ESB Hydrogen Production Demonstration Project

Aghada

Environmental Considerations Report

ESB

Project number: 60691388
Document reference: 60691388_ACM_RP_EN_002_3

04 January 2024

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Quality information

Prepared by	Checked by	Verified by	Approved by
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Revision History

Revision	Revision date	Details	Authorized	Name	Position
0	15 September 2023	Draft for Comment	Y	Bernice Cahill	Associate Director
1	8 November 2023	Update	Y	Bernice Cahill	Associate Director
2	14 November 2023	Update	Y	Bernice Cahill	Associate Director
3	29 November 2023	Final Draft	Y	Bernice Cahill	Associate Director
4	15 December 2023	Final	Y	Bernice Cahill	Associate Director

Distribution List

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1. Introduction

This Environmental Considerations Report (ECR) has been prepared by AECOM Ireland Limited (AECOM) on behalf of the Electricity Supply Board (ESB) (herein referred to as 'the Applicant'). ESB are seeking planning permission for a hydrogen production demonstration project and associated plant and (herein referred to as the 'Proposed Development'). The Proposed Development is located within the administrative area of Cork County Council (CCC).

The Site of the Proposed Development (herein referred to as 'the Site') is located within the boundary of the existing ESB Aghada Power Station, Aghada, County Cork (herein referred to as the "Power Station"). Operations at the Power Station are currently governed by an industrial emissions licence (IEL) which was issued by the Environmental Protection Agency (EPA) in 2011 (reference P0561-05). The Power Station is a registered lower tier establishment under the Control of Major Accident Hazard (COMAH) Regulations[1].

This ECR identifies the potential significant environmental effects (if any) arising from the construction, operational and decommissioning phases of the Proposed Development. Where potential significant environmental effects have been identified, mitigation and monitoring measures have been proposed to avoid, prevent, reduce or offset the effects. In addition, cumulative environmental impacts have been assessed, where appropriate.

1.1 The Applicant

The ESB was established in 1927 as a statutory corporation in the Republic of Ireland (RoI), under the Electricity (Supply) Act 1927. ESB operates across the electricity market from generation, through transmission and distribution to supply.

In line with the ESB's net zero ambition of net zero carbon emissions by 2040, the storage of renewable energy will be crucial. Green hydrogen, which is hydrogen created using renewable energy sources, offers an alternative sustainable solution to fossil fuels and will support the integrated zero carbon energy system in Ireland. The Proposed Development is ESB's initial step in demonstrating the viability of green hydrogen projects into the future.

1.2 Scope of the ECR

The ECR has been prepared in conjunction with an Environmental Impact Assessment (EIA) Screening Report[2] and each environmental topic includes a baseline assessment, impact prediction and evaluation, and determination of appropriate mitigation measures, including monitoring and reinstatement where appropriate.

The EIA Screening Report notes the following:

- Air quality: During construction dust generation will be reduced through the implementation of inherent controls, regulatory controls and best practice measures. With the adoption of these measures, it is anticipated that the dust produced would not cause a significant effect on the environment. During operation, emissions to air are limited to air, elemental nitrogen, oxygen, water vapor and small amounts of vented hydrogen and are not considered pollutants.
- Climate: Given the scale, size and type of the Proposed Development, no significant impacts on climate are anticipated in the environment surrounding the Proposed Development.
- Landscape and visual impact: Given the industrial nature of the surrounding Power Station, the nature of the Proposed Development is unlikely to have any significant environmental effect on the landscape of the area. Impacts to Views from Scenic Route 51 will be not significant owing to the scale of the surrounding industrial development. During construction the presence of plant and machinery will detract from certain views; however, this is short term in nature and not considered to be significant.

Consequently, these topics are not considered further in this report. The structure of this report is outlined in Table 1-1.

[1] Government of Ireland (2015), Chemicals Act (Control of Major Accidents Hazards Involving Dangerous Substances) Regulations
[2] AECOM (2023), ESB Hydrogen Production Demonstration Project Aghada Environmental Impact Assessment Screening Report

Table 1-1 Structure of the ECR

Section	Chapter Title
1	Introduction
2	Description of Proposed Development
3	Population and Human Health
4	Biodiversity
5	Land and Soils
6	Water
7	Noise and Vibration
8	Material Assets
9	Cultural Heritage
0	Traffic and Transport
11	Major Accidents and Disasters
12	Mitigation, Monitoring and Residual Effects, Conclusions

1.3 Methodology

Each technical chapter of this report, the classification and significance of effects is generally evaluated in accordance with the EIA Directive[10] and the methodology outlined in the EPA's Guidelines on the Information to be Contained in Environmental Impact Assessment Reports'[3].

Where more relevant and specific standards and methodologies exist, they are adopted and outlined in the respective methodology sections within each technical chapter.

1.3.1 Describing Potential Effects

With reference to the EPA Guidelines, effects are described under various headings, including Quality, Significance, Extent and Context, Probability, Duration and Frequency. Of particular relevance are the definitions of significance and duration, which are provided in Table 1.2 and Table 1.3 respectively.

Table 1.2 Description of Significance of Effects

Aspect	Description
Imperceptible	An effect capable of measurement but without significant consequences
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends
Significant	An effect which, by its character, magnitude, duration or intensity, alters a sensitive aspect of the environment
Very Significant	An effect which, by its character, magnitude, duration or intensity, significantly alters most of a sensitive aspect of the environment
Profound	An effect which obliterates sensitive characteristics

Table 1.3 Description of Duration of Effects

Aspect	Description
Momentary	Effects lasting from seconds to minutes
Brief	Effects lasting less than a day
Temporary	Effects lasting less than a year
Short-Term	Effects lasting from one to seven years

[3] EPA (2022), Guidelines on the Information to be Contained in Environmental Impact Assessment Reports

Aspect	Description
Medium-Term	Effects lasting from seven to 15 years
Long-Term	Effects lasting from 15 to 60 years
Permanent	Effects lasting over 60 years
Reversible	Effects that can be undone, e.g., through remediation or restoration
Frequency	How often the effect will occur

1.3.2 Determining Significance

Once the magnitude of the impact has been identified, this can be cross-referenced with the sensitivity of the receptor to derive the overall significance of impact as per the EPA Guidelines. By bringing together magnitude and sensitivity, the assessment considers the classification of the effects as outlined in Table 1-4.

Table 1-4 Typical Classifications of the Significance of Effects

Sensitivity of Receptors	Magnitude of Effect			
	High	Medium	Low	Negligible
High	Very significant	Significant	Slight	Not significant
Medium	Significant	Moderate	Slight	Imperceptible
Low	Moderate	Slight	Slight	Imperceptible
Negligible	Imperceptible	Imperceptible	Imperceptible	Imperceptible

1.4 Need for the Proposed Development

European, national and regional planning policy provides substantial support for the production of hydrogen to contribute to international efforts to lower carbon emissions. Hydrogen is a fuel that is relatively simple to create, can be stored in large amounts for later use, and can be either used in zero emission vehicles utilising fuel cells or integrated into the natural gas networks. Green hydrogen – which is hydrogen created using renewable energy sources - offers an alternative sustainable solution to fossil fuels.

European Union (EU) policy sets out a legally binding target for the year 2030 with at least 55% cut in GHG emissions from 1990 levels and a reduction of 80%-95% below 1990 levels by 2050 based on the Energy Roadmap 2050. Renewable hydrogen is prioritised in the EU and as detailed in the European Hydrogen Strategy, the European Commission (EC) will support the installation of at least 6 gigawatts (GW) of renewable hydrogen electrolysers in the EU, and the production of up to 1 million tonnes of renewable hydrogen by the year of 2024.

National planning policy[4] recognises that hydrogen technologies can play a significant role in enabling the transition to a low-carbon and climate resilient economy in Ireland. The National Development Plan 2021 to 2030[5] is committed to the decarbonisation of electricity supply and to increase the share of renewable electricity up to 80% by 2030.

The Climate Action Plan 2023 (CAP23)[6] identifies that green hydrogen has a critically important role to play in reducing CO_2 emissions in hard to abate sectors such as aviation, industry, long-distance transport by providing an alternative source of renewable electricity. It also recognises that green hydrogen can minimise the overall cost of decarbonisation across all sectors.

The National Hydrogen Strategy was developed with the aims of achieving a decarbonised economy, enhanced energy security and developing commercial hydrogen production and export opportunities. The strategy identifies that hydrogen production is a key component of securing a zero-carbon economy. Due to current uncertainty associated with hydrogen as an energy source, the strategy strongly supports and encourages the implementation of demonstration projects, such as the Proposed Development, across the hydrogen value chain.

Regional planning policy is consistent with the National Planning Framework (NPF)[7] and emphasises the transition to a Low Carbon Economy and encourages the employment of green tech and infrastructure. The Regional Spatial and Economic Strategy (RSES)[8] supports renewable energy development in the Southern region and specifically encourages the upgrade of existing power stations for indigenous renewable energy production as is proposed here.

[4] Government of Ireland (2018), Project Ireland 2040, National Planning Framework
[5] Department of Public Expenditure, NDP Delivery and Reform (2021), National Development Plan 2021-2030
[6] Department of the Environment, Climate and Communications (2022), Climate Action Plan 2023
[7] Government of Ireland (2023), National Planning Framework
[8] Southern Regional Assembly (2020), Regional Spatial & Economic Strategy (RSES) for the Southern Region

At local level, the Cork County Development Plan (CCDP)[9] sets out objectives in support of renewable energy development in County Cork and encourages the sustainable development of the electricity network. It is recognised that green hydrogen has the potential to replace the use of fossil fuels in the energy mix and it is an objective of the plan to support the sustainable development of hydrogen energy at suitable locations across the county such as the Site.

1.5 Planning, Policy and Development Context

Details of the relevant policies and planning and development context are provided in the Planning Statement (KPMG, September 2023) accompanying this planning application.

1.6 Planning History Context

A review was initially carried out to identify other existing and/or approved projects (including approved projects that have been appealed and a decision is pending), taking into account any existing environmental impacts. A review was carried out of the planning files from the following databases:

- CCC.
- An Bord Pleanála (ABP).
- Department of Housing, Planning and Local Government (DHPLG) EIA Portal.

An overview of the planning history search is included in Appendix A.

This assessment considers whether any of these existing/approved projects will likely have significant cumulative effects in combination with the Proposed Development. The assessment also considers whether all of the existing/approved projects taken together as a whole will likely have significant cumulative effects in combination with the Proposed Development. There are many projects listed on the planning databases considered, however, the focus for this assessment was on the proximity, scale and nature of those projects in relation to the Proposed Development and on those which could potentially exacerbate environmental effects and thus be of significance to the cumulative effects assessment. Particular attention was given to those projects which were designated as Strategic Infrastructure Developments (SID) in proximity to the Proposed Development given the larger scale and nature of these developments. Those projects where environmental impact assessment reports (EIARs), or Natura Impact Statements (NIS's) accompanied the planning applications were also given due regard at review stage. Live or proposed projects which have not yet been permitted were not considered in this assessment, with the exception of the recently submitted application by ESB for an open cycle gas turbine generating unit within the Power Station.

Arising from this review, a number of existing and/or approved projects (as listed in Table 1-5) were identified which could have the potential for likely significant cumulative effects.

Table 1-5 List of Planned Projects Identified as Having a Potential Cumulative Effect of the Proposed Development

Reference	Proposed Development
314003	Development is sought for a period of 10 years at a 10.22hasite within Power Station Generating Station consisting of 1) Construction/installation of an open cycle gas turbine (OCGT) generating unit and associated plant and equipment, comprising the following main components with approximate dimensions as stated : Gas turbine air intake [24m x 18m x 26m high], Generator enclosure [24m x 18m x 14.5m high], Gas turbine enclosure [53m x 15m x 26m high], Exhauster diffuser [14.5m x 10.4m x 10.5m high], Exhaust stack [40m high, 8m diameter], Gas turbine control and electrical modules [20.5m x 18m x 10m high], Fin fan coolers [27m x 19m x 8m high], Main transformer [12.2m x 7.5m x 8.5m high] including 17.5m x 17.9m concrete bund; and 2 no. 12m high concrete blast walls, Auxiliary transformer [5m x 4.7m x 7.5m high] including 6.8m x 7.5m concrete bund; and 2 no. 12m high concrete blast walls, Demineralised water treatment plant [20m x 10m x 5.4m high], Demin water storage tank [14.63m high x 24.4m diameter], Raw water/Firewater storage tank [14.63m high x 15.2m diameter], Fuel oil storage tanks [two, each 12.19m high x 17.4, diameter], including 67m x 35m concrete bund, Fuel oil forwarding pumps [6m x 10m x 2.2m high], Firefighting pumphouse [10m x 7m x 5.4m high], Gas conditioning compound [42.3m x 11.5m x 6m high]. Above ground installation gas compound expansion [23m x 73m], Indoor switchgear building [20m x 30m x 18m high], Emergency diesel generator <1 MW [10m x 4m x 5m high], Generator circuit breaker [8.8m x 5.1m x 4m high], Continuous emissions monitoring skid [3.5 m x 2.5m x 5m high], Workshop/Stores/Administration building [35.9m x 12m x 15m], Hydrogen storage compound [8m x 4m x 2m high], Surface water drainage system, Vehicle parking, Internal roadways, 2) Demolition of an existing single storey stores building, 3) connection to the existing on-site above ground installation (AGI), 4) Connection to the National Grid by means of underground cable to existing on-site 220kV substation, 5) All associated works to facilitate the development such as temporary construction compounds, perimeter fencing, use of an existing access to public road, above ground pipe racks, underground cables on the Site and crossing the R630 roadway, site lighting and telecommunications. The development consists of an activity for which an Industrial Emissions Licence is required. Power Station Generating Station is a registered lower tier establishment under the Control of Major Accidents and Disasters.

[9] Cork County Council (2022), Cork County Development Plan

Reference	Proposed Development
235104	Development is sought for a period of 10 years at a 10.22 hectares site within ESB Aghada Generating Station consisting of 1) Construction/installation of an open cycle gas turbine (OCGT) generating unit and associated plant and equipment, comprising the following main components with approximate dimensions as stated : Gas turbine air intake [24m x 18m x 26m high], Generator enclosure [24m x 18m x 14.5m high], Gas turbine enclosure [53m x 15m x 26m high], Exhauster diffuser [14.5m x 10.4m x 10.5m high], Exhaust stack [40m high, 8m diameter], Gas turbine control and electrical modules [20.5m x 18m x 10m high], Fin fan coolers [27m x 19m x 8m high], Main transformer [12.2m x 7.5m x 8.5m high] including 17.6m x 17.9m concrete bund; and 2 no. 12m high concrete blast walls, Auxiliary transformer [5m x 4.7m x 7.5m high] including 6.8m x 7.5m concrete bund; and 2 no. 12m high concrete blast walls, Demineralised water treatment plant [20m x 10m x 5.4m high], Demin water storage tank [14.63m high x 24.4m diameter], Raw water/Firewater storage tank [14.63m high x 15.2m diameter], Fuel oil storage tanks [two, each 12.19m high x 17.4, diameter], including 67m x 35m concrete bund, Fuel oil forwarding pumps [6m x 10m x 2.2m high], Firefighting pumphouse [10m x 7m x 5.4m high], Gas conditioning compound [42.3m x 11.5m x 6m high]. Above ground installation gas compound expansion [23m x 73m], Indoor switchgear building [20m x 30m x 18m high], Emergency diesel generator <1 MW [10m x 4m x 5m high], Generator circuit breaker [8.8m x 5.1m x 4m high], Continuous emissions monitoring skid [3.5 m x 2.5m x 5m high], Workshop/Stores/Administration building [35.9m x 12m x 15m], Hydrogen storage compound [8m x 4m x 2m high], Surface water drainage system, Vehicle parking, Internal roadways, 2) Demolition of an existing single storey stores building, 3) connection to the existing on-site above ground installation (AGI), 4) Connection to the National Grid by means of underground cable to existing on-site 220kV substation, 5) All associated works to facilitate the development such as temporary construction compounds, perimeter fencing, use of an existing access to public road, above ground pipe racks, underground cables on the site and crossing the R630 roadway, site lighting and telecommunications. The development consists of an activity for which an Industrial Emissions Licence is required. ESB Aghada Generating Station is a registered lower tier establishment under the Control of Major Accidents and Disasters.
184725	22/08/2018: A decision to grant planning permission was issued by Cork County Council on 09/08/2018 to Irving Oil Whitegate Refinery Limited for heavy atmospheric gas oil (HAGO) project located within the Whitegate Oil Refinery. The proposed HAGO development principally comprises a 35m high steel reactor and a 27m high steel vacuum column. It will be provided with steel access platforms and pipework connections to existing facilities. A new remote instrument building that stores the control hardware will also be included. The proposed HAGO development will be placed on a concrete foundation at ground level, with surface water drainage routed to existing facilities. There will be no continuous emissions from the proposed development. The Proposed Development is for the purposes of an activity which holds an existing Industrial Emissions Licence. The Proposed Development relates to modifications to an establishment within the meaning of Part 11 (Major Accidents Directive) of Planning and Development Regulations, 2001 as amended.
185659	05/09/2018: A decision to grant planning permission was issued by Cork County Council on 20/08/2018 to Electricity Supply Board for the development of a c.19 MW capacity battery storage facility located within a secured compound, on a 0.65ha site, and will –subject to detailed design, commercial and technical considerations; include; (a) up to 6 No. battery storage units [each typically comprising a containerised battery (c.12.2m x 2.5m x 3.2m), HVAC (c2.7m x 2.7m), inverter (c.3m x 3m) and transformer (c.3.3m x 3.3m)]; (b) a 28m² single storey control building; (c) a 28m² single storey switchgear building; (d) ancillary electrical plant including a transformer and var support unit; (e) a c.15.6m high lightning mast and c.18m high SCADA communications mast; (f) a 2.6m high chain-link fence and access gate, with primary access via the existing station and temporary access via the existing boundary onto the R630; (g) ancillary site works including site clearance and the installation of site services. Licenced by the Environmental Protection Agency under an Industrial Emissions (IE) Licence [Ref. P0561-05] and a Lower Tier COMAH site and therefore falls under the requirements of the Control of Major Accident Hazard Regulations (COMAH) Regulations, 2015.
194891	20/06/2019: A decision to grant planning permission was issued by Cork County Council on 04/06/2019 to ESB Head Office for a c.159 MW capacity battery storage facility located within a secured compound, on a c. 3.2Ha site, and will - subject to detailed design, commercial and technical considerations, include: (a) up to 89 No. battery container units (c.14.7m x 3.4m x 3.8m); (b) up to 36 No. inverter units (c.12.2m x 2.4m x 2.9m); (c) a substation compound surrounded by a 2.6m high palisade fence with a dedicated access gate containing a single – storey control building (c. 240m²) and electrical plant including a bunded transformer (c. 200m² with a c. 8m high fire wall on one side); a bunded house transformer (c. 20m² surrounded on 3 sides by a c. 3m high fire wall) and var support unit (4m x 3m x 3.4m high); (d) a single storey battery control building (c. 156m²); (e) a 2.6m high palisade fence and access gate, with primary access via the existing station and internal roadway network and temporary access via the existing boundary onto the R630; (f) ancillary structures including lightning masts (c. 18m high) and pole mounted CCTV cameras (c. 8.3m high); (g) and ancillary site works including site clearance works and the installation of site services including underground cables. The planning permission is being sought for a 10-year duration. A Natura Impact Statement will be submitted to the Planning Authority with the application. Licensed by the Environmental Protection Agency under an Industrial Emissions (IE) License [Ref. P0561-05] and a Lower Tier COMAH site and therefore falls under the requirements of the Control of Major Accident Hazard Regulations (COMAH) Regulations, 2015.
195411	04/03/2020: A decision to grant planning permission was issued by Cork County Council on 02/10/2019 to ESB Head Office for a55 MWe (electrical output) aero derivative gas fired turbine, including the following elements: (a) 1 No. Turbine module (c.535m², c.15.2m high) in a fully enclosed weatherproof acoustic enclosure including a c.30m high stack, selective catalytic reduction (SCR), gas turbine and air intake; (b) supporting items of plant including: step up transformer with firewall (c.192m²); bunded station service transformer (c.11m²); single storey control/electrical room (c.150m²); bunded ammonia storage tank (c.20m²); gas compressor (c.128 m²); gas compressor cooler (c.28m²); single storey building containing a fire suppression system and gas bottle storage (c.79m²); fin fan coolers (c.53m²); lube oil skid (c.32m²); fenced gas receiving station (c.11m²); (c) external service areas including a maintenance laydown area and an ammonia unloading area; (d) connections to existing site services networks including: gas, liquid fuel, electrical, water, wastewater, and an underground surface water attenuation tank connecting to surface water drains. (e) all other ancillary and miscellaneous site works including site clearance; site access and a temporary

