by the mid-19th century.

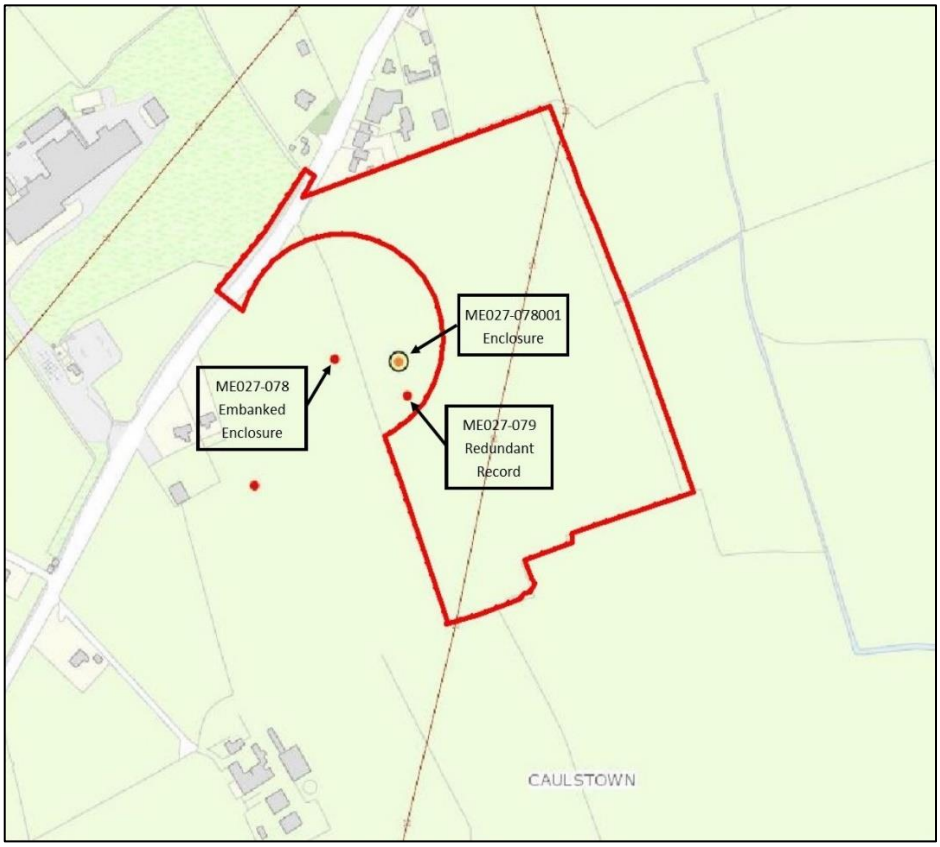


Figure 13.3: Extract from OSI map showing redundant archaeological records within and to the west side of the proposed development site

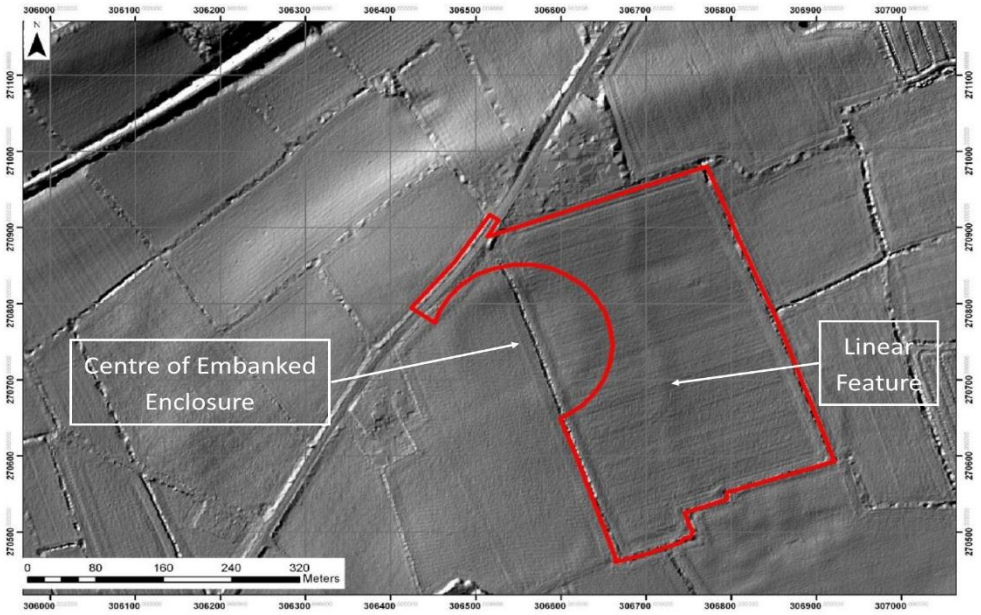


Figure 13.4: LiDAR image showing substantial embanked enclosure extending into the northwest side of the lands proposed for development (courtesy of Dr Stephen Davis)

As part of a pre-planning investigations for the previously proposed distillate fired 208 MW OCGT Generating Plant (Planning Ref. no. LB190031), a geophysical survey was carried out at the site in November 2018 by J. M. Leigh Surveys Ltd (included in Attachment 3 of this Environmental Report).

The gradiometer survey did not show any trace of the enclosing bank that is so clearly visible on the LiDAR imagery but it did identify a probable enclosure (ME027-078001) inside its perimeter and another less certain feature to the south. A number of potential archaeological features were identified in other areas of the field proposed for development and some of these were recognised during the test excavation which was carried out in March 2019.

13.4.2 Results of Test Excavation Undertaken In 2019

As part of the previous planning application by SSE to develop this site (Planning ref. LB190031), a test excavation was undertaken at the proposed development site by Margaret McCarthy, Consultant Archaeologist in 2019 focusing on the anomalies of potential archaeological interest identified by the geophysical survey (Leigh 2018). At that stage, the layout of the then proposed development had been designed in order to avoid the embanked enclosure (ME027-078) visible on the LiDAR imagery. A zone of exclusion measuring 25m in width had been established extending from the outer edge of the monument (Figure 13.5). The test excavation did not encroach either into the area of the monument or the exclusion zone established around it. This exclusion zone has been maintained in the site layout for the new proposed development for which this Environmental Report is being submitted.

A total of 15 trenches were opened and the placement of these was dictated by the presence of an 110kV electricity line traversing in a northeast-southwest direction across the field and a required wayleave measuring 50m in width beneath the line. The location of the test trenches is shown in Figure 13.6.

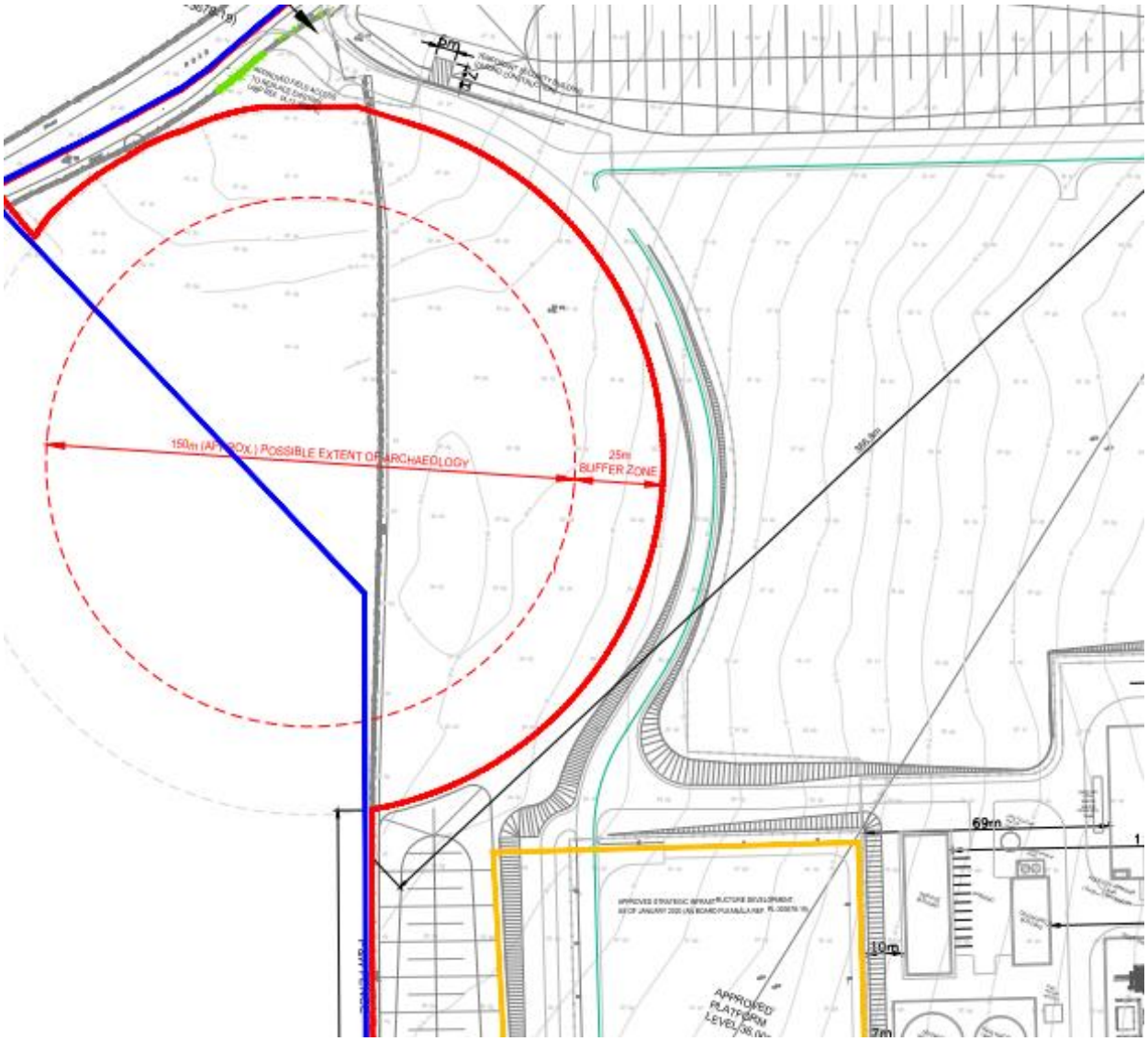


Figure 13.5: Excerpt of proposed development layout plan showing buffer zone established around embanked enclosure (ME027-078) in the northwest corner of the site (See drawing no. 60695232-PTN-DR-002)

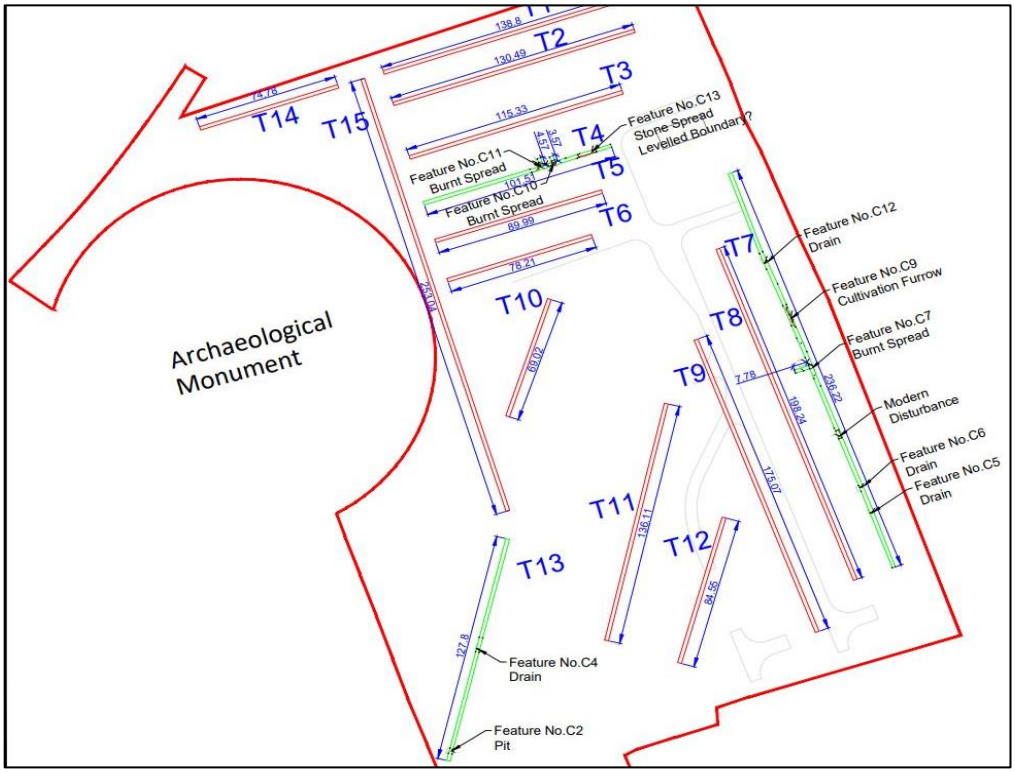


Figure 13.6: Location of test trenches

Two spreads (C10 & C11) of black charcoal enriched soil and burnt stone were identified in the central area of Trench 4, excavated to the east of the embanked enclosure (Plates 13.5 & 13.6). A similar type spread (C7, Plate 13.7) was exposed in Trench 7 and all resemble Bronze Age *fulacht fiadh* material. At the east side of Trench 4, a broad concentrated spread of stone (C13) may represent the remnants of a former field boundary indicated extending N-S across the development and clearly depicted on the LiDAR image (Figure 13.4).

Plate 13.5: Test Trench 4 – Burnt spread (C11) – looking W

Plate 13.6: Test Trench 4 – Burnt spread (C10) – looking NNW

Plate 13.7: Test Trench 7 – burnt spread (C7) - looking E

A single feature was exposed at the southern end of Test Trench 13 consisting of a small spread of charcoal enriched soil (C2). It was manually cleaned and half-sectioned to revealed the presence of a shallow oval-shaped feature measuring 58cm EW x 49cm NS and reaching a maximum depth of 17cm (Plate 13.8).

Plate 13.8: Test Trench 13 – possible pit (C2)

13.4.3 Recorded Archaeological Monuments within the Environs of the Proposed Development

The western half of the embanked enclosure visible on the LiDAR image is adjacent to the northwest boundary of the subject lands (Figure 13.5). In the wider area, there is a sufficiently large number of recorded archaeological monuments to provide evidence for extensive prehistoric, early medieval and medieval settlement (Table 13.2, Figure 13.7). The nearest monument of significance is located to the immediate north of the Irish Cement facility in Platin townland, listed in the Record of Monuments and Places for Co. Meath as a church (ME027-003001) with two associated stone crosses (ME027:00303-04). The church is situated on a slight east-facing slope at the northeast extremity of the parish of Duleek. Platin was in the possession of the Benedictine Order until its suppression in 1540. The church is an undivided nave and chancel structure that survives complete with opposing round-headed doorways and with a stoup inside the south doorway. Two crosses are set into the remains of the church; one (ME027-003003) has figure sculptures on each side with foliage designs and the design dates it to the 1500AD (King 1984). The other cross (ME027-003004) is a disc-headed cross with a raised ring which probably dates to the later seventeenth century (ibid.). There are also a number of prehistoric sites in the environs of the proposed development including two fulachta fiadh (ME027-058 & ME027-103) in Carranstown townland that were exposed during topsoil stripping to the west of the Irish Cement facility and two enclosures (ME020-086 & ME020-087) in Platin townland identified from aerial imagery. Enclosures and earthworks are general classifications used to describe sites whose exact nature is unclear except that they are levelled monuments of indeterminate date. An inland promontory fort (ME020-014) is located in Platin townland on the east side of the M1. The monument is situated on top of a rock outcrop and covers an area of approximately two acres. The monument is roughly oval in plan and is surrounded by banks and ditches. An archaeological excavation (Licence no. 01E0044) of the west half of the promontory fort was undertaken in advance of the construction of the motorway in 2001 and this revealed the presence of a child burial dated to between the first and the late third century AD. Finds from the excavation also included prehistoric pottery of Early/Middle Neolithic date, flint tools and significantly an 8th/10th century AD ring pin (Conway 2001).

Table 13.2: Recorded monuments located within 2km of the study area

RMP no.	Townland	Site Type
ME027-006	Bellewstown	Souterrain
ME027-008	Annagor/Beaumont	Bridge
ME027-041	Kilsharvan	Excavation-miscellaneous
ME027-042	Kilsharvan	Excavation-miscellaneous
ME027-043	Kilsharvan	Excavation-miscellaneous
ME027-048	Kilsharvan	Kiln – corn drying
ME027-049	Kilsharvan	Kiln
ME027-050	Kilsharvan	Excavation – miscellaneous
ME027-051	Kilsharvan	Excavation-miscellaneous
ME027-052	Kilsharvan	Structure
ME027-053	Kilsharvan	Excavation
ME027-054	Kilsharvan	Enclosure
ME027-055	Kilsharvan	Excavation-miscellaneous
ME027-056	Kilsharvan	Excavation-miscellaneous
ME027-058	Carranstown	Fulacht Fiadh
ME027-060	Beaumont	Enclosure
ME027-06202	Bellewstown	Ring ditch
ME027-06203	Bellewstown	Ring ditch
ME027-065	Bellewstown	Enclosure
ME027-067	Bellewstown	Enclosure
ME027-075	Bellewstown	Enclosure
ME027-084	Bellewstown	Burial Ground
ME027-103	Carranstown	Fulacht Fiadh

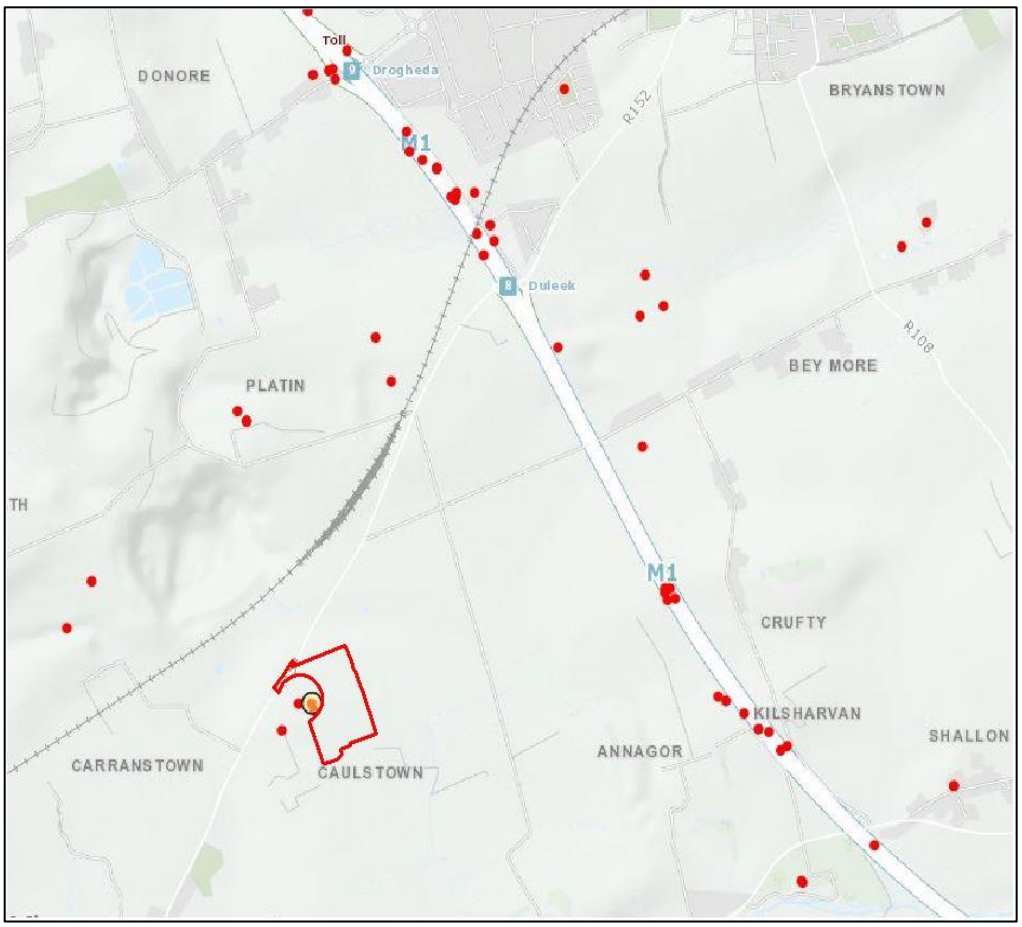


Figure 13.7: Recorded archaeological sites in the environs of the proposed development (proposed site boundary outlined in red). Image taken from Historic Environment Viewer, National Monuments Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Powered by ESRI Ireland, Annotated by Margaret McCarthy.

13.4.4 General Archaeological Summary

The county of Meath can be regarded as exceptional in terms of its density of recorded archaeological monuments including the UNESCO World Heritage Site of Brú na Bóinne, the seat of the High Kings of Ireland at Tara, the passage tombs of Newgrange, Knowth and Dowth and the largest Anglo-Norman castle in Ireland at Trim (Moore 1987). The historic towns of Navan, Trim and Kells contain many buildings of architectural merit while the country houses with their demesne landscapes and industrial sites such as canals and mills contribute significantly to the cultural heritage value of the county.

The earliest evidence of settlement in the county is from the Mesolithic period (*c.* 7000BC) when hunter-gatherer groups exploited the natural resources around the coast and along the Rivers Boyne and Blackwater. The Neolithic period (*c.* 4000 BC) saw the introduction of farming with family groups settling down and clearing the forests and woods to plant crops and rear livestock. It is these communities who built the impressive communal burial sites such as the famous passage graves of Newgrange, Knowth and Dowth along the Bend of the Boyne. Increased population during the Bronze Age saw a further phase of communal building and the construction of circular earthworks in close proximity to the passage tombs (Moore 1987). Meath is known as ‘The Royal County’ because the Hill of Tara was the seat of the High Kings of Ireland for many centuries. The site consists of several large earthworks overlooking the fertile farmland of Meath plain. The World Heritage Site of the Bend of the Boyne is commonly known as Brú na Bóinne, which means the ‘palace’ or the ‘mansion’ of the Boyne. It refers to the area within the bend of the river Boyne around Newgrange,

Knowth and Dowth, and is one of the world's most important archaeological complexes. The large passage tombs are on high ground overlooking the valley, while there are numerous other archaeological sites on the low lying areas and floodplain closer to the river (ibid.). Co. Meath also has a very high proportion of substantial embanked enclosures or henge monuments (O'Sullivan *et al* 2012).