Reference	Proposed Development
	construction compound. Planning permission is being sought for a duration of 10 years. 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 (EPA). A Natura Impact Statement (NIS) will be submitted to the Planning Authority with the application. A 1.81ha site located to the east of the R630; located inside the Aghada Generating Station, which is licenced by the Environmental Protection Agency under an Industrial Emissions (IE) Licence [Ref.P0561-05] and a Lower Tier COMAH site and therefore falls under the requirements of the Control of Major Accident Hazard Regulations (COMAH) Regulations, 2015.
195706	12/09/2019: A decision to grant planning permission was issued by Cork County Council on 28/08/2019 to Amarenco Solar Limited for a 5 MW solar farm comprising approximately 22,200 photovoltaic panels on ground mounted frames within a site area of 12ha, 2 no. single storey inverter/transformer stations, 1 no. single storey delivery station, security fencing, CCTV and all associated development works.
204294	23/04/2020: A decision to grant planning permission was issued by Cork County Council on 09/04/2020 to ESB Head Office for development on a c. 1.8ha site, on ESB lands. The development will consist of a c.19 MW capacity battery storage facility located within a secured compound, and will - subject to detailed design, commercial and technical considerations, include: (a) a control building (c. 112m², c. 4.7m high); (b) plant and equipment comprising : (1) up to 12 no. battery container units (c. 30m² and up to c. 4.7m high) with roof mounted HVACs; (2) up to 6 no. battery unit transformers on concrete plinths (c. 11m² and c. 4m high); 3) up to 6 no. inverter units (c. 30m² and c. 3m high); (4) a bunded house transformer (c. 20m² and c. 3.3m high) with firewall on three sides; (5) an MV stepdown transformer (c. 60m² and c. 4.5m high) with firewall on three sides; (6) VAR supports system on a concrete plinth (c.24m² and c. 3.4m high); (7) cable trays and associated service connections; (8) up to 4 no. lightning masts (c. 20m high); (9) a c. 18m high SCADA pole; (10) a pole mounted security camera (c. 8.3m high); (c) c. 2.6m high palisade fencing and gates; (d) demolition of an existing building (c. 147m² and c.5.5m high) and (e) ancillary site clearance and development works including provision of areas of hardstanding, internal access roads, and connections to site services networks. The planning permission is being sought for a 10-year duration. A Natura Impact Statement will be submitted to the Planning Authority with the application. Licensed by the Environment Protection Agency under an Industrial Emissions (IE) License [Ref. P0561-05] and a Lower Tier COMAH site and therefore falls under the requirements of the Control of Major Accident Hazard (COMAH) Regulations, 2015.
206011	18/11/2020: A decision to grant planning permission was issued by Cork County Council on 10/11/2020 to ESB International for development on a 1.81ha site which is licenced by the Environmental Protection Agency under an Industrial Emissions (IE) Licence (Ref. P0561-05) and a Lower Tier COMAH site and therefore falls under the requirements of the control of Major Accident Hazard Regulations (COMAH) Regulations, 2015. The development will consist of a 75 MWe (Electrical output) aero derivative gas fired turbine, including the following elements: (a) 1 No. turbine module (c.535 m², c.15.2m high) in a fully enclosed weatherproof acoustic enclosure including a c.30m high stack, selective catalytic reduction (SCR), gas turbine and air intake; (b) Supporting items of plant including: step up transformer with firewall (c.192m²); bunded station service transformer (c.11m²); single storey control/electrical room (c.150m²); bunded ammonia storage tank (c.20m²); gas compressor (c.128m²); gas compressor cooler (c.28m²); single storey building containing a fire suppression system and gas bottle storage (c.79m²); fin fan coolers (c.53m²); lube oil skid (c.32m²); fenced gas receiving station (c.11m²); (c) External service areas including a maintenance laydown area and an ammonia unloading area; (d) Connections to existing site services networks including gas, liquid fuel, electrical , water and wastewater and an underground surface water attenuation tank connecting to surface water drains; (e) All other ancillary and miscellaneous site works including site clearance; site access and a temporary construction compound. [For information – the planning application represents a resubmission of a similar 55MW development approved by CCC under Reg. Ref. 19/05411]. The planning permission is being sought for a 10-year duration. 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 (EPA). A Natura Impact Statement (NIS) will be submitted to the Planning Authority with the application.

1.7 Screening for Environmental Impact Assessment

The Environmental Impact Assessment (EIA) Directive[10] (EIA Directive) on the assessment of the effect of certain public and private projects on the environment (codification), as amended, sets out the process by which the anticipated effects of a project on the environment are assessed. The relevant requirements of the EIA Directive have been implemented into Irish law pursuant to the provisions of, inter alia, the Planning and Development Regulations 2001[11], as amended. An EIA Screening[2] accompanies this planning application and notes that it does not trigger the mandatory criteria for a full EIA as set out within Schedule 5 Part 1 and Part 2 of the Planning and Development Regulations. A sub-threshold assessment was undertaken to determine whether the Proposed Development is likely to have significant effects on the existing environment, in accordance with the criteria outlined within Schedule 7 of the Planning and Development Regulations 2001[11] was carried out. Taking into consideration embedded mitigation, an EIA is not required for the Proposed Development.

[10] European Union (2011), Environmental Impact Assessment (EIA) Directive 2011/92/EU
[11] Government of Ireland (2001). S.I. No. 600/2001. Planning and Development Regulations 2001 (as amended).

1.8 Screening for Appropriate Assessment

Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora, which is more commonly known as 'the Habitats Directive', requires Member States of the European Union (EU) to take measures to maintain or restore, at favourable conservation status, natural habitats and wild species of fauna and flora of community interest. The provisions of the Habitats Directive require that Member States designate Special Areas of Conservation (SAC) for habitats listed on Annex I and for species listed on Annex II. Similarly, Directive 2009/147/EC on the conservation of wild birds (more commonly known as 'the Birds Directive') provides a framework for the conservation and management of wild birds. It also requires Member States to identify and classify Special Protection Areas (SPAs) for rare or vulnerable species listed on Annex I of the Directive, as well as for all regularly occurring migratory species. The complete network of European sites is referred to as 'Natura 2000'.

In Ireland, the requirements of Article 6(3) are transposed into national law by Part 5 of the European Communities (Birds and Natural Habitats Regulations) 2011 (S.I. No. 477 of 2011)) (more commonly referred to as the 'Habitats Regulations') and Part XAB of the Planning and Development Act 2000 (as amended)[11].

Under article 6(3) of the Habitats Directive, any plan or project which is not directly connected with or necessary to the management of a European site but would be likely to have a significant effect on such a site, either individually or in combination with other plans or projects, must be subject to an 'Appropriate Assessment' (AA) of its implications for the SAC/SPA and its nature conservation objectives.

A Screening for AA and Natura Impact Statement[12] (NIS) is included in this application for the Proposed Development.

1.9 Consultation

1.9.1 Pre-Application Consultation Meeting with CCC

Pre-application meetings were held with CCC on the 24 October 2023. The objective of the meetings was to outline the proposal and to discuss any concerns or comments that CCC may have in relation to the proposal.

1.9.2 Pre-Application Consultation Meeting with Environmental Protection Agency

The Application held a number of pre-application meetings were held with the EPA to discuss the Proposed Development in terms of the wider Power Station IEL. Given the purpose of the Proposed Development is research and development, it was noted that it would not require a license amendment or review.

1.9.3 Consultation with Health and Safety Authority

The Applicant has consulted the Health and Safety Authority (HSA) in regard to the COMAH status of the Power Station and the requirement to update reports and modelling as required by the HSA as a result of the Proposed Development.

1.9.4 Consultation with Uisce Éireann (Irish Water)

The Applicant has consulted with Uisce Éireann in relation to water demand of the Proposed Development. The Applicant noted to Uisce Éireann that given the small demand in the context of existing water storage on site a notable change in the pattern of water demand from the site is not expected and no change to the Uisce Éireann potable water supply is proposed as part of this project. In addition the Application noted the site is an IE licenced site (P0561-05) and there is no proposed connection to the Irish Water sewer.

1.10 References

- Department of Housing, Planning and Local Government (DHPLG) (2023), National Planning Framework.
- Southern Regional Assembly (2020). Regional Spatial & Economic Strategy (RSES) for the Southern Region.
- Department of the Environment, Climate and Communications (DECC) (2022). Climate Action Plan 2023 (CAP 2023).
- Department of Public Expenditure, NDP Delivery and Reform (2021). National Development Plan 2021-2030.
- EC (2020). A Hydrogen Strategy for a Climate-Neutral Europe.
- Cork County Council (2022). Cork County Council Development Plan 2022 to 2028.

[12] AECOM (2023), Hydrogen Production Demonstration Project Aghada Appropriate Assessment Screening and Natura Impact Statement

- Department of Housing, Planning and Local Government (DHPLG) (2018). Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment.
- Environmental Protection Agency (EPA) (2022). Guidelines on the Information to be Contained in Environmental Impact Assessment Reports.
- EC (2017). Environmental Impact Assessment of Projects - Guidance on Scoping.

2. Description of Proposed Development

2.1 Location of the Proposed Development

The Proposed Development is centred at an approximate Irish Transverse Mercator (ITM) reference 583521, 565001 with an approximate area of 0.5 hectares (ha).

The Site of the Proposed Development is approximately 12 kilometres (km) southeast of Cork City, on the eastern side of Cork Harbour. The Site is located within the boundary of the existing Power Station located at Ballincarroonig, near the village of Lower Aghada (approximately 770 metres (m) northeast). The village of Whitegate is sited approximately 1.2km south of the Site. Irving Oil Whitegate Refinery lies approximately 1.7km southwest, with Fort Davis approximately 430m beyond that. Corkbeg Island (housing seven tanks for the oil refinery) lies approximately 1.25km southwest. Further beyond, within Cork Harbour, lies Spike Island (and Fort Mitchel), approximately 3km west of the Site, refer to Figure 2-1.

Figure 2-1 Proposed Development Site Locality[13]

2.2 Existing Site Description

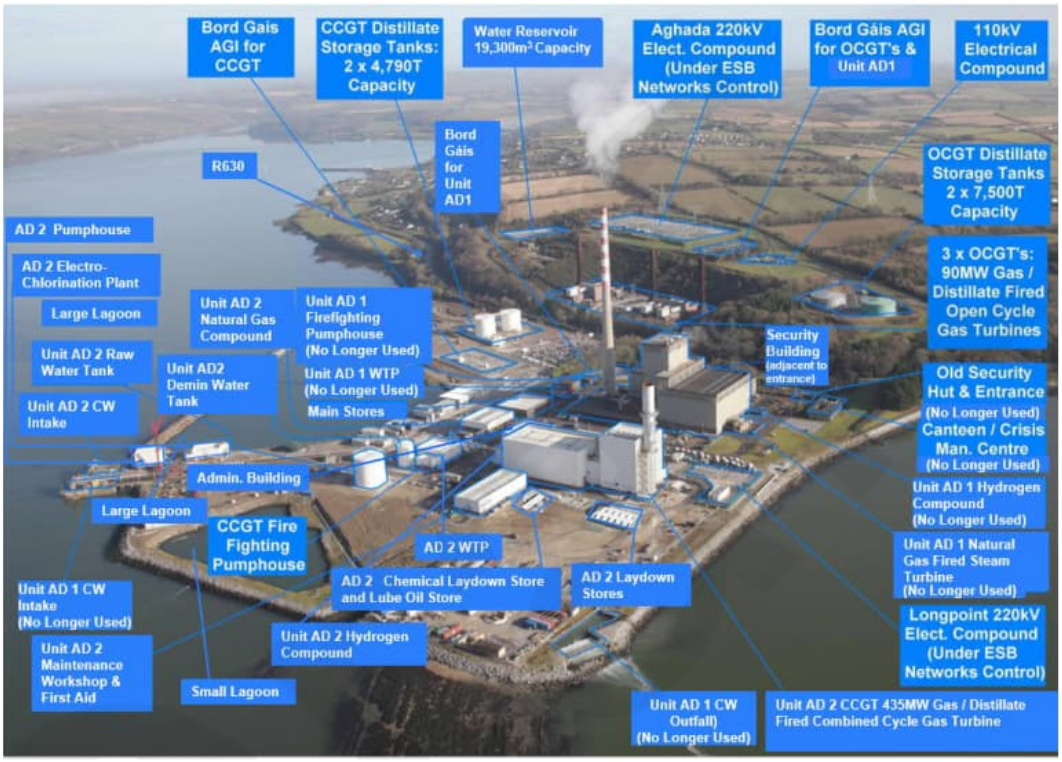
The Power Station started operating in 1980 as a conventional natural gas fired open cycle turbine. The station capacity was increased to 963MW in 2010 with the addition of the combined cycle, natural gas fired, plant with older generation equipment decommissioned. Operations at the Power Station are currently governed by an IEL which was issued by the EPA in 2011 (reference P0561-05). Prior to 2011, operations were under various EPA license types, including an integrated pollution prevention control (IPPC) license which was first issued to the facility in 2000.

The Power Station lies upon a rocky bed of land extending into Cork Harbour's eastern shoreline. The R630 provides the access/egress to the Power Station, via two locations on the western side of the R630 at the Power Station's northeast and southeast corners. The Power Station is serviced by an internal road network and is bisected by the R630 public road.

The Power Station comprises steam and gas turbines in addition to large areas of hardstanding, internal access roads, a main (tarmac paved) carpark to the northeast, with further car parking areas dispersed around the wider site. Access to the eastern area of the Power Station, across the R630, is provided via a connecting bridge. The western boundary consists of grassland and dispersed vegetation, in front of a green palisade fence, with dense vegetation, behind matching fencing, framing the eastern boundary as shown in Figure 2-2.

[13] Source OpenStreetMap, 2023 - Annotations Added

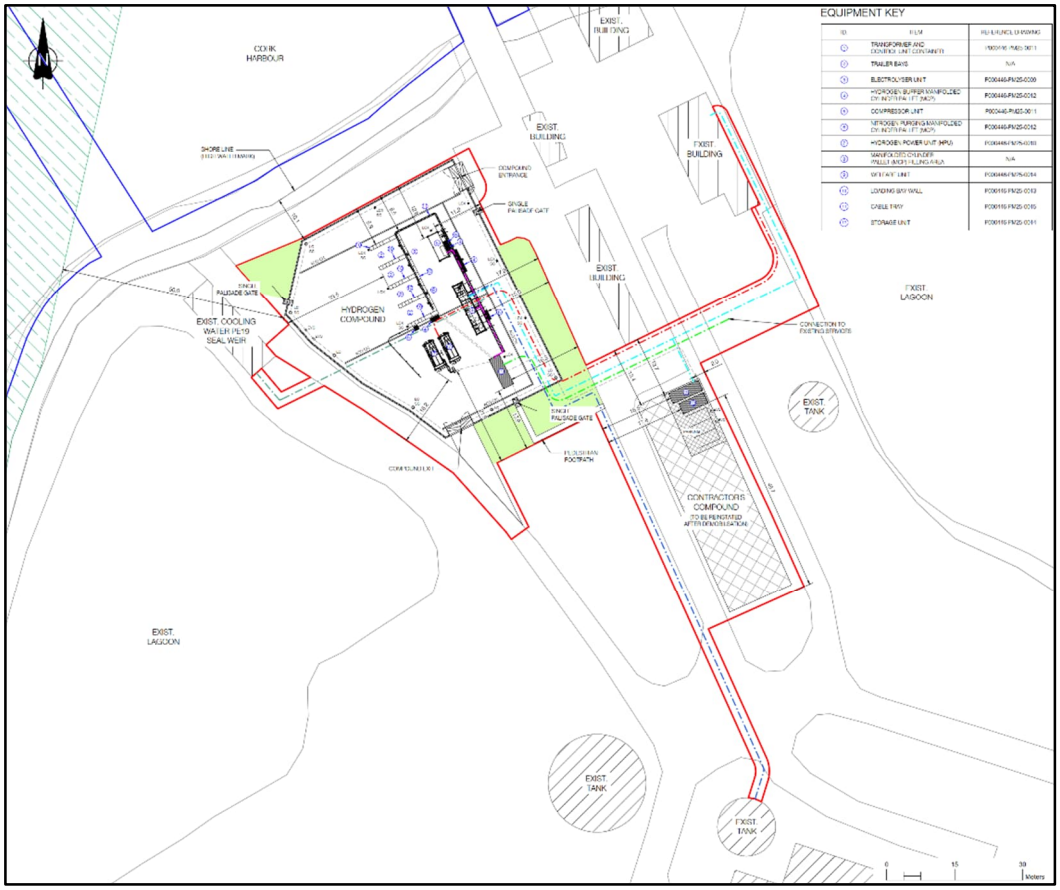
Figure 2-2 Existing Power Station Layout



Two sea water attenuation ponds (no longer in active use) are within the Power Station site, along with numerous power station buildings, ranging in height, mass and colour palettes. The Power Station has a total of 5 stacks (chimneys) ranging in height from 65m (four stacks) to 152m (single stack).

The Site of the Proposed Development is located in the northwest of the Power Station on a grassed undeveloped area between two disused sea water attenuation ponds, as shown in Figure 2-3 (reproduction of Drawing P000446-PM²5-0005 included in this application).

Figure 2-3 Proposed Development Layout



2.3 Surrounding Land Use

As the Proposed Development is situated within the boundary of the existing Power Station, it is immediately bound by structures, roads and ponds associated with the station to the north, south, east and west. Cork Harbour is situated to the north of the Power Station. Agricultural lands are situated to the south and west of the Power Station. Cork Harbour Special Protection Area (SPA) (site code 004030) is located 25m north of the Site and Whitegate Bay Proposed Natural Heritage Area (pNHA) (site code 001084) are located approximately 45m west of the Site. In addition, the Great Island Channel Special Area of Conservation (SAC) (site code: 001058) is located approximately 5km north of the Site. In addition, the Great Island Channel Special Area of Conservation (SAC) (site code: 001058) is located approximately 5km north of the Site.

2.4 Overview of Proposed Development

The Proposed Development will demonstrate the full supply chain hydrogen production via electrolysis, storage, usage on site via fuel cell and transport offsite to other sector hydrogen users for a period of up to five years. The Proposed Development has an approximate area of 5,000 square metres (m²), with the footprint of the hydrogen compound covering an area of approximately 2,400m².