The origins of Duleek date back to an early Christian monastic settlement (Moore 1987). The town takes its name from the Irish word *Daimh Liag* meaning 'house of stones' which refers to an early stone built church, St. Cianan's Church, the ruins of which are still visible in the town today. The town was an important bridging point on the River Nanny and the settlement was built on a slight rise of the river flood plain.

13.4.5 Cartographic Background

A review of historic mapping is an invaluable tool in showing how the landscape has changed over time and the comparison of various editions can indicate how some landscape features have been created, altered or removed. In some instances, topographical features that appear on these early maps are found to be of potential archaeological significance during field survey. The pre-Famine first edition map (1841) of the study is one of a well-managed agricultural character stemming from the eighteenth century estate system of fields bounded by hedgerows with individual farm holdings and small towns and villages. Meath's long history in farming is reflected in numerous country houses and farmhouses, outbuilding and stables scattered across the landscape. The first edition OS map indicates that the proposed development lands are located on the west side of Caulstown townland with the townland boundary between it and Carranstown forming the western boundary to the site (Figures 13.8 & 13.9). The area consists of a large rectangular-shaped field oriented northwest/southeast. A vernacular building reached by a trackway to the west is depicted to the south of the proposed development site. Caulstown estate house and demesne is depicted to the west of the proposed development site. The second edition (1915) OS map shows no significant change in the landscape character with the area continuing to comprise a mixture of large and small field enclosures with very little evidence for loss or removal of hedgerows (Figure 13.9). Caulstown House and Mt. Hanover National School are indicated to the east of the proposed development site in the adjacent townland.

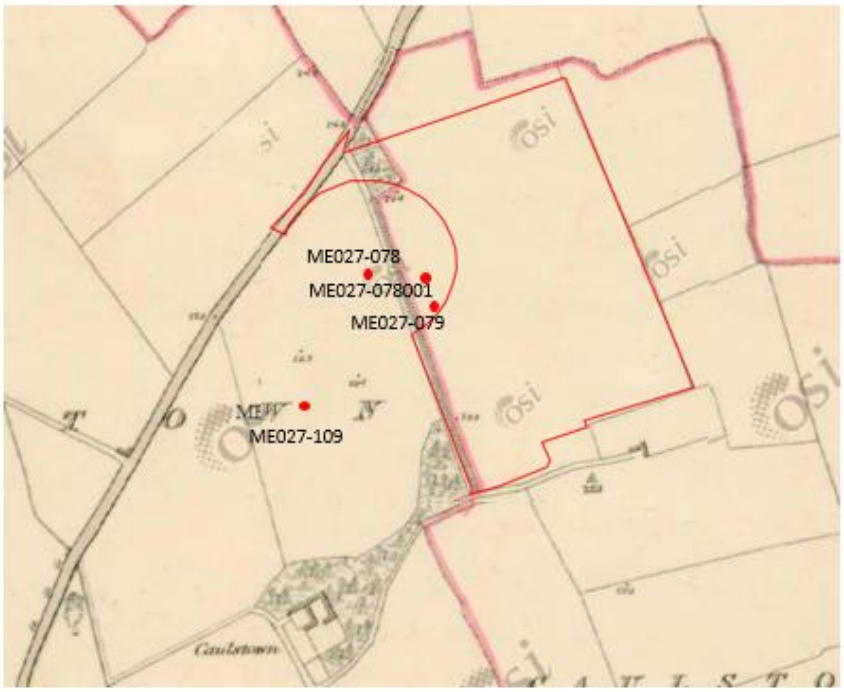


Figure 13.8: Extract from 1st Edition (1840) OS map (proposed site boundary outlined in red)

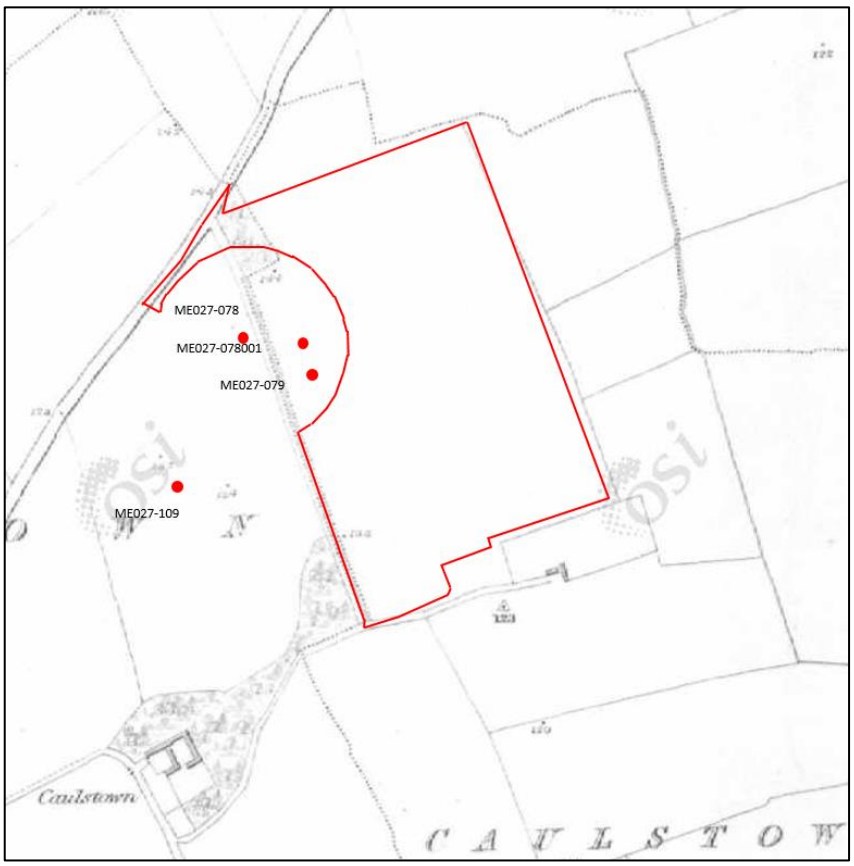


Figure 13.9: Extract from revised 1st Edition OS map (proposed site boundary outlined in red)

13.4.6 Record of Protected Structures

The Meath County Development Plan 2021 - 2027 provides a full list of all its Protected Structures. The Plan recognises the status of these buildings as sites of architectural merit and all are afforded legal protection. There are no protected structures either within or in the general environs of the proposed development site.

13.4.7 National Inventory of Architectural Heritage (NIAH)

A search of the database of the National Inventory of Architectural Heritage indicated that no buildings or other features considered of architectural merit are listed within the proposed site development boundary.

13.4.8 Previous Archaeological Work Undertaken in the Environs of the Study Area

The Excavations Bulletin is both a published annual directory and an on-line database that provides summary accounts of all the excavations carried out on the island of Ireland from 1970 to 2019. Meath County has been subject to considerable development and infrastructural works in recent years and archaeological excavations since the 1990s have revealed a significant number of previously unknown prehistoric habitation and ritual sites. Within the immediate environs of the proposed development, a total of 32 archaeological sites have been discovered and excavated mostly during work on the M1. Details of the excavated sites are presented in tabular form in Table 13.3. The density of archaeological sites discovered in the general area in recent years through infrastructural works is an indicator of the potential for archaeological features to be present in the lands forming the subject of this impact assessment report.

Table 13.3: Excavated archaeological sites within the immediate environs of the proposed development lands

Excavation no.	Townland	Site Type
00E0813	Rathmullan	Habitation site/pit
01E0293	Rathmullan	Burnt mound/pit
01E0294	Rathmullan	Pit
01E0113	Lagavooren	Pit
01E0129	Lagavooren	Structure
01E0161	Lagavooren	Habitation site
01E0162	Lagavooren	Pit
01E0163	Lagavooren	Pit
01E0397	Lagavooren	Enclosure
01E0914	Lagavooren	Bronze Age settlement
00E0030	Platin	Inland promontory fort
00E0822	Platin	Inland promontory fort
01E0338	Platin	Prehistoric settlement
01E0044	Platin	Inland promontory fort
01E0176	Kilsharvan	Kiln
01E0177	Kilsharvan	Kiln
01E0178	Kilsharvan	Pit
01E0179	Kilsharvan	Pit
01E0180	Kilsharvan	Structure
01E0181	Kilsharvan	Burnt spreads
01E0182	Kilsharvan	Deposit
01E0183	Kilsharvan	Pit
01E0185	Kilsharvan	Pit
01E0187	Kilsharvan	Clay and charcoal deposit
01E0188	Kilsharvan	Pit
01E0190	Kilsharvan	Pit
01E0191	Kilsharvan	Enclosure
01E0192	Kilsharvan	Bronze Age pit
01E0193	Kilsharvan	Pit
01E0194	Kilsharvan	Surface finds
01E0195	Shallon	Furnace/pit
01E0197	Shallon	Metalworking site

13.5 Impact Assessment

The impact of the proposed development on the archaeological heritage, both recorded and potential sub-surface remains, is assessed below.

13.5.1 Direct Impact on Archaeological Features Exposed During 2019 Test Excavation

A number of archaeological features were identified during a test excavation undertaken at the proposed development site in 2019. Three of these were located in the central and eastern areas of the field, east of the embanked enclosure. A single isolated pit was exposed in the southwest corner of the site. These features will be directly impacted upon in the event of any development work being undertaken at the site.

13.5.2 Potential Indirect Impacts on Archaeological Heritage

Given the existence of an embanked enclosure (ME027-078) in the northwest corner of the land owned by SSE and the exposure of a number of features of potential archaeological significance during the test excavation undertaken at these lands in 2019, the adjacent proposed development lands are considered as being of high archaeological potential. The greatest potential impacts on archaeological heritage will arise therefore during ground works at the initial construction phase as this type of disturbance using heavy plant machinery is inherently destructive to archaeological sites that have no surface expression.

13.5.3 Impact on Architectural and Cultural Heritage

There are no protected structures (RPS) within the study area and the National Inventory of Architectural Heritage (NIAH) does not list any upstanding buildings or structures for the lands. There will therefore be no direct impact on any known architectural and cultural heritage sites.

13.5.4 Visual Impact

This refers to the potential impact of a development on the overall character and setting of an archaeological monument or landscape. The recently discovered archaeological site at the west side of the subject lands has no surface expression as the enclosing bank has been totally levelled. The immediate area has been subject to considerable industrial and road infrastructure development in recent years, therefore it is considered that the overall visual impact of the proposed development is low.

13.6 Mitigation

The following mitigation measures will be implemented in the interest of safeguarding the archaeological heritage of the study area.

13.6.1 Pre-Construction Phase Mitigation

Embanked enclosure (ME027-078)

The eastern half of a substantial embanked enclosure, detected through recent geophysical and LiDAR investigation, survives in the northwest corner of lands owned by SSE, adjacent to the proposed development site. Preservation *in situ,* i.e. avoidance, is the chosen option for this significant recorded monument and this is in accordance with the Department of Culture, Heritage and the Gaeltacht's publication on 'Frameworks and Principles for the Protection of the Archaeological Heritage'. To ensure no accidental damage or encroachment onto the site of the monument, a solid buffer zone will be established around the monument prior to the commencement of any development works at the site. This will be achieved by the erection of a solid post and rail fencing, clearly signed as an 'Archaeological Monument'. An archaeologist will be present to establish the buffer zone around the embanked enclosure in advance of site preparation works. The post and rail fencing will be erected prior to the commencement of topsoil removal and will remain in place during the course of construction work.

Excavation of archaeological features exposed during 2019 test excavation

The archaeological test excavation undertaken in 2019 identified a small number of potential archaeological features and these will be fully exposed and investigated by a qualified Archaeologist prior to the commencement of the main phase of ground works at the site. The archaeologist will obtain an excavation licence for this work to be issued by The National Monuments Service, Department of Culture, Heritage and the Gaeltacht and approved by the National Museum of Ireland.

13.6.2 Construction Phase Mitigation

Embanked enclosure

While the proposed development has been designed to avoid the archaeological monument by establishing a 25m exclusion zone around its perimeter, the potential for impact during construction is increased due to its levelled nature. No ground works, stockpiling of topsoil or storage of construction materials and plant equipment will take place within the agreed buffer zone, which will be clearly defined prior to the commencement of any development works by a solid post and wire fence.

Potential sub-surface archaeological features

The construction phase of any development involves considerable ground disturbance therefore the greatest potential impact of the proposed development at Caulstown on the archaeological resource will be during the removal of topsoil and general ground reduction. The test excavation identified a number of potential archaeological features and these features will be excavated prior to the main phase of groundworks at the site.

Following commencement of groundworks, all topsoil removal operations required of the development will be fully monitored by a qualified archaeologist. The archaeologist will obtain an excavation licence for this work to be issued by The National Monuments Service, Department of Regional Development, Rural Affairs, Arts and the Gaeltacht and approved by the National Museum of Ireland. The developer will allow the archaeologist sufficient time, usually four weeks, to obtain an archaeological licence prior to the commencement of construction works. The time-scale for the construction phase will be made available to the archaeologist at an early stage with information on where and when topsoil stripping will take place.

In the event of archaeological features being exposed during the course of monitoring, the archaeologist will be empowered to have works ceased in the vicinity of such material. If archaeological remains are encountered, these areas become archaeological sites and are protected by National Monuments legislation (National Monuments Act 1930 (as amended)). Further work on the site will require consultation with the archaeological staff of The National Monuments Service, Department of Culture, Heritage and the Gaeltacht. Should archaeological artefactual material be uncovered, the requirements of the National Museum of Ireland with regard to such items will be implemented.

Provision, including financial and time, will be made to facilitate any excavation or recording of archaeological material that may be uncovered during the developmental works. The excavations will be undertaken in compliance with any measures that the National Monuments Service and the National Museum of Ireland deem appropriate. Following completion of monitoring, and other possible archaeological investigations, the archaeologist will submit a report to the National Monuments Service, the National Museum and the Local Authority.

13.6.3 Operational Phase Mitigation

Permanent buffer zone around embanked enclosure

A permanent horizontal buffer zone measuring 25m in length will be established around monument (ME027-078) in the northwest corner of the field proposed for development. This permanent and obvious buffer zone will serve to define the presence of the monument in years to come.

13.6.4 ‘Do Nothing’ Scenario

In the ‘Do Nothing’ scenario, there would be no impact on the archaeological heritage as there would be no opportunity to establish the nature and extent of potential sub-surface archaeological features.

13.6.5 Residual Impacts

The proposed development is located in an industrially developed landscape of Drogheda’s environs that lie close to the Brú na Bóinne UNESCO World Heritage site. Recent geophysical survey combined with LiDAR imagery has shown that the eastern half of a substantial embanked enclosure (ME027-078) of presumed prehistoric date survives in the northwest corner of the subject lands. This monument is subject to statutory protection. Additionally, three previously unknown sub-surface burnt spreads of potential prehistoric date were exposed during the test excavation undertaken in February 2019.

While no above ground elements of the embanked enclosure (ME027-078) survive, the significance of the monument cannot be understated and its future conservation and management will accord with the strict implementation of the mitigation measures outlined above as well as the Objectives and Actions outlined in a Conservation Plan for the monument compiled by the author on behalf of SSE Ireland LTD (Attachment 7).

13.7 Conclusions

This chapter has assessed the potential impact of the proposed development of a 10.55ha parcel of land in Caulstown, Co. Meath on the archaeological, architectural and cultural heritage resource. A large embanked enclosure was detected through geophysical survey and the analysis of LiDAR data at the west side of the subject development lands. A test excavation undertaken at the site in 2019 identified a limited amount of archaeological features. A significant number of archaeological sites were also exposed and excavated during the construction of the M1 to the east, and it is considered therefore that there is a high potential for archaeological remains to survive beneath the surface. No above ground trace of the embanked enclosure survives and a number of mitigation measures will be implemented to safeguard the monument. Potential direct impacts to previously undocumented sub-surface archaeological features have also been identified and appropriate mitigation will be implemented.

13.8 Chapter 13 Bibliography

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4. McCarthy, M. 2018 *Caulstown/Carronstown: Archaeology, Architecture and Cultural Heritage Chapter*. Included in EIAR submitted to Meath County Council
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7. Moore, M. 1987 *Archaeological Inventory of County Meath*, Dublin, Stationery Office.
8. O'Sullivan, M., Davis, S. and Stout, G. 2012 In: A. Gibson *Enclosing the Neolithic: Recent Studies in Britain and Europe,* BAR International Series 2440, 37-53.

Other sources

– Meath County Council Library Website
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– Excavations.ie, database of Irish excavation reports. Available at http://www.excavations.ie.
– National Monuments Service website http://www.archaeology.ie
– Department of Environment, Heritage and Local Government

14 Climate

This chapter is divided into two separate aspects relating to climate:

– Effects of the proposed development on climate: the effects of GHG emissions arising from the proposed development on climate change. The receptor in this situation is the global atmosphere and the ensuing effect on climate itself.
– Resilience of the proposed development to present-day and future weather and climate due to climate change.

14.1 Greenhouse Gas (GHG) Emissions

14.1.1 Introduction

This section presents an assessment of the likely and significant impacts arising from the proposed development on climate change. The assessment is based on the development as described in Chapter 2 of this Environmental Report.

Throughout the section, reference is made to Greenhouse Gas (GHG) emissions, these consist of any atmospheric gas that absorbs thermal radiation emitted by the Earth's surface and traps the heat in the atmosphere, keeping the surface at a warmer temperature than otherwise be possible. These commonly refer to the following gases, as covered in the IPCC Guidelines for National Greenhouse Gas Inventories[90]:

– Carbon dioxide (CO_2);
– Methane (CH_4);
– Nitrous oxide (N_2O)
– Fluorinated gases (e.g. SF_6, hydrofluorocarbons, and perfluorocarbons).

14.1.2 Policy and Guidance

The Planning Report which accompanies this application (AOS Document ref. AOS120723-SSE-002) describes the wider policy and legislative context applicable to the proposed development. Policies and guidance documents of potential relevance to the climate impacts are set out in this section.

The following policy and guidance documents have been used to inform this section of the Environmental Report.

14.1.2.1 International Climate Change Legislation and Policy

Ireland is party to the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. Both provide a legal framework for addressing global climate change. Building on the UNFCCC process, the Paris Agreement is a global treaty established with the intention of developing a unified approach to combating climate change. Agreed in December 2015, the Paris Agreement aims to restrict global temperature rise to well below 2˚C above pre-industrial levels, and to pursue efforts to limit the temperature increase to 1.5˚C[91]. All countries will aim to play their role in curbing emissions through their nationally determined contributions (NDC). Since the Paris Agreement, countries have reconvened at Glasgow in 2021 and agreed to pledge further cuts to emissions at the following conference as well as phase down the use of coal[92]. In 2022, countries met in Sharm el-Sheikh, Egypt and agreed to outcomes that reflected only modest, incremental progress on reducing emissions, despite a clear emissions gap between current national climate plans and what's needed to limit temperature rise to 1.5˚C.

[90] IPCC (2006), IPCC Guidelines for National Greenhouse Gas Inventories. Available at: https://www.ipcc.ch/report/2006-ipcc-guidelines-for-national-greenhouse-gas-inventories/ (Accessed 31 March 2023)
[91] UNFCCC (2015), Paris Agreement. Available at: Paris Agreement (All languages version) (accessed 31 March 2023)
[92] UNFCCC (2021), Report of the Conference of Parties serving as the meeting of the Parties to the Paris Agreement on its third session, held in Glasgow from 31 October to 13 November. Available at: https://unfccc.int/sites/default/files/resource/cma2021_10_add1_adv.pdf (Accessed 31 March 2023)

The Glasgow Climate Pact adopted requested parties to "revisit and strengthen their 2030 targets" to align with the Paris Agreement temperature goal. Yet since then, only 34 of 194 parties have submitted new or updated NDCs though this did include major economies such as Australia, Mexico, and Indonesia. The conference reiterated the request to Parties that have not yet done so to revisit and strengthen their targets to align with the Paris temperature goal.[93]

14.1.2.2 EU Legislation

EU ETS[94]

The European Union's Emissions Trading Scheme (ETS) is designed to bring about reductions in GHG emissions at least cost, covering the following gases and sectors:

– CO_2 emissions from energy intensive industry, aviation, and electricity and heat generation;
– N_2O from the production of nitric, adipic and glyoxylic acids and glyoxal; and
– Perfluorocarbons (PFCs) from the production of aluminium.

It is the 'cornerstone' of the EU's policy to combat climate change and reduce GHG emissions. It has undergone three phases to date, with Phase 4 starting in 2021 and ending in 2030. Prior to the 2021 revision of the EU ETS in the Fit for 55 packages[95], the reduction in emissions required by the end of Phase 4 was of at least 43% by 2030 relative to 2005 levels. Under the fit for 55 package, the proposed European Commission target is to achieve 61% of emissions reductions by 2030 in the sectors covered by EU ETS.

EU Effort Sharing Regulation[96]

Under the EU Effort Sharing Regulation (ESR), Ireland has a target of reducing GHG emissions for sectors not included in the EU Emissions Trading Scheme (EU ETS) by 20% below 2005 levels by 2020 and a 30% reduction by 2030. The sectors covered by EU ESR are:

– Transport (except aviation and non-domestic shipping);
– Buildings;
– Agriculture;
– Industrial installations and gases not covered by the EU ETS and their waste; and
– Non-combustion related emissions from energy and product use.

Fit for 55[97]

Realising the need to step up its ambition to reach climate neutrality by 2050, the EU made several revisions to previous laws and released five new proposals as part of its 'Fit for 55' package. Most notably, the new GHG emissions new reduction target by 2030 was changed to 55% from 40% compared to 1990 levels. Revisions include increasing the uptake of renewable energy from 32% to 40%, a 42% reduction of non-EU ETS GHG instead of 30% for Ireland in the Effort Sharing Regulation, an ambition of 61% of emissions reductions by 2030 in the sectors covered by the EU ETS, and the introduction of a Carbon Border Adjustment Mechanism (CBAM). EU environment ministers agreed on a Council negotiating position on the revised rules on 29 June 2022. In November 2022, the Council reached a provisional agreement with the European Parliament. The regulation was adopted by the Council in March 2023.

[93] UNFCCC (2022), Conference of the Parties Report of the Conference of the Parties on its twenty-seventh session, held in Sharm el-Sheikh from 6 to 20 November 2022. Available at: https://unfccc.int/sites/default/files/resource/cp2022_10a03_adv.pdf?download (Accessed 31 March 2023)
[94] EU (2003), Regulation (EU) 2003/87. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32003L0087&from=EN (Accessed 31 March 2023)
[95] European Commission (2020), Stepping up Europe's 2030 climate ambition. Available at https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0562&from=EN (Accessed 31 March 2023)
[96] EU (2018), Regulation (EU) 2018/842. Available at https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018R0842&from=EN (Access 03 April 2023)
[97] European Commission (2020), Stepping up Europe's 2030 climate ambition. Available at https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0562&from=EN (Accessed 31 March 2023)

F Gas Regulations[98]

The objective of the F-gas regulation is to control the emission related to fluorinated greenhouse gases (F-gases), include hydrofluorocarbons (HFCs). In the short term it seeks to limit the sales of the most important F-gases with the aim of phasing them down to one fifth of their 2014 sales by 2030. The use of F-gases is also banned when less harmful alternatives are widely available such as in fridges, air conditioning, or asthma sprays. Additionally, all existing equipment will require checks, servicing and recovery of the gases at the end of the equipment's life to prevent any further emissions.

This regulation is now being reviewed by the European Commission with a view to update it to ensure it aligns with Fit for 55.

14.1.2.3 National Legislation

Climate Action and Low Carbon Development Act 2015[99]

The Climate Action and Low Carbon Development Act 2015 set out the legislative framework in which the Irish Government will ensure the transition to a "low carbon, resilient and environmentally sustainable economy by the end of the year 2050". The main goals of the Act are to lay out the tool through which the transition will be achieved, these being:

- The National Mitigation Plan, which specifies the policy measures that will be required to manage and remove GHGs at a level appropriate to achieve the transition. It must be published at least every five years, the first was published in 2017;
- The national adaptation framework, which details the strategy that different sectors and local authorities must follow to reduce the vulnerability of the Irish State with regards to the effects of climate change. This too must be published at least every five years; and
- An independent Climate Change Advisory Council, which will advise the Government in its preparation, submission, and approval of the mitigation plan and adaptation framework, as well as publishing its own report on the progress made by the Irish State.

The progress made in tackling climate change is presented yearly in the Annual Statement.

Climate Action and Low Carbon Development (Amendment) Act 2021[100]

The Climate Action and Low Carbon Development Act 2015 was amended in 2021 with a new objective for 2050 of a "climate resilient, biodiversity rich, environmentally sustainable and climate neutral economy". The purpose of the amendment was to strengthen the ambition of the Irish Government in addressing climate change by setting in legislation some of the suggestions made by the Climate Action Plan (see below, Climate Action Plan 2019, 2021) such as the five year Carbon Budgets. These must be consistent with the Paris Agreement and other international obligations and will include all forms of GHG emissions. The first two carbon budgets, over a period up to 2030, will have to lead to a 51% reduction in emissions compared to the 2018 baseline with the first carbon budget formally approved by the Irish Government in February 2022. The Irish Government has also approved the sector-specific emission ceilings within the carbon budget. Finally, the local authorities will also have to prepare their own action plans for adaptation as well as mitigation, rather than just adaptation as set in the original Act.

Carbon Budgets[101]

The Irish Carbon Budgets are three five-year economy-wide carbon budgets proposed by the Climate Change Advisory Council and approved by the Government and Oireachtas. These are set

[98] EU (2014) Regulation (EU) No 517/2014 of the European Parliament and of the Council on fluorinated gases and repealing Regulation (EC) No 842/2006
[99] Irish Government (2015); Climate Action and Low Carbon Development Act 2015. Available at: https://www.irishstatutebook.ie/eli/2015/act/46/enacted/en/html (accessed 03 April 2023)
[100] Department of the Environment, Climate and Communications (2021); Climate Act signed into law. Available at https://www.gov.ie/en/press-release/9336b-irelands-ambitious-climate-act-signed-into-law/ (accessed 03 April 2023)
[101] Irish Government (2022); Carbon Budgets. Available at: https://www.gov.ie/en/publication/9af1b-carbon-budgets/ (Accessed 03 April 2023)

out to help Ireland meet its 51% reduction in GHG emissions by 2030 and continue working towards its 2050 net-zero goal.

– 2021-2025: 295 Mt CO_2eq. This represents an average reduction in emissions of 4.8% per annum for the first budget period;
– 2026-2030: 200 Mt CO_2eq. This represents an average reduction in emissions of 8.3% per annum for the second budget period; and
– 2031-2035: 151 Mt CO_2eq. This represents an average reduction in emissions of 3.5% per annum for the third provisional budget.

To put this in perspective, total 2018 Irish GHG emissions were 68.3 Mt CO_2eq. It should also be noted that these budgets can be revised if new obligations are imposed by the EU, through other international agreements, or due to significant scientific advances.

To support carbon budget targets, in 2022 the government set sectoral emission ceilings for the electricity, transport, buildings, industry and agriculture sectors. For the electricity sector, a ceiling of 3 Mt CO_2eq has been set for 2030, equivalent to a 75% reduction from 2018[102]. The Government also committed additional resources for solar, off-shore wind, green hydrogen, agroforestry and anaerobic digestion to further accelerate the reduction of emissions.

14.1.2.4 National Policy

National Policy Position, 2014[103]

The National Policy Position recognised the challenge of reducing Ireland's emissions as well as setting the objective of an 80% reduction of CO_2eq emissions by 2050 compared to 1990 across the electricity generation, built environment and transport sectors, as well as "approaching" carbon neutrality in the agricultural and land-use sector. The strategies set out to achieve this were first outlined in the first National Mitigation Plan[104]. Moving forward, climate policy in Ireland will be a continual and dynamic process with frequently updated national plans to be adopted over the period to 2050.

Climate Action Plan 2019, 2021[105] and 2023[106]

The Climate Action Plan was first published in 2019 and detailed the proposed cross-sectoral policy measures for addressing climate change by setting out 200 different actions that could be implemented to meet its 2030 targets consistent with a net zero by 2050. Principal actions were aimed at increasing electricity generated from renewables to 70% through the Government's flagship support scheme; reducing EU ETS industry emissions by 10-15% compared to projections; and increasing the number of electric Vehicles (EV) and Light Electric Vehicles (LEVs) to 936,000. There have been two updates to the Climate Action Plan in 2021 and 2023. The Climate Action 2023 is the first to be prepared under the Climate Action and Low Carbon Development (Amendment) Act 2021 and following the introduction of the economy-wide carbon budgets and sectoral emissions ceilings. The sectoral carbon budgets for electricity are 40 Mt CO_2eq (2021-2025 period) and 20 Mt CO_2eq (2026-2030 period) respectively. Key measures for the electricity sector include:

– Contribute to a reduction in annual sectoral emissions to 3 Mt CO_2eq by 2030 (75% reduction from 2018 levels);

[102] Gov.ie - Government annouces sectoral emissions ceilings, setting Ireland on a pathway to turn the tide on climate changes (www.gov.ie) (accessed 03 April 2023)
[103] Department of the Environment, Climate and Communications; National Policy Position. Available at: gov.ie - National Policy Position on Climate action and Low Carbon Development (www.gov.ie) (accessed 03 April 2023)
[104] Department of the Environment, Climate and Communications; National Mitigation Plan 2017. Available at: gov.ie - National Mitigation Plan (www.gove.ie) (accessed 03 April 2023)
[105] Department of the Environment, Climate and Communications; Climate Action Plan 2021. Available at: https://www.gov.ie/en/publication/6223e-climate-action-plan-2021/ (accessed 03 April 2023)
[106] Department of the Environment, Climate and Communications; Climate Action Plan 2023. Available at: https://www.gov.ie/en/publication/7bd8c-climate-action-plan-2023/ (accessed 03 April 2023)

- Accelerate and increase the deployment of renewable energy to replace fossil fuels. This includes increasing the delivery of onshore wind, offshore wind, and solar to achieve 80% of electricity demand from renewable energy by 2030;
- Target 6 GW of onshore wind and up to 5 GW of solar by 2025;
- Target 9 GW onshore wind , 8 GW solar, and at least 5 GW of offshore wind by 2030 (and an additional 2 GW offshore wind for green hydrogen production);
- Deliver and accelerate a flexible system to support renewables, with a minimum of 2 GW of new flexible gas-fired power generation by 2030;
- Manage electricity demand growth. Deliver a Demand Side Strategy to ensure 20-30% demand side flexibility by 2030; and
- Achieve further emissions reduction through the electrification of other sectors, such as transport and heating.

Key climate actions supported by the proposed development include:

- Reduce fossil fuel use from 64% of final consumption (2021) to 45% by 2025 and further by 2030.

Programme for Government – Our Shared Future (Government of Ireland 2020)[107]

The Programme for Government set out the objectives of the government in response to the Covid-19 fallout but also contained several commitments regarding the climate crises such as enshrining net-zero into Irish law, an annual average of 7% reduction in GHG emissions, retrofitting houses, electrification of transport. Additionally, there will be an extensive reshape of investment in transport to ensure a modal shift towards public transport, cycling, and walking.

14.1.2.5 Local Policy

As highlighted in Section 7.1.2.3 of the Climate Action and Low Carbon Development (Amendment) Bill 2021 requires each local authority to make a five year “local authority climate action plan” that specifies mitigation and adaptation measures to be adopted. They should also consult, co-ordinate, and co-operate with other local authorities where appropriate.

Climate Action Regional Offices (CARO)[108]

Four regional offices were set up, funded by the Department of Environment, Climate and Communications, to coordinate regional and local level action on climate change, as a response to the National Adaptation Framework published in 2018. Meath County Council (MCC) sits within the Eastern & Midlands Climate Action Regional Office (CARO). While the Eastern & Midlands CARO[109] supports and coordinates all actions across both climate mitigation and adaptation, the Eastern & Midlands CARO will have a particular focus on fluvial, rural pluvial and groundwater flooding and develop knowledge hubs for these primary climate risks.

In addition to this, the aims and objectives of the CARO are to:

- Support and coordinate effort by the Local Authorities in this region, public bodies and other stakeholders to deliver climate action at a local level.
- Raise awareness of the impacts of climate change and equip Local Authorities with the information they need to adapt.
- Facilitate collaboration and information forums to support Local Authorities, public bodies and stakeholders to share climate change adaptation and mitigation action, research and best practice.
- Work with the Local Authorities in the region to deliver on the Local Authority Climate Action Charter and promote community and individual action at a local level.

[107] Department of the Taoiseach (2020); Programme for Government; Our Shared Future. Available at: https://www.gov.ie/en/publication/7e05d-programme-for-government-our-shared-future/ (accessed 03 April 2023)
[108] CARO.ie (2023). Available at: https://www.caro.ie/ (accessed 03 April 2023)
[109] CARO.ie (2023), Eastern & Midlands CARO. Available at: https://www.caro.ie/the-caros/eastern-midlands (accessed 03 April 2023)

– Facilitate stakeholder engagement and input into climate action policy development and implementation at a local level.
– Develop a knowledge hub with links to academia, state agencies and relevant stakeholders to capture, share and exchange information on the most significant risks to the region.

Meath County Council (MCC) Climate Action Strategy[110]

The MCC Climate Action Strategy is linked to the County Development Plan and is intended to cover the period from 2019-2025. Key targets include:

– Reducing Meath County Councils emissions by 33% by 2020.
– Reducing CO2 emissions of the county by at least 40% by 2030.
– Increasing our resilience by adapting to the impacts of climate change.
– Sharing our vision, results, experience and know-how with fellow local and regional authorities within the EU and beyond through direct cooperation and peer-to-peer exchange, namely in the context of the Global Covenant of Mayors.

Aligned with the Climate Action Strategy, there is the Local Authority Climate Action Charter and Meath County Council Energy Policy.

14.1.2.6 Guidelines

This assessment was prepared in accordance to the following guidance documents:

– Institute of Environmental Management & assessment (IEMA) Guide: Assessing Greenhouse Gas Emissions and Evaluating their Significance, second edition (February 2022)[111]
– Environmental Protection Agency, Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR) (2022);
– European Commission (EC), Guidance on Integrating Climate change and Biodiversity into Environmental Impact Assessment (2013); and
– Publicly Available Specification 2080 (PAS), PAS 2080:2016 Carbon Management in infrastructure.
– World Resources Institute GHG Protocol Corporate Standard.
– RICS 2021 Whole Life Carbon Assessment for the Built Environment (RICS), 1st edition[112]

Assessing Greenhouse Gas Emissions and Evaluating their Significance (IEMA)

IEMA's guide on Assessing Greenhouse Gas Emissions and Evaluating their Significance (second edition, 2022), hereafter referred to as "IEMA guidance", provides a recommended approach to the treatment of GHG emissions within an Environmental Impact Assessment (EIA) and how these should be reported within an Environmental Impact Assessment Report (EIAR).

PAS 2080 Carbon Management in Infrastructure[113]

PAS 2080 (2016) sets out a common approach and understanding to managing whole life carbon in the provision of economic infrastructure based upon the findings of the Infrastructure Carbon Review[114]

[110] Meath County Council, Meath County Council Climate Action Strategy 2019 - 2024. Available at: https://www.meath.ie/council/council-services/environment/climate-action/meath-county-council-climate-action (accessed 03 April 2023)
[111] IEMA (2022). Available at: Launch of the Updated EIA Guidance on Assessing GHG Emissions - February 2022 (Accessed 03 April 2023)
[112] RICS (2017). Available at: Whole Life Carbon Assessment for the Built Environment (Accessed 03 April 2023)
[113] BSI (2016) PAS 2080: Carbon Management in Infrastructure. Available at: https://www.carbontrust.com/what-we-do/assurance-and-labelling/pas-2080-carbon-management-in-infrastructure (Accessed 03 April 2023)
[114] HM Treasury (2013) Infrastructure Carbon Review. Available at: https://www.gov.uk/government/publications/infrastructure-carbon-review (Accessed 03

14.1.3 Methodology

14.1.3.1 Approach to Data Collection

The completion of a climate impact assessment requires collection of relevant activity data and carbon emission factors for each emission source within the defined assessment boundaries and scope (see Section 14.1.3.2). Activity data has been obtained from project design specifications, and other relevant reports (including other sections of this Environmental Report) where activities, materials, and energy required for the project's construction and operation stages are estimated at this stage. GHG emission factors have been obtained from recognised industry reference sources. All data sources used in the production of this section of the Climate Chapter are summarised in Table 14.1 below.

Table 14.1 Data Sources used to inform the GHG section of this Climate Chapter

Data Source	Date	Data Contents
Sustainable Energy Authority of Ireland (SEAI) Conversion Factors[115]	April 2023	Energy and fuels GHG emission factors published by SEAI
United Kingdom's Department for Business, Energy & Industrial Strategy (BEIS) Conversion Factors 2022: full set for advanced users – revised June 2022[116]	April 2023	Energy and fuels GHG emissions factors published by BEIS
Air Quality and Climate Modelling Scenarios Table	April 2023	OCGT operation and fuel consumed under different scenarios, provided by PM Group
OCGT <170MW, Estimated Gas Turbine Performance	April 2023	OCGT performance data provided by SSE
Environmental Report Chapter 8 Noise and Vibration	May 2023	Estimated onsite machinery use during proposed development construction
Environmental Report Chapter 5 Traffic and Transportation	April 2023	Estimated vehicle movements to and from site.
Environmental Report Chapter 12 Material Assets	April 2023	Landfill and Recovery sites
CESMM4: Civil Engineering Standard Method of Measurement, Fourth edition (CESMM4)[117]	April 2023	Construction materials and construction processes GHG emissions
PM Group's in-house carbon impact assessment calculator.	May 2023	Construction and operation phase GHG emissions

14.1.3.2 Impact Assessment

The approach followed to complete the climate impact assessment has been based on IEMA's guidance as well as "Guidance on the information to be contained in Environmental Impact Assessment Reports" (EPA, 2022) which will be referred to as the EPA's guidance hereafter. The guidance indicates that assessments should follow the principles set out in referenced GHG quantification guidelines, such as the GHG Protocol Corporate Standard, which are: relevance, completeness, consistency, transparency, and accuracy. The guidance does not specify a specific

[115] SEAI (2023) Conversion Factors. Available at: https://www.seai.ie/data-and-insights/seai-statistics/conversion-factors/ (Accessed 11 April 2023)
[116] GOV UK (2023) Greenhouse Gas Conversion Factors 2022. Available at: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2022 (Accessed 11 April 2023)
[117] CESMM4: Civil Engineering Standard Method of Measurement, Fourth edition (2019). Available at: https://www.icevirtuallibrary.com/doi/book/10.1680/cessmfr.64409 (Accessed 11 April 2023)

approach, but it provides a framework of six steps that an assessment should incorporate. These steps have been followed in completing this impact assessment and are explained and presented in the sections below.

GHG Assessment Scope and Boundaries

The activities that take place in the construction and operation of an infrastructure project, such as the proposed development, generate GHG emissions directly and indirectly. Typical direct GHG emissions during the construction phase include combustion of fossil fuels for machinery operation and vehicle movements on site. Indirect GHG emissions (emissions that do not occur in the project site boundary but occur elsewhere because of project activities) include emissions associated with the consumption of grid electricity, and emissions arising from the production and transport to site of the construction materials and equipment installed. After construction, direct and indirect GHG emissions arise from the operation and maintenance of the project over its operational life and end-of-life decommissioning.

The different activities that give rise to GHG emissions for an infrastructure project categorised according to their lifecycle stage (as defined by PAS2080 and EN15804 Standards):

Table 14.2 Life Cycle Stages and Modules for Infrastructure GHG Emissions Assessment (based on PAS2080)

Life Cycle Stages and Modules for Infrastructure GHG Emissions Assessment		
Preliminary Stage	Preliminary studies	A0
Product Stage	Raw Material Supply	A1
	Transport	A2
	Manufacturing	A3
Construction Stage	Transport to building site	A4
	Installation into building	A5
In-use stage	Use/application	B1
	Maintenance	B2
	Repair	B3
	Replacement	B4
	Refurbishment	B5
	Operational energy use	B6
	Operational water use	B7
	Other operational processes	B8
	Users' utilisation of infrastructure	B9
End of life stage	Deconstruction & demolition	C1
	Transport	C2
	Waste processing	C3
	Disposal	C4
Circular Economy Life Cycle Stages		
Benefits beyond the system boundary	Reuse	D
	Recovery	D
	Recycling	D

To assess the climate impact of the proposed development at Platin, the boundaries set out for the GHG assessment include activities during the construction of the proposed development and during operation of the plant over its lifetime. In particular, the following project lifecycle stages have been included in the assessment:

– Construction activities: Product stages (A1, A2, A3) and construction process stages (A4, A5); and
– Operation activities: Operational energy use (B6).

Under construction activities, transport of construction workers to site and temporary accommodation has been excluded, based on professional judgement of materiality. The basis for this is that, under use stage activities, maintenance, repair, replacement, and refurbishment of plant as these have yet to be defined and will be subject to the contract agreement and materiality considerations. Other use activities such as operational water use, and end-of-life stage activities are also excluded for the same reasons. With regards to exclusion of life cycle modules, IEMA's guidance indicates "*Certain life cycle modules (or stages) can be excluded if these exclusions are clearly highlighted and justified by the practitioner using professional judgement and in accordance with the materiality and cut-off guidance".* Such guidance is that life cycle stages can be excluded where expected emissions are less than 1% of total emissions and where all such exclusions total a maximum of 5% emissions. Given the nature of the project it is expected that over its lifetime more than 95% of GHG emissions will arise from operational energy use (B6), therefore exclusion of other use activities indicated above is justified.

Baseline

To assess and report the net GHG emissions impact of the proposed development, it is necessary to establish a baseline against which the proposed development can be compared.

In the main Platin OCGT development area (physical boundary of the plant), there are no pre-existing buildings, foundations or ground slabs requiring demolition as the site is greenfield. Therefore, the baseline GHG emissions within the physical boundary of the project are zero.

As the impacts of GHG emissions and climate change are geographically limited, it is not pertinent or relevant to set out a geographical boundary near the project physical site boundary to establish a baseline.

With regards to the impact of the proposed OCGT at Platin to sector level, a sectoral baseline can be set out based on available regional or national data. As an electricity generation project, the sectoral baselines has been determined at national level by using the Irish Government's published sectoral emissions ceilings in the Climate Action Plan 2023 which show the sector's total GHG emissions in 2018 were a total of 10.5 million tonnes of carbon dioxide equivalents (Mt CO_2eq)[118]. The set ceiling sets out a high pace GHG emissions reduction trajectory to limit emissions in 2030 to 2-4 Mt CO_2eq as per Climate Action Plan 2023.