The Proposed Development comprises:

- 1 megawatt (MW) electrolyser including a water purification unit (40-foot (ft) container (approximately 12m)) with a stack height of 7.5 metres (m) above ground level.
- A transformer and control unit container (20ft container (approximately 6m)).
- Welfare unit.
- Compressor unit (20ft container (approximately 6m)).
- 400kg hydrogen storage (manifolded cylinder pallets (MCP) unit).
- Mobile refuelling capability.
- Two 250-kilowatt (kW) fuel cells.
- 6.6 kilovolt (kV) to 400kV transformer.

- Four heavy goods vehicle (HGV) loading bays.
- 195m of 2.6m high palisade fence.

In addition to the above the Proposed Development will include the following

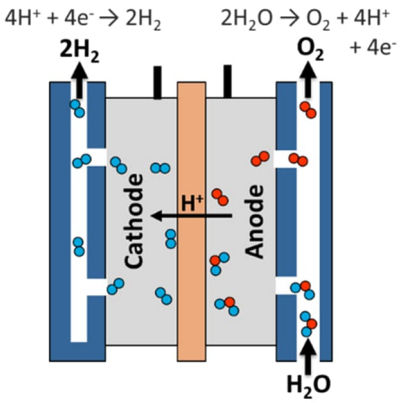
- Internal site access road.
- Three parking bays.
- Drainage infrastructure.
- All associated and ancillary site development works.

2.5 Hydrogen Production

Water electrolysis is the process of splitting water (H_2O) into its basic components, hydrogen (H_2) and oxygen (O_2), using an electric current in an electrolyser. Through this process, electrical energy can be stored as chemical energy in the resulting hydrogen.

A basic electrolysis setup involves a water-filled container equipped with electrodes (conductive rods). When an electric current is passed through the water, it triggers a reaction at the electrodes. The charge introduced into the water "breaks" the water molecules, forming individual hydrogen and oxygen ions. These ions are kept separate using a membrane and will accumulate at the positive and negative poles respectively. Hydrogen ions will accumulate at the negatively charged electrode (cathode) to form hydrogen gas, and oxygen ions will form oxygen at the positively charged electrode (anode) as shown in Figure 2-4.

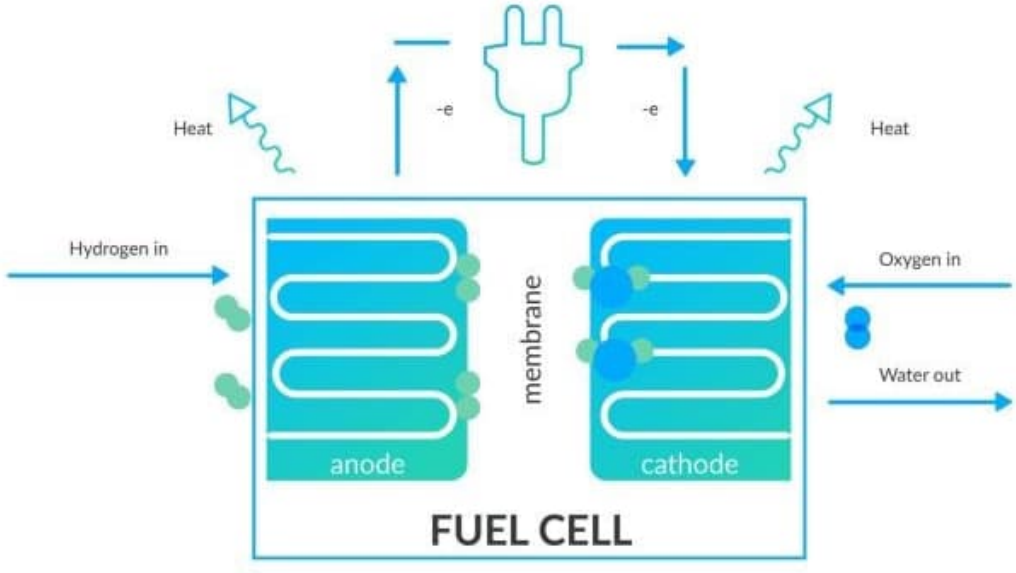
Figure 2-4 Hydrogen Electrolysis Working Principle[14]



Through this process, electrical energy can be stored as chemical energy in the resulting hydrogen. The newly formed chemical energy can be utilised as a fuel or converted back to electricity when required using Hydrogen Power Units (HPUs). The HPU is typically made up of an anode, a cathode, and an electrolyte membrane, as shown in Figure 2-5.

[14] US Department of Energy

Figure 2-5 Hydrogen Power Units (HPUs) Working Principle[15]



In the HPU, hydrogen will be introduced to the anode as raw material, while oxygen (as air) will enter the cathode. At the anode, the hydrogen (H_2) will be broken into positively charged protons (H^+). Since hydrogen gas is uncharged, negatively charged, high energy, electrons (e^-) will be produced at the same time.

The electrolyte membrane in HPU is a special membrane that only allows positively charged protons to pass through. The produced electrons are forced to pass through the external circuit to get to the other side of the membrane. The process of electrons passing through the external circuit is the current needed to produce electricity. The protons and electrons reunite with oxygen at the cathode to generate H_2O (water).

The reaction of water electrolyzing produces only hydrogen and oxygen, with the hydrogen being compressed and stored, while the oxygen can be released to the air or stored for further use. The reaction in HPU generates heat and water, therefore, the process produces no carbon emissions.

2.5.1 Hydrogen Compound

The footprint of the hydrogen compound covers an area of approximately 2,400 square meters (m^2) in size. It will include an electrolyser, transformer container, trailer bays, welfare unit, compressor unit, hydrogen storage, mobile refueling area, HGV loading bays and fencing. The maximum height of plant would be the electrolyser vents at approximately 7.5m above ground level. The layouts and elevations of the proposed substation and its compound are shown in Drawing P000446-PM25-0005 which accompanies this planning application.

- 1 megawatt (MW) electrolyser including a water purification unit (40-foot (ft) container (approximately 12m)) with a stack height of 7.5 metres (m) above ground level.
- A transformer and control unit container (20ft container (approximately 6m)).
- Welfare unit.
- Compressor unit (20ft container (approximately 6m)).
- 400kg hydrogen storage (manifolded cylinder pallets (MCP) unit).
- Mobile refuelling capability.
- Two 250-kilowatt (kW) fuel cells.
- 6.6 kilovolt (kV) to 400kV transformer.
- Four HGV loading bays.
- 195m of 2.6m high palisade fence.

An extension to the existing stormwater drainage system will be installed around the contractor compound areas and all stormwater discharge will be monitored against the revised IEL discharge criteria, prior to discharge.

[15] ENGIE

The Proposed Development will temporarily store foul wastewater on the Site which will be removed by tanker to a licensed disposal facility at regular intervals.

The main electrical supply to the works will be provided by an extension of an existing 6.6kV supply to the east of the Site.

Telecommunications supply will be sufficiently facilitated by the existing networks, supplemented by extensions where necessary.

2.5.2 Drainage

The proposed surface water network for the hydrogen compound will be connected into the existing drainage network. The Proposed Development consists of a new impermeable concrete yard to house the hydrogen infrastructure. The hydrogen compound constitutes an impermeable area of 2,196m². The surface water generated from the concrete yard will be limited to a rate of discharge of 2l/s). Surface water runoff will be collected by a series of slot drains on the surface of the yard and conveyed by a series of underground sewers before being slowly discharged from the site at a controlled rate of 2l/s by a hydrobrake flow control device located in the outlet manhole.

The concrete yard is proposed to act as an attenuation tank during storm events. A perimeter wall around the edge of the yard is proposed to be constructed which will allow surface water to be attenuated during storm events, further details of which are outlined in Drainage Services Report included in Appendix E.

The surface water generated in the proposed concrete yard will be treated by a Klargester (or equivalent) oil interceptor before discharging into the existing drainage network in the site which ultimately discharges to Cork harbour at existing outfall SW22, refer to Drawing P000446-PM²5-0006, submitted with this application.

2.6 Construction Phase

An experienced civil works Contractor will be appointed for the construction phase. The Contractor and any sub-contractor will create a construction methodology that will comply with the mitigation measures outlined herein, and within the outline Construction Environmental Management Plan (oCEMP) and NIS. The Contractors construction methodology will include method statements for each key element of the construction process.

The Contractors construction methodology will consider the following:

- Site entrances.
- Access tracks and drainage.
- Temporary site compounds.
- Fencing.
- Hard standings/lay down areas.
- Foundations.
- Utility trenching.
- Buildings.
- Electrical works.
- Working hours.
- Material requirements.
- Waste management.
- Environmental management.
- Health and safety.

2.6.1 Site Access

Access to the Power Station is currently provided via existing entrances from the R630. It is proposed to utilise the existing access from the R630 and internal access roads within the Power Station which will connect to an upgraded internal access road associated with the Proposed Development. Access roads will be typically 3.6m in width.

2.6.2 Haulage Route and Construction Traffic

Construction materials will be brought to site by road along the R630. Construction materials will be transported in clean vehicles and lorries/trucks will be properly enclosed or covered during transportation of friable construction materials and spoil to prevent escape of material along the public roadway. Construction of the Proposed Development is anticipated to take three months. Additional traffic movements are expected to peak at 10 vehicles per day, with four of those being Heavy Goods Vehicle (HGV) (i.e., a total of eight trips per day – four inbound and four outbound). A Construction Traffic Management Plan (CTMP) will be implemented by the appointed Contractor, prior to the commencement of construction.

2.6.3 Enabling Works

Enabling works for the Proposed Development will involve site clearance, excavations and levelling of the Site to the necessary base level for construction, surveying and setting out for structures and any rerouting of services/connections to services. A combination of bulldozers, excavators and other plant will commence the main site clearance and levelling aspects.

Enabling works will also include erecting perimeter hoardings around the Site, construction of the Site compound and storage areas, forming site access and egress points and providing site security.

2.6.4 Contractor Compounds

A fenced contractor compound will be provided onsite (as shown in Figure 2-3), to include offices, welfare facilities, material storage, parking and secure pedestrian walkways. It is noted that the location is indicative and may change during the works.

All necessary utility diversions will be completed prior to establishment of the contractor compounds. The compound will include offices, toilets, washing facilities, first aid areas, canteen, drying rooms and personal protective equipment storage.

Bunded storage will also be retained within the contractor compound for potentially hazardous materials (e.g., oils, hydraulic fluids, greases, solvents, chemicals and paints) used during the works. Oil and fuel storage tank design will be bunded to a volume of not less than the greater of 110% of the capacity of the largest tank or drum within the bunded area, or 25% of the total volume of the substance which could be stored within the bunded area, with impermeable bases within each contractor's storage area as required.

2.6.5 Materials and Storage

Key materials will include steel, concrete, composite cladding, piping, electrical cabling, process equipment and finishes. Exact quantities are currently unknown and will be identified at the detailed design stage. Vehicles transporting friable construction materials and spoil will be adequately enclosed or covered during transportation to prevent material escape. Where possible, materials will be sourced from the local area to minimise transportation distances and will be scheduled to avoid queues/increased traffic on local routes.

2.6.6 Security

The Proposed Development will be separated from the Power Station during the construction phase using security fencing/hoarding approximately 195m in length and 2.6m high. Security within the Power Station is controlled by ESB personnel. The appointed Contractor will liaise with ESB personnel to manage and control site security. The Proposed Development will be securely fenced and monitored at all times by close circuit television (CCTV) surveillance.

2.6.7 Levelling/Cut and Fill

Any excess spoil not suitable and/or required for reuse onsite will be removed offsite for appropriate reuse, recovery and/or disposal.

2.6.8 Foundations and Building Structure

Following completion of the enabling works and site clearance, all structures will require footings. Building structures will comprise standard structural steel frames and/or modular units, and it is anticipated that foundations will require moderate scale excavations.

The site of the proposed works lies within Flood Zone C for coastal flood risk as defined by the Planning System and Flood Risk Management Guidelines for Local Authorities. A reinforced concrete slab is proposed for the compound yard will be located at a minimum height of 3.65mOD. This will ensure the site is above the mid-range future scenario level of 3.54mOD.

2.6.9 Works Schedule

2.6.9.1 Hours of Working

Hours of working onsite will be between 07:00 and 19:00 Monday to Friday and 08:00 to 14:00 on Saturday. This excludes public holidays, emergency work provisions and other working periods which would be agreed in writing with CCC. It is expected that the number of construction workers required throughout the duration of the construction phase will peak at approximately 30 persons. It is envisaged that employees may travel to and from work areas by car or light commercial vehicles outside of these hours.

2.6.9.2 Schedule of Works

The anticipated duration of the construction period for the Proposed Development has been estimated to be three months.

2.6.10 Waste Management

All waste products (general waste, plastic, timber, etc.) arising during the construction phase will be managed and disposed of in accordance with the provisions of the Waste Management Act 1996 and associated amendments and regulations, and a Waste Management Plan (WMP) will be prepared by the appointed Contractor prior to construction.

In terms of wastewater generated during the construction phase, welfare facilities on site will be discharged to a holding tank, which will be emptied by a licensed contractor. All waste contractors used will be required to be agreed with the EPA in accordance with condition 8.0 of the Power Station's IEL. All loads will be required to be documented and reported to the EPA as part of IEL requirements.

2.6.11 Reinstatement

Once all construction works are complete, the work areas will be reinstated with excavated soil/stone and seeded out with plants of local providence.

2.6.12 Embedded Mitigation

The Proposed Development incorporates embedded measures that avoid or reduce as far as reasonably practicable the potential for adverse effects on the environment including the following:

- The construction contractor will be required to implement appropriate communications including reporting of environmental practice onsite, toolbox talks, daily briefings, an environmental noticeboard (with ecological information, spill/emergency response, refuelling area/procedure and any particularly relevant environmental related information to ongoing works) and signage.
- The Proposed Development will be carried out in accordance with the outline Construction Environmental Management Plan (oCEMP) submitted as part of this planning application (refer to Appendix B). In advance of work starting onsite, the appointed Contractor will expand and develop the oCEMP into a Contractor's CEMP and provide a documented account of the implementation of the environmental commitments set out in the ECR, NIS and any measures stipulated in the planning conditions.

Best practice guidance on pollution prevention will be followed at all times during the construction/decommissioning and operation of the Proposed Development, which will include:

- Controls and contingency measures will be provided to manage runoff from construction areas and to manage sediment.
- Dust and particular matter mitigation measures in accordance with the Institute of Air Quality Management guidance documents (Holeman *et al*, 2016 and IAQM, 2016) will be implemented.
- All oils, fuels, lubricants or other chemicals will be stored in an appropriate secure container in a suitable storage area, with spill kits provided at the storage location and at places across the Site. There will be no storage of any oils, fuels, lubricants or other chemicals stored or batched within 30m of any aquatic feature.
- In order to avoid potential pollution impacts to waterbodies, soils or vegetation from machinery during construction, all refuelling and servicing of vehicles and plant will be carried out in a designated area which is bunded and has an impermeable base. This will be situated at least 30m from any aquatic feature.
- Concrete batching will only occur outside the setback zone of 30m from aquatic features and will be carefully controlled to avoid spillage. Washout from concrete chutes will be carried out only in a designated contained impermeable area.

- Temporary soil storage should be located at least 10m from any aquatic feature.
- Soil exposure during the construction works will be minimised and exposed soil will be reinstated as rapidly as possible.
- The construction contractor will not be permitted to use materials that could cause heavy metal, sulphide or strong acid pollution of runoff and must use aggregates free of excessive fines/clays.
- The appointed contractor will ensure pumping of water from excavations (if required) is controlled, to prevent excessive dewatering.
- A pollution prevention plan (or similar document) will be prepared by the appointed contractor and will include procedures and diagrams for:
    - Notification of a water quality incident and actions to remediate the incident.
    - Dewatering of excavations to designated treatment area.
    - Temporary soil storage.
    - Fuel storage/refuelling.
    - Concrete wash-out area.
    - Controlling surface water entering site.
    - Preventing existing drainage features becoming pathways for construction runoff.
    - Reducing soil exposure and reinstating as rapidly as possible.
    - Temporary construction mitigation measures such as silt fencing and straw bales.
    - Contingency measures.

A range of best practice control measures in relation to noise and vibration will be implemented with a view to maintaining noise emissions at reduced levels. The following mitigation measures will apply during the construction and/or decommissioning phase of the Proposed Development:

- All plant used on the Site will comply with the EC Directive on noise emissions for outdoor equipment (2000/14/EC), where applicable.
- Operation of plant in accordance with the manufacturer's instructions.
- All plant used on the Site will be regularly maintained, paying particular attention to the integrity of silencers and acoustic enclosures.
- Construction machinery and plant in intermittent use will be shut down in the intervening periods between work or throttled down to a minimum.
- Drop heights of materials from lorries and other plant will be kept to a minimum.
- Adherence to the codes of practice for construction working and piling given in British Standard (BS) 5228 and the guidance given therein for minimising noise emissions from the Site.
- Compliance with normal construction working hours of 07:00 to 19:00hrs Monday to Friday, 08:00 to 14:00hrs on Saturdays. This excludes public holidays, emergency work provisions and other working periods which would be agreed in writing with the planning authority. If works are undertaken during peak winter months, works will operate from 08:00 to 17:30hrs Monday to Friday (November to January) to reduce disturbance of any roosting special conservation interest (SCI) birds.
- Periodically check that mitigation measures are being implemented and are fit for purpose during the works with corrective action mechanisms in place.

2.7 Operational Phases

2.7.1 Industrial Emissions Licence

The Proposed Development will comply with the requirements of the existing Power Station's IEL (Ref. P0561-05).

The Environmental Management System (EMS) for the Power Station which will be amended to include the Proposed Development. The EMS will set out the requirements and procedures required to ensure that the Proposed Development is operating to appropriate standards.

2.7.2 Start Up and Shutdown

The Proposed Development will be started up and shutdown in response to electricity supply and demand, will be operated remotely when there is excess network supply.

2.7.3 Site Services

2.7.3.1 Electricity Network

Electricity will be supplied via an underground a 6.6kV electricity cabling connection laid between the Proposed Development and the Power Station's 6.6kV power outlet to the east of the Site. This connection will be stepped down to 400V within the Site.

2.7.3.2 Wastewater Services (Surface, Process and Foul Water)

Surface water will drain at a controlled rate to a new 200mm wide collection drain and diverted by a 150mm diameter pipe to the existing network within the Power Station, refer to Drawing P000446-PM²5-0006, submitted with this application. From there the piped surface water drainage network passes through an existing oil separator and oil interceptor prior to being discharged to the sea at an existing discharge point (SW22) under the terms of the IEL.

Surface water storage up to the 100-year flood event will be provided on site within the proposed concrete yard compound. The yard is proposed to act as a storage tank and will retain water during flood events. A low height reinforced concrete perimeter wall will be constructed along the edge of the proposed concrete slab with the access road into the yard compound ramped down locally at the entrance to ensure water can be retained within the yard compound.

Process water effluent will be directed to the Power Station's effluent network via an underground pipe and discharged in accordance with the Power Station's IEL emission limits at an existing discharge point PE19. The quantity of discharge water (effluent) from the hydrogen process will be up to 678l/hr when running on potable water and negligible when running with demineralised water. The Power Stations' IEL, provides for a maximum hourly discharge rate of 33,000m3/hr to Cork Harbour, therefore, the additional discharge associated with the development is minimal.

The quality will be similar to demineralised reject water. The Proposed Development includes for an automatic sampler upstream of the effluent discharge point (outfall PE19). This will sample the process water effluent to ensure that the pH limits remain within the range of 6 to 9 as per IEL requirements. In the event that the process water effluent is outside of this range, a shut off valve will prevent the water from discharging. This valve will be closed, and the process will be temporarily ceased until the issue is rectified.

The Proposed Development will temporarily store foul waste on the Site which will be removed by tanker to a licensed disposal facility at regular intervals.

2.7.3.3 Water Supply Network

There is an existing Uisce Éireann mains water connection (west of the R630) and Water Treatment Plant (WTP) on the Power Station. The Proposed Development will connect into the existing water supply via a series of underground supply pipes as shown in Drawing P000446-PM25-0004 submitted as part of this application. The Proposed Development requires an input of up to 540l/hr of water for the process during peak operation, depending on raw water quality. An existing demineralised water tank on site which will supply the facility with demineralised water which will be supplemented by potable water via the existing potable water supply.

During the operational phase, mains water will be required to produce demineralised water. Demineralised water will be produced in an onsite water treatment plant using industry-standard technology (ion exchange, reverse osmosis).

2.7.3.4 Telecommunications

There is an existing telecommunications compound within the southeast of the Power Station, the Proposed Development will connect to the existing network via underground cables.

2.7.4 Operational Hours of Working

Hours of operation will be up to 24 hours/day, seven days a week.

2.7.5 Operational Phase Staffing

During the operational phase, the Proposed Development will be remotely operated but there will be periodic maintenance visits by ESB personnel.

2.7.6 Operational Phase Lighting

The intention is for the facility to be unmanned and therefore the compound would not require to be continuously illuminated. Instead, motion-activated security lighting would be installed for access during hours of darkness as shown in Drawing P000446-PM²5-0015 included with this application. Flood lights would be installed but only used in the event of a fault requiring illumination.

2.7.7 Operational Phase Chemical Storage

Key materials used and stored onsite during operations will include potassium hydroxide, propylene glycol, hydraulic fluid and transformer oil. Where chemicals are not integrated into the equipment, storage tanks will be bunded to a volume of 110% of the capacity of the largest tank/container within the bunded area.

2.7.8 Operational Phase Maintenance

Routine maintenance will be carried out in accordance with the maintenance procedures provided by the appointed Contractor and manufacturer. The Proposed Development will be required to undertake an annual inspection, as per the manufacturer's requirements. During this time the Proposed Development will be shut down to allow the inspection to be completed.

2.7.9 Operational Traffic and Transport

During peak production of the electrolyser, it is anticipated that approximately 400kg of green hydrogen would be produced per day. All hydrogen would be temporarily stored on site, in road going tube trailers of maximum capacity of one tonne each, for transportation offsite. Before the hydrogen is transported offsite it would be compressed allowing it to be transported more efficiently and be ready for commercial use. It is expected that two hydrogen filled tube HGV trailers would leave the Site and two empty trailers would be returned to the Site per day (i.e., a total of four trips per day – two inbound and two outbound) which is not considered to have any major impact on the surrounding road network.

2.8 Decommissioning Phase

It is expected that the Proposed Development will have an operational life of five years. After five years in operation, the operational life of the Proposed Development will either be extended via a new planning application or it will be decommissioned, depending on the electricity system and research requirements. Decommissioning will include the removal plant, equipment and machinery from the hydrogen compound for reuse on other hydrogen projects. Transformers and electrical equipment will also be removed offsite and stored for possible reuse.

The loading bay walls will be removed block by block to level in line with the concrete yard by a civil contractor and recycled at a suitable facility. Any materials removed from site will be disposed of in an environmentally friendly manner, i.e., sent for reuse/recycling where appropriate.

It is expected that all that will remain at the compound is the fencing, concrete yard, lighting and CCTV. This concrete yard will be available for use by the station for storage purposes or other future needs.

When decommissioning takes place, all above-ground equipment associated with the Proposed Development will be disassembled and removed from the Site. The majority of the plant and equipment will have residual value and, be suitable for further use and may be reused elsewhere, sold or recycled.

Utility service connections will be left in place for future use.

Contamination prevention is a requirement of the Power Station's IEL during the operational phase. Therefore, the Proposed Development has been designed to prevent new areas of ground contamination or pathways to receptors as a result of construction or operation. Once the plant and equipment have been removed to ground level the hardstanding and sealed concrete areas will be left in place.

A Decommissioning Plan (which will include a Decommissioning Environmental Management Plan (DEMP)) will be prepared and agreed with the EPA. The DEMP will consider the potential environmental risks at the Site and provide guidance and appropriate mitigation procedures as necessary, to manage risk.

The Decommissioning Plan will include an outline programme of works and ensure that decommissioning phase activities will be conducted in accordance with the appropriate guidance and legislation. It is expected that decommissioning will take up to three months.

3. Population and Human Health

3.1 Introduction

This chapter describes the potential effects of the Proposed Development on population and human health. It defines the study area, the methodology used for developing the baseline and impact assessment, provides a description of the baseline environment in relation to population and human health, and presents the findings of the impact assessment.

Impacts on population and human health have potential to arise from various aspects of the Proposed Development. The following chapter provides an assessment of impacts on:

- Land use.
- Access between local residents and community resources.
- Economic activity and employment.
- Human health and wellbeing.

Full details on the Proposed Development are provided in Chapter 2 and the Planning Statement submitted with this planning application.

Major accidents and disasters are considered in Chapter 11.

3.2 Legislation, Policy and Guidance

This section identifies the relevant legislation, planning policy and technical guidance relevant to the assessment. This Highways England (HE) (2020). Design Manual for Roads and Bridges Population and Human Health.

- Institute of Public Health (2021). Health Impact Assessment Guidance A Manual.
- Health in Environmental Impact Assessment (Institute of Environmental Management and Assessment (IEMA), 2017).
- Addressing Human Health in Environmental Impact Assessment as per EU directive 2011/92/EU amended by 2014/52/EU (IAIA, 2019).
- European Public Health Association (EUPHA) (2019). Addressing human health in environmental impact assessment.
- Healthy Urban Development Unit (HUDU) guidance (NHS, 2019).

In addition, the following have been considered:

- GOI (2018), National Planning Framework: Project Ireland 2040.
- Department of Health (2019), Healthy Ireland Framework 2019-2025.
- CCC (2017), East Cork Municipal District Local Area Plan.
- CCC (2022), Cork County Development Plan 2022-2028.

3.3 Methodology

The potential impacts to land-use, population (social patterns), settlement patterns, economic and employment, tourism and community amenity and human health, as a result of the Proposed Development were assessed through a desktop study of available information.

3.3.1 Study Area

The study area for the population and human health assessment has considered the area of land that encompasses the likely effects of the Proposed Development. The area used for the baseline analysis comprises the electoral division (ED) of Corkbeg, as this is where the majority of population and human health effects are likely to occur. However, there is potential for effects to occur on receptors outside of this area such as employment effects for which the study area is County Cork. In addition, it is not always possible to determine the catchment area for community facilities as residents of an area may utilise facilities located within different districts, counties or regions without regard for statutory boundaries. In addition, this assessment refers to the findings of other chapters which have different study areas.

3.3.2 Determination of the Baseline Environment

In order to assess the associated potential effects of the Proposed Development, it is necessary to determine the baseline conditions, resources and receptors in the Site and surrounding area. The baseline conditions are not necessarily the same as those that exist at the current time, as they will reflect the conditions that will exist at the time that the Proposed Development is expected to start. The identification of the baseline conditions therefore involves predicting changes that are likely to happen in the intervening period, for reasons unrelated to the Proposed Development.

The baseline section of this chapter includes a description of local communities within the study area and a profile of the people who reside within these communities. This profile comprises an analysis of population and population growth, age, demographics, and health determinants. The presence of any vulnerable groups which could be disproportionately affected by the impacts of the Proposed Development are also identified in the baseline.

The baseline also includes a description of land uses in the local area, including the presence of:

- Private residential buildings and commercial properties.
- Community land (e.g., common land, village greens, open green space, allotments, sports pitches etc.).
- Community facilities (e.g., village halls, healthcare facilities, education facilities, religious facilities etc.).
- Land allocated for employment and residential development by local authorities.

3.3.3 Determination of Sensitive Receptors

The sensitivity of the existing environment identifies the ability of the receptor to respond to potential effects. Receptors in the population and human health assessment are members of the local and wider community which have potential to be impacted by any of the effects described. The following section identifies the methodology for defining the sensitivity of receptors for each type of potential effect identified. Terminology used to describe the sensitivity of the receptor is as per the EPA Guidelines[3]. The assessment of human health is assessed using HUDU tool[16].

3.3.3.1 Land Use

The value and typical descriptors which have been applied to determine sensitivity have been based on professional judgement. Examples of the sensitivities typically assigned to different land uses are identified in Table 3-1. It is important to note, however, that other criteria are also used to inform the sensitivity of a resource to potential change. This includes how often the resource is used, how many users the resources have and whether the resource is maintained.

Table 3-1 Examples of Sensitivities Assigned to Different Land Uses

Sensitivity	Description
High	• Private residential buildings, or land allocated for development of housing. • Buildings used for employment use, and land allocated for development of employment uses. • Regularly used community buildings which have only limited alternatives available nearby. • National or regional walking, cycling and horse-riding routes, and other routes regularly used by vulnerable travellers such as the elderly. • Designated public open spaces, or open spaces which attract users nationally e.g., national parks. • Religious sites and cemeteries. • Regularly used agricultural land where the enterprise is dependent on the spatial relationship of the land to key agricultural infrastructure.
Medium	• Land associated with private residential buildings e.g., gardens. • Community buildings which are regularly used or where there are only limited alternatives available in the local area. • Open spaces which span over a regional area and attract visitors from a regional catchment e.g., country parks, forests. • Public rights of way and other routes close to communities which are used for recreational or utility purposes, but for which alternative routes can be taken. • Agricultural land holdings which are used semi-regularly and where the enterprise is partially dependent on the spatial relationship of land to key agricultural infrastructure.
Low	• Community buildings which are infrequently used or where there are many alternatives available in the local area.

[16] NHS (2019). *HUDU Planning for Health - Rapid Health Impact Assessment Tool.*

Sensitivity	Description
	• Open spaces which are used for informal recreation (e.g., dog walking), and where there are alternative open spaces available. • Locally used community land e.g., local parks and playing fields. • Walking, cycling and horse-riding routes which have fallen into disuse through past severance, or which are scarcely used because they do not currently offer a meaningful route for either utility or recreational purposes. • Agricultural land which is used semi-regularly but where the enterprise is not dependent on the spatial relationship of land to key agricultural infrastructure.
Negligible	• Derelict or unoccupied buildings. • Agricultural land which is infrequently used on a non-commercial basis.

3.3.3.2 Employment

The receptor with potential to experience employment effects is the workforce in County Cork. This includes the workforce in the construction industry and the local supply chain. No sensitivity values are assigned to receptors with potential to experience employment effects.

3.3.3.3 Human Health

The effects on human health are assessed using guidance set out in the HUDU Rapid Health Impact Assessment Tool. Sensitivities are not defined for receptors.

3.3.4 Describing Potential Effects and Significance Criteria

Effects on land use and economic activity are described using the criteria provided in the EPA Guidelines[3]. In summary, it involves combining a sensitivity of a receptor with a description of an impact on that receptor (its quality, type, frequency, duration, probability, and magnitude) to determine a significance of impact. Detail on the criteria used to determine the sensitivity of a receptor is included in the section above. This section describes, for each type of effect, the assessment criteria which informs the description of the impact. This includes the parameters which define a direct or indirect effect, and how a magnitude of effect is determined.

Since the EPA Guidelines do not provide extensive guidance on assessing human health, the assessment of human health is instead based on guidance set out in the HUDU Rapid Health Impact Assessment Tool[16]. The assessment method used to determine human health effects is also identified below.

3.3.4.1 Land Use

The land use assessment includes all direct and indirect effects on community resources and private assets in the study area. Direct effects include land-take and/or impacts on access. Indirect effects include impacts on the amenity of residents of properties and/or users of community resources in the study area. Depending on the type of land use effect being assessed, the magnitude of the impact is determined by:

- The amount of land to be taken or the number of properties to be demolished.
- The extent to which access to community resources or private property is impacted.
- The number of users and the extent to which these users experience impacts on their amenity.

3.3.4.2 Employment

This assessment considers the impact on the workforce in County Cork. The Proposed Development may provide direct and indirect job opportunities.

Direct jobs include the temporary workforce required to construct the Proposed Development in the short to medium term, as well as the workforce required to operate the facility in the longer term.

Indirect jobs include those created in the supply chain to provide material, specialist labour and demolition and remediation services for the workforce. There is no consolidated methodology or practice for assessing the magnitude of the impact on employment in EPA Guidelines. It has therefore been assessed based on best practice of previous projects in which the size of the workforce in the impact area is considered, relative to the number of jobs that the Proposed Development will create.

3.3.4.3 Determining Significance

Once the magnitude of the impact has been identified, this can be cross-referenced with the sensitivity of the receptor to derive the overall significance of impact as per the EPA Guidelines.

3.3.4.4 Human Health

The human health assessment includes impacts on the health of residents of properties and users of community resources in the study area. Whilst relevant guidance from the Institute of Public Health in Ireland (IPHI), specifically the Health Impact Assessment Guidance[17], has been considered, there is no consolidated methodology or practice for describing effects on human health in the EPA Guidelines. The impacts of the Proposed Development on human health will therefore be assessed qualitatively using the human health determinants set out in the HUDU Rapid Health Impact Assessment Tool. Whilst not designed or specifically developed for Ireland, a checklist approach will provide a broad overview of the potential health impacts and is applicable to a wide range of proposals. The checklist is split into 11 broad determinants and is based on the World Health Organisation (WHO) publication 'Healthy Urban Planning[18]'.

The WHO defines health as "a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity"[19]. Consequently, public health encompasses general wellbeing, not just the absence of illness. Some effects are direct and obvious, others are indirect, while some may be synergistic, with different types of impact acting in combination. In keeping with this definition, this assessment considers the potential impacts of the Proposed Development on physical, mental, and social health.

An initial scoping exercise was undertaken to determine the criteria within the HUDU guidance which is relevant to this assessment. The criteria which will be assessed as part of this chapter are listed below. Other criteria in HUDU guidance but not in the list below, have been scoped out:

- Access to open space and nature.
- Access to employment and social infrastructure.
- Air quality, noise, and neighbourhood amenity.
- Climate change.

The assessment of human health is a qualitative rather than quantitative assessment, due to the diverse nature of health determinants and health outcomes which are assessed. Although the assessment of human health effects describes the likely qualitative health outcomes, it is not possible to quantify the severity or extent of the effects which give rise to these impacts. As such, the potential health impacts are described as outlined in Table 3-2, based on broad categories for the qualitative effects identified. Where an effect has been identified, actions have been recommended to mitigate any negative impact on health, or opportunities to enhance health benefits. It should be noted that in many cases, embedded mitigation to reduce these effects or measures to enhance certain benefits already form part of the Proposed Development and the assessment has considered these impacts as such.

Table 3-2 Human Health Impact Categories

Impact Category	Impact symbol	Description
Positive	+	A beneficial impact is identified
Neutral	0	No discernible health impact is identified
Negative	-	An adverse impact is identified
Uncertain	?	Where uncertainty as to the overall impact

3.3.5 Limitations and Assumptions

This population and human health assessment is based on professional judgement and considers both the adverse and beneficial impacts that the Proposed Development can have upon existing and surrounding receptors. It provides a broad, high-level indication of effects, reporting on the potential effects to people and the local community.

[17] IPHI (2021). *Health Impact Assessment Guidance*.
[18] WHO (2000), Healthy Urban Planning
[19] WHO (2006). Constitution of the World Health Organisation.

The assessment is based on information about the Proposed Development available at the time of writing the chapter. It draws upon other specialist topic inputs to aid the assessment of the impact of the Proposed Development on population and human health receptors.

Community resources are mentioned expressly in the environmental baseline only where they contribute to the local context or where they may be affected by the Proposed Development. Consequently, not all community resources within the study area are mentioned.

Information in the baseline related to demographics (other than total population) and the health profile of the population in the study area uses statistics from the 2022 Census.

3.4 Baseline Environment

3.4.1 Data Sources

The following data sources were used to inform the baseline and gain an understanding of the community in the study area:

- A review of relevant local policy documents including the Cork County Development Plan (CCDP) 2022-2028 and the East Cork Municipal District Local Area Plan.
- Central Statistics Office (CSO) relating to the 2022 census.
- Spatial information relevant to planning applications and decisions in Ireland from myplan.ie and ABP.

3.4.2 Overview

The Proposed Development is located within the existing ESB Aghada site in the east of County Cork. To inform the baseline profile, data from the 2022 Census has been analysed where possible. Where 2022 data is not available, 2016 data has been used.

The study area for this analysis has been defined as Corkbeg ED. Residents within this ED are most likely to experience effects from the Proposed Development. The below analysis compares statistics regarding the population in the study area with those in County Cork and Ireland as a whole.

This section establishes a socio-economic and human health profile of the Study Area, including consideration of the labour market and health indicators. Dependent on the availability of data from the CSO, the baseline section presents analysis of socio-economic indicators which provides the narrative and evidence base of the current status of the area surrounding the Site. Baseline analysis in this section sets the context for the potential impacts of the Proposed Development.

3.4.3 Population

There are 2,810 residents in the study area of Corkbeg ED. The population of Corkbeg contains fewer residents aged 65 or over (11.6%) compared to County Cork (15.6.0%) and Ireland (15.1%). The working age population (aged 15 to 64) is similar in the study area at 63.2% compared to 63.1% in County Cork and 61% nationally. In addition, there is a higher proportion of residents aged 0 to 15 (25.2%) in comparison to County Cork (21.2%) and Ireland (19.7%).

3.4.3.1 Deprivation

The Podal HP Deprivation Index is the primary source for deprivation data in Ireland. It combines three dimensions of affluence or disadvantage (demographic profile, social class composition and labour market situation) to provide a Relative Index Score for every Small Area in Ireland. The Relative Index Scores are normally distributed around a bell-shaped curve to display the current levels of deprivation compared to other areas, with most areas clustered around the mean and comparatively fewer areas exhibiting extreme levels of affluence or deprivation. The eight classifications for deprivation range from extremely affluent to extremely disadvantaged.

According to latest available data, Corkbeg ED was classified as ‘marginally above average’ in 2022 with a relative score of 6.28.

3.4.3.2 Education and Skills

In terms of educational attainment, the study area is relatively level with County Cork and Ireland as shown in Table 3.3. For example, 19% of working age residents in the study area are educated to upper secondary level, in line with 18.4% in County Cork and 18.1% nationally. The proportion of inhabitants educated to bachelor’s degree level

(or equivalent) or higher in the study area is 33.3% which is similar to the rate for County Cork (33%) and Ireland (33.7%). In contrast, 1.5% of residents have no formal education, a lower proportion than in County Cork (2%) and nationally (2.4%).

Table 3.3 Highest Level of Education Completed

Level of Education	Study Area	County Cork	Ireland
No formal education (%)	1.5%	2.0%	2.4%
Primary (%)	3.8%	6.6%	7.4%
Lower secondary (%)	9.9%	13.8%	13.2%
Upper secondary (%)	19.0%	18.4%	18.1%
Technical/vocational (%)	9.0%	8.6%	7.5%
Advanced certificate/completed apprenticeship (%)	8.0%	7.2%	5.6%
Higher certificate (%)	6.8%	6.0%	5.5%
Ordinary bachelor's degree/professional qualification or both (%)	8.5%	8.6%	8.1%
Honours bachelor's degree/professional qualification or both (%)	13.5%	13.2%	13.3%
Postgraduate diploma or degree (%)	10.7%	10.1%	11.2%
Doctorate (Ph.D.) (%)	0.6%	1.1%	1.1%
Not stated (%)	1.5%	2.0%	6.5%

3.4.3.3 Employment

In 2022, the total size of the labour force across Corkbeg is 2,102 of which 1,092 (58.8%) are in employment which is slightly lower than the labour force participation rate (LFPR) in Corkbeg ED (65.3%) and rates in County Cork (61.6%) and Ireland as a whole (61%). In regard to unemployment, the rate in Corkbeg ED is 9.2%, the same as in County Cork (6.8%) but lower than the national figure of 8%. The existing ESB Aghada Power Station currently employs 40 persons.