Table 14.3 Electricity Sector Emission Ceiling

Sector	2018 Emissions (Mt CO_2eq)	2030 Target Emissions (Mt CO_2eq)	% Reduction Relative to 2018
Electricity	10.5	2-4	62-81

Assessment Methodology

The GHG assessment methodology consists of the collection of activity data, and relevant carbon emission factors, to calculate GHG emissions for each of the project stages and emission sources within the assessment boundary and scope. Data collection sources have been listed in Table 14.1. In doing so, the principles of relevance, completeness, consistency, transparency, and accuracy have been followed. As per IEMA's guidance, several scenarios have been assessed to ensure both normal (expected) and reasonable worst-case outcomes are assessed. Also, in following the principles of relevance and accuracy, bespoke emission factors through mass balance (stack emission mass flow) have been used to calculate operational GHG emissions.

[118] gov.ie - Government announces sectoral emissions ceilings, setting Ireland on a pathway to turn the tide on climate change (www.gov.ie)

In completing the GHG assessment for the construction activities (lifecycle A1 to A5), the following approach has been followed:

- The construction and operation carbon impact assessment has been completed using PM Group's in-house calculation method (included in Attachment 5 of this Environmental Report).
- The construction materials embodied carbon (lifecycle stages A1 to A3) has been calculated using the PM Groups in-house calculation method. Where the material type is not specified, reasonable material type assumptions have been made based on professional judgement. For example, average engineering steel has been used to estimate GHG emissions from construction metalwork and associated plant use requirements.
- GHG emissions from the transport of construction materials to site (A4) and transport of demolition waste to landfill/recovery sites where applicable (A5) have been calculated from materials quantities and the distance travelled.
- For construction materials two different transport routes have been considered: most materials have been assumed to be a normal load and have a transport distance of 50km by rigid average heavy goods vehicle (HGV) (as per RICS guidance). Abnormal load (plant and metalwork) have been assumed to be transported by HGV.
- Waste transport has been accounted for in two different ways to account for disposal and recovery. 50% of the generated waste material has been assumed to be recovered, this is achievable given there is local infrastructure to process C&D waste (Chapter 12 Material Assets), with an average distance to local recovery sites to be 10km. The 50% sent to landfill will travel an average of 10km. None of the materials can be used as potential sources of waste to energy so none will be sent to the nearby Indaver generation site.
- Due to a lack of specific Irish emission factors, the GHG emissions from waste disposal have been calculated using the United Kingdom's Department for Business, Energy and Industry Strategy (BEIS, UK) for landfill disposal (Conversion Factors 2022:full set for advanced users – revised June 2022). An estimate of the construction equipment used on site has been taken from chapter 8 Noise and Vibration of this Environmental Report. Plant and machinery typical fuel use has been taken primarily from CESMM4. Fuel emission factors have been taken from BEIS Conversion Factors 2022.
- HVO usage includes well to tank (WTT) emissions.
- The conversion emission factor for HVO is lower than other fuel conversion factors as the carbon dioxide emitted during combustion is readily reabsorbed by the crops utilised in vegetable oil production. Combustion of HVO does emit nitrous oxide (N_2O) and methane (CH_4) which are not as readily reabsorbed.
- Scope 1, 2 and 3 emissions are considered for the Proposed Development. Scope 1 emissions for this project are calculated using the maximum fuel usage in the plant and minor contributions from the refrigerant consumption in the air conditioning units. Scope 2 emissions account for the projected electricity consumption of the plant. Scope 3 emissions, are those associated with transporting the fuel from different ports to the site in Platin. An approximate distance of 300km has been used. For completeness the embodied GHG emissions associated with activities resulting from collection of waste foodstocks, processing of HVO and transportation of the HVO from UK and/or Europe have also been calculated.

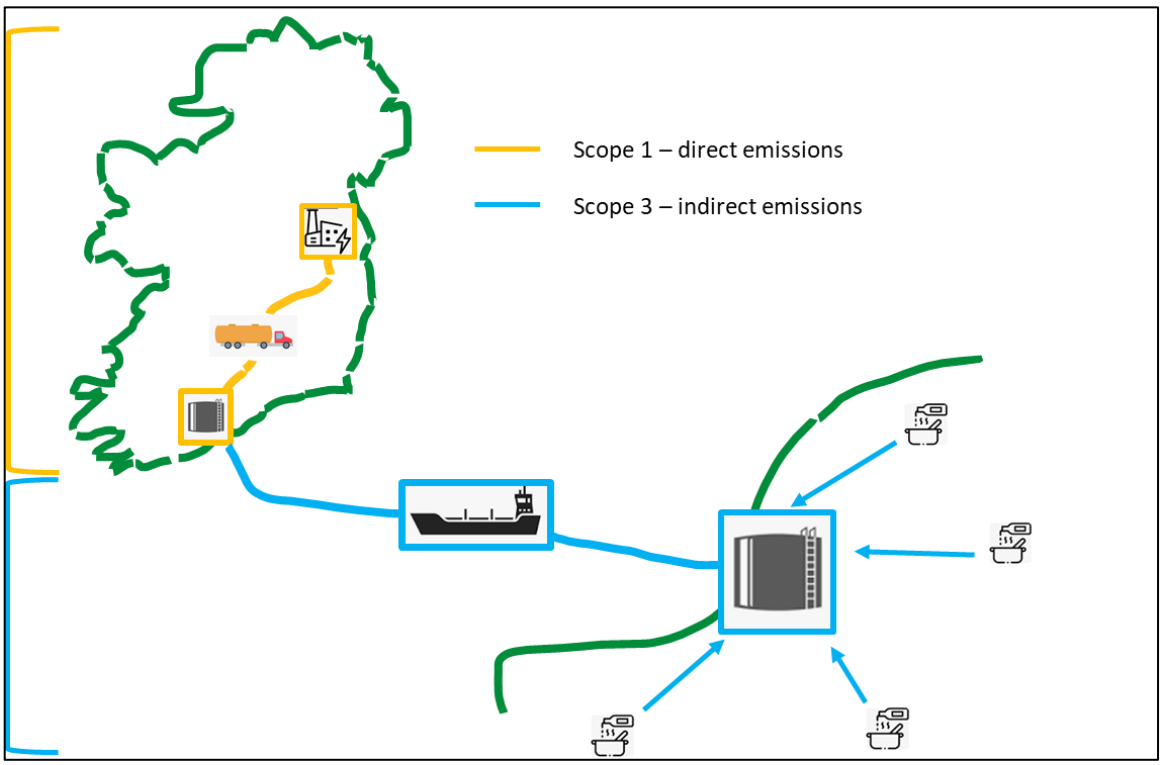

Figure 14.1: Scope 1 vs Scope 3 emissions

To assess GHG emissions from the operation of the proposed Platin OCGT (lifecycle stage B6) mass balance data from the proposed OCGT plant's design technical specification provided by the client has been used. This method is more specific to the plant's design and therefore has been deemed to be more accurate than the use of fuel consumption data and carbon emission factors from reference sources.

14.1.3.3 Assumptions and Limitations

Any GHG emissions assessment at design stage is an estimate of the proposed development based on best available data. There is an inherent limitation in GHG carbon assessments[119], as the assessments are based on the project design at the time. The final constructed asset will not have precisely the same carbon emissions as estimated due to differences in the final design, materials' procurement specification and construction practices on site. The final operational GHG emissions may vary more than estimated depending on the final operation hours for the plant and plant performance efficiency during its operational lifetime as per IEMA guidance on future baseline.

Therefore, the GHG emissions quantitative results obtained from this assessment are a reasonable estimate, developed for the only purpose of evaluating the likely impact of the proposed development on the climate.

Both the BEIS Conversion Factors 2022 and the BEIS Conversion Factors 2023 do not include conversion factors for HVO usage in road transportation. For this reason, diesel was used to provide a more conservative carbon assessment calculation. The 2022 Conversion Factors were used in lieu of the 2023 Conversion Factors due to the 2023 Conversion Factors being revised on the 28th June, shortly after being published. The 2022 Conversion Factors provide a more conservative estimate of the carbon emissions comparatively.

[119] Greenhouse Gas Protocol, GHG Protocol guidance on uncertainty assessment in GHG inventories and calculating statistical parameter uncertainty. Available at: https://ghgprotocol.org/sites/default/files/2023-03/ghg-uncertainty.pdf accessed 25 May 2023

14.1.3.4 Evaluation of Significance

The IEMA Guidance on Assessing Greenhouse Gas Emissions and Evaluating their Significance has been used for the GHG significance criteria in the assessment.

The IEMA Guidance (2022) states that "*the crux of significance therefore is not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050".*

In accordance with the IEMA Guidance (2022) and the TII Guidance developed for Climate Impact Assessment[120], the Climate Practitioner must assess:

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

Table 14.5 illustrates the significance matrix included in the TII Guidance and which is also used in this assessment.

Table 14.5 Significance Criteria

Effects	Significance Level	Description
Significant adverse:	Major adverse	– The project's GHG impacts are not mitigated. – The project has not complied with do-minimum standards set through regulation, nor provide reductions required by local or national policies; and – No meaningful absolute contribution to Ireland's trajectory towards net zero.
	Moderate adverse	– The project's GHG impacts are partially mitigated. – The project has partially complied with do-minimum standards set through regulation, and have not fully complied with local or national policies; and – Falls short of full contribution to Ireland's trajectory towards net zero.
Not Significant:	Minor adverse	– The project's GHG impacts are mitigated through 'good practice' measures. – The project has complied with existing and emerging policy requirements; and – Fully in line to achieve Ireland's trajectory towards net zero.
	Negligible	– The project's GHG impacts are mitigated beyond design standards. – The project has gone well beyond existing and emerging policy requirements; and – Well 'ahead of the curve' for Ireland's trajectory towards net zero.
Beneficial	Beneficial	– A project's net GHG impacts are below zero and it causes a reduction in atmospheric

[120] Transport Infrastructure Ireland (TII) (2022), Climate Guidance for National Roads, Light Rail, and Rural Cycleways, https://www.tiipublications.ie/library/PE-ENV-01104-01.pdf accessed 11 April 2023

Effects	Significance Level	Description
		GHG concentration. – The project has gone well beyond existing and emerging policy requirements; and – Well 'ahead of the curve' for Ireland's trajectory towards net zero, provides a positive climate impact.

The IEMA Guidance (2022) also states *"it is down to the practitioner's professional judgement on how best to contextualise a project's GHG impact."* An example of good practice approach outlined in the guidance is comparison of the proposed development's carbon footprint against various sectoral, local or national carbon budgets.

For the purposes of this assessment, the Ireland Carbon Budgets and Sectoral Emission Ceilings have been used to provide context for the assessment where appropriate.

14.1.3.5 Study Area

The assessment of the effects on climate does not have a physical study area per se as the receptor (the global climate) for GHG emissions is not spatially defined. Climate change resulting from GHG emissions will lead to social, environmental, and economic impacts felt globally, regardless of where they are emitted.

14.1.4 Receiving Environment

As described above, GHG emissions are not geographically limited and have a global effect rather than a specific local receptor to which a level of sensitivity can be assigned. Therefore, the receptor of GHG emissions from the project is the global atmosphere.

14.1.5 Likely Significant Impacts

14.1.5.1 Construction Phase

The construction phase impact assessment has included GHG emissions arising from the following activities (relevant lifecycle stages in brackets):

– Production of construction materials, also known as materials' embodied carbon (A1, A2, A3);
– Delivery of construction materials to site (A4);
– Energy used in construction activities (A5); and
– Transport of waste to disposal site and waste disposal emissions (A5).

The estimated GHG emissions for the proposed Platin OCGT construction phase are presented in Table 14.6. These include GHG emissions from enabling works and construction of the proposed Platin OCGT. These figures are based on best available data and assumptions (as detailed in Section 14.1.3.3 above) and are considered to be suitable indicative estimates for the proposed development.

Table 14.6: GHG Emissions Estimate from Project Construction Phase

Stage	Emissions Stage	GHG Emissions (approx. tonnes CO_2eq)
Enabling work and main development	A1-A3	10199.716
	A4	484.953
	A5	14.273

14.1.5.2 Operation and Maintenance Phase

The operation phase climate impact assessment has included GHG emissions arising from the following activities:

– Energy consumption during the operation of the OCGT Generating Plant.

The GHG assessment results are outlined in Table 14.7. These show total direct and indirect GHG emissions of approx. 44,547 tonnes of CO_2eq per year under normal operation of the OCGT Generating Plant.

Table 14.7: OCGT Generating Plant Operational GHG Emissions under Normal Operation (including direct and indirect GHG emissions)

Description	Units	Normal operation – 1800 hours per year
Fuel Consumption	tonnes CO_2eq	3810.62
Air Conditioning Units	tonnes CO_2eq	3.216
Electricity Usage	tonnes CO_2eq	705.84
Water Supply	tonnes CO_2eq	3.970
WTT HVO Embodied Carbon	tonnes CO_2eq	37675.69
Transport	tonnes CO_2eq	2347.96
Total GHG emissions (direct and indirect)	tonnes CO_2eq	44547.17
Total GHG emissions (direct only)	tonnes CO_2eq	6871.48

When compared to the sectoral baseline for Ireland electricity sector, these direct annual emissions will likely result in an increase of 0.065% over the 2018 baseline emissions for the Irish electricity sector.

14.1.6 Decommissioning Phase

The climate impact for the proposed development demolition after its end of life is reached has not been assessed, due to lack of data and uncertainty regarding the final disposal date and route for disposal. Based on professional judgement, these are likely to be minimal compared to the project whole life emissions. The impacts expected and mitigation measures required in the decommissioning phase are expected to be similar to those of the construction phase. Decommissioning of the proposed development would be subject to grant of approval by Meath County Council. In the event of the proposed development being decommissioned at the end of its operational lifetime (expected to be 20 years), a designated Decommissioning Management Plan will be developed which will outline the mitigation measures required, similar to those outlined in the Construction Environmental Management Plan and submitted to Meath County Council for approval.

14.1.7 Project Whole Life

Assuming the project whole life is 20 years, the whole life GHG emissions can be estimated by adding operational emissions over 20 years of plant operation to the construction emissions. This results in estimated total project life GHG emissions of circa 890,940 tonnes CO_2eq. These results indicate that 98.8% of the project's whole life GHG emissions are likely to originate from the operation of the OCGT Generating Plant (stage B6).

This whole life GHG emissions estimate is based on assuming the OCGT Generating Plant would operate under the 'normal' scenario of 1800 hours per year. All calculations are based on best

available data, which is likely to be updated as the proposed development progresses through procurement, construction, and operation.

14.1.8 Cumulative Effects

GHG emissions are cumulative in nature, impacting the global atmospheric concentration of emissions. Additional development in the local area does not result in a greater local climate change effect from the Proposed Development (or vice versa). IEMA's guidance states that *"effects of GHG emissions from specific cumulative projects therefore in general should not be individually assessed, as there is no basis for selecting any particular (or more than ones) cumulative project that has GHG emissions for assessment over any other".*

14.1.9 Significance of Effects

To evaluate the significance of the proposed development effects on the climate, the likely impact of the proposed development on climate is compared against national set targets for climate change mitigation and with sectoral commitments. As described in Section 14.1.3.2 the Irish Government set ceiling for the electricity sector aims to reduce emissions to 2-4 $MtCO_2eq$ per year by 2030 as per Climate Action Plan 2023, compared to 10.5 $MtCO_2eq$ per year in 2018. This means a significant GHG emission reduction trajectory for the sector up to 2030.

Based on the GHG emissions assessment, the likely impact of the proposed development will be not be significant, as the use of HVO results in lower net GHG emissions compared to other fuel types such as natural gas or distillate oil. Use of HVO as a fuel results in lower net GHG emissions; using natural gas for 1800 hours per year would result in direct GHG emissions in the order of 173,214 tonnes CO_2eq despite having lower transport embodied carbon as there is a gas pipeline adjacent to the project site. Use of distillate oil in the previous 2019 application was calculated at 267,368 tonnes CO_2eq direct emissions for a 208MW plant operating for 1500 hours. These calculations for natural gas and distillate oil are inclusive of transportation emissions and exclude the embodied carbon emissions from processing and refinement.

14.1.10 Indirect Impacts

The proposed development supports the national and sectoral climate mitigation targets. The proposed development intends to provide additional generating capacity during periods of high demand or when renewable energy sources cannot meet demand. This development will facilitate the increased use of renewable energy technologies by providing energy to the national grid during periods when the energy available from the renewable technologies is insufficient.

14.1.11 Mitigation and Monitoring Measures

For effective climate change impact mitigation, project GHG emissions reduction measures should be considered and implemented through all project delivery stages, starting at project design and construction and continuing through project operation and up to end of life and decommissioning. The proposed climate change mitigation measures for this proposed OCGT are outlined below.

14.1.12 Design Phase

Proposed climate mitigation measures that will be implemented at design stage:

- Use of HVO has far lower GHG emissions as per Sections 14.1.5.2 and 14.1.9. This is a mitigation by design.
- Carefully evaluate plant design options and technology specification to ensure final plant design delivers in efficiency and performance, consequently reducing the amount of fuel consumed and GHG emissions released once the plant is in operation; and
- Where possible, specify electrical equipment without SF_6 insulation gas. When not possible, ensure all SF_6 containing equipment complies with or exceeds applicable Europeans and national legislation to minimise leakage.

14.1.13 Construction Phase

Proposed climate mitigation measures that will be implemented at construction stage:

- Where possible, utilise HGVs delivering HVO which are fuelled by HVO. Minimise transport distances and select low carbon transport methods such as shipping or train transportation;
- Where possible, minimise the quantity of materials used, and aim to ruse and/or repurpose local materials instead of procuring or importing new ones.
- Where possible, use low carbon materials. This is of particular importance for high embodied carbon materials such as steel, and materials used in large quantities like concrete;
- Notwithstanding the above, it is important to consider the durability of materials and/or equipment and their maintenance, replace and refurbishment over the project life. Selection should aim to reduce the overall project climate impact, not only the embodied carbon when constructed; and
- Select energy efficient construction materials and vehicles, ensure rational use to minimise emissions.

14.1.13.1 Operation and Maintenance Phase

As the results of the GHG assessment demonstrate, the greatest sources of GHG emissions for the OCGT Generating Plant will arise from the fuel consumption and energy usage during operation (stage B6), therefore it will be very important to closely monitor energy consumption and to implement any possible energy saving measures during operation.

The following mitigation measures that will be implemented:

- Ensure maintenance and operation procedures are followed as per design and manufacturer specifications to ensure maximum efficiency of plant is achieved. This minimises the amount of HVO fuel required to achieve a defined power output;
- Continuously monitor OCGT plant performance parameters to ensure operation in optimal efficient conditions against KPIs;
- Monitor stack emissions and report plant GHG emissions on a regular basis, continuously look for options to reduce emissions against KPIs;
- Review on a regular basis the availability of deploying other low carbon fuels and implement when possible. For example, green hydrogen might become available and feasible to implement in the medium to long term future; and
- If high voltage switchgear with SF_6 as insulation gas is installed, ensure monitoring against KPIs and adequate maintenance to prevent leakage.

14.1.14 Residual Impacts

There are GHG emissions from the use of HVO as a fuel in the OCGT Generating Plant. However, these GHG emissions are far lower than comparable fuel types that could be utilised for the generation of energy use as natural gas and distillate oil.

The Developer is committed to sourcing HVO that is third party Certified to RED-II under the International Sustainability and Carbon Certification (ISCC). HVO will be sourced from 100% waste feedstocks, the raw materials for which are grown on a seasonal basis so there is no long-term "carbon debt". There is an existing HVO supply chain and infrastructure in Ireland which the Proposed Development will utilise. The transport of HVO from this existing infrastructure to the Site has been taken into account in the delivery of HVO presented in Table 14.7.

Use of HVO as a fuel for 1800 hours per year results in direct GHG emissions in the order of 6,872 tonnes CO_2eq; using natural gas for 1800 hours per year would result in direct GHG emissions in the order of 173,214 tonnes CO_2eq despite having lower transport embodied carbon as there is a gas pipeline adjacent to the project site. Use of distillate oil in the previous 2019 application was calculated at 267,368 tonnes CO_2eq direct emissions for a 208MW plant operating for 1500 hours. Including embodied carbon emissions, the total direct and indirect GHG emissions from the use of HVO as a fuel are in the order of 44,547tonnes CO_2eq and comparatively are far lower than direct emissions from natural gas and distillate oil.

All deliveries of HVO to the site are by HGVs fuelled by HVO. By utilising HVO instead of diesel, this has led to a reduction in transportation emissions by 89 tonnes CO_2eq.

14.2 Climate Resilience

14.2.1 Introduction

This section presents a high-level assessment of the resilience of the proposed development to present day and future weather, and changes to the climate due to climate change. The assessment is based on the development as described in Chapter 2 of the Environmental Report.

This section details the possible impacts of climate change on the proposed development and outlines the appropriate mitigation that will be implemented during the implementation stage of design.

14.2.2 Policy and Guidance

The Planning Report that accompanies this application (AOS Document ref. AOS120723-SSE-002) describes the wider policy and legislative context applicable to the proposed development. Policies and guidance documents of potential relevance to the climate impacts are set out in this section.

The following policy and guidance documents have been used to inform this section of the Climate Chapter of the Environmental Report.

International Climate Change Legislation and Policy

Ireland is a party to the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. Both provide a legal framework for addressing global climate change. Building on the UNFCCC process, the Paris Agreement is a global treaty established with the intention of developing a unified approach to combating climate change. Agreed in December 2015, the Paris Agreement aims to restrict global temperature rise to well below 2˚C above pre-industrial levels, and to pursue effort to limit the temperature increase to 1.5˚C[121].

All countries will aim to play their role in curbing emissions through their nationally determined contributions (NDC). Since the Paris Agreement, countries have reconvened at Glasgow in 2021 and agreed to pledge further cuts to emissions at the following conference as well as phase down the use of coal[122]. In 2022, countries met in Sharm el-Sheikh, Egypt and agreed to outcomes that reflected only modest, incremental progress on reducing emissions, despite a clear emissions gap between current national climate plans and what's needed to limit temperature rise to 1.5˚C.[123]

The European Union launched its EU Adaptation Strategy[124] in 2021 which sets out how the European Union can adapt to the unavoidable impacts of climate change and become climate resilient by 2050.