Table 3.4 Economic Status (aged 15+ years)

Economic Status	Study Area/Corkbeg ED	County Cork	Ireland
LFPR	58.8%	60.5%	61%
Unemployment Rate	7.7%	6.8%	8%

3.4.3.4 Social Class

The Census also provides a breakdown of the total population by 'social class'. These groupings are based on the level of skill and education attainment of their occupation. For the population which does not work, the social class of the person which they are deemed to depend on is attributed to them (as per guidance issued by the Central Statistics Office). Data shows (refer to Table 3.5) that the study area has fewer residents who are categorised as 'professional', and 'managerial and technical' (37.3%) to County Cork (42.2%) and Ireland as a whole (40%).

Table 3.5 Social Class

Social Class	Study Area	County Cork	Ireland
Professional workers (%)	10.0%	10.0%	9.3%
Managerial and technical (%)	27.3%	32.2%	30.7%
Non-manual (%)	16.1%	15.8%	16.2%
Skilled manual (%)	11.7%	14.4%	12.9%
Semi-skilled (%)	12.1%	12.1%	11.2%
Unskilled (%)	3.1%	2.7%	3.1%
All others gainfully occupied and unknown	19.6%	12.8%	16.6%

3.4.4 Human Health

The results of a self-assessment of health in the 2022 Census are shown in Table 3.6. On average, general health in the study area is slightly better than in County Cork and Ireland. 57.9% of residents in the study area self-assessed their health as 'very good' compared to slightly lower rates in County Cork (57%) and nationally (53.2%). In addition, 0.8% of residents in the study area described their health as 'bad' or 'very bad', a lower proportion than in County Cork (1.3%) and in Ireland (1.6%).

Table 3.6 Population by General Health

Self-Assessed Health	Study Area	County Cork	Ireland
Very Good (%)	57.9%	57.0%	53.2%
Good (%)	26.6%	29.6%	29.7%
Fair (%)	6.3%	7.8%	8.6%
Bad (%)	0.7%	1.1%	1.4%
Very bad (%)	0.2%	0.3%	0.3%
Not stated (%)	8.4%	4.2%	6.7%

Fewer residents (as a percentage of total population) live with a disability in the study area compared to County Cork and Ireland as a whole. In the 2022 Census, 19% stated they had a disability in the Study Area. This proportion is slightly lower than the average for County Cork (21%) and Ireland (21.5%).

The 2022 Census does not provide further information on health limitations or physical activity data by local area. However, the Irish Health Survey provides further detail on health profiles at a regional level[20].

The Irish Health Survey reports the mental health status of residents (aged 15 and over) at regional and national level. In 2019, 83% of residents in the southwest stated they experience no or minimal depression, which was slightly lower than across Ireland (86%). The full mental health statistics for the southwest and Ireland are shown in Table 3.7, which indicates on the whole, residents in the Southwest experience slightly higher levels of depression compared to residents across the county.

Table 3.7 Mental Health Indicators

Mental Health Indicator	Southwest	Ireland
None to minimal depression (%)	83	86
Mild depression (%)	11	9
Moderate depression (%)	4	3
Moderately severe or severe depression (%)	3	2

There are several healthcare facilities in the surrounding area to the Site The nearest is Harbours Brink Medical Centre, a GP surgery, which is located approximately 1.8km northeast of the Site. Cork University Hospital (CUH) is the closest major hospital facility, located around 19.5km northwest of the Site. The hospital is a large facility with 800 beds.

[20] CSO (2015). *Irish Health Survey 2015.*

3.4.5 Travel Patterns and the Existing Transport Network

Table 3.8 illustrates travel time to work, school, or college for residents in the study area and its comparator areas. It shows that on average, residents travel for longer in the study area with 39.8% travelling for half an hour or more compared to 27.3% and 37.8% doing this in Munster and Ireland respectively.

Table 3.8 Duration of Travel to Work, School, or College (population aged 5+ years)

Duration of Travel	Study Area	Munster	Ireland
Under 15 mins (%)	26.7%	33.1%	29.4%
1/4 hour - under 1/2 hour (%)	22.6%	29.4%	28.1%
1/2 hour - under 3/4 hour (%)	22.2%	16.4%	17.3%
3/4 hour - under 1 hour (%)	10.1%	4.8%	5.9%
1 hour - under 1 1/2 hours (%)	6.1%	4.3%	6.1%
1 1/2 hours and over (%)	1.4%	1.8%	2.5%
Not stated (%)	10.8%	10.2%	10.7%

In regard to mode of transport used to travel to work, school, or college, the study area largely aligns with patterns in the comparator areas. Most residents in the study area travel via car (driver or passenger) (62.9%). This is also the most used mode in County Cork (64.4%) and Ireland as a whole (53.84%).

3.4.6 Land Use

3.4.6.1 Local Community Facilities

The nearest community facilities to the Proposed Development are primarily located in the village of Aghada which is approximately 2km from the Site. Aghada is home to one school (Aghada National School), a pre-school (Aghada Parish Community Playgroup), a church (Church of St. Erasmus), a post office and a community centre (Aghada and District Community Centre).

There is also a collection of community facilities outside of Aghada but in close proximity to the study area. These include Whitegate Garda Station (1km from the Proposed Development), Corkbeg AFC (1.3km away), St. Michael & All Angels Church (1.4km away), White Bay Beach (3km away), and Rostellan Woods Forest (3.5km away).

3.4.6.2 Commercial Facilities

Regarding commercial facilities, there are also tourist attractions and leisure facilities in Aghada such as a boat tour company (Ocean Escapes), a tennis and sailing club (Lower Aghada Tennis and Sailing Club), a bed & breakfast (Tranquil Water) and a bar (Rosie's Bar). The village of Whitegate (1km from the Proposed Development) also includes to a number of bars and pubs.

Approximately 1.8km from the Proposed Development is Irving Oil Refinery Whitegate and Whitegate Power Station (gas fired), the latter of which can supply up to ten percent of the electricity demand in Ireland.

3.4.6.3 Planning Applications

A planning search of proposed and existing planning applications was undertaken (in March 2023) of applications within 5km of the Proposed Development, refer to Appendix A. The majority of planning applications for adjoining lands consist of mainly agriculture and industrial related developments, as well as educational expansions and recreational works. Withdrawn and incomplete planning applications were not included.

3.5 Potential Impacts

3.5.1 Construction Phase

3.5.1.1 Land Use

The Site is located in a primarily rural area, with the nearest residential property located approximately 880m from the boundary of the Site. The Site is currently owned by the Applicant. Therefore, there is no requirement for purchase or to gain access to any other land not owned by ESB for the construction of the Proposed Development.

Consequently, the Proposed Development will have no land use impacts during construction.

3.5.1.2 Employment

As noted in Chapter 2, the construction phase of the Proposed Development will be approximately three months.

The impact on direct employment has been identified by the number of construction workers required. It is expected that the number of construction workers required throughout the duration of the construction phase will peak at approximately 30 persons. It is anticipated that Site preparation and the installation of the Proposed Development will create temporary employment within the surrounding environs. Where practicable, the work force and construction materials will be sourced locally. During the construction phase, there will be a Slight, Short Term, Positive effect on the local economy, as a result of the construction work force and the additional indirect and induced employment effects supported within the supply chain and ancillary services (e.g., retail) in the study area.

3.5.1.3 Human Health

This section summarises the impact of the Proposed Development on human health and wellbeing, structured by health determinants as set out in the HUDU Tool.

Access to Open Space and Nature

As the Proposed Development will be constructed within the existing boundary of the Power Station, the proposal does not include the demolition or provision of open and natural spaces. However, this assessment considers whether the traffic and noise effects of the Proposed Development are likely to impact the character of open and natural spaces and whether they remain welcoming, safe and accessible for all during the construction phase.

In regard to air emissions, the Proposed Development is not expected to result in any change to the local air quality environment. In regard to noise creation during the construction phase, no significant adverse effects are expected at residential receptors.

The Proposed Development will utilise the existing regional road network, comprising the R630 and N25 for the Proposed Development construction traffic. Traffic volumes associated with the Proposed Development are relatively low in number and relate primarily to the delivery of construction equipment, materials and operations. The implementation of an approved CTMP put in place by the appointed Contractor prior to construction will minimise the potential for traffic and transport impacts during construction activities, consequently, it is not anticipated to cause significant environmental effects.

Therefore, it is expected that the Proposed Development will not impact upon the ability to access and enjoy existing open and natural spaces within the study area and the existing provision of open and natural spaces is expected to remain welcoming, safe and accessible for all. Consequently, the impact of the Proposed Development on access to open space and nature as a determinant of human health and well-being during the construction phase is assessed to be Neutral (0).

Access to Healthcare Services and Other Social Infrastructure

As the study area is predominantly rural with limited public transport available, local residents rely heavily on the local and regional road network to access healthcare services, workplaces, educational facilities, and community facilities.

During the construction phase, HGV traffic, general delivery traffic and site operatives will all be required to travel to and from the Site. The construction phase traffic will travel to and from the study area via the R630, N25 and wider national road network.

The transport assessment finds that although construction activity will cause an increase in traffic, it will not lead to congestion. The low existing number of vehicles using these roads means that even with traffic increases these junctions do not become congested. Therefore, it is expected that there will be a limited effect on the ability of residents to access healthcare and social facilities in the study area. The potential health impact during construction related to access to healthcare services and other social infrastructure is therefore assessed to be Neutral (0).

Air Quality, Noise and Neighbourhood Amenity

The quality of the local environment can have a significant impact on physical and mental health. Pollution caused by traffic and commercial activity can result in poor air quality, noise nuisance and vibration. Noise pollution can have a detrimental impact on health resulting in sleep disturbance, cardiovascular and psycho-physiological effects. Good design and the separation of land uses can lessen noise impacts.

Through the embedded mitigation outlined in 2.6.12, dust impacts occurring during construction which could affect human health are not significant.

An oCEMP (Appendix B) has been prepared and will be further refined and expanded by the appointed Contractor, into a Contractor's CEMP. The Contractor's CEMP will also ensure no impact on any vector that would pose a significant risk to human health. Therefore, the impact of the Proposed Development on air quality, noise and neighbourhood amenity as a determinant of human health and well-being is assessed to be Neutral (0).

3.5.2 Operational Phase

3.5.2.1 Land Use

As noted in Section 3.5.1.1, the Proposed Development is located in a primarily rural area and the Site is currently owned by the Applicant. Therefore, there is no requirement for purchase or to gain access to any other land not owned by ESB for the construction or the operation of the Proposed Development. Consequently, the Proposed Development will have no land use impacts during operation.

3.5.2.2 Employment

During the operational phase, the Proposed Development will be operated, maintained and managed by ESB personnel. Therefore, there will be no direct impacts to employment during the operational phase.

3.5.2.3 Human Health

Access to Open Space and Nature

Similar to the construction phase, the Proposed Development will operate within the existing boundary of the Power Station and will not require the demolition or provision of open and natural spaces.

It is also important to assess whether the Proposed Development physically constrains people from accessing open and natural spaces nearby.

Therefore, in regard to impacts on the character of open and natural spaces and whether they remain welcoming, safe and accessible for all, there will be no significant noise, air quality or traffic effects likely to arise during the operational phase. The impact of the Proposed Development on access to open space and nature as a determinant of human health and well-being during the operational phase is assessed to be Neutral (0).

Access to Healthcare Services and Other Social Infrastructure

During the operational phase, some additional staff will be required to travel to and from the Site. Due to existing operations on the Power Station site and the very small number of additional trips expected, this is not expected to lead to congestion, and it will not impact accessibility between local residents and the healthcare facilities and social infrastructure they use in the study area. The potential health impact during operation related to access to healthcare services and social infrastructure is therefore assessed to be Neutral (0).

Air Quality, Noise and Neighbourhood Amenity

It is expected that the Proposed Development will not result in any significant change to the local air quality or noise environment during operation. Therefore, the impact of the Proposed Development on air quality, noise and neighbourhood amenity as a determinant of human health and well-being is assessed to be Neutral (0).

3.5.3 Decommissioning Phase

It is expected that decommissioning will take up to three months. Effects arising from the process of decommissioning of the Proposed Development are considered to be of a similar nature and duration to those arising from the construction phase and are therefore have not been considered separately.

3.6 Mitigation Measures

An oCEMP (Appendix B) has been prepared as part of the planning application. In advance of work starting onsite, the appointed Contractor will expand and develop the oCEMP into a Contractor's CEMP to ensure that there are no impacts on any vector that would pose a risk to human health.

No additional mitigation measures related to Population and Human Health are proposed during the operation of the Proposed Development.

No additional monitoring measures are proposed.

3.7 Cumulative Impacts

A desktop planning history search using the CCC online Planning System noted a number of planning applications which could combine with the Proposed Development to create a cumulative impact upon population and human health, refer to Appendix A.

The development of an OCGT plant is proposed within the Power Station (planning reference 314003), given its proximity to the Proposed Development, in the unlikely event that construction works are undertaken in parallel, it may result in cumulative impacts on population and human health, however, the construction phase of this development is unlikely to occur during the same time period as the Proposed Development, as it is managed by ESB.

There is potential for temporary indirect cumulative effects on population and human health due to increased construction traffic and nuisances associated with site activities (dust, noise). However, given the scale of the of the projects it is unlikely there will be a significant direct or indirect cumulative effect on human health and population during construction. No significant direct or indirect cumulative effects on population or human health are predicted during the operation of the planned and Proposed Development.

3.8 Residual Impacts and Summary

As part of the assessment of impacts on population and human health, the overall classification and significance of each effect has been assessed across the study area. A summary of the potential effects on population and human health is identified in Table 3-9 and Table 3-10.

Table 3-9 Summary of Potential Effects on Population Receptors

Population Determinant	Sensitivity of Receptor	Nature of Effect/Geographic Scale	Magnitude of Impact	Initial Classification of Effect (with embedded mitigation)	Additional Mitigation	Residual Effect Classification and Significance
Construction						
Land use	N/A	N/A	N/A	No impact	None	No impact
Employment	N/A	Temporary/Local	Low	Slight positive	None	Slight positive
Operation						
Land use	N/A	N/A	N/A	No impact	None	No impact
Employment	N/A	N/A	N/A	No impact	None	No impact

Table 3-10 Summary of Potential Effects on Human Health Receptors

Health Determinant	Potential Health Impact	Additional Mitigation	Residual Effect Classification
Construction			
Access to Open Space and Nature	Neutral (0)	None	Neutral (0)
Access to healthcare services and other social infrastructure	Neutral (0)	None	Neutral (0)
Air Quality, Noise and Neighbourhood Amenity	Neutral (0)	None	Neutral (0)
Operation			
Access to Open Space and Nature	Neutral (0)	None	Neutral (0)
Access to healthcare services and other social infrastructure	Neutral (0)	None	Neutral (0)
Air Quality, Noise and Neighbourhood Amenity	Neutral (0)	None	Neutral (0)

3.9 References

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4. Biodiversity

An Ecological Impact Assessment (EcIA) Report has been completed for the Proposed Development and is included in Appendix C.

5. Land and Soils

5.1 Introduction

This chapter of the ECR assesses the impacts on the land, soil, and groundwater environments associated with the Proposed Development.

This chapter provides a description of the baseline soils, geology and hydrogeology environments for the project site. a statement of the likely significant impacts associated with both the construction and operation phases of the development. Mitigation measures are proposed in the form of avoidance, prevention, reduction, offsetting, and reinstatement or remedial measures and recommendations for monitoring are included where appropriate predicted residual effects are described.

Full details on the Proposed Development are provided in Chapter 2 and the Planning Statement submitted with this planning application.

5.2 Legislation, Policy and Guidance

This chapter has been prepared with reference to the following:

- Institute of Geologists Ireland (IGI) (2013). Guidelines for the preparation of soils geology and hydrogeology chapters of environmental impact statements.
- IGI (2002). Geology in environmental impact statements, a guide.
- NRA (2009). Guidelines on procedures for the assessment and treatment of geology, hydrology and hydrogeology for national road schemes.
- CIRIA (2001). C532 control of water pollution from construction sites guidance for consultants and contractors.
- CIRIA (2000). C512 environmental handbook for building and civil engineering projects.

5.3 Methodology

5.3.1 Study Area

The study area with regard to land and soils encompasses the entire area within the boundary of the Site of the Proposed Development.

5.3.2 Determination of the Baseline Environment

These objectives were achieved by way of a geological desk study and site investigation (SI), refer to Appendix D. The sources of the information are listed below:

- Ordnance Survey Ireland (OSI) maps (www.osi.ie, accessed August 2022).
- Geological Survey Ireland (GSI) Groundwater and Geotechnical mapviewer (www.gsi.ie, accessed August 2023).
- EPA Envision Maps (https//gis.EPA.ie/EPAMaps/, accessed August 2023).
- Preliminary Geotechnical Summary Report by ESB, July 2023.

5.3.3 Determination of Sensitive Receptors

The sensitivity of the existing environment identifies the ability of the receptor to respond to potential effects. Receptors have been identified during the baseline study and a qualitative assessment has been used to assign a sensitivity rating from low to extremely high, based on the NRA 'Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes' [21]. Assigning a sensitivity rating considers an attribute's likely adaptability, tolerance and recoverability, as well as their designation.

[21] NRA (2009). *Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes.*

5.3.4 Describing Potential Effects

The methodology used for describing the potential effects considers the 'quality' of the effects (i.e., whether it is adverse or beneficial), the 'probability' of the event occurring and the 'duration' of the effects (i.e., whether it is short or long-term) as per Section 3.7.3 and Table 3.4 of the EPA Guidelines[3].

Specific assessment criteria and typical examples for soil and geology (based on information within the NRA 'Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes'[22]) are outlined in Table 5-1.

Table 5-1 Criteria and Examples for Describing Potential Effects on Land & Soils Environment

Magnitude of Effect	Criteria for Effects	Typical Examples (Positive and Negative)
Large Adverse	Results in loss of attribute	Soil and Geology Loss of high proportion of future quarry or pit reserves. Irreversible loss of high proportion of local high fertility soils. Removal of entirety of geological heritage feature. Requirement to excavate/ remediate entire waste site. Requirement to excavate and replace high proportion of peat, organic soils and/or soft mineral soils beneath alignment.
Moderate Adverse	Results in impact on integrity of attribute or loss of part of attribute	Soil and Geology Loss of moderate proportion of future quarry or pit reserves. Removal of part of geological heritage feature. Irreversible loss of moderate proportion of local high fertility soils. Requirement to excavate/ remediate significant proportion of waste site. Requirement to excavate and replace moderate proportion of peat, organic soils and/or soft mineral soils beneath alignment.
Small Adverse	Results in minor impact on integrity of attribute or loss of small part of attribute	Soil and Geology Loss of small proportion of future quarry or pit reserves. Removal of small part of geological heritage feature. Irreversible loss of small proportion of local high fertility soils and/or high proportion of local low fertility soils. Requirement to excavate/remediate small proportion of waste site. Requirement to excavate and replace small proportion of peat, organic soils and/or soft mineral soils beneath alignment.
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity	Soil and Geology No measurable changes in attributes.
Minor Beneficial	Results in minor improvement of attribute quality	Minor enhancement of geological heritage feature.
Moderate Beneficial	Results in moderate improvement of attribute quality	Moderate enhancement of geological heritage feature.
Major Beneficial	Results in major improvement of attribute quality	Major enhancement of geological heritage feature.