The Strategy has four principle objectives: to make adaptation smarter, swifter and more systemic, and to step up international action on adaptation to climate change.

Complementing the EU's ambitious goal to become climate neutral by mid-century, this strategy aims to reinforce the adaptive capacity of the EU and the world and minimise vulnerability to the impacts of climate change, in line with the Paris Agreement and the proposal for the European Climate Law. The Strategy seeks to step up action across the economy and society in synergy with other Green Deal policies such as biodiversity protection and sustainable agriculture. This will be done by making adaptation smarter, swifter and more systemic, as well as stepping up international action on adaptation. This means improving knowledge of climate impacts and adaptation solutions; stepping up adaptation planning and climate risk assessments; accelerating adaptation action; and helping to strengthen climate resilience globally. This strategy sets out a whole-economy approach, with

[121] UNFCCC (2015); Paris Agreement. Available at: Paris Agreement (All languages version) (accessed 31 March 2023)
[122] UNFCCC (2021); Report of the Conference of Parties serving as the meeting of the Parties to the Paris Agreement on its third session, held in Glasgow from 31 October to 13 November. Available at: https://unfccc.int/sites/default/files/resource/cma2021_10_add1_adv.pdf (Accessed 31 March 2023)
[123] UNFCCC (2022); Conference of the Parties Report of the Conference of the Parties on its twenty-seventh session, held in Sharm el-Sheikh from 6 to 20 November 2022. Available at: https://unfccc.int/sites/default/files/resource/cp2022_10a03_adv.pdf?download (Accessed 31 March 2023)
[124] European Union (2021); EU Adaptation Strategy. Available at: https://climate.ec.europa.eu/eu-action/adaptation-climate-change/eu-adaptation-strategy_en (Accessed 26 May 2023)

particular consideration for those who are most vulnerable to guarantee that resilience is achieved in a just and fair way.

14.2.2.1 National Legislation

National Policy on Climate Action and Low Carbon Development[125]

Ireland's first piece of climate action policy on its coherent journey towards a low-carbon, climate resilient and sustainable economy was the Climate Action and Low-Carbon Development National Policy Position, which was launched in 2014. The policy position:

– Recognises the threat of climate change for humanity
– Anticipates and supports mobilisation of a comprehensive international response to climate changes, and global transition to a low-carbon future.
– Recognises the challenges and opportunities of the broad transition agenda for society.
– Aims, as a fundamental national objective, to achieve transition to a competitive, low-carbon, climate resilient and environmental sustainable economy by 2050.

The policy position also sets out a high-level roadmap for future climate policy in Ireland, based on the adoption of a series of national plans addressing both climate adaptation and greenhouse gas mitigation efforts in the period to 2050. The policy did not outline any GHG targets or adaptation plans and ultimately was replaced in 2015 by the Climate Action and Low-Carbon Development Act.

Climate Action and Low-Carbon Development Act, 2015 (Amended 2021[126])

The Act was the first piece of legislation following the launch of the National Policy Position. The Act provides the statutory basis for the national transition laid out in the national policy position. It provides arrangements for achieving transition to a low-carbon, climate-resilient and environmentally sustainable economy by 2050. The Act includes the following key elements:

– Places on a statutory basis a 'national climate objective', which commits to pursue and achieve no later than 2050, the transition to a climate resilient, biodiversity-rich, environmentally sustainable and climate-neutral economy.
– Mandated the creation of sector level adaptation plans.
– A National Long Term Action Strategy will be prepared every five years.
– Introduces a requirement for each local authority to prepare a Climate Action Plan which will include both mitigation and adaption measures and be updated every five years.

National Adaptation Framework (NAF), 2018[127]

The NAF specifies the national strategy for the application of adaptation measures in different sectors and by local authorities in order to reduce the vulnerability of Ireland to the adverse impacts of climate change and realise any positive impacts. Adaptation actions under this framework range from building adaptive capacity through to policy and finance-based actions.

Additional key actions under the framework includes:

– Putting in place revised governance and reporting arrangements.
– Formulising the status of existing guidelines.
– Formulising long term operational support for key sectors.
– Facilitating the establishment of regional local authority climate action offices.
– Increasing awareness around climate adaptation and resilience.
– Integrating climate adaptation into key national plans and policies.

[125] Department of the Environment, Climate and Communications; National Policy Position. Available at: gov.ie - National Policy Position on Climate action and Low Carbon Development (www.gov.ie) (Accessed 03 April 2023)
[126] Department of the Environment, Climate and Communications (2021); Climate Act signed into law. Available at https://www.gov.ie/en/press-release/9336b-irelands-ambitious-climate-act-signed-into-law/ (accessed 03 April 2023)
[127] Department of the Environment, Climate and Communications (2018) National Adaptation Framework. Available from: https://www.gov.ie/en/publication/fbe331-national-adaptation-framework/ (Accessed 22 May 2023)

Climate Action Plan, 2023[128]

The Climate Action Plan provides a detailed plan to reduce Ireland's emissions and enhance climate resilience to ensure Ireland is put on a more sustainable path. The path details a number of actions to achieve this aim. The supplementary Annex to the Plan published in March 2023 provides the specific actions required to implement the targets set out in the Plan, and includes information regarding outputs, Lead Departments, timelines and stakeholders.

Electricity and Gas Networks Sector – Climate Change Adaptation Plan[129]

This is the first sectoral Adaptation Plan for the energy networks (electricity and gas sector), prepared under the National Adaptation Framework. The plan focuses on the energy networks (electricity and gas), specifically electricity generation, electricity and gas transmission, and distribution infrastructures and interconnectors. The Plan is to be viewed as the first step towards reducing vulnerability and building resilience in the sector. The Plan also:

– Examines the impacts of climate change and weather-related events, both past and projected, on the energy networks.
– Details how the energy sector must prepare for and adapt to new climate conditions.
– Sets a methodology for identifying areas of vulnerability, the steps that can be taken and measures put in place to avoid or minimise future adverse impacts within the sector and to exploit opportunities.

Meath County Council Climate Change Action Strategy 2019 - 2024[130]

The Meath County Council Climate Action Strategy published in June 2018 to address both adaptation and mitigation of climate change. Areas of focus to deliver the plan include 'Planning' and 'Clean Energy'. Under 'Planning' the strategy recognises the need to use planning policy to promote clean energy and energy efficiency. Under 'Clean Energy' the strategy recognises the need to increase renewable energy usage. This action strategy covers the period from 2019-2025.

Targets include:

– Increasing our resilience by adapting to the impacts of climate change.
– Ensuing that climate adaptation is mainstreamed into all activities and operations.
– Ensuing that climate resilience is considered for all council-lead developments.

14.2.3 Methodology

This assessment is a high-level screening of potential impacts associated with climate change on the scheme receptors and identification of potential mitigation measures that will be considered and implemented as required at the next stage of design. The screening involves the following steps:

– Legislation and policy review – a review of national and local policy and guidance relating to climate change adaptation and resilience and its applicability to the scheme.
– Receiving environment – identification of receptors, in this case features of the scheme that may be impacted by climate change.
– Climate baseline – identification of current and future climate baseline for the site over the lifetime of the scheme. The current baseline includes information about the state of current climate variables (1981-2010), including temperature, precipitation and wind, as well as information on extreme weather events experienced in the vicinity of the site. Information on current climate is based on Met Éireann records. The future baseline includes information on project change in climate variables over the 21st century, based on information from the World Bank Climate Change Knowledge Portal.

[128] Department of the Environment, Climate and Communications; Climate Action Plan 2023. Available at: https://www.gov.ie/en/publication/7bd8c-climate-action-plan-2023/ (accessed 03 April 2023)
[129] Government of Ireland (2019); Electricity and Gas Networks Sector Climate Change Adaptation Plan. Available at: https://www.gov.ie/en/publication/7fcf4-electricity-and-gas-networks-sector-climate-change-adaptation-plan/ (Accessed 22 May 2023)
[130] Meath County Council; Meath County Council Climate Action Strategy 2019 - 2024. Available at: https://www.meath.ie/council/council-services/environment/climate-action/meath-county-council-climate-action (accessed 03 April 2023)

– Potential impacts – high level identification of potential impacts on scheme receptors from climate hazards associated with change in climate variables (future baseline), based on literature review and experience of the project team in carrying out similar assessments. Impacts from climate change during the construction phase are not in the scope of the assessment as construction phase is short (in climatic terms) and there is not expected to be a significant change in climate over this period. Impacts from climate change during the operation of the project during its approximately 20 year lifespan are in scope. Decommissioning activities are not expected to be subject to significant climate change but should be planned and implemented in accordance with the climate 'as-is' at the time the decommissioning phase commences. As such, the impacts of climate change on decommissioning are not included within the assessment.
– Identification of mitigation measures – high level identification of potential measures that could be taken to mitigate the impacts from climate hazards, based on literature review and experience of the project team in carrying out similar assessments. The specified mitigation measures should be considered for inclusion in the next design stage.

The approach is based on the initial steps set out in the IEMA EIA Guidance on Climate Change Adaptation but does not include a full risk assessment.

14.2.3.1 Assumptions and Limitations

The assessment in this report is based on freely available information from third parties for reporting purposes, being observational data from local weather stations, a number of readily available climate change projections and a range of existing climate change datasets and literature at the time of writing this assessment in May 2023. The following limitations and disclaimer should be noted:

– Climate change projections: climate projections are not predictions or forecasts but simulations of potential scenarios of future climate under a range of hypothetical emission scenarios and assumptions. The results, therefore, from the experiments performed by climate models cannot be treated as exact, but projection options. These represent internally consistent representations of how the climate may evolve in response to a range of potential forecast scenarios and their reliability varies between climate variables.

  For a single emission scenario, projections can vary significantly as a function of the model used and how it is applied, so that there is a wide uncertainty band in the results. Scenarios exclude outlying "surprise" or "disaster" scenarios in the literature and any scenario necessarily includes subjective elements and is open to various interpretations.

  Generally global projections are more certain than regional, and temperature projections more certain than those for precipitation. Further, the degree of uncertainty associated with all climate change projections increases for projections further into the future. Climate models and associated projections are updated on a regular basis, implying changes in the forecasted future climate.
– Validation of information: PM Group has not independently verified the observational or projection data and does not accept responsibility or liability for any inaccuracies or shortcomings in this information. Should these information sources be modified by these third parties we assume no responsibility for any of the resulting inaccuracies in any of our reports. Issued reports relevant to the project information provided and are not intended to address changes in project configuration or modifications which occur over time. The data is obtained to provide a general 'sense check' on the published literature on existing observational and climate projections for the region.

We have not undertaken any climate modelling and rely solely on freely available data on climate projections in this region. Accordingly, any further research, analysis or decision-making should take account of the nature of these data sources and climate projections and should consider the range of literature, additional observational data, evidence and research available – and any recent developments in these.

14.2.4 Receiving Environment

14.2.4.1 Project Receptors

Since the purpose of the climate resilience assessment is to determine impacts of climate change upon the proposed development, the receiving environment for this aspect refers to the receptors that constitute the proposed development. These receptors include the physical assets, asset operations and site staff, plus local ecology, watercourses and communities that may be affected by the proposed development emissions in-combination with the impacts of climate change.

The receiving receptors that are included within this assessment are those outlined in Section 2.2:

- OCGT Generating Plant, with associated generators and ancillary works;
- Water treatment plant comprising of raw water treatment tank, deionised water tank and processed water tank;
- Sanitary foul/fire water tanks;
- 2 no. HVO tanks;
- Transformer(s);
- 110kV substation; and
- Onsite operational staff (plant will operate unmanned but there will be personnel onsite carrying out routine inspections and maintenance).

14.2.4.2 Present Day Climate Baseline

Ireland's climate is described by the climate averages for 1981-2010 summarised by Met Éireann[131]. Ireland's climate is dominantly influenced by the Atlantic Ocean and therefore does not suffer from the extremes of temperatures experienced by other countries at similar latitudes. Mean temperature generally range between 9˚C and 10˚C with higher mean temperatures in coastal regions. Summer is the warmest season, followed by autumn, spring and winter. Highest rainfall occurs in the western half of Ireland and on high ground, with rainfall decreasing towards the north-east. Averaged over all of Ireland, mean annual rainfall is 1230mm. The driest seasons are spring and summer with mean rainfall of 260mm and autumn and winter with a mean rainfall of 350mm.

The summary of 1981-2010 climate averages show that, averaged over the country, there has been an increase of 5% in rainfall totals between the periods 1961-1990 and 1981-2010 with all seasons showing an overall increase in rainfall. There has been an increase of 0.5˚C in mean temperatures between 1961-1990 and 1981-2010. Maximum and minimum temperatures have also increased by 0.5˚C with all seasons showing a rise in temperature with spring and summer showing the largest differences between the two time periods with an increase of 0.7˚C.

14.2.4.3 Future Climate Baseline

Climate projections for Ireland from Paul Nolan and Jason Flanagan (2020)[132] are summarised in Table 14.8.

[131] Met Éireann (2012), A Summary of Climate Averages for Ireland 1981-2010. Available from: https://www.met.ie/climate-ireland/SummaryClimAvgs.pdf (access 23 May 2023)
[132] Nolan, P. and Flanagan, J. (2020) High-resolution Climate Projections for Ireland – A Multi-model Ensemble Approach Available from: https://www.epa.ie/publications/research/climate-change/Research_Report_339_Part1.pdf (Accessed 23 May 2023)

Table 14.8: Climate Projections for Ireland (Nolan and Flanagan, 2020)

Climate variables	Climate projections summary (2041-2060 relative to 1981-2000)	Resultant future climate
Temperature	Mean annual temperature is projected to increase up to 1.2°C and 1.6°C for the RCP4.5 and RCP8.5 scenarios respectively. Summer months are projected to increase up to 1.3°C and 1.8°C for the RCP4.5 and RCP8.5 scenarios respectively. Winter months are projected to increase up to 1.2°C and 1.6°C for the RCP4.5 and RCP8.5 scenarios respectively.	Ireland is projected to experience an increase in ambient air temperature across both emission scenarios.
Precipitation	Decreases in precipitation are projected for the summer months with an increase up to 11% decrease and 17% decrease for the RCP4.5 and RCP8.5 scenarios respectively. Frequencies of heavy precipitation events show notable increases over the year and in the winter and autumn month with projected increases in frequency of up to 19%.	Ireland is projected to experience to experience drier summers and wetter winters across both emission scenarios. Ireland is also projected to see an increase in heavy rainfall events throughout the year.
Heatwaves	Heatwave events are projected to increase with a range of 1 to 8 events for the RCP4.5 scenario and 3 to 15 for the RCP8.5 scenario in the period of 2041-2060. There is a clear gradient across Ireland concerning heatwaves, with the highest number of heatwaves is projected to occur in the south-east. The NE of the country will also experience a rise in heatwave events. This is relative to the 1981-2000 baseline which observed 1 to 6 heatwaves across Ireland.	Ireland is projected to experience an increase in heatwave events across both emission scenarios with more heatwave events occurring in the south-east.
Frost and ice days	Number of frost days is projected to decrease by 45% and 58% for the RCP4.5 and RCP8.5 scenarios respectively. Number of ice days is projected to decrease by 68% and 78% for the RCP4.5 and RCP8.5 scenarios respectively.	Ireland is projected to experience a decrease in frost and ice days due to rising ambient air temperatures.
Snowfall	Snowfall is projected to decrease with reductions of 51% and 60% for the RCP4.5 and RCP8.5 scenarios respectively.	Ireland is projected to experience a decrease in snowfall events due to rising ambient air temperatures.
Wind speed	Mean 10-m wind speeds are projected to decrease for all seasons up to 3.4% and 5.4% for the RCP4.5 and RCP8.5 scenarios respectively.	Ireland is projected to experience a decrease in average wind speeds throughout the year across all emissions scenarios.

Climate projections for Dublin from the World Bank Group, Climate Change Knowledge Portal are presented in Table 14.9. Dublin is the closest geographic location to Meath for which data is available.

Table 14.9: Climate Projections for Dublin (World Bank CCKP)

	Climate Scenario (Anomaly change, SSP5-8.5, 50th percentile)				
Climate variables	**Baseline (1995 – 2014)**	**2020-2039**	**2040-2059**	**2060-2079**	**2080-2099**
Mean air temperature (°C change)	Annual: 9.7	Annual: +0.6	Annual: +1.3	Annual: +2	Annual: +3
	Summer: 14.4	Summer: +0.9	Summer: +1.8	Summer: +2.7	Summer: +4.3
	Winter: 5.7	Winter: +0.4	Winter: +1	Winter: +1.7	Winter: +2.4
Maximum temperature (°C change)	Annual: 13.5	Annual: +0.6	Annual: +1.2	Annual: +2.1	Annual: +3.1
	Summer: 18.9	Summer: +0.9	Summer: +1.8	Summer: +2.9	Summer: +4.4
	Winter: 9.1	Winter: +0.5	Winter: +0.9	Winter: +1.8	Winter: +2.4
Minimum temperature (°C change)	Annual: 6	Annual: +0.6	Annual: +1.2	Annual: +2	Annual: +3.2
	Summer: 10.5	Summer: +0.8	Summer: +1.7	Summer: +2.6	Summer: +4.3
	Winter: 2.4	Winter: +0.4	Winter: +1	Winter: +1.8	Winter: +2.6
Precipitation (% change)	Annual: 84.4mm	Annual: -0.26	Annual: -1.1	Annual: -0.8	Annual: -1.3
	Summer: 68.3mm	Summer: -3.8	Summer: -9.1	Summer: -15	Summer: -20.2
	Winter: 103.3mm	Winter: +1.12	Winter: +5	Winter: +12.1	Winter: +19.4

Projections for Dublin generally follow the climate trends projected for Ireland. In general, temperatures are projected to increase throughout the year with warmer summers and winters. Precipitation is projected to see small changes on average across the year with larger seasonal variations following a trend of drier summers and wetter winters. The frequency of extreme events across Ireland such as heatwaves are projected to increase substantially while cold-weather related events such as frost and ice days and snowfall may experience large reductions. These projections are in line with climate change trends identified in the observed changes in climate for Ireland between 1981-2010.

14.2.5 Potential Likely Significant Impacts and Recommended Mitigation Measures

This section outlines the potential impacts the project may face due to climate change throughout its operational lifetime (20 years) and through the decommissioning phase.

Table 14.10 summarises potential impacts and provides recommended mitigations for these impacts. Mitigations can take one of two forms:

– Embedded: Some measures are embedded into the design of the proposed development. For example, inclusion of climate changes allowances within flood modelling and the application of climate change uplifts to drainage design. Embedded mitigations already present within the proposed development design have not yet been fully reviewed at this stage.
– Operational: These are secondary mitigation measures such as asset management planning and asset maintenance that should be carried out throughout the lifetime of the proposed development to continue to provide protection against evolving climate hazards. Such mitigations may also include future refurbishments, upgrades or changes to assets and processes at the appropriate time in the future, based on how significantly the climate continues to change and the evolving resilience needs of the proposed development.

Embedded mitigations should be considered and incorporated through the detailed design phase. Operational mitigations will be the responsibility of the maintainer throughout the operational lifetime.

Table 14.10: Potential Impacts of Climate Change upon the Proposed Development

Change in climate variable	Climate hazard	Description of potential climate impact	Affected Asset(s)	Mitigation measures to be implemented
Increased heavy rainfall events	Fluvial flooding from the River Nanny. Surface flooding due to heavy rainfall onto the site	Flooding and severe precipitation events may result in damage to assets such as machinery, the substation, generators and buildings, affecting operations and leading to reduced output or time lost.	OCGT Generating Plant and operations buildings	It is noted in Section 9.2 that the southern edge of the site is approx. 1.4km north of the River Nanny and at an elevation approx. 15m above the ground level at the river and is therefore not subject to Fluvial flooding from this source. The OPW flood mapping allows for climate change- the site has no flood risk in this model. Slight pluvial flooding occurs along part of the eastern boundary of the site. Notwithstanding this, no past flood event, comprising either a single flood event or recurring flood event, has been recorded on the site according to the OPW Flood Maps website (http://www.floodinfo.ie/map/floodmaps/). In addition to this, the various components of the proposed development are situated outside the area subject to pluvial flooding which is located to the eastern boundary of the site. Additional drainage measures in this area of the site may mitigate any fluvial flooding risk.
	Access and egress due to flooded access routes	Danger to operational workforce and issues for road tankers accessing / moving around the site.	Onsite maintenance staff	There is no history of flooding on the R152 which would hinder access to the proposed development site, as noted on the OPW Flood Maps website.
	Flood water ingress	Contamination of demineralised water treatment plant and storage tanks	Water and fuel tanks	Tanks are bunded which will prevent a low volume of flood water ingressing. Mitigation during the operational phase will include periodic inspections and maintenance of storage tanks and transfer pipes.
	Scour	Scour damage and corrosion of pipework and structures leading to damage to pipework and plant assets	OCGT and water pipework OCGT Generating Plant and operations buildings	Detailed design will consider runoff routes for rainfall to prevent scour of pipework and paint. At the operational phase, periodic inspections and maintenance will be carried out of assets that may be potentially affected, to include monitoring of deterioration of equipment and structures.
	Changes to water quality at receiving water bodies	Increased surface runoff from site leading to increased risk of foul water / contamination of runoff. Chapter 9, section 9.4.1 reports there will be a negligible impact on water quality. Increased rainfall in the future would further reduce contamination levels.	Receiving waterbodies	Surface water from the site will have no effect on water quality. No mitigation required.
Reduced rainfall	Increased drought risk	Shrinkage and desiccation of ground leading to cracks, strength loss and instability. Foundations may be affected.	Structural foundations, buried pipes and cabling	The geotechnical assessment at the detailed design stage will consider future ground conditions, temperature and rainfall when designing new foundations and specifications of foundation depth. Monitoring during the operational phase will include ground movements and repair where necessary.
		Reduced water availability on site / increased costs for water affecting potable water supply, OCGT water supply and cooling water	OCGT Generating Plant and operations	Water requirements are low and can be supplied from delivered water if required. Air conditioning will be utilised onsite to improve equipment performance.
Temperature increases (including average temperatures and temperature extremes)	Increased risk of extreme high temperatures / heatwaves	Exacerbated temperature extremes and/or sustained high temperatures may inhibit power infrastructure performance and export. This is due to the envelope of the operating temperature ranges of the generators and electrical equipment	OCGT generating unit and operations electrical equipment, cooling systems, substation	The detailed design stage will consider the design of key or critical elements using materials with higher temperature threshold specification. The operational phase will include monitoring deterioration of equipment and structures. Air conditioning is proposed to be utilised onsite to improve equipment performance.