5.3.5 Significance of Effects

A qualitative approach was used to determine the significance of effects as per the EPA Guidelines determination figure (Figure 3.4. page 53). Due account was taken of both the sensitivity of the attributes and the description of the potential effect.

5.3.6 Limitations and Assumptions

The description of existing conditions is based on the available desk study and information supplied by the design team as outlined in Section 5.3.2.

[22] TII (formerly NRA) (2008), Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes

5.4 Baseline Environment

5.4.1 Site Description

The Site of the Proposed Development is approximately 12km southeast of Cork City, on the eastern side of Cork Harbour. The Site is located within the boundary of the existing Power Station.

The Power Station contains a significant hardscaped (tarmac paved) carpark towards its northeast boundary, with further car parking areas dispersed around the wider site. Access to the eastern end of the Power Station site, across the R630, is provided via a connecting bridge.

Two sea water attenuation ponds (no longer in active use) are within the Power Station, along with numerous power station buildings.

The Site of the Proposed Development is located in the northwest of the existing Power Station site on an undeveloped area between the disused sea water attenuation ponds.

5.4.2 Topography

A topographic survey has been undertaken for the Site, with contours produced for the Site of the Proposed Development, refer to Drawing P000446-PM²5-0003 submitted as part of this application.

5.4.3 Surrounding Land Use

Land use in the surrounding area is dominated by the Power Station, beyond which lies Cork Harbour to the north and agricultural lands and rural settlements to the east, west and south. Surrounding land use is summarised in Table 5-2.

Table 5-2 Adjacent Land Use[23]

Site Boundary	Land Use
North	A sea water attenuation pond (no longer in active use) associated with the Power Station is immediately to the northwest. Immediately to the northwest, and further to the northeast beyond the attenuation pond, is Cork Harbour.
South	To the south of the Site are buildings associated with Power Station, with woodland and agricultural land further to the southeast. Residential properties on the edge of Whitegate village are approximately 1km southeast.
East	Pylons associated with the Power Station site and agricultural lands are present to the east of the Site. The closest residences, a mix of single rural housing and houses associated with Aghada village, are approximately 200m to the east and northeast.
West	To the west of the Site are buildings and a sea water attenuation pond (no longer in active use) on the Power Station and Cork Harbour.

5.4.4 Site History

The Site is on an area of land that was reclaimed from the sea. The Site is located to the north of a foreshore known locally as ‘Long Point’ (also recorded as ‘Ring Point’). Long Point is shown on the end of a narrow peninsula on historical mapping from the 19th century, with a portion of the peninsula noted to be ‘covered by spring tides’. A historical burial ground is also recorded at the western end of the peninsula, refer to Section 9.5.10 for further details.

A timeline of the Power Station development and changes since it was developed from greenfield in 1977 is summarised in Table 5-3.

Table 5-3 Site Operational Timeline

Year	Discussion
1978	Construction started on the Power Station.
1980	Power Station becomes operational.
2000	Power Station receives its IEL from the EPA (P0561-01).
2012	Power Station receives its current IEL from the EPA (P0561-05).

[23] Source Google Maps (2022).

5.4.5 Quaternary Deposits

GSI mapping indicates quaternary sediments are absent across the Site, with made ground associated with industrial development noted to the southwest of the Proposed Development (as shown in Appendix D.3). The Site is expected to be underlain by made ground overlying natural marine sediments.

5.4.6 Bedrock

The GSI map indicates that the west of the Site is underlain by flaser-bedded sandstone & minor mudstone of the Cuskinny Member of the Old Head Sandstone Formation and the main Old Head Sandstone Formation itself. Part of the south of the Site is underlain by green sandstone, siltstone and mudstone of the Devonian age Ballyknock Formation.

There is a north-south trending fault passing through the Site. The bedrock geology is shown in Appendix D.3.

5.4.7 Hydrogeology

The bedrock aquifer underlying the Site is classified by the GSI as a 'Locally Important Aquifer (LI)' where the bedrock is "moderately productive only in local zones". It is anticipated that groundwater flow varies across the Site, and is likely to be to the north, south and west towards the Cork Harbour, with anticipated tidal influence.

The GSI map does not classify the groundwater vulnerability beneath the Site, however the closest mapped area (at Long Point to the immediate south) is classified as 'Extreme' due to exposed bedrock at the foreshore, as shown in Appendix D.3.

The Site is not located in a groundwater source protection area. Groundwater beneath the Site forms part of the Whitegate groundwater body (code IE_SW_G_079), classified as a 'Poorly Productive' bedrock aquifer. Under the most recent Water Framework Directive (WFD) data (2013-2018) groundwater beneath the Site is classified as having 'Good' status and 'Not at Risk' of not achieving Good status.

5.4.8 Groundwater Recharge

The average groundwater recharge rate according to the GSI Groundwater Data Viewer is 126mm/year to the southwest of the Site.

5.4.9 Groundwater Abstractions

A search of the GSI well database found one borehole within 2km of the Proposed Development.

- Borehole (1705NWW084) located at E184570, N63550, approximately 1km south, drilled to a depth of 44.2m, with rockhead recorded at 3.7m. The use of the borehole is recorded as 'for domestic purposes only' and it is recorded as having a 'moderate' yield (43.6m^3/day).

It should be noted however, that there is no obligation to register or licence private wells in Ireland and the presence of additional private domestic wells in the vicinity of the Site cannot be ruled out, as these wells are not always identified fully on the GSI online mapping database. The necessity to register wells that have abstraction rates of 25m^3/day or more with the EPA only came into effect in November 2018 and that well register has not yet been published.

However, due to the Site's coastal setting on a made ground platform and the absence of dwellings between the Site and Cork Harbour, groundwater beneath the Site is likely to be brackish and unsuitable for potable supply.

5.4.10 Ecologically Protected Areas

A search of the EPA interactive map viewer revealed the following protected areas in the vicinity of the Site.

- Cork Harbour SPA (Code 004030) is immediately to the northeast and approximately 120m to the southwest of the Site.
- Whitegate Bay pNHA (Code001084), 0.2km west of the Site.
- Rostellan Lough, Aghada Shore and Poulnabibe Inlet pNHA (Code 001076), 1.9km northeast of the Site.

For further details on ecologically protected areas, refer to the ecological impact assessment included as Appendix C and the NIS which accompanies this planning application.

5.5 Preliminary Geotechnical Summary Report

The summary report considers (refer to Appendix D.1) available historic ground investigation reports within the vicinity of the Proposed Development. Two reports were reviewed, both prepared by Geotech Specialists Ltd. The first report (report ref: KC3202) was prepared in 2004 as part of the Aghada repowering project. The second report (report ref: KC6109) was prepared in 2007 as part of the combined-cycle gas turbine (CCGT) project.

The ground conditions encountered generally consisted of an overburden layer consisting of intermixed gravel/sand, clay and weathered rock overlying a mudstone/shale bedrock.

During the excavation of TP15 (in the vicinity of the proposed HGV bays), groundwater was noted as 'lying in base of pit' at 3.9m below ground level (m bgl), in addition, standpipes were installed in the relevant historic boreholes and were monitored with groundwater level typically varying from 1.5m to 2.5m bgl.

The report considered shallow pad or strip foundations most appropriate for the CCGT Proposed Development and provided preliminary geotechnical parameters, noting that site specific investigations were recommended prior to detailed design.

5.6 Potential Impacts

5.6.1 Construction Phase

The potential construction phase impacts to land and soils include the following:

- Accidental spills and leaks of oils and chemicals, which could impact soils and groundwater.
- Excavation and infilling of ground, which may lead to exposure of potentially contaminated subsoils, increased rainwater infiltration and the mobilisation of contaminants to groundwater.
- The depletion of non-renewable natural resources to be imported as aggregates and fill materials.
- The use of concrete and lime in construction works, which has the potential to impact the pH of groundwater.

5.6.1.1 Accidental Spills and Leaks

During the construction phase of the Proposed Development, there is a risk of accidental pollution incidents from the following sources:

- Spillage or leakage of chemicals stored and used onsite as part of construction works.
- Spillage or leakage of oils and fuels from construction machinery or site vehicles.
- Spillage of oil or fuel from refuelling machinery onsite.

Accidental spillage of fuels or chemicals could potentially result in the impact of soils and groundwater underlying the Site if inappropriately handled or stored, during construction. Potential contaminants could migrate through the subsoils and impact underlying groundwater.

A groundwater well has been identified within a 2km radius to the south of the Site close to Whitegate village, as per Section 6.4.7. However, it is noted that topographically driven groundwater flow direction from the Proposed Development is likely to be generally westward towards Cork Harbour and that the identified well is therefore likely to be hydraulically up-gradient or cross-gradient of the Proposed Development. Any water quality impacts from the Proposed Development on this receptor is therefore considered unlikely, given the flow direction and also the fact that the bedrock is of low permeability and is classified as Poorly Productive, limiting any potential for contaminant migration via groundwater.

There will, however, exist the potential for activities at the Site to impact on the aquifer, the quality of which will be considered under the WFD. This is considered a direct negative effect and, if it occurs, would be confined to one-off releases. The impact could alter the character of soil and/or groundwater at the local scale but would be temporary in nature. The impact would therefore result in a small effect on a Low sensitivity soil environment and the significance of the effect is Imperceptible with regard to soils.

One-off localised releases to ground may also locally impact on groundwater quality but this is considered to be a Low effect on a Medium sensitivity environment and the significance of the effect is Slight with regard to groundwater.

5.6.1.2 Excavation and Infilling

Excavation earthwork impacts will mainly relate to removal of topsoil and shallow subsoils, while infill earthwork will mainly relate to the import and compaction of acceptable fill material to achieve the required engineering design and grades.

Excavation of soils will be required as part of foundation construction and in areas of the Proposed Development where levels need to be reduced. These excavations are likely to be limited in area and depth.

Stockpiling of unsuitable soils will be undertaken prior to removal from the Site. In the absence of mitigation, this would have the potential to impact on soil and groundwater, through the leaching of contaminants.

The removal of hardstanding during construction works may also expose potentially contaminated shallow soils to rainwater infiltration, increasing the potential for leaching of contaminants to groundwater. Previous site investigations carried out on the wider Power Station did not indicate any significant soil contamination at the Site with the potential to be leached and mobilised, indicating a low risk of potential impact to groundwater quality or to Cork Harbour via groundwater flow.

The classification of groundwater vulnerability beneath the Site, where mapped is ‘Extreme’, therefore the Proposed Development is unlikely to result in a change to groundwater vulnerability.

Excavation and infilling impacts will result in a permanent direct negative effect which is certain to occur and irreversible. This is considered to be a low effect on a soil and groundwater environment of Medium sensitivity and the significance of the effect is considered Slight.

5.6.1.3 Use of Natural Resources

Aggregates will be imported to the Site for use in the establishment of contractor’s compounds, and in fill placement and construction. The sourcing of these aggregates from reputable, authorised quarries is mandated by development requirements and for ensuring regulatory compliance.

Aggregates are natural non-renewable resources and their use results in depletion of the national stock of these resources. Use of natural resources is therefore considered a permanent direct impact of neutral quality which will be imperceptible on the quality or character of the wider environment but is certain to occur and irreversible. The use of natural resources is considered to be a Low impact on a soil environment of Medium sensitivity and the significance of the impact is considered Slight.

5.6.1.4 Use of Concrete and Lime

Lime and concrete (specifically, the cement component) is highly alkaline and any spillage which migrates through subsoil could impact groundwater quality. The activities most likely to result in contamination include concreting during foundation construction and laying of services.

As noted above, any impacts are considered unlikely to impact on identified groundwater wells but may impact the WFD groundwater body or the adjacent coastal surface water body.

The impacts will result in a direct negative effect but unlikely to occur and, if they occur, would be confined to one-off releases. The impact could alter the character of soil, surface water and/or groundwater at the local site but would be Temporary in nature. Therefore, it is considered to be a Low effect to a Medium sensitivity environment and the significance of the effect is Slight.

5.6.2 Operational Phase

The potential impacts during the operational phase include the following:

- Accidental spills and leaks from chemical storage (transformer oils, etc.) impacting soils and groundwater.

5.6.2.1 Accidental Spills and Leaks

There is the potential for accidental spills and leaks to occur from fuel storage and from vehicles using the Proposed Development during its operation. All chemicals will be bunded and drainage from paved areas will be collected and directed to interceptors prior to discharge. as such any accidental spill would be prevented from direct discharge to surrounding soils and groundwater. Any spills or leaks will be managed in accordance with Condition 9 of the Power Station’s IEL

The impact is considered a direct negative impact but unlikely to occur with the embedded mitigation measures. If it does occur, it would be confined to one-off releases. The impact has the potential to alter the character of soil and/or

groundwater at the local site but would be temporary in nature. Therefore, it is considered to be a Low impact on a Medium sensitivity environment and the significance of the impact is Slight.

5.6.3 Decommissioning Phase

It is expected that decommissioning will take up to three months. Effects arising from the process of decommissioning of the Proposed Development are considered to be of a similar nature and duration to those arising from the construction phase and are therefore have not been considered separately.

5.7 Mitigation Measures

This section describes a range of recommendations and mitigation measures designed to avoid, reduce or offset any potential adverse geological impacts identified.

Due to the inter-relationship between soils, hydrogeology, surface water and biodiversity, the mitigation measures discussed will are also considered applicable to these sections and this chapter should be read in conjunction with Chapter 4 (Biodiversity) and Chapter 6 (Water).

5.7.1 Construction Phase

To reduce the impacts on the soils, geology and hydrogeological environment a number of mitigation measures will be adopted as part of the construction works onsite. The measures will address the main activities of potential impact which include the measures outlined in the following sections.

5.7.1.1 Fuel and Chemical Handling, Transport and Storage

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

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

5.7.1.2 Excavation and Infilling

5.7.1.2.1 Control of Soil Excavation and Export from Site

The Proposed Development will incorporate the reduce, reuse and recycle approach in terms of soil excavations onsite. The construction will be carefully planned to ensure only material required to be excavated will be excavated, with as much material left in-situ as possible. All excavation arisings will be reused onsite where possible/if suitable.

Soil stripping, earthworks and stockpiling of soil will be carried out during the works. Stockpiles have the potential to cause negative impacts on air and water quality. The effects of soil stripping and stockpiling will be mitigated through the implementation of an appropriate earthworks handling protocol during construction. It is anticipated that only local/low level of stockpiling will occur as the bulk of the material will be excavated either straight into trucks for transport off site or will be reused in other areas of the Site as fill.

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

5.7.1.2.2 Export of Surplus Material from Site

Where material cannot be reused offsite, it will be sent for recovery/disposal at an appropriately permitted/licenced site. Provisions of possible offsite management of excavation waste will be outlined in oCEMP to be finalised by the appointed Contractor prior to works starting onsite.

5.7.1.2.3 Control of Water During Construction

Runoff from excavations/earthworks cannot be prevented entirely and is largely a function of the prevailing weather conditions. Earthwork operations will be carried out such that surfaces, as they are being raised, shall be designed with adequate drainage, falls and profile to control runoff and prevent ponding and flowing. Care will be taken to ensure that exposed soil surfaces are stable to minimise erosion. All exposed soil surfaces will be within the main

excavation site, which limits the potential for any offsite impacts. Any runoff will be prevented from directly entering any watercourses or Cork Harbour.

Should any discharge of construction water be required during the construction phase, discharge to foul sewer will be regulated under a Discharge Licence obtained from the Regulator (Uisce Eireann) issued under the Water Pollution Act. Attenuation, pre-treatment and monitoring of discharge water will likely be required under any Discharge Licence (Section 16 Licence). Pre-treatment and silt reduction measures onsite will include a combination of silt fencing, settlement measures (silt traps, silt sacks and settlement tanks) and hydrocarbon interceptors. Active treatment systems such as Siltbusters or similar may be required depending on turbidity levels and discharge limits. Qualitative and quantitative monitoring will be implemented as per the Conditions of any Discharge Licence. The Applicant's environmental consultant will audit the sampling and analysis results as required to ensure conformance to the discharge licence limits and testing frequency requirements.

5.7.1.3 Sources of Fill and Aggregates for the Proposed Development

All fill and aggregate for the Proposed Development will be sourced from reputable suppliers as per the project Contract and Procurement Procedures. All suppliers will be vetted for:

- Aggregate compliance certificates/declarations of conformity for the classes of material specified for the Proposed Development.
- Environmental management status.
- Regulatory and legal compliance status of the suppliers.

Potential local sources of aggregates include Midleton Aggregates, Knockgriffin, Midleton, County Cork, Roadstone Carrigtwohill Quarry, Burgesland, Carrigtwohill, County Cork, Kilsaran Rossmore Quarry, Carrigtwohill, County Cork and Breedon Ireland Rossmore Quarry, Carrigtwohill, County Cork.

5.7.1.4 Control of Concrete and Lime

Ready-mixed concrete will be brought to the Site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated water to the underlying subsoil and groundwater or to nearby surface waters.

The pouring of concrete will take place within a designated area protected to prevent concrete runoff into the soil/groundwater media. Washout of concrete transporting vehicles will take place at an appropriate facility, offsite where possible. Alternatively, where wash out takes place onsite, it will be carried out in carefully managed designated onsite wash out areas.

5.7.1.5 Construction Environmental Management Plan

An oCEMP (Appendix B) has been prepared as part of the planning application. In advance of work starting onsite, the appointed Contractor will expand and develop the oCEMP into a Contractor's CEMP, taking into account any additional requirements of the Design Team or Planning.

The CEMP will set out the overarching vision of how the construction of the Proposed Development will be managed in a safe and organised manner by the appointed Contractor with the oversight of the Developer. The CEMP is a live document, and it will go through a number of iterations before works commence and during the works. It will set out requirements and standards which must be met during the construction phase and will include the mitigation measures relevant to the Proposed Development.

5.7.2 Operational Phase

The Proposed Development will incorporate mitigation measures for potential spills of oils and/or chemicals in accordance with best practices which will suffice to reduce the impact of such events if they occur.

In addition, the Site is located within a facility already licenced by the EPA. The existing Power Station IEL requires regular monitoring of environmental receptors (groundwater, etc.).

5.7.3 Decommissioning Phase

As outlined in Chapter 2, at the time of decommissioning, measures will be undertaken to ensure that there will be no significant, negative environmental effects from the development.

5.8 Residual Impacts

5.8.1 Construction Phase

Assuming implementation of the mitigation measures set out in Section 5.7.1, construction phase impacts are assessed to be a Negligible impact on a Medium sensitivity receptor. The residual impact on land, soil and groundwater environment is therefore Imperceptible.

5.8.2 Operational Phase

Assuming implementation of the mitigation measures set out in Section 5.7.2, operational phase impacts are assessed to be a Negligible impact on a Medium sensitivity receptor. The residual impact on land, soil and groundwater environment is therefore Imperceptible.

5.8.3 Decommissioning Phase

As outlined in Chapter 2, in the event of decommissioning, measures will be undertaken to ensure that there will be no Significant, Negative residual environmental effects from the development. Additional potential impacts and associated effects arising during the decommissioning phase are not anticipated above and beyond those already assessed during the construction phase of the Proposed Development.

5.9 Cumulative Impacts

Should the construction of the listed projects in Table 1-5 and the Proposed Development occur concurrently, there is potential for temporary indirect cumulative effects on land and soils. Should these developments be constructed at the same time as the Proposed Development, there is a potential for cumulative effects associated with the use of natural resources and accidental spills and leaks.

As reported in Section 5.8, potential emissions to soil and groundwater associated with the Proposed Development can be mitigated to the extent that the impact will not be significant. It is not unreasonable to assume that the committed developments listed above, which have also gone through the planning process, will also implement standard and best practice mitigation measures to the extent that impacts are not significant. Providing standard best practice control measures are implemented as required on all sites, the cumulative impact will not be significant.

5.10 Summary

- During the construction phase, potential impacts include accidental spills and leaks of fuels and chemicals, mobilisation of contaminants during excavation and infilling, the depletion of natural resources and potential for pH changes to water receptors due to use of concrete and lime. The significance of effects was assessed as follows prior to mitigation:
    - A slight effect to soil and groundwater from accidental spillage and leaks of fuels and chemicals during construction.
    - A moderate effect on soil and groundwater associated with excavation and infilling works.
    - A slight impact associated with the depletion of non-renewable natural resources namely the use of aggregates as fill and the use of concrete.
    - A slight effect from local temporary pH alterations of soils, surface water and/or groundwaters resulting from the use of concrete and lime.
- During the operational phase, a slight impact has been identified with respect to the soil and groundwater associated with accidental spills and leaks.
- Mitigation (including embedded mitigation) will ensure soils and groundwater are protected from adverse impacts of construction and operation.
- It is considered that residual negative effects of the Proposed Development on land, soils and groundwater will overall be imperceptible provided that appropriate mitigation measures are applied.
- It was concluded cumulative effects will be not significant.

Table 5-4 Summary of Impacts and Mitigation

Phase	Activity	Mitigation
Construction	Discharge of contaminated water to sewer	The appointed Contractor will be supplied with the most recent groundwater sampling results and any subsequent groundwater analytical results. The Contractor will design an onsite pre-treatment system (if required). Any discharge to sewer will be carried out under a discharge licence.
Construction	Storage of Hazardous Material/Accidental Spills	Good housekeeping and proper handling, storage and disposal of any potentially polluting substances can prevent soil and/or water contamination. Designated and bunded storage areas will be maintained.
Construction	Import/Export of Materials	All suitable surplus subsoil, if any exists, will be exported for reuse off site where a suitable reuse site can be identified. Soil reuse will be subject to the requirements under the Waste Management Act (e.g., Article 27 or 28). Where material cannot be reused it will be recovered or disposed of in accordance with the Waste Hierarchy and Waste Management Act. Aggregates will be required for sub-base under roads and buildings. All sub-base materials must meet the relevant engineering specification. The use of recycled or secondary aggregates will be considered as a replacement for primary aggregates.
Construction and Operational	Potential contaminated runoff percolating to ground and the underlying aquifer	There will be no direct discharge to groundwater during construction. Protection of groundwater from potentially polluting substances will be dealt with through a number of measures including correct handling and storage of potentially polluting substances. Concrete use and wash-out areas will be in designated areas, with measures to prevent alkaline wastewaters or contaminated storm water runoff to the underlying subsoil or to the surface water or marine environment.
Operational/Unplanned Events	Storage of hazardous material	Good housekeeping and proper handling, storage and disposal of any potentially polluting substances can prevent soil and/or water contamination. Designated and bunded storage areas will be maintained. Integrity testing of bunds will mitigate against any risk of leaks.

5.11 References

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6. Water

6.1 Introduction

This chapter presents an assessment of the impacts of the Proposed Development upon the water environment. This chapter defines the study area, the methodology used for developing the baseline and impact assessment, provides a description of the baseline environment in relation to water, and presents the findings of the impact assessment focused on water, hydrology and flooding issues associated with the Proposed Development.

Full details on the Proposed Development are provided in Chapter 2 and the Planning Statement submitted with this planning application.

This chapter should also be read in conjunction with Chapter 4 (Biodiversity), Chapter 5 (Land and Soils) and Chapter 8 (Material Assets) of this ECR, which pay particular attention to the potential for impacts upon the aquatic/riparian environment, hydrogeological environment, deposition of particles from emissions, flood risk due to climate change, and water usage respectively.

6.2 Legislation, Policy and Guidance

This chapter has been prepared in general accordance with the following:

- European Union WFD (2000/60/EC), which was adopted as a single piece of legislation covering rivers, lakes, groundwater and transitional (estuarine) and coastal waters. The following regulation in Ireland governs the shape of the WFD characterisation, monitoring and status assessment programmes in terms of monitoring different water categories, determining the quality elements and undertaking characterisation and classification assessments.
    - European Communities (Water Policy) Regulations, 2003 (S.I. No. 722 of 2003), as amended in 2014 (by S.I. No. 350 of 2014).
    - European Communities Environmental Objectives (Surface Water) Regulations, 2009 ('S.I. No. 272 of 2009 as amended'), as amended in 2012 (by S.I. No. 327 of 2012), 2015 (by S.I. No. 386 of 2015) and 2019 (by S.I. No. 77 of 2019).
    - European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010 as amended), as amended in 2016 (S.I. No. 366 of 2016).
- The EU floods directive 2007/60/EC.
- European Communities (Assessment and Management of Flood Risks) Regulations, 2010 (S.I. No. 122 of 2010), as amended in 2015 (S.I. No. 495 of 2015).
- European Communities, Environmental Impact Assessment of Projects – Guidance on Scoping (Directive 2011/92/EU as amended by 2014/52/EU) (EC, 2017).
- Guidelines for Preparation of Soils, Geology, Hydrogeology Chapters of Environmental Impact Statements (IGI, 2013).
- DHPLG (2018), River Basin Management Plan for Ireland 2018-2021.
- DHPLG (2022), Draft River Basin Management Plan for Ireland 2022-2027.

6.3 Methodology

6.3.1 Study Area

The study area for surface water receptors encompasses the entire area within the Site, and water features within a 2km radius. The study area is considered appropriate based on professional judgement of the potential spatial extent of potential impacts.

6.3.2 Determination of the Baseline Environment

The baseline water environment has been determined from desktop review, site walkovers and site studies/investigations, as follows:

- OSI website for historical maps of 1:2,500 scale and 1:10,560 scale and aerial photographs.
- OSI Discovery series of 1:50,000 scale.
- GSI website for public viewer and groundwater maps.

- EPA website 'Envision'.
- Local authority web portals.
- Topography maps.
- OPW flood information mapping.
- Historic site investigations.

In addition, a Site-Specific Flood Risk Assessment (FRA) has been prepared for the Proposed Development and is submitted with this planning application, refer to Appendix E.

6.3.3 Determination of Sensitive Receptors

The sensitivity of the existing environment identifies the ability of the receptor to respond to potential effects. Receptors have been identified during the baseline study and a qualitative assessment has been used to assign a sensitivity rating from low to extremely high based on the NRA 'Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes'[24]. Assigning a sensitivity rating considers an attribute's likely adaptability, tolerance and recoverability, as well as their designation.

Table 6-1 Estimation of Importance of Hydrology Attributes

Importance	Criteria	Typical Examples
Extremely High	Attribute has a high quality or value on an international scale.	River, wetland or surface water body ecosystem protected by EU legislation e.g., 'European sites' designated under the Habitats Regulations or 'Salmonid waters' designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988.
Very High	Attribute has a high quality or value on a regional or national scale.	River, wetland or surface water body ecosystem protected by national legislation – NHA status. Regionally important potable water source supplying >2500 homes Quality Class A (Biotic Index Q4, Q5). Flood plain protecting more than 50 residential or commercial properties from flooding. Nationally important amenity site for wide range of leisure activities.
High	Attribute has a high quality or value on a local scale.	Salmon fishery Locally important potable water source supplying >1000 homes Quality Class B (Biotic Index Q3-4). Flood plain protecting between 5 and 50 residential or commercial properties from flooding. Locally important amenity site for wide range of leisure activities.
Medium	Attribute has a medium quality or value on a local scale.	Coarse fishery. Local potable water source supplying >50 homes. Quality Class C (Biotic Index Q3, Q2- 3). Flood plain protecting between 1 and 5 residential or commercial properties from flooding.
Low	Attribute has a low quality or value on a local scale.	Locally important amenity site for small range of leisure activities Local potable water source supplying <50 homes. Quality Class D (Biotic Index Q2, Q1) Flood plain protecting 1 residential or commercial property from flooding. Amenity site used by small numbers of local people.

6.3.4 Describing Potential Effects

The methodology used for describing the potential effects considers the "quality" of the effects (i.e., whether it is adverse or beneficial), the "probability" of the event occurring and the "duration" of the effects (i.e., whether it is short or long-term) as per Section 3.7.3 and Table 3.4 of the EPA Guidelines.

Specific assessment criteria and typical examples (based on information within the NRAs 'Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes'[22] are outlined in Table 7.2.

[24] TII (formerly NRA) (2009), Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes

Table 6-2 Criteria and Examples for Describing Potential Effects on Waters Environment

Magnitude of Effect	Criteria for Effects	Typical Examples (Positive and Negative)
Large Adverse	Results in loss of attribute	Hydrogeology: • Removal of large proportion of aquifer. • Changes to aquifer or unsaturated zone resulting in extensive change to existing water supply springs and wells, river baseflow or ecosystems. • Potential high risk of pollution to groundwater from routine runoff. • Calculated risk of serious pollution incident >2% annually. Hydrology: • Loss or extensive change to a waterbody or water dependent habitat. • Increase in predicted peak flood level >100mm. • Extensive loss of fishery. • Calculated risk of serious pollution incident >2% annually. • Extensive reduction in amenity value.
Moderate Adverse	Results in impact on integrity of attribute or loss of part of attribute	Hydrogeology: • Removal of moderate proportion of aquifer. • Changes to aquifer or unsaturated zone resulting in moderate change to existing water supply springs and wells, river baseflow or ecosystems. • Potential medium risk of pollution to groundwater from routine runoff. • Calculated risk of serious pollution incident >1% annually. Hydrology: • Increase in predicted peak flood level >50mm. • Partial loss of fishery. • Calculated risk of serious pollution incident >1% annually. • Partial reduction in amenity value.
Small Adverse	Results in minor impact on integrity of attribute or loss of small part of attribute	Hydrogeology: • Removal of small proportion of aquifer • Changes to aquifer or unsaturated zone resulting in minor change to water supply springs and wells, river baseflow or ecosystems. • Potential low risk of pollution to groundwater from routine runoff. • Calculated risk of serious pollution incident >0.5% annually. Hydrology: • Increase in predicted peak flood level >10mm. • Minor loss of fishery. • Calculated risk of serious pollution incident >0.5% annually. • Slight reduction in amenity value.
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity	Hydrogeology: • Calculated risk of serious pollution incident <0.5% annually. Hydrology: • Negligible change in predicted peak flood level. • Calculated risk of serious pollution. • incident <0.5% annually.
Minor Beneficial	Results in minor improvement of attribute quality	Hydrology: • Reduction in predicted peak flood level >10mm. • Calculated reduction in pollution risk of 50% or more where existing risk is <1% annually.
Moderate Beneficial	Results in moderate improvement of attribute quality	Hydrology: • Reduction in predicted peak flood level >50mm. • Calculated reduction in pollution risk of 50% or more where existing risk is >1% annually.
Major Beneficial	Results in major improvement of attribute quality	Hydrology: • Reduction in predicted peak flood level >100mm.

6.3.5 Significance of Effects

A qualitative approach was used to determine the significance of effects as per the EPA Guidelines determination figure (Figure 3.4 page 53). Due account was taken of both the sensitivity of the attributes and the description of the potential effect.

It should be noted the control measures have been considered to be embedded in the project design and their application has been assumed in determining the significance of the impact. Mitigation measures will be devised for each potential complete pollutant linkage (comprising a source, pathway and receptor), no matter how significant the impact. Additional mitigation measures have then been considered prior to determination of residual impacts.

6.3.6 Limitations and Assumptions

The description of existing conditions is based on the available desk study and information supplied by the design team as outlined in Section 6.3.2.

6.4 Baseline Environment

6.4.1 Topography

A topographic survey has been undertaken for the Site, with contours produced for the Proposed Development, as presented within the Site-Specific FRA (refer to Appendix E). The topography of the Site is relatively flat from south to north and slightly slopes from east to west. There are some localised low spots located to the north and west of the Site also. The approx. level at the centre of the Site is of the order of 3.75mOD.

A topographic survey has been undertaken for the Site, with contours produced for the Site of the Proposed Development, refer to Drawing P000446-PM²5-0003 submitted as part of this application.

6.4.2 Surface Water Features

Cork Harbour is located to the immediate north, 80m east and 45m west of the Proposed Development. The Site area is currently unused and is situated in an area of reclaimed land as part of the power station development. Two settlement lagoons are located either side of the Site. Areas of Cork Harbour are designated a SPA (Site code 004030).

The nearest rivers mapped by the EPA are the Ardnabourkey, approximately 1.3km to the south, and the Lower Aghada, approximately 2.4km to the east. Groundwater or stormwater runoff from the Site is not considered likely to impact these rivers based on likely surface water runoff or groundwater flow directions.

6.4.3 Surface Water Quality

The River Waterbody WFD Status 2013-2018 of both the Ardnabourkey and the Lower Aghada are classified as ‘Moderate’. Both rivers are classified as ‘not at risk’ of meeting WFD objectives by 2027.

The Coastal Waterbody WFD Status 2013-2018 of Cork Harbour is also classified as ‘Moderate’ and Coastal Water Quality 2018-2020 as ‘intermediate’ but is classified as ‘at risk’ with respect to 2027 WFD targets.

6.4.4 Hydrogeology

The hydrogeological regime beneath the Site is described in Chapter 5 (Land and Soils).

6.4.5 Historic Site Investigations

Historic site investigation data is summarised in Section 5.5, it is noted that groundwater level is expected to vary from 1.5m to 2.5m bgl.

6.4.6 Drainage

A series of drainage gullies collect surface water from the existing road network, from there the piped surface water drainage network passes through an oil separator prior to being discharged to the sea, under the terms of the IEL. A foul sewerage system, operated by Uisce Eireann in partnership with CCC, serves the Site. Existing drainage is shown on Drawing AGH/U/21084/R0 (P378250-EA36-0006) and AGH/U/21084/R0 (P378250-EA36-0007) accompanying this planning application.

6.4.7 Water Supply

There is an existing Uisce Eireann mains water connection (west of the R630) and water treatment plant (WTP) on the Power Station site.

6.4.8 Flood Risk Assessment (FRA)

A Site-Specific FRA for the Site was undertaken in accordance with the requirements of "*The Planning System and Flood Risk Management – Guidelines for Planning Authorities*" [25], refer to Appendix E.

The flood risk assessment concluded that there is no significant risk of flooding to the Proposed Development.

The Site of the proposed works lies within Flood Zone C for coastal flood risk as defined by the Planning System and Flood Risk Management Guidelines for Local Authorities. The Proposed Development is classified as highly vulnerable development and is permissible in Flood Zone C in accordance with the guidelines.

A localised area of the Site to the southwest classifies as Flood Zone B in the Mid-Range Future Scenario (MRFS). However, there is no development proposed within this area. Designated Sites

Cork Harbour SPA is approximately 45m to the west of the Site.

6.4.9 Summary of Baseline Conditions

The Site is located adjacent to Cork Harbour, areas of which are a designated SPA and are designated as 'at risk' with respect to WFD targets. The sensitivity of the surface water environment is considered to be 'medium'.

6.5 Potential Impacts

6.5.1 Construction Phase

During the construction phase, the following potential surface water environment impacts may occur in the absence of mitigation:

- Sedimentation of surface water features from construction works, which include:
  - Preliminary works, including clearance, levelling, excavation, stockpiling, formation of site roads, establishment of compounds and underground services.
  - Laying of foundations for plant and buildings.
  - Reinstatement.
- Pollution of surface waters from accidental spills and leaks of fuels and chemicals, which may be associated with:
  - Storage and use of construction chemicals.
  - Refuelling of construction vehicles.
- Alteration of pH in surface water features associated with the use of concrete and lime, which may arise from:
  - Construction works, including laying of foundations and underground services.

Foul sewage arising from temporary toilets and sanitary facilities on the Site will initially be discharged to an onsite receptacle which will be emptied by tanker on a regular basis for disposal. As this control measure will be incorporated into the Site set-up, additional specific mitigation measures are therefore not required to address foul sewage during the construction phase and are not discussed further in following sections.

6.5.1.1 Sedimentation of Surface Waters

Various construction activities have the potential to release sediment and cause unacceptable sediment levels in the catchment area. Site stripping and bulk earthworks would leave deposits exposed to temporary erosion by wind or rain and this could potentially lead to temporary increases in sediment loading of the surface water network or directly to the nearby marine environment. Contamination from suspended sediments may also be caused by runoff from material stockpiles.

Runoff containing large amounts of suspended solids could potentially adversely impact on surface water. The impact is considered a direct effect of a negative nature and temporary duration given it is only associated with the construction programme. Runoff containing large amounts of suspended solids is considered unlikely to occur and should it occur is likely to be temporary. Therefore, it is considered to be a Medium impact to an environment of Medium sensitivity and the significance of the effect is Moderate.

[25] The Planning System and Flood Risk Management, Guidelines for Planning Authorities, Office of Public Works (November 2009)

6.5.1.2 Accidental Spillage and Leaks

Any construction activities carried out close to surface waters involve a risk of pollution due to accidental spillage and leaks. While liquids such as oils, lubricants, paints, bituminous coatings, preservatives and weed killers present the greatest risk, fuel spillages from machinery operating close to watercourses also present a risk. The refuelling of general construction plant also poses a significant risk of pollution, depending on how and where it is carried out.

Accidental spillage may potentially result in a direct or indirect impact to surface water should contaminants enter surface waters directly or migrate through the subsoils and underlying groundwater to surface waters. The impact is considered a direct effect of negative nature and temporary duration given it is only associated with the construction programme. Accidental spillages and leaks are considered unlikely to occur and should they occur are likely to be temporary. Therefore, it is considered to be a Medium impact to an environment of Medium sensitivity and the significance of the effect is Moderate.

6.5.1.3 Use of Concrete and Lime

Lime and concrete (specifically, the cement component) is highly alkaline, and any spillage could enter surface water or migrate though subsoils and groundwater impacting surface water quality.

The impact is considered a direct effect of a negative nature and of a temporary duration given it is only associated with the construction programme. Impacts associated with the use of concrete and lime are considered unlikely to occur and should they occur are likely to be confined to one-off releases, however, due to the proximity of Cork Harbour, there is a potential risk of concrete fluids migrating to nearby surface waters. Therefore, the construction phase use of lime and concrete is considered to result in a Medium impact to an environment of Medium sensitivity and the significance of the effect is Moderate.

6.5.1.4 Wastewater Services

During the construction phase foul water arising from welfare facilities within the Construction Compound, be collected and periodically removed from the Site by road tanker to a licensed water treatment plant. As this control measure will be incorporated into the Site set-up, additional specific mitigation measures are therefore not required to address foul sewage during the construction phase and are not discussed further.

6.5.1.5 Water Demand

During the construction phase a temporary water supply for construction works will be provided by means of the existing mains water connection onsite. During the construction phase, potable water will be required to serve the workforce and for dust control (if necessary). The water demand during construction will be significantly less than that required for the development in operational phase. As a result, there is potential for a Temporary impact to the existing mains water connection onsite, by way of disruption in water supply to Power Station.

In terms of significance, there will be a Low sensitivity associated with the existing water supply network at Power Station. The magnitude of impact will be Negligible and the significance of impact without mitigation will be Not Significant/Slight, and Temporary in duration.

6.5.2 Operational Phase

During the operational phase, process wastewater and surface water runoff will be generated. The process wastewater will be discharged to the process effluent drainage system which have been developed to mimic the natural drainage patterns of the site and in accordance with SuDS. The surface water proposals replicate greenfield drainage conditions of the site where possible.