Change in climate variable	Climate hazard	Description of potential climate impact	Affected Asset(s)	Mitigation measures to be implemented
		being reached. This can cause electrical faults and increase the risk of fire. Cracking, reduced strength and increased risk of deterioration of metallic and reinforced concrete assets due to high temperatures HVO potentially reaching flash point		
		Cracking, strength loss and more rapid deterioration of concrete due to high temperatures	Buildings, internal access roads, concrete water tanks, building and other structures	During the construction phase, monitoring and adjustment of the curing process of the concrete for new structures will be carried out to minimise risk of future high temperatures on the deterioration rate of the structure. The operational phase will include monitoring deterioration of structures.
		Loss of productivity and risks to workers health (heat stress and dehydration).	Onsite staff Buildings	Air conditioning will be used, if necessary. New structures and machinery will be designed to a higher temperature threshold specification to avoid maintenance requirements at hottest parts of the day.
		Inability to operate and maintain the plant in the high temperatures		
		Overheating of operational buildings		
Increasing average temperatures and maximum temperatures	Increased risk of extreme high temperatures / heatwaves	Stack emission concentration of oxides of nitrogen and sulphur oxide may be breached. High temperatures (combined with low wind) may negatively impact the dispersion of emissions in the air and breach air quality regulations.	Local air quality.	As noted in Chapter 10: Air Quality, during the operational phase no exceedances of the hourly NO_x, annual NO_x or 8-hour rolling CO AQS are predicted. This means that there is not considered a likely risk to human health. A review will be carried out at the next design stage to ensure changes to ambient air temperatures due to climate change will not affect acceptable emission concentrations. Emission levels and air quality will be monitored and if levels exceed required Air Quality Standards – revised air quality measures will be implemented.
Changing temperature variability	Reduced risk but occasional, sporadic cold snaps including extreme cold weather, ice and snow	Risk of freezing and plant shutdown, risk to site access from deep snow, risk to transportation from freezing temperatures and adverse road conditions, poor working conditions. Decreasing temperatures will like decrease electricity demand for cooling and increase HVO demand for heating. Inability to meet customer demand if infrastructure damaged and service disrupted. Disruption to power transmission and distribution.	OCGT Generating Plant and operations. Pipework and other metallic equipment. Mechanical and electrical equipment.	The detail design stage will identify bedding/material that is suitably resistant to temperature fluctuation, such as gravel casing to around vulnerable pipes, plus pipes and cables with material resistant to freezing conditions. OCGT plan can run at low temperatures. Additional portable heating can be utilised onsite to heat buildings. The operational phase will include monitoring of the deterioration of structures and equipment.
Increase in extreme weather including storms, high winds and lighting	High winds	Structural damage resulting from storminess and high winds	Buildings, internal access roads, water tanks, buildings and other structures	Stacks and higher level structures are designed to withstand storms and wind loads that account for future climate changes.
	Lighting strike	Electrical faults leading to power outages, due to storms and lightning	OCGT Generating Plant and operations	Lightning risk is always considered within plant design and will utilise earthed shielded copper cabling.

Change in climate variable	Climate hazard	Description of potential climate impact	Affected Asset(s)	Mitigation measures to be implemented
		strike		The site benefits from taller structures in neighbouring facilities with taller stack heights (70m and 110m respectively)
	Storms, higher winds, lightning	Staff access to the site could be restricted during extreme storm events with the potential shut down of operations if staff are not able to access site	Onsite staff	Use of an appropriate hazardous weather plan during construction and operation to ensure staff health and safety when working in or following hazardous conditions.
		Increased risk of physical damage to transmission infrastructure affecting the ability to transfer power to the national grid.	Interdependent transmission infrastructure / grid connection and water supply.	The operational phase will include monitoring of the deterioration of structures and equipment.

14.3 Residual Impacts

There are no residual impacts from the proposed development in the context of climate resilience.

14.4 Conclusion

Through design and required mitigation measures, the proposed development will withstand the potential forecasted impacts of climate change as detailed in this Chapter.

15 Interactions and Cumulative Impacts

15.1 Introduction

An important aspect of assessing the environmental impacts associated with any development is to consider how impacts identified under each of the subject headings might interact to cause a cumulative impact. Similarly, consideration must also be given to the cumulative effects arising from the interaction of the project with impacts arising from current and known future developments in the area.

15.2 Industries in the Area

Industries in the area of the proposed development include a large cement manufacturing plant and its associated quarry (Irish Cement Ltd.) which is located just to the north of the site. In addition, Indaver Waste to Energy facility lies immediately northwest of the site across the R152 road. Directly adjacent to the north of the proposed plant is a cluster of commercial and residential buildings including a service station and a Commercial Vehicle Roadworthiness Test (CVRT) centre. Residential development in the vicinity of the site is scattered, typical of the rural location. Future proposed developments include a Solar Farm (Highfield Solar Limited). Details of the main industries in the area are outlined below.

15.2.1 Approved 110 kV Substation

A planning application for the strategic infrastructure development of the 110kV transmission sub-station at Platin, Carranstown, Co. Meath was lodged with ABP in February 2019 (Case Reference PL17.303678). ABP granted permission for the development in January 2020.

15.2.2 Irish Cement

Irish Cement produces cement from its facility in Platin that includes a limestone quarry as a raw material in the production process. The facility is in operation since 1938 and currently operates under the IE Licence P0030-06. In 1972, a new dry process plant, Kiln 1 was constructed when operations transferred to the current site in Platin. A major upgrade was completed with the addition of Kiln 2 in 1977 and then again in 2008 with the construction of Kiln 3. The plant has undertaken alterations to its heating of the kilns with the incorporation of alternative fuels as opposed to coal into the process. In 2011, an increasing proportion of the fossil fuels in Platin have been replaced by Solid Recovered Fuel (SRF). In 2015, Irish Cement received planning permission for a new development in Platin that can recover surplus heat from the process to generate up to 7.5 Megawatts (MW) of electricity on site.

In 2018 Irish Cement Limited (ICL) was granted permission by ABP (ABP Case Reference PL17 .PA0050) for a ten year planning permission for development for the further replacement of fossil fuels with alternative fuels and for the use of alternative raw materials at their Cement Works in Platin, County Meath. Platin Cement Works already has permission for the use of up to 120,000 tonnes per annum of alternative fuels and the additional fossil fuel replacement will be achieved, progressively over time, by expanding the quantity and range of alternative fuels used at the Cement Works.

In 2022 ICL was granted permission by Meath County Council for extension of 811.50sqm gross floor area to an existing bulk materials storage shed and ancillary site works. The maximum height of the extension will be circa 14m, which is the same height as the existing building. The 1,868sqm development is located within the existing Cement Works at Platin, County Meath. The application relates to Platin Cement Works, which is subject to an Industrial Emissions License (IE License No. P0030-60).

15.2.3 Indaver

Indaver operates a waste to energy facility in Carranstown, Duleek, Co. Meath. The facility began the commissioning phase in August 2011, and has been fully operational since October 2011. The facility operates under the IE Waste Licence W0167-03. The facility was designed and built to accept 235,000 tonnes of municipal waste per annum. The treated municipal waste generates 18MW of

electricity. Bottom ash and metals following treatment of waste are removed from the facility. Between 2016 and 2018 Indaver applied for and was granted planning permission alterations to the waste-to-energy facility (MCC Case References FS16071, FS16072, and FS18022).

In 2019, Indaver applied to ABP as a Strategic Infrastructure Development (ABP Case Reference PC17.305252, PA17.307433) to increase annual treatment volumes by 24,000 tonnes to a treatment capacity of 250,000 tonnes. This was granted in 2022.

In 2020, Indaver applied to ABP (ABP Case Reference PA17.307433) to increase in annual total waste for treatment from currently permitted 235,000 tonnes to 250,000 tonnes, increase in annual amount of hazardous waste from currently permitted 10,000 tonnes to 25,000 tonnes, development of a aqueous waste tank farm, hydrogen generation unit, bottom ash storage building, development of a single storage warehouse, new concrete yard, weather canopy, demolition and rebuilding of an existing single storey modular office and ancillary site works. This was granted by An Bord Pleanála in March 2023.

15.2.4 Highfield Solar Limited

In 2016 Highfield Solar Limited applied to Meath County Council (MCC Case Reference LB160898, ABP Case Reference PL.248146) for permission to build a solar farm on a site which was split into two sites to the northeast and southwest of the Downestown Road at Garballagh, Thomastown, Gillinstown and Downestown, Duleek, Co. Meath. The decision taken by Meath County Council to grant permission for the development was appealed to An Bord Pleanála.

In January 2019, ABP ultimately made a split decision, granting permission for the larger western solar array in the townlands of Garballagh, Thomastown and Gillinstown, and refusing permission for the smaller eastern solar array in the townland of Downestown. The developed was obliged to achieve consent for 110 kV substation under Strategic Infrastructure Legislation.

Highfield Solar lodged a request with ABP (PL17.306330) in January 2020 to consider if their proposal to construct a 110kV substation Garballagh and Commons, Duleek would fall within the scope of section 182A of the Planning and Development Act 2000, as amended (strategic development infrastructure). ABP issued a decision in April stating that this development does fall under the scope of section 182A of the Planning and Development Act 2000, as amended. The proposed sub-station will be connected directly to the Drybridge-Baltrasna 110kV line by way of a looped in/out connection, and therefore will have no impact/connection to the proposed development or approved 110kV Substation at the Site. In 2021, an amendment was lodged (ABP Case Reference VM17.309291). The proposed alteration comprises the replacement of an existing steel angle tower with a new Line Cable Interface Mast to facilitate the connection of underground cables from the approved substation to the overhead lines.

In 2022, Highfield Solar Limited applied to Meath County Council (MCC Case Reference 22262) to amend the lifetime of the approved development (Planning ref: LB/160898) which comprises consent for the development of a solar farm on a site of approximately 131.37 hectares at Garballagh, Thomastown, Gillinstown, Duleek, Co Meath. Permission was granted to amend the operational lifespan of the consented development from 25 years to 35 years.

This project is not considered to have a cumulative negative impact with the proposed development as it is c. 5 km from the proposed development site on the other side (west) of Duleek and has no potential for interaction in respect of traffic, landscape, biodiversity or residential amenity.

A review of the Meath County Council online planning database has been carried out to determine if there are live planning applications for other developments in the vicinity of the proposed development site, that have not been built yet, that could potentially lead to cumulative impacts with the proposed development during both the construction and operational phases. This review concluded that, although there are a number of live planning applications in the vicinity of the proposed development site, due to their nature and scale, none of these have the potential to generate significant cumulative impacts with the proposed development that exceed the predicted potential impacts of the projects when considered individually.

15.3 Potential of Interactive and Cumulative Impacts

The examination of these impacts is important as an impact which directly affects one environmental medium may also have an indirect impact on other media (sometimes referred to as cross media impacts).

The interactions of the impacts between the various environmental media assessed during this Environmental Report and the different stages of both the construction and the operational phases of the proposed development have been assessed as appropriate in the relevant chapters (3 - 14). Consideration has also been given to cumulative and interactive impacts as a result of other facilities/developments in the vicinity of the proposed development site. The key potential impacts, and associated mitigation measures, can be summarised as follows;

- The construction and operation of the development is not predicted to have any significant impact on the health of local residents. The environmental impact of the construction activity will be minimised by specifying high standards of housekeeping, appropriate attention to environmental issues within the construction contracts, and by ongoing monitoring of performance during construction. The construction phase of the development is expected to last 30 months and up to 40 to 60 workers, both skilled and unskilled, will be employed on site at peak times. Local services and construction staff from the surrounding areas will be used where possible during the construction phase. Therefore the construction of the development will have a temporary positive impact on employment and the local economy. The environmental control technologies will be designed on the basis of Best Available Techniques (BAT) to ensure the protection of human health and the environment. Therefore, the operation of the proposed development will not have any significant any adverse impact on human health.
- The assessment of impacts in relation to landscape character and the visual environment as a result of the proposed development has concluded that there will not be any significant impact. The clustering of existing and permitted industrial and energy related infrastructure projects at this location is cited as an example which can be replicated at other locations in Meath in the County Development Plan 2021 – 2027 (see section 6.15.3 of the Meath County Development Plan 2021-2027).
- The proposed development will lead to a number of indirect spin-off employment opportunities through local contractors, service providers and suppliers.
- The construction and operational impact assessments in relation to Traffic and Transportation found that no significant impact on the surrounding road network is expected. The estimated maximum volumes of traffic travelling to and from the proposed development as described above are considered minimal, and will have an imperceptible impact on the local network. Because of this, it is concluded that there is no potential for significant cumulative impacts.
- The construction and operational impact assessments in relation to Air Quality and Climate are anticipated to be short term. A number of mitigation measures will be implemented during the construction and operational phases of the plant to ensure that atmospheric emissions do not have any significant adverse impact on ambient air quality. The proposed development will run up to 1,800 hours annually, the facility will be subject to IE licensing and the combustion process will be tightly monitored and controlled to ensure the facility runs as efficiently as possible. It has been demonstrated in Chapter 10 of this report that the cumulative impact during the operational phase of the proposed development will not be significant and will not lead to a contravention of Air Quality Standards in the vicinity of the proposed developed when considered cumulatively with the existing ambient air quality in the area.
- The construction and operational impact assessments in relation to noise are discussed within Chapter 8. It is anticipated that there may be a short term and local cumulative noise impact during the construction stage as construction generated noise is considered cumulatively with ambient noise levels in the area. However there will be mitigation measures as outlined in Chapter 8 in place to ensure this impact is not significant. The cumulative impact during the operational phase of the proposed development will not be significant and will not lead to a contravention of the site's future IE licence requirements in relation to noise. In addition, there is no increase in ambient noise levels predicted when the proposed development is considered cumulatively with existing ambient noise levels in the area.

- Off-site treatment and disposal of waste generated at the proposed development could have a potential indirect impact on air, soil, surface water, and groundwater quality at the off-site treatment/disposal sites. However, as discussed in the relevant chapters of this report these activities will be carried out by licensed operators and contractors in accordance with regulatory requirements and therefore will have an imperceptible negative impact only. Treatment and monitoring of water onsite prior to discharge off-site will ensure that there is no potential for significant impacts. As part of the overall CEMP, appropriate mitigation measures will be implemented to ensure that construction impacts on the existing site and off-site will be minimised as much as possible.
- There will be a permanent, slight negative visual impact from the proposed development, however the site is located within an industrialised zone and there are existing large-scale operations adjacent to the site which both have large stacks associated with their operations.
- Greenhouse gas (GHG) emissions are cumulative in nature, impacting the global atmospheric concentration of emissions. Additional development in the local area does not result in a greater local climate change effect from the Proposed Development (or vice versa). IEMA's guidance states that *"effects of GHG emissions from specific cumulative projects therefore in general should not be individually assessed, as there is no basis for selecting any particular (or more than ones) cumulative project that has GHG emissions for assessment over any other".*
- The GHG emissions during the construction phase 10,698 tonnes CO_2eq are negated by the low emissions during the operational phase of 6,872 tonnes direct emissions CO_2eq per year. Based on the GHG emissions assessment, the likely impact of the proposed development will be not be significant, as the use of HVO results in lower GHG emissions compared to other fuel types such as natural gas or distillate oil. Use of HVO as a fuel results in lower GHG emissions; using natural gas for 1800 hours per year would result in direct GHG emissions in the order of 173,214 tonnes CO2eq despite having lower transport embodied carbon as there is a gas pipeline adjacent to the project site.

15.4 Matrix of Interactions

Table 15.1 presents the interactions matrix. The interactions matrix examines the potential for the topic or issue in the left hand column to interact or have an effect on the environmental media listed in the top row of the matrix.

If there is the potential for an effect during the construction phase, it is indicated by a 'C'. An 'O' indicates the potential for an effect during the operational phase. A 'D' indicates the potential for an effect during the decommissioning phase. Any combination of letters from the above indicates interactions in the corresponding phases. If there is considered to be no potential for an effect, this is indicated by an '-'.

The purpose of the interactions matrix is to identify potential effects in different media. Actual effects and their significance are dealt with in the most relevant chapter.

Table 15.1: Interaction of Effects Matrix
(C = Construction, O= Operational, D= Decommissioning) (These impacts can be positive or negative)

	Population and Human Health	Landscape and Visual Impact	Traffic and Transportation	Land and Soils	Biodiversity	Noise and Vibration	Water and Waste Water	Air Quality	Waste Management	Material Assets	Archaeology, Architecture and Cultural Heritage	Climate
Population and Human Health		-	-	-	-	-	-	-	-	-	-	-
Landscape and Visual Impact	-		-	-	-	-	-	-	-	-	C	-
Traffic and Transportation	CD	CD		-	-	CD	-	CD	-	-	-	CD
Land and Soils	-	-	-		CD	-	CD	-	-	-	-	-
Biodiversity	-	-	-	-		-	-	-	-	-	-	-
Noise and Vibration	CD	-	-	-	CD		-	-	-	-	CD	-
Water and Waste Water	O	-	-	-	CD	-		-	-	O	-	-
Air Quality	CD	-	-	-	CD	-	-		-	-	-	-
Waste Management	-	CD	-	-	CD	-	CD	CD		-	-	-
Material Assets	COD	-	-	-	-	-	-	-	-		-	-
Archaeology, Architecture and Cultural Heritage	-	-	-	-	-	-	-	-	-	-		-
Climate	COD	-	COD	-	COD	-	COD	COD	-	-	-	

15.5 Conclusion

The interactions of potential environmental impacts from the proposed development have been considered throughout this Environmental Report and are not expected to have any significant effect.

The cumulative impact of the proposed development in conjunction with existing industries in the area and planned projects/developments in the area has also been given appropriate consideration under each of the relevant chapters of this Environmental Report; it is considered there will be no significant cumulative impacts. Mitigation measures have been outlined where appropriate which will ensure that any potential impacts are controlled and minimised as much as possible.

Appendix A

Irish Drilling Limited Site Investigation Laboratory Test Results March 2019 Comparison Against Groundwater Standards.

Table A. 1: *Irish Drilling Limited Site Investigation Groundwater Laboratory Test Results March 2019 Comparison Against Groundwater Standards.*

Component	LOD/ Units	Method	RC02	RC06	RC09	RC10	Environmental Guideline Value	Environmental Guideline Source	Below IGV/GTV?
Coliforms, Total*	CFU/100ml	SUB	36500	1790	921	1200	0 Counts per 100ml	EPA IGV	N
Coliforms, Faecal*	CFU/100ml	SUB	4900	37	120	<100	0 Counts per 100ml	EPA IGV	N
Dissolved solids, Total (gravimetric)	<10 mg/l	TM021	538 #	443 #	482 #	525 #	1000mg/l	EPA IGV	Y
Alkalinity, Total as CaCO3	<2 mg/l	TM043	402 #	289 #	276 #	246 #	No abnormal change	EPA IGV	N/A
Organic Carbon, Total	<3 mg/l	TM090	<3	4.28 #	<3 #	63.1 #	No abnormal change	EPA IGV	N/A
Ammoniacal Nitrogen as NH4	<0.3 mg/l	TM099	<0.3 #	0.378 #	<0.3 #	1.01 #	N/A	N/A	N/A
Fluoride	<0.5 mg/l	TM104	<0.5 #	<0.5 #	<0.5 #	1.18 #	1 mg/l	EPA IGV	N
Conductivity @ 20 deg.C	<0.005 mS/cm	TM120	0.629 #	0.594 #	0.663 #	0.665 #	1 mS/cm	EPA IGV	Y
Aluminium (diss.filt)	<10 µg/l	TM152	<10 #	<10 #	<10 #	<10 #	150 µg/l	S.I. 9 of 2010	Y
Arsenic (diss.filt)	<0.5 µg/l	TM152	<0.5 #	0.562 #	0.962 #	3.57 #	7.5 µg/l	S.I. 9 of 2010	Y
Boron (diss.filt)	<10 µg/l	TM152	12.6 #	28.8 #	12.1 #	421 #	750 µg/l	S.I. 9 of 2010	Y
Chromium (diss.filt)	<1 µg/l	TM152	<1 #	<1 #	<1 #	<1 #	37.5 µg/l	S.I. 9 of 2010	Y
Copper (diss.filt)	<0.3 µg/l	TM152	1.38 #	2.51 #	<0.3 #	7.18 #	1500 µg/l	S.I. 9 of 2010	Y
Lead (diss.filt)	<0.2 µg/l	TM152	<0.2 #	<0.2 #	<0.2 #	<0.2 #	18.75 µg/l	S.I. 9 of 2010	Y
Manganese (diss.filt)	<3 µg/l	TM152	46.9 #	121 #	6.48 #	78.8 #	50 µg/l	EPA IGV	N

Component	LOD/ Units	Method	RC02	RC06	RC09	RC10	Environmental Guideline Value	Environmental Guideline Source	Below IGV/GTV?
Nickel (diss.filt)	<0.4 µg/l	TM152	0.9 #	0.819 #	0.859 #	4.73 #	15 µg/l	S.I. 9 of 2010	Y
Phosphorus (diss.filt)	<10 µg/l	TM152	<10 #	11.5 #	<10 #	<10 #	N/A	N/A	N/A
Selenium (diss.filt)	<1 µg/l	TM152	<1 #	5.18 #	<1 #	<1 #	N/A	N/A	N/A
Zinc (diss.filt)	<1 µg/l	TM152	3.93 #	5.16 #	6.83 #	1630 #	100 µg/l	EPA IGV	N
Silver (diss.filt)	<0.5 µg/l	TM152	<0.5 #	<0.5 #	<0.5 #	<0.5 #	N/A	N/A	N/A
Sodium (diss.filt)	<0.076 mg/l	TM152	12 #	17.4 #	12.2 #	28.1 #	150 mg/l	EPA IGV	Y
Magnesium (diss.filt)	<0.036 mg/l	TM152	9.77 #	15.3 #	11.9 #	13.6 #	50 mg/l	EPA IGV	Y
Potassium (diss.filt)	<0.2 mg/l	TM152	0.996 #	2.45 #	1.43 #	1.36 #	5 mg/l	EPA IGV	Y
Iron (diss.filt)	<0.019 mg/l	TM152	<0.019 #	<0.019 #	<0.019 #	<0.019 #	0.2 mg/l	EPA IGV	Y
Mineral oil >C10 C40 (aq)	<100 µg/l	TM172	159	416	<100	53000	10 µg/l	EPA IGV	N
Mercury (diss.filt)	<0.01 µg/l	TM183	<0.01 #	<0.01 #	<0.01 #	<0.01 #	0.75 µg/l	S.I. 9 of 2010	Y
Phosphate (Ortho as PO4)	<0.05 mg/l	TM184	<0.05 #	<0.05 #	<0.05 #	<0.05 #	N/A	N/A	N/A
Sulphate	<2 mg/l	TM184	52.5 #	57 #	67.6 #	64.9 #	187.5 mg/l	S.I. 9 of 2010	Y
Nitrite as N	<0.0152 mg/l	TM184	0.0158 #	0.182 #	<0.0152 #	0.567 #	0.375 mg/l	S.I. 9 of 2010	N
Phosphate (Ortho as P)	<0.02 mg/l	TM184	<0.02 #	<0.02 #	<0.02 #	<0.02 #	N/A	N/A	N/A
Nitrate as N	<0.0677 mg/l	TM184	9.35	3.93	5.94	7.51	37.5 mg/l	S.I. 9 of 2010	Y
Total Oxidised Nitrogen as N	<0.1 mg/l	TM184	9.37 #	4.12 #	5.96 #	8.08 #	No abnormal change	EPA IGV	N/A
Cyanide, Total	<0.05 mg/l	TM227	<0.05 #	<0.05 #	<0.05 #	<0.05 #	0.01 mg/l	EPA IGV	<LOD

Component	LOD/ Units	Method	RC02	RC06	RC09	RC10	Environmental Guideline Value	Environmental Guideline Source	Below IGV/GTV?
pH	<1 pH Units	TM256	8.01 #	8.21 #	7.69 #	7.58 #	>6.5 and < 9.5	EPA IGV	Y
Phenol	<0.002 mg/l	TM259	<0.002 #	<0.002 #	<0.002 #	<0.002 #	0.0005 mg/l	EPA IGV	<LOD
1,2,4-Trichlorobenzene (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	0.4 µg/l	EPA IGV	<LOD
1,2-Dichlorobenzene (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	10 µg/l	EPA IGV	Y
1,3-Dichlorobenzene (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A
1,4-Dichlorobenzene (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A
2,4,5-Trichlorophenol (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A
2,4,6-Trichlorophenol (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	200 µg/l	EPA IGV	Y
2,4-Dichlorophenol (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A
2,4-Dimethylphenol (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A
2,4-Dinitrotoluene (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A
2,6-Dinitrotoluene (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A
2-Chloronaphthalene (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A
2-Chlorophenol (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	200 mg/l	EPA IGV	Y
2-Methylnaphthalene (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A
2-Methylphenol (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A
2-Nitroaniline (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A
2-Nitrophenol (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A

Component	LOD/ Units	Method	RC02	RC06	RC09	RC10	Environmental Guideline Value	Environmental Guideline Source	Below IGV/GTV?
3-Nitroaniline (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A
4-Bromophenylphenylether (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A
4-Chloro-3-methylphenol (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A
4-Chloroaniline (aq)	<1 µg/l	TM176	<1	<4	<4	<8	N/A	N/A	N/A
4-Chlorophenylphenylether (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A
4-Methylphenol (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A
4-Nitroaniline (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A
4-Nitrophenol (aq)	<1 µg/l	TM176	<1	<4	<4	<8	N/A	N/A	N/A
Azobenzene (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A
Acenaphthylene (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A
Acenaphthene (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A
Anthracene (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A
bis(2-Chloroethyl)ether (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A
bis(2-Chloroethoxy)methane (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A
bis(2-Ethylhexyl) phthalate (aq)	<2 µg/l	TM176	<2 #	<8 #	<8 #	<16 #	N/A	N/A	N/A
Butylbenzyl phthalate (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A
Benzo(a)anthracene (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A

Component	LOD/ Units	Method	RC02	RC06	RC09	RC10	Environmental Guideline Value	Environmental Guideline Source	Below IGV/GTV?
Benzo(b)fluoranthene (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	0.05 µg/l	EPA IGV	<LOD
Benzo(k)fluoranthene (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	0.5 µg/l	EPA IGV	<LOD
Benzo(a)pyrene (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	0.01 µg/l	EPA IGV	<LOD
Benzo(g,h,i)perylene (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	0.05 µg/l	EPA IGV	<LOD
Carbazole (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A
Chrysene (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A
Dibenzofuran (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A
n-Dibutyl phthalate (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A
Diethyl phthalate (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A
Dibenzo(a,h)anthracene (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A
Dimethyl phthalate (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A
n-Dioctyl phthalate (aq)	<5 µg/l	TM176	<5 #	<20 #	<20 #	<40 #	N/A	N/A	N/A
Fluoranthene (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	1 µg/l	EPA IGV	<LOD
Fluorene (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A
Hexachlorobenzene (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	0.03 µg/l	EPA IGV	<LOD
Hexachlorobutadiene (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	0.1 µg/l	EPA IGV	<LOD

Component	LOD/ Units	Method	RC02	RC06	RC09	RC10	Environmental Guideline Value	Environmental Guideline Source	Below IGV/GTV?
Pentachlorophenol (aq)	<1 µg/l	TM176	<1	<4	<4	<8	2 µg/l	EPA IGV	<LOD
Phenol (aq)	<1 µg/l	TM176	<1	<4	<4	<8	N/A	N/A	N/A
n-Nitroso-n-dipropylamine (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A
Hexachloroethane (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A
Nitrobenzene (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A
Naphthalene (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A
Isophorone (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A
Hexachlorocyclopentadiene (aq)	<1 µg/l	TM176	<1	<4	<4	<8	N/A	N/A	N/A
Phenanthrene (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A
Indeno(1,2,3-cd)pyrene (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A
Pyrene (aq)	<1 µg/l	TM176	<1 #	<4 #	<4 #	<8 #	N/A	N/A	N/A
GRO Surrogate % recovery**	%	TM245	102	112	99	103	N/A	N/A	N/A
GRO >C5-C12	<50 µg/l	TM245	<50 #	<50 #	<50 #	107 #	N/A	N/A	N/A
Methyl tertiary butyl ether (MTBE)	<3 µg/l	TM245	<3	<3	<3	<3	30 mg/l	EPA IGV	Y
Benzene	<7 µg/l	TM245	<7	<7	<7	<7	0.75 µg/l	S.I. 9 of 2010	<LOD

Component	LOD/ Units	Method	RC02	RC06	RC09	RC10	Environmental Guideline Value	Environmental Guideline Source	Below IGV/GTV?
Toluene	<4 µg/l	TM245	<4	<4	<4	<4	10 µg/l	EPA IGV	Y
Ethylbenzene	<5 µg/l	TM245	<5	<5	<5	<5	10 µg/l	EPA IGV	Y
m,p-Xylene	<8 µg/l	TM245	<8	<8	<8	<8	N/A	N/A	N/A
o-Xylene	<3 µg/l	TM245	<3	<3	<3	<3	N/A	N/A	N/A
Sum of detected Xylenes	<11 µg/l	TM245	<11	<11	<11	<11	10 µg/l	EPA IGV	<LOD
Sum of detected BTEX	<28 µg/l	TM245	<28	<28	<28	<28	N/A	N/A	N/A
Aliphatics >C5-C6	<10 µg/l	TM245	<10	<10	<10	<10	N/A	N/A	N/A
Aliphatics >C6-C8	<10 µg/l	TM245	<10	<10	<10	<10	N/A	N/A	N/A
Aliphatics >C8-C10	<10 µg/l	TM245	<10	<10	<10	<10	N/A	N/A	N/A
Aliphatics >C10-C12	<10 µg/l	TM245	<10	<10	<10	48	N/A	N/A	N/A
Aliphatics >C12-C16 (aq)	<10 µg/l	TM174	11	162	<10	42300	N/A	N/A	N/A
Aliphatics >C16-C21 (aq)	<10 µg/l	TM174	<10	15	<10	220	N/A	N/A	N/A
Aliphatics >C21-C35 (aq)	<10 µg/l	TM174	43	140	<10	1990	N/A	N/A	N/A
Total Aliphatics >C12-C35 (aq)	<10 µg/l	TM174	54	317	<10	44500	N/A	N/A	N/A
Aromatics >EC5-EC7	<10 µg/l	TM245	<10	<10	<10	<10	N/A	N/A	N/A
Aromatics >EC7-EC8	<10 µg/l	TM245	<10	<10	<10	<10	N/A	N/A	N/A
Aromatics >EC8-EC10	<10 µg/l	TM245	<10	<10	<10	<10	N/A	N/A	N/A

Component	LOD/ Units	Method	RC02	RC06	RC09	RC10	Environmental Guideline Value	Environmental Guideline Source	Below IGV/GTV?
Aromatics >EC10-EC12	<10 µg/l	TM245	<10	<10	<10	32	N/A	N/A	N/A
Aromatics >EC12-EC16 (aq)	<10 µg/l	TM174	<10	<10	<10	88	N/A	N/A	N/A
Aromatics >EC16-EC21 (aq)	<10 µg/l	TM174	<10	<10	<10	17	N/A	N/A	N/A
Aromatics >EC21-EC35 (aq)	<10 µg/l	TM174	<10	<10	<10	279	N/A	N/A	N/A
Total Aromatics >EC12-EC35 (aq)	<10 µg/l	TM174	<10	<10	<10	384	N/A	N/A	N/A
Total Aliphatics & Aromatics >C5-35 (aq)	<10 µg/l	TM174	54	317	<10	45000	N/A	N/A	N/A
Aliphatics >C16-C35 Aqueous	<10 µg/l	TM174	43	155	<10	2210	N/A	N/A	N/A
Dibromofluoromethane**	%	TM208	107	107	106	111	N/A	N/A	N/A
Toluene-d8**	%	TM208	101	101	101	98.5	N/A	N/A	N/A
4-Bromofluorobenzene**	%	TM208	96.4	94.2	95.4	92.9	N/A	N/A	N/A
Dichlorodifluoromethane	<1 µg/l	TM208	<1	<1	<1	<1	N/A	N/A	N/A
Chloromethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
Vinyl chloride	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
Bromomethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
Chloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
Trichlorofluoromethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
1,1-Dichloroethene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A

Component	LOD/ Units	Method	RC02	RC06	RC09	RC10	Environmental Guideline Value	Environmental Guideline Source	Below IGV/GTV?
Carbon disulphide	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
Dichloromethane	<3 µg/l	TM208	<3 #	<3 #	<3 #	<3 #	10 µg/l	EPA IGV	Y
Methyl tertiary butyl ether (MTBE)	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
trans-1,2-Dichloroethene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
1,1-Dichloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
cis-1,2-Dichloroethene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
2,2-Dichloropropane	<1 µg/l	TM208	<1	<1	<1	<1	N/A	N/A	N/A
Bromochloromethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
Chloroform	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	12 µg/l	EPA IGV	Y
1,1,1-Trichloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	500 µg/l	EPA IGV	Y
1,1-Dichloropropene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
Carbontetrachloride	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
1,2-Dichloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	3 µg/l	EPA IGV	Y
Benzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	0.75 µg/l	S.I. 9 of 2010	<LOD
Trichloroethene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	7.5	S.I. 9 of 2010	Y
1,2-Dichloropropane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
Dibromomethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A

Component	LOD/ Units	Method	RC02	RC06	RC09	RC10	Environmental Guideline Value	Environmental Guideline Source	Below IGV/GTV?
Bromodichloromethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
cis-1,3-Dichloropropene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
Toluene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	10 µg/l	EPA IGV	Y
trans-1,3-Dichloropropene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
1,1,2-Trichloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
1,3-Dichloropropane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
Tetrachloroethene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	40 µg/l	EPA IGV	Y
Dibromochloromethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
1,2-Dibromoethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
Chlorobenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	1 µg/l	EPA IGV	Y
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
Ethylbenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	10 µg/l	EPA IGV	Y
m,p-Xylene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	10 µg/l	EPA IGV	Y
o-Xylene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	10 µg/l	EPA IGV	Y
Styrene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
Bromoform	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
Isopropylbenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A

Component	LOD/ Units	Method	RC02	RC06	RC09	RC10	Environmental Guideline Value	Environmental Guideline Source	Below IGV/GTV?
1,1,2,2-Tetrachloroethane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
1,2,3-Trichloropropane	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
Bromobenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
Propylbenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
2-Chlorotoluene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
1,3,5-Trimethylbenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
4-Chlorotoluene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
tert-Butylbenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
1,2,4-Trimethylbenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
sec-Butylbenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
4-iso-Propyltoluene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
1,3-Dichlorobenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
1,4-Dichlorobenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
n-Butylbenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
1,2-Dichlorobenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
1,2-Dibromo-3-chloropropane	<1 µg/l	TM208	<1	<1	<1	<1	N/A	N/A	N/A
1,2,4-Trichlorobenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
Hexachlorobutadiene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	0.1	EPA IGV	<LOD

Component	LOD/ Units	Method	RC02	RC06	RC09	RC10	Environmental Guideline Value	Environmental Guideline Source	Below IGV/GTV?
tert-Amyl methyl ether (TAME)	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
Naphthalene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
1,2,3-Trichlorobenzene	<1 µg/l	TM208	<1 #	<1 #	<1 #	<1 #	N/A	N/A	N/A
1,3,5-Trichlorobenzene	<1 µg/l	TM208	<1	<1	<1	<1	N/A	N/A	N/A

ISO17025 accredited.
M mCERTS accredited.
Aq Aqueous / settled sample
***** Subcontracted.
****** % recovery from the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery.
Diss.filt Dissolved / filtered sample.
Tot.unfilt Total unfiltered sample
(F) Trigger breach confirmed
1-3♦§@ Sample deviation

Note:

Method No	Reference	Description
SUB		Subcontracted Test
TM021	Method 2540C, AWWA/APHA, 20th Ed., 1999	Determination of total dissolved solids in waters by gravimetry.
TM043	Method 2320B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part109 1984	Determination of alkalinity in aqueous samples
TM061	Method for the Determination of EPH,Massachusetts Dept.of EP, 1998	Determination of Extractable Petroleum Hydrocarbons by GC-FID (C10-C40)
TM090	Method 5310, AWWA/APHA, 20th Ed., 1999 / Modified: US EPA Method 415.1 & 9060	Determination of Total Organic Carbon/Total Inorganic Carbon in Water and Waste Water
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM104	Method 4500F, AWWA/APHA, 20th Ed., 1999	Determination of Fluoride using the Kone Analyser
TM120	Method 2510B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part 9:1970	Determination of Electrical Conductivity using a Conductivity Meter
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS
TM172	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	EPH in Waters
TM174	Analysis of Petroleum Hydrocarbons in Environmental Media – Total Petroleum Hydrocarbon Criteria	Determination of Speciated Extractable Petroleum Hydrocarbons in Waters by GC-FID
TM176	EPA 8270D Semi-Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)	Determination of SVOCs in Water by GCMS
TM183	BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters
TM227	Standard methods for the examination of waters and wastewaters 20th Edition, AWWA/APHA Method 4500.	Determination of Total Cyanide, Free (Easily Liberatable) Cyanide and Thiocyanate
TM245	By GC-FID	Determination of GRO by Headspace in waters
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4.	Determination of pH in Water and Leachate using the GLpH pH Meter
TM259	by HPLC	Determination of Phenols in Waters and Leachates by HPLC

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

Appendix B
Chapter 7 Biodiversity Appendices

Appendix 7.1: The Qualifying Interests (QIs) and Special Conservation Interests (SCIs) of European sites in the vicinity of the proposed development site

Site name and code	Distance from Proposed Development	Reasons for designation[133]
Special Areas of Conservation (SACs)		
River Boyne and River Blackwater SAC (002299)	Located *c.* 3.5km north of the proposed development site	[1099] River Lamprey *Lampetra fluviatilis* [1106] Salmon *Salmo salar* [1355] Otter *Lutra* [7230] Alkaline fens [91E0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae)* NPWS (2021) Conservation Objectives: River Boyne and River Blackwater SAC 002299. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.
Boyne Coast and Estuary SAC [001957]	Located *c*. 6.9km north-east of the proposed development site	1130 Estuaries 1140 Mudflats and sandflats not covered by seawater at low tide 1210 Annual vegetation of drift lines 1310 *Salicornia* and other annuals colonising mud and sand 1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) 1410 Mediterranean salt meadows (*Juncetalia maritimi*) 2110 Embryonic shifting dunes 2120 Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) 2130 Fixed coastal dunes with herbaceous vegetation (grey dunes)* S.I. No. 433/2021- European Union Habitats (Boyne coast and Estuary Special Area of Conservation 001957) Regulations 2021 NPWS (2012) *Conservation Objectives: Boyne Coast and Estuary SAC 001957.* Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.
Clogher Head SAC [001459]	Located *c*. 15.6km north-east of the proposed development site	[1230] Vegetated sea cliffs of the Atlantic and Baltic coasts [4030] European dry heaths S.I. No. 610/2019 - European Union Habitats (Clogher Head Special Area of Conservation 001459) Regulations 2019 NPWS (2017) Conservation Objectives: Clogher Head SAC 001459. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.
Rockabill to Dalkey Island SAC [003000]	Located *c*. 22km south-east of the proposed development	[1170] Reefs [1351] Harbour porpoise *Phocoena phocoena* S.I. No. 94/2019 - European Union Habitats (Rockabill To Dalkey Island Special Area Of Conservation 003000) Regulations 2019 NPWS (2013) Conservation Objectives: Rockabill to Dalkey Island SAC 003000. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

[133] "Qualifying Interests" for SACs and "Special Conservation Interests" for SPAs based on relevant Statutory Instruments for each SAC and SPA, or NPWS Conservation Objectives downloaded from www.npws.ie in June 2023. Data on NHA/pNHA sites from the site synopsis documents published by the NPWS (where available).

Priority Annex I habitat types are denoted with an "*" and are habitat types which are in danger of disappearance at a European level – from the definition of "priority natural habitat types" in Article 1(d) of the Habitats Directive

Site name and code	Distance from Proposed Development	Reasons for designation[133]
Rogerstown Estuary SAC [000208]	Located *c*. 23km south-east of the proposed development	1130 Estuaries 1140 Mudflats and sandflats not covered by seawater at low tide 1310 *Salicornia* and other annuals colonising mud and sand 1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae) 1410 Mediterranean salt meadows (Juncetalia maritimi) 2120 Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) 2130 Fixed coastal dunes with herbaceous vegetation (grey dunes)* S.I. No. 286/2018 - European Union Habitats (Rogerstown Estuary Special Area of Conservation 000208) Regulations 2018 NPWS (2013) Conservation Objectives: Rogerstown Estuary SAC 000208. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht
Special Protection Areas (SPAs)		
River Boyne and River Blackwater SPA [004232]	Located *c.* 3.7km north-west of the proposed development site	A229 Kingfisher *Alcedo atthis* *S.I. No. 462/2012 - European Communities (Conservation of Wild Birds (River Boyne and River Blackwater Special Protection Area 004232)) Regulations 2012.* NPWS (2022) *Conservation objectives for River Boyne and River Blackwater SPA [004232*] First Order Site-Specific Conservation Objectives Version 1. Department of Housing, Local Government and Heritage.
Boyne Estuary SPA [004080]	Located *c*. 5.7km north-east of the proposed development site	A048 Shelduck *Tadorna tadorna* A130 Oystercatcher *Haematopus ostralegus* A140 Golden Plover *Pluvialis apricaria* A141 Grey Plover *Pluvialis squatarola* A142 Lapwing *Vanellus vanellus* A143 Knot *Calidris canutus* A144 Sanderling *Calidris alba* A156 Black-tailed Godwit *Limosa limosa* A162 Redshank *Tringa totanus* A169 Turnstone *Arenaria interpres* A195 Little Tern *Sterna albifrons* A999 Wetlands *S.I. No. 626/2011 - European Communities (Conservation of Wild Birds (Boyne Estuary Special Protection Area 004080)) Regulations 2011.* NPWS (2013) *Conservation Objectives: Boyne Estuary SPA 004080*. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.
River Nanny Estuary and Shore SPA [004158]	Located *c.* 8km east of the proposed development site	A130 Oystercatcher *Haematopus ostralegus* A137 Ringed Plover *Charadrius hiaticula* A140 Golden Plover *Pluvialis apricaria* A143 Knot *Calidris canutus* A144 Sanderling *Calidris alba* A184 Herring Gull *Larus argentatus* A999 Wetlands *S.I. No. 140/2012 - European Communities (Conservation of Wild Birds (River Nanny Estuary and Shore SPA 004158)) Regulations 2012.* NPWS (2012) *Conservation Objectives: River Nanny Estuary*

Site name and code	Distance from Proposed Development	Reasons for designation[133]
		and Shore SPA 004158. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.
Skerries Islands SPA [004122]	Located *c.* 21km south-east of the proposed development	A017 Cormorant *Phalacrocorax carbo* A018 Shag *Phalacrocorax aristotelis* A046 Light-bellied Brent Goose *Branta bernicla hrota* A148 Purple Sandpiper *Calidris maritima* A169 Turnstone *Arenaria interpres* A184 Herring Gull *Larus argentatus* *S.I. No. 245/2010 - European Communities (Conservation of Wild Birds (Skerries Islands Special Protection Area 004122)) Regulations 2010.* *NPWS (2022) Conservation objectives for Skerries Islands SPA [004122].* First Order Site-Specific Conservation Objectives *Version 1.0. Department of Housing, Local Government and Heritage*
Rogerstown Estuary SPA [004015]	Located *c.* 23km south-east of the proposed development	A043 Greylag Goose *Anser anser* A046 Brent Goose *Branta bernicla hrota* A048 Shelduck *Tadorna tadorna* A056 Shoveler *Anas clypeata* A130 Oystercatcher *Haematopus ostralegus* A137 Ringed Plover *Charadrius hiaticula* A141 Grey Plover *Pluvialis squatarola* A143 Knot *Calidris canutus* A149 Dunlin *Calidris alpina* A156 Black-tailed Godwit *Limosa limosa* A162 Redshank *Tringa totanus* A999 Wetlands *S.I. No. 271/2010 - European Communities (Conservation of Wild Birds (Rogerstown Estuary Special Protection Area 004015)) Regulations 2010.* NPWS (2013) *Conservation Objectives: Rogerstown Estuary SPA 004015*. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

Appendix 7.2: Nationally designated sites in the vicinity of the proposed development site

Site name and code[134]	Distance from Proposed Development	Reasons for designation
Duleek Commons pNHA (001578)	Located *c.* 2km west of the proposed development site	It has been designated for its marsh habitat, and as it contains the rare species slender spike-rush *Eleocharis uniglumis*.
Dowth Wetland pNHA (001861)	Located *c*. 4km north of the proposed development site	The NPWS website does not include information on this site's designation, however it overlaps with the River Boyne and River Blackwater SAC boundary (See Appendix 7.1)..
Boyne River Islands pNHA (001862)	Located *c*. 4.5km north of the proposed development site	It has been designated for its example of riparian woodland habitat. This site overlaps with the River Boyne and River Blackwater SAC boundary (See Appendix 7.1)..
Thomastown Bog pNHA (001593)	Located *c*. 5.5km south-west of the proposed development	It has been designated for its range of habitats, which include raised bog, wet grassland and wet woodland.
King William's Glen pNHA (001804),	Located *c*. 6km north of the proposed development	The NPWS website does not include information on this site's designation, however it overlaps with the River Boyne and River Blackwater SAC and River Boyne and River Blackwater SPA (See Appendix 7.1).
Cromwell's Bush Fen pNHA (001576)	Located *c*. 6.5km south of the proposed development site	It has been designated for its wetland habitats, which, although small in area, is rare in the east of Ireland.
Laytown Dunes/Nanny Estuary pNHA (000554)	Located *c*. 6.5km east of the proposed development site	The NPWS website does not include information on this site's designation, however it overlaps with the River Nanny Estuary and Shore SPA (See Appendix 7.1).
Rosnaree Riverbank pNHA (001589)	Located *c.* 6.5km west of the proposed development site	The NPWS website does not include information on this site's designation. However this small wetland on the banks of the Boyne is important as it contains the rare round-fruited rush, *Juncus compressus*, a plant of very limited distribution .
Boyne Coast and Estuary pNHA (001957)	Located *c.* 7km north-east of the proposed development	The NPWS website does not include information on this site's designation, however it overlaps with the Boyne Coast and Estuary SAC and Boyne Estuary SPA (See Appendix 7.1).
Crewbane Marsh pNHA (000553)	Located *c.* 7km north-west of the proposed development	The NPWS website does not include information on this site's designation, however it overlaps with the River Boyne and River Blackwater SAC and the River Boyne and River Blackwater SPA (See Appendix 7.1).

[134] Only pNHAs considered to have potential source-pathway-receptor links or where risk of potential impact exists are listed in Appendix 7.2. pNHAs shown on Figure 7.3 and not listed in Appendix 7.2 are considered to fall outside the zone of influence of the proposed development due to the distance between the proposed development site and the pNHA and lack of source-pathway-receptor links, mainly hydrological.

Site name and code[134]	Distance from Proposed Development	Reasons for designation
Balrath Woods pNHA (001579)	Located *c.* 8km south-west of the proposed development	It is designated for its woodland habitat, a habitat type which is relatively rare in Meath. It also contains the flora species common wintergreen *Pyrola minor*, which is listed as "near-threatened" on the *Ireland Red List No. 10: Vascular Plants*[135]
Boyne Woods pNHA (001592)	Located *c.* 10km west of the proposed development	The NPWS website does not include information on this site's designation, however it overlaps with the River Boyne and River Blackwater SAC (See Appendix 7.1).
Melifont Abbey Woods pNHA (001464)	Located *c.* 13km north-east of the proposed development	It is designated for its woodland and infilling lake habitats, and for the presence of a notable invertebrate species, the Pyrenean snail *Semilimax pyrenaicus*.
Blackhall Woods pNHA (001293)	Located *c.* 13km north-east of the proposed development	It has been designated for its bryophyte flora, which forms a typical Atlantic community on fallen logs in the woodland.
Castlecoo Hill pNHA (001458)	Located *c.* 14km north-west of the proposed development	There are no details of the reasons for designation of this site publicly available from the NPWS website. From examination of orthophotography, it appears to be at least partially wooded.
Bog of the Ring pNHA (001204)	Located *c.* 14.5km south-east of the proposed development	This site has been designated due to its marshy habitats, and the foraging resource they provide to overwintering bird species.

[135] Wyse Jackson, M., FitzPatrick, Ú., Cole, E., Jebb, M., McFerran, D., Sheehy Skeffington, M. & Wright, M. (2016). *Ireland Red List No. 10: Vascular Plants*. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin, Ireland.

Appendix 7.3: Desk Study Flora and Fauna Records

Desktop records accessed 29th June 2023 of protected, rare, or other notable plant species are listed in Table 1. These are plant species which are legally protected under the Flora (Protection) Order, 2022 and/or are listed as Critically Endangered, Endangered or Vulnerable on the relevant national Red Data list for Ireland[136].

Table 1: Records of protected, red-listed or notable flora recorded from the desk study in the vicinity of the study area.

Common Name / Scientific Name	Legal Status[137]	Red List Status	Source
Tufted Thread-moss *Bryum caespiticium*	n/a	Vulnerable	NBDC online database record

Desktop records of protected, rare, or other notable fauna species are listed below in Table 2 In relation to amphibian, reptile and mammal species those which are protected under the Wildlife Acts, the Habitats Directive and/or are listed as threatened (Vulnerable to Critically Endangered) on the relevant national Red Lists are included. In the case of bird species, only those species listed in Annex I of the *Birds Directive or on the Birds of Conservation Concern in Ireland* (BoCCI) Red List are included in the table below. For invertebrate species, those which are listed as threatened (Vulnerable to Critically Endangered) on the relevant national Red List are included.

[136] Vascular flora from Wyse Jackson, M., FitzPatrick, Ú., Cole, E., Jebb, M., McFerran, D., Sheehy Skeffington, M. & Wright, M. (2016) *Ireland Red List No. 10: Vascular Plants*. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin, Ireland.
Bryophytes from Lockhart, N., Hodgetts, N. & Holyoak, D. (2012) *Ireland Red List No.8: Bryophytes*. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.
[137] HDII/IV/V = Habitats Directive Annexes II/IV/V; FPO = Flora (Protection) Order, 2022; WA = Wildlife Acts

Table 2: Records of protected, red-listed or notable fauna recorded from the desk study in the vicinity of the study area.

Common Name / Scientific Name	Legal Status[138]	Red List Status[139]	Source
Amphibians			
Common Frog *Rana temporaria*	HD ll	Least concern	NBDC online database record
Smooth newt *Lissotriton vulgaris*	WA	Least concern	NBDC online database record
Mammals			
Badger *Meles meles*	WA	Least concern	NBDC online database record
Common pipistrelle *Pipistrellus pipistrellus*	HD_IV, WA	Least concern	NBDC online database record
Daubenton's bat *Myotis daubentonii*	HD_IV, WA	Least concern	NBDC online database record
Hedgehog *Erinaceus europaeus*	WA	Least concern	NBDC online database record
Irish hare *Lepus timidus* subsp. *hibernicus*	WA	Least concern	NBDC online database record
Irish stoat *Mustela erminea* subsp. *hibernica*	WA	Least concern	NBDC online database record

[138] HD_II/IV/V = Habitats Directive Annexes II/IV/V; WA = Wildlife Acts; BD_I/II/III = Birds Directive Annex I/II/III; OSPAR = Convention for the protection of the marine environment of the North-east Atlantic 1992

[139] Mammals from 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.
Birds from Gilbert, G, Stanbury, A & Lewis, L. (2021) *Birds of Conservation Concern in Ireland 4: 2020-2026*. Irish Birds 43:1-22 (2021).
Amphibians, reptiles and fish from King, J.L., Marnell, F., Kingston, N., Rosell, R., Boylan, P., Caffrey, J.M., Fitzpatrick, Ú., Gargan, P.G., Kelly, F.L., O'Grady, M.F., Poole, R., Roche, W.K. & Cassidy, D. (2011) *Ireland Red List No. 5: Amphibians, Reptiles & Freshwater Fish*.
Non-Marine Molluscs from Byrne, A., Moorkens, E.A., Anderson, R., Killeen, I.J. & Regan, E.C. (2009) *Ireland Red List No. 2: Non-Marine Molluscs.*
Butterflies from Regan, E.C., Nelson, B., Aldwell, B., Bertrand, C., Bond, K., Harding, J., Nash, D., Nixon, D., & Wilson, C.J. (2010) *Ireland Red List No. 4: Butterflies*.
Moths from Allen, D., O'Donnell, M., Nelson, B., Tyner, A., Bond, K.G.M., Bryant, T., Crory, A., Mellon, C., O'Boyle, J., O'Donnell, E., Rolston, T., Sheppard, R., Strickland, P., Fitzpatrick, U., & Regan, E. (2016) *Ireland Red List No. 9: Macro-moths (Lepidoptera).*
Damselflies and dragonflies from Nelson, B., Ronayne, C. & Thompson, R. (2011) *Ireland Red List No.6: Damselflies & Dragonflies (Odonata).*
Water beetles from Foster, G. N., Nelson, B. H. & O Connor, Á. (2009) *Ireland Red List No. 1: Water beetles*.

Common Name / Scientific Name	Legal Status[138]	Red List Status[139]	Source
Leisler's bat *Nyctalus leisleri*	HD_IV, WA	Least concern	NBDC online database record
Natterer's bat *Myotis nattereri*	HD_IV, WA	Least concern	NBDC online database record
Otter *Lutra lutra*	HD_II, V, WA	Least concern	NBDC online database record
Pine marten *Martes martes*	WA	Least concern	NBDC online database record
Red deer *Cervus elaphus*	WA	Least concern	NBDC online database record
Red squirrel *Sciurus vulgaris*	WA	Least concern	NBDC online database record
Soprano pipistrelle *Pipistrellus pygmaeus*	HD_IV, WA	Least concern	NBDC online database record
Birds			
Barn owl *Tyto alba*	WA	Red	NBDC online database record
Barn swallow *Hirundo rustica*	WA	Amber	NBDC online database record
Black-headed gull *Chroicocephalus ridibundus*	WA	Amber	NBDC online database record
Black-legged kittiwake *Rissa tridactyla*	WA	Red	NBDC online database record
Common coot *Fulica atra*	WA	Amber	NBDC online database record
Common goldeneye *Bucephala clangula*	BD_II (II), WA	Amber	NBDC online database record
Common grasshopper warbler *Locustella naevia*	WA	Green	NBDC online database record
Common greenshank *Tringa nebularia*	WA	Green	NBDC online database record

Common Name / Scientific Name	Legal Status[138]	Red List Status[139]	Source
Common kestrel *Falco tinnunculus*	WA	Red	NBDC online database record
Common kingfisher *Alcedo atthis*	BD_I, WA	Amber	NBDC online database record
Common linnet *Carduelis cannabina*	WA	Amber	NBDC online database record
Common pheasant *Phasianus colchicus*	BD_II (I), III (I), WA	Green	NBDC online database record
Common pochard *Aythya ferina*	BD_II (I), III (II), WA	Amber	NBDC online database record
Common Quail *Coturnix coturnix*	WA	Red	NBDC online database record
Common redshank *Tringa totanus*	WA	Red	NBDC online database record
Common sandpiper *Actitis hypoleucos*	WA	Amber	NBDC online database record
Common shelduck *Tadorna tadorna*	WA	Amber	NBDC online database record
Common snipe *Gallinago gallinago*	BD_II (I), III (III), WA	Amber	NBDC online database record
Common starling *Sturnus vulgaris*	WA	Amber	NBDC online database record
Common swift *Apus apus*	WA	Amber	NBDC online database record
Common wood pigeon *Columba palumbus*	WA	Green	NBDC online database record
Corn Bunting *Emberiza calandra*	WA	Green	NBDC online database record
Corn crake *Crex crex*	BD_I, WA	Red	NBDC online database record
Eurasian curlew *Numenius arquata*	BD_II, WA	Red	NBDC online database record

Common Name / Scientific Name	Legal Status[138]	Red List Status[139]	Source
Eurasian oystercatcher *Haematopus ostralegus*	WA	Amber	NBDC online database record
Eurasian teal *Anas crecca*	BD_II (I), III (II), WA	Amber	NBDC online database record
Eurasian Tree Sparrow *Passer montanus*	WA	Amber	NBDC online database record
Eurasian wigeon *Anas penelope*	BD_II (I), III (II), WA	Amber	NBDC online database record
Eurasian woodcock *Scolopax rusticola*	BD_II (I), III (II), WA	Amber	NBDC online database record
European golden plover *Pluvialis apricaria*	BD_I, II (II), III (III), WA	Red	NBDC online database record
Great black-backed gull *Larus marinus*	WA	Amber	NBDC online database record
Great cormorant *Phalacrocorax carbo*	WA	Amber	NBDC online database record
Great crested grebe *Podices cristatus*	WA	Amber	NBDC online database record
Grey partridge *Perdix perdix*	BD_II (I), III (I), WA	Red	NBDC online database record
Hen harrier *Circus cyaneus*	BD_I, WA	Amber	NBDC online database record
Herring gull *Larus argentatus*	WA	Red	NBDC online database record
House martin *Delichon urbicum*	WA	Amber	NBDC online database record
House sparrow *Passer domesticus*	WA	Amber	NBDC online database record
Lesser black-backed gull *Larus fuscus*	WA	Amber	NBDC online database record
Little egret *Egretta garzetta*	BD_I, WA	Green	NBDC online database record

Common Name / Scientific Name	Legal Status[138]	Red List Status[139]	Source
Little grebe *Tachybaptus ruficollis*	WA	Amber	NBDC online database record
Mallard *Anas platyrhynchos*	BD_II (I), III (I), WA	Amber	NBDC online database record
Merlin *Falco columbarius*	BD_I, WA	Amber	NBDC online database record
Mew gull *Larus canus*	WA	Amber	NBDC online database record
Mute swan *Cygnus olor*	WA	Amber	NBDC online database record
Northern lapwing *Vanellus vanellus*	BD_II (II), WA	Red	NBDC online database record
Northern pintail *Anas acuta*	BD_II (I), III (II), WA	Red	NBDC online database record
Northern shoveler *Anas clypeata*	BD_II (I), III (III), WA	Red	NBDC online database record
Northern wheatear *Oenanthe oenanthe*	WA	Amber	NBDC online database record
Peregrine falcon *Falco peregrinus*	BD_I, WA	Red	NBDC online database record
Red-breasted merganser *Mergus serrator*	BD_II (II), WA	Amber	NBDC online database record
Rock pigeon *Columba livia*	BD_I, WA	Green	NBDC online database record
Sand martin *Riparia riparia*	WA	Amber	NBDC online database record
Sky lark *Alauda arvensis*	BD_I, WA	Amber	NBDC online database record
Spotted flycatcher *Muscicapa striata*	WA	Amber	NBDC online database record
Stock Pigeon *Columba oenas*	BD_I, WA	Amber	NBDC online database record

Common Name / Scientific Name	Legal Status[138]	Red List Status[139]	Source
Tufted duck *Aythya fuligula*	BD_II (I), III (I), WA	Amber	NBDC online database record
Water rail *Rallus aquaticus*	WA	Amber	NBDC online database record
Whooper swan *Cygnus cygnus*	BD_I, WA	Amber	NBDC online database record
Yellowhammer *Emberiza citrinella*	WA	Red	NBDC online database record
Invertebrates			
Wall brown butterfly (*Lasiommata megera*)	n/a	Endangered	NBDC online database record
Blind Snail (*Cecilioides (Cecilioides) acicula*)	n/a	Vulnerable	NBDC online database record
Desmoulin's Whorl Snail (Vertigo (Vertigo) moulinsiana)	HD_II, WA	Endangered	NBDC online database record
English Chrysalis Snail (*Leiostyla (Leiostyla) anglica*)	n/a	Vulnerable	NBDC online database record
Lesser Bulin (*Merdigera obscura*)	n/a	Endangered	NBDC online database record
Marsh Whorl Snail (*Vertigo (Vertigo) antivertigo*)	n/a	Vulnerable	NBDC online database record
Moss Chrysalis Snail (Pupilla (*Pupilla) muscorum*)	n/a	Endangered	NBDC online database record
Point Snail (*Acicula fusca*)	n/a	Vulnerable	NBDC online database record
Smooth Grass Snail (*Vallonia pulchella*)	n/a	Vulnerable	NBDC online database record
Smooth Ramshorn (*Gyraulus (Torquis) laevis*)	n/a	Endangered	NBDC online database record
Tree Snail (*Balea (Balea) perversa*)	n/a	Vulnerable	NBDC online database record

Appendix 7.4: Criteria for Ecological Evaluation

Ecological Valuation Criteria
International Importance

• 'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation.
• Proposed Special Protection Area (pSPA).
• Site that fulfils the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended).
• Features essential to maintaining the coherence of the Natura 2000 Network.[140]
• Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive.
• Resident or regularly occurring populations (assessed to be important at the national level)[141] of the following:
  ○ Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and / or
  ○ Species of animal and plants listed in Annex II and/or IV of the Habitats Directive.
• Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971).
• World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972).
• Biosphere Reserve (UNESCO Man & the Biosphere Programme).
• Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979).
• Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979).
• Biogenetic Reserve under the Council of Europe.
• European Diploma Site under the Council of Europe.
• Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).[142]

National Importance
• Site designated or proposed as a Natural Heritage Area (NHA). • Statutory Nature Reserve. • Refuge for Fauna and Flora protected under the Wildlife Acts. • National Park. • Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park. • Resident or regularly occurring populations (assessed to be important at the national level)[143] of the

[140] See Articles 3 and 10 of the Habitats Directive.
[141] It is suggested that, in general, 1% of the national population of such species qualifies as an internationally important population. However, a smaller population may qualify as internationally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.
[142] Note that such waters are designated based on these waters' capabilities of supporting salmon (*Salmo salar*), trout (*Salmo trutta*), char (*Salvelinus*) and whitefish (*Coregonus*).

Ecological Valuation Criteria
following: ○ Species protected under the Wildlife Acts; and/or ○ Species listed on the relevant Red Data list. • Site containing 'viable areas'[144] of the habitat types listed in Annex I of the Habitats Directive.
County Importance
• Area of Special Amenity.[145] • Area subject to a Tree Preservation Order. • Area of High Amenity, or equivalent, designated under the County Development Plan. • Resident or regularly occurring populations (assessed to be important at the County level)[146] of the following: ○ Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; ○ Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; ○ Species protected under the Wildlife Acts; and/or ○ Species listed on the relevant Red Data list. • Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance. • County important populations of species, or viable areas of semi-natural habitats or natural heritage features identified in the National or Local Biodiversity Action Plan (BAP) if this has been prepared. • Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county. • Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.
Local Importance (higher value)
• Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared; • Resident or regularly occurring populations (assessed to be important at the Local level)[147] of the following: ○ Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; ○ Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;

[143] It is suggested that, in general, 1% of the national population of such species qualifies as a nationally important population. However, a smaller population may qualify as nationally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.
[144] A 'viable area' is defined as an area of a habitat that, given the particular characteristics of that habitat, was of a sufficient size and shape, such that its integrity (in terms of species composition, and ecological processes and function) would be maintained in the face of stochastic change (for example, as a result of climatic variation).
[145] It should be noted that whilst areas such as Areas of Special Amenity, areas subject to a Tree Preservation Order and Areas of High Amenity are often designated on the basis of their ecological value, they may also be designated for other reasons, such as their amenity or recreational value. Therefore, it should not be automatically assumed that such sites are of County importance from an ecological perspective.
[146] It is suggested that, in general, 1% of the County population of such species qualifies as a County important population. However, a smaller population may qualify as County importance where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.
[147] It is suggested that, in general, 1%of the local population of such species qualifies as a locally important population. However, a smaller population may qualify as locally important where the population forms a critical part of a wider population, or the species is at a critical phase of its life cycle.

Ecological Valuation Criteria
○ Species protected under the Wildlife Acts; and/or ○ Species listed on the relevant Red Data list. • Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality; Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.
Local Importance (lower value)
• Sites containing small areas of semi-natural habitat that are of some local importance for wildlife; • Sites or features containing non-native species that are of some importance in maintaining habitat links.