It is proposed to connect the proposed surface water network into the existing drainage network. The site of the Proposed Development consists of a new impermeable concrete yard to house the hydrogen infrastructure. The proposed yard constitutes an area of 2,196m^2. Surface water runoff will be collected by a series of slot drains on the surface of the yard and conveyed by a series of underground sewers before being slowly discharged from the site at a controlled rate of 2l/s by a hydrobrake flow control device located in the outlet manhole.

The concrete yard is proposed to act as an attenuation tank during storm events. A perimeter wall around the edge of the yard is proposed to be constructed which will allow surface water to be attenuated during storm events, further details of which are outlined in Drainage Services Report included in Appendix E.

The surface water generated in the proposed concrete yard will be treated by a Klargester (or equivalent) oil interceptor before discharging into the existing drainage network in the site which ultimately discharges to Cork harbour at existing outfall SW22. This will ensure that only non-contaminated water enters the drainage network. In

addition, a sluice valve is also proposed to be located downstream of the flow control manhole (MHSW-3) which can be closed in the event or other environmental emergency.

Process water effluent will be diverted to the Power Station's effluent network via an underground pipe and discharged in accordance with the Power Station's IEL emission limits at an existing discharge point PE19. The quantity of discharge water (effluent) from the hydrogen process will be up to 678l/hr when running on potable water and negligible when running with demineralised water. The Power Stations' IEL, provides for a maximum hourly discharge rate of 33,000m3/hr to Cork Harbour, therefore, the additional discharge associated with the development is minimal.

The quality will be similar to demineralised water effluent. The Proposed Development includes for an automatic sampler upstream of the effluent discharge point (outfall PE19). This will sample the process water effluent to ensure that the pH limits remain within the range of 6 to 9 as per IEL requirements. In the event that the process water effluent is outside of this range, a shut off valve will prevent the water from discharging. This valve will be closed, and the process will be temporarily ceased until the issue is rectified.

During the operational phase, a foul water holding tank will be provided at the administration/workshop and stores building. The foul water tank will be emptied by tanker at regular intervals.

During the operational phase the following potential water environment impacts may occur in the absence of mitigation:

- Increased water demand.
- Potential increase in volume and rate of surface water runoff from new impervious areas, leading to an impact on flood risk, upstream and downstream of the Site.
- Pollution of surface waters from accidental spills and leaks of fuels and chemicals.

6.5.2.1 Water Demand

The Proposed Development will connect into the existing water supply via a series of underground supply pipes as shown in Drawing P000446-PM25-0004 submitted as part of this application. The Proposed Development requires an input of up to 540l/hr of water for the process.

During the operational phase, mains water will be required to produce demineralised water. Demineralised water will be produced in an onsite water treatment plant using industry-standard technology (ion exchange, reverse osmosis).

In terms of significance, there will be a Medium sensitivity associated with the existing water supply network. The magnitude of impact will be Moderate as there will be additional demand on the existing water network. As a result, for the existing water network, the significance of impact without mitigation will be Moderate, and Short-Term in duration.

6.5.2.2 Wastewater Services (Surface, Foul and Process Water)

During the operational phase, surface water runoff will be generated from all hard surfaces within the Site which are exposed to rainwater or to which water is applied during wash down. This will include all hardstanding surfaces, roofs, and other impermeable surfaces. As noted above, surface water is collected by means of the underground drainage network and will pass through an oil separator and oil interceptor prior to being discharged to the sea under the terms of the IEL.

Surface water will drain at a controlled rate to the existing surface water network and discharges at SW22. The proposed drainage layouts are presented in Drawing P000446-PM²5-0006, submitted with this application.

There is a potential for increases in volume and rate of surface water runoff from new impervious areas, leading to an impact on flood risk, upstream and downstream of the Site.

During the operational phase, the production of demineralised water will result in process wastewater which will be discharged to the surface water drainage system (PE19). The process water effluent will contain the naturally occurring minerals removed from the mains water. This discharge will be regulated and monitored under the IEL.

The quantity of process water effluent going to the surface water drainage system will be minimal. Impacts on receiving waterbodies from the above process wastewaters in the surface water drainage system are not anticipated, based on the embedded design measures.

Impacts on receiving waterbodies from anthropogenic pollutants in surface water runoff are not anticipated**,** based on the embedded design measures, including bunding of fuel tanks and inclusion of interceptors within the drainage system. As a result, the significance of impact will be Imperceptible.

6.5.2.3 Flood Risk

In addition, the reinforced concrete slab proposed for the compound yard will be located at a minimum height of 3.65mOD. This will ensure the site is above the MRFS level of 3.54mOD. Furthermore, all infrastructure associated with the development will be located on jacking pads further reducing any flood risk to the proposed development. The proposed level of the concrete slab (3.65mOD), in addition to the 190mm height provided by the jacking pads, will provide 300mm freeboard to the development above the MFRS level of 3.54mOD.

Surface water runoff associated with the proposed development will be collected on site in a dedicated drainage network and will ultimately discharge to Cork harbour. Surface water storage up to the 100-year flood event will be provided on site within the proposed concrete yard compound. The yard is proposed to act as a storage tank and will retain water during flood events. A low height reinforced concrete perimeter wall will be constructed along the edge of the proposed concrete slab with the access road into the yard compound ramped down locally at the entrance to ensure water can be retained within the yard compound.

All hydrogen infrastructure associated with the development will be placed on jacking pads. These jacks are at a height of 190mm which will elevate the development infrastructure to a level of 3.84mOD. The equivalent depth of water for the 100-year flood volume that will be temporarily stored within the compound yard/storage tank is 50mm. The proposed development would not be at risk of flooding as a result.

Drainage networks have the potential to be blocked and lose capacity, which can ultimately lead to surface water flooding, however, the Site-specific FRA, refer to Appendix E, assessed the Site as not being at risk for fluvial, coastal or groundwater flooding and confirmed that the Site is not considered at risk from pluvial flooding in its current state, or in the proposed scenario.

6.5.2.4 Accidental Spillage and Leaks

Accidental spillage may potentially result in a direct or indirect impact to surface water should contaminants enter surface waters directly or migrate through the subsoils and underlying groundwater to surface waters. The impact is considered a direct effect of negative nature and temporary duration given it is only associated with the operational phase. Accidental spillages and leaks are considered unlikely to occur and should they occur are likely to be temporary. The Site is located within a facility already licenced by the EPA, the existing Power Station IEL requires regular monitoring of environmental receptors (groundwater, etc.). Therefore, it is considered to be a Medium impact to an environment of Medium sensitivity and the significance of the effect is Moderate.

6.5.3 Decommissioning Phase

It is expected that decommissioning will take up to three months. Effects arising from the process of decommissioning of the Proposed Development are considered to be of a similar nature and duration to those arising from the construction phase and therefore have not been considered separately.

6.6 Mitigation Measures

The operational phase of the Proposed Development is unlikely to have any significant adverse effects on the local water environment/hydrology due to the environmental design considerations incorporated into the Proposed Development. These measures will seek to avoid or minimise potential effects in the main through the implementation of best practice construction methods and adherence to all relevant legislation.

The nature of the Proposed Development dictates that the greatest potential impact on surface waters associated with the development will be during the construction phase. In order to prevent/minimise potential impacts, it is necessary to devise mitigation measures to be adopted as part of the construction works onsite.

Due to the inter-relationship between surface water and soils, hydrogeology and biodiversity, the mitigation measures discussed will are also considered applicable to these sections and this chapter should be read in conjunction with Chapter 4 (Biodiversity) and Chapter 5 (Land and Soils).

6.6.1 Construction Phase

6.6.1.1 Sedimentation of Surface Waters

During the construction phase, the following mitigation measures will ensure that no sediment contamination, contaminated runoff or untreated wastewater will enter watercourses on or near the Site.

- Excavations will only remain open for the shortest possible time to reduce groundwater ingress. Silt traps will be placed around the Site to reduce silt loss, and these will be inspected and cleaned or replaced regularly.

- Runoff from spoil heaps will be prevented from entering watercourses by diverting it through settlement ponds and removing material offsite as soon as possible to designated storage areas.
- Silt traps will be placed at any crossing points to avoid siltation of drainage channels and, if the need arises, silt fences will be used during the works in order to reduce the potential for pollution of watercourses. These will be maintained and cleaned regularly throughout the construction phase.
- Good construction practices will also be used during the construction phase, such as wheel washers and dust suppression onsite roads and at the Site access points.
- Surface water runoff from working areas will not be allowed to discharge directly to Cork Harbour. To achieve this, the drainage system will be constructed prior to the commencement of major site works. All design and construction will be carried out in accordance with CIRIA C532 Control of Water Pollution from Construction Sites Guidance for Consultants and Contractors.

6.6.1.2 Fuel and Chemical Handling

It will be necessary to adopt the following mitigation measures at the Site in order to prevent spillages to ground and drains of fuels during the Construction phase, and to prevent any consequent surface water impacts.

- Designate a bunded storage area at the Contractor's compound(s) and away from surface water gullies or drains for oils, solvents and paints used during construction. The fuel storage tanks will be bunded to a volume of 110% of the capacity of the largest tank/container within the bunded area.
- Drainage from the bunded area will be diverted for collection and safe disposal. All containers within the storage area will be clearly labelled so that appropriate remedial action can be taken in the event of a spillage. When moving drums from the bunded storage area to locations within the Site, a suitably sized spill pallet will be used for containing any spillages during transit.
- Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles, will take place in designated impermeable refuelling areas isolated from surface water drains. Spill kit facilities will be provided at the fuelling area in order to provide for any accidental releases or spillages in and around the area. Any used spill kit materials should be disposed of via a hazardous waste contractor.
- Where mobile fuel bowsers are used on the Site in the event of a machine requiring refuelling outside of the designated area, fuel will be transported in a mobile double skinned tank. Any flexible pipe, tap or valve must be fitted with a safety lock where it leaves the container and locked shut when not in use. Each bowser should carry a spill kit and each bowser operator must have spill response training. No refuelling will be allowed within 30m of Cork Harbour.
- Adequate stocks of hydrocarbon absorbent materials (e.g., spill-kits and/or booms) will be held onsite in order to facilitate response to accidental spills. Spill response materials will also be stored on all construction vehicles.

6.6.1.3 Water Demand

While the water demand associated with the Proposed Development is low, the Site water main system will be managed to facilitate detection of leakage and the prevention of water loss. Dual & low flush toilets, water economy outlets and rainwater harvesting will be considered to reduce the water demand.

6.6.1.4 Control of Concrete and Lime

All ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out, which will include measures to prevent discharge of alkaline wastewaters or wash-water to the surface water drainage system or to the underlying subsoil. Wash down and washout of concrete transporting vehicles will take place at an appropriate bunded area and direct discharge of wash-water to surface waters will be strictly prohibited.

6.6.1.5 Wastewater Services (Foul Water)

Foul water during the construction phase will be collected and periodically removed from the Site by road tanker to a licensed water treatment plant. As this control measure will be incorporated into the Site set-up, additional specific mitigation measures are therefore not required.

6.6.1.6 Construction Environmental Management Plan

An oCEMP has been prepared as part of the planning application, refer to Appendix B. In advance of work starting onsite, the appointed Contractor will expand and develop the Outline CEMP into a Contractor's CEMP.

The Contractor's CEMP will cover all potentially polluting activities and include an emergency response procedure. All personnel working on the Site will be trained in the implementation of the procedures.

6.6.2 Operational Phase

6.6.2.1 Water Demand

While the water demand associated with the operational phase of the Proposed Development is low, similar mitigation measures to those proposed during the construction phase (Section 6.6.1.3) are proposed.

6.6.2.2 Wastewater Services (Foul Water)

Foul water during operations will be collected and periodically removed from the Site by road tanker to a licensed water treatment plant. As this control measure will be incorporated into the Proposed Development, additional specific mitigation measures are therefore not required.

6.6.2.3 Flood Risk

From a pluvial perspective during the operational phase, the surface drainage network should be maintained and cleaned under a maintenance plan to ensure flows are not restricted within the system.

The Site-specific FRA, refer to Appendix E, assessed the Site as not being at risk for fluvial, coastal or groundwater flooding and confirmed that the Site is not considered at risk from pluvial flooding in its current state, or in the proposed scenario.

6.6.2.4 Accidental Spillage and Leaks

Owing to the proposed embedded mitigation (as outlined in Section 2.7.7), there will be no requirement for additional mitigation measures during the operational phase.

However, routine maintenance will be carried out in accordance with the maintenance procedures provided by the contractor and manufacturer. The Proposed Development will be required to undertake an annual inspection, as per the manufacturer's requirements.

6.6.3 Decommissioning Phase

In the event of decommissioning, measures will be undertaken to ensure that there will be No Significant, Negative environmental effects from the development.

6.7 Residual Impacts

6.7.1 Construction Phase

The implementation of mitigation measures highlighted above will significantly reduce the likelihood and magnitude of the potential effects on the water environment during the construction phase. With respect to water, the magnitude of the potential residual effect during the construction phase is therefore considered to be Negligible on an environment of Medium significance/sensitivity, therefore the significance of the potential effect of the Proposed Development is considered to be Imperceptible on the water environment.

6.7.2 Operational Phase

The magnitude of the potential residual effect the water environment during the operational phase is considered to be Negligible on an environment of medium sensitivity, therefore the significance of the potential effect of the Proposed Development is considered to be Imperceptible on the water environment.

6.7.3 Decommissioning Phase

In the event of decommissioning, measures will be undertaken to ensure that there will be no significant, negative residual environmental effects from the development. Additional potential impacts and associated effects arising during the decommissioning phase are not anticipated above and beyond those already assessed during the construction phase of the Proposed Development.

6.8 Cumulative Impacts

Should the construction of the listed projects in Table 1-5 and the Proposed Development occur concurrently, there is potential for temporary indirect cumulative effects on hydrology and water quality. Should these developments be constructed at the same time as the Proposed Development, there is a potential for cumulative effects associated with accidental spills and leaks and the use of concrete and lime.

As reported in Section 6.7, potential emissions to surface waters associated with the Proposed Development can be mitigated to the extent that the impact will not be significant. It is not unreasonable to assume that the committed developments listed above, which have also gone through the planning process, will also implement standard and best practice mitigation measures to the extent that impacts are not significant. Providing standard best practice control measures are implemented as required on all sites, the cumulative impact will not be significant.

6.9 Summary

- During the construction phase, potential impacts include sedimentation of surface waters, accidental spills and leaks of fuels and chemicals to surface waters and potential for pH changes to water due to use of concrete and lime. The significance of effects was assessed as follows prior to mitigation:
  - A moderate effect to surface waters from the runoff of sediment during construction works.
  - A moderate effect to water from accidental spillage and leaks of fuels and chemicals during construction.
  - A moderate effect from local temporary pH alterations of surface waters resulting from the use of concrete and lime.
- During the operational phase, no significant impacts have been identified with respect to the water environment following the completion of a Site-Specific FRA.
- Mitigation (including embedded mitigation) will ensure surface waters are protected from adverse impacts of construction and operation.
- It is considered that residual negative effects of the Proposed Development on the water environment will overall be imperceptible provided that appropriate mitigation measures are applied.
- It was concluded cumulative effects will be Not Significant.

6.10 References

- Ciria (2001). C532 control of water pollution from construction sites guidance for consultants and contractors.
- DHPLG (2018). River Basin Management Plan for Ireland 2018-2021.
- EPA (2003). Advice Notes on Current Practice in the Preparation of Environmental Impact Statements.
- EPA (2020). Air Dispersion Modelling from Industrial Installations Guidance Note (AG4).
- EPA (2022). EPA Maps Available at https//gis.EPA.ie/EPAMaps/, accessed August 2023.
- EPA (2022). Guidelines on the Information to be Contained in Environmental Impact Assessment Reports.
- EU (2000). Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for the community action in the field of water policy.
- EU (2007). Directive 2007/60/EC of the European Parliament and of the Council of 23 October 2007 on the assessment and management of flood risks.
- GSI (2023). Geological Survey Ireland Spatial Resources. Available at https//www.gsi.ie/en-ie/data-and-maps/Pages/default.aspx , accessed August 2023.
- TII (2009). Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes.

7. Noise and Vibration

7.1 Introduction

This chapter of the ECR assesses the potential noise impacts and effects associated with the Proposed Development.

Noise emissions can potentially occur during the construction, operational and decommissioning phases of the Proposed Development. Potential noise sources during the construction phase comprise mobile plant and construction processes such as earthworks which can give rise to elevated sound and vibration levels.

Potential noise sources during the operational phase comprise plant and equipment associated with the operation of the power plant.

Full details on the Proposed Development are provided in Chapter 2 and the Planning Statement submitted with this planning application.

Appendix A provides explanation of some key acoustic terminology and concepts relevant to this chapter.

7.2 Legislation, Policy and Guidance

The following outlines the main relevant legislation, policy and guidance that has been referred to in this chapter.

- NG4 Guidance Note for Noise Licence Applications, Surveys and Assessments in Relation to Scheduled Activities[26].
- NRA Guidelines for the Treatment of Noise and Vibration in National Road Schemes[27].
- British Standard (BS) 5228-12009+A12014 'Code of practice for noise and vibration control on construction and open sites'.

7.3 Methodology

7.3.1 Study Area

The study area for assessment of onsite construction noise and vibration and operational noise is defined as an area extending from the Site of the Proposed Development up to and including the nearest most exposed sensitive receptor locations. If compliant levels of noise and vibration are predicted at the nearest most exposed sensitive receptor locations, it follows that compliant levels will be achieved at all other locations.

The study area for offsite traffic noise is the same as identified in the transport assessment, detailed in Chapter 11 (Traffic and Transport).

7.3.2 Determination of the Baseline Environment

The baseline sound environment has been determined via several long-term surveys conducted in and around the Site. These surveys are detailed in Section 8.4.

7.3.3 Describing Potential Effects

With reference to the EPA Guidelines[28], effects are described under various headings, including Quality, Significance, Extent and Context, Probability, Duration and Frequency. Of particular relevance are the definitions of duration which are provided in Table 7-1.

Table 7-1 Description of Duration of Effects

Aspect	Description
Momentary	Effects lasting from seconds to minutes
Brief	Effects lasting less than a day
Temporary	Effects lasting less than a year
Short-Term	Effects lasting from one to seven years
Medium-Term	Effects lasting from seven to 15 years

[26] EPA (2016). *Guidance Note for Noise Licence Applications, Surveys and Assessments in Relation to Scheduled Activities.*
[27] NRA (2004). *Guidelines for the Treatment of Noise and Vibration in National Road Schemes*.
[28] EPA (2022). *Guidelines on the Information to be contained in Environmental Impacts Assessment Reports.*

Aspect	Description
Long-Term	Effects lasting from 15 to 60 years
Permanent	Effects lasting over 60 years
Reversible	Effects that can be undone, e.g., through remediation or restoration
Frequency	How often the effect will occur

7.3.4 Significance of Effects Construction Phase

7.3.4.1 Introduction

To determine potential temporary noise and vibration impacts and effects during the construction phase of the Proposed Development, the following matters have been considered:

- Noise and vibration caused by construction site activities.
- Noise caused by increases in traffic on existing roads.

7.3.4.2 Criteria Noise from Onsite Construction Activities

TII[29] is the only government body in Ireland that has published construction noise limits, which are presented in the Guidelines for the Treatment of Noise and Vibration in National Road Schemes[30] .

It is acknowledged that the limits presented in the NRA Guidelines relate to construction works for road schemes, however, it is assumed that noise sensitive receptors (NSR) are likely to be equally sensitive to construction noise from other project types.

The criteria presented in the NRA Guidelines are presented in Table 7-2.

Table 7-2 Maximum Permissible Noise Levels at the Façade of Dwellings During Construction

Period	LAeq,1hr dB	Lp(max) slow dB
Monday to Friday - 0700 to 1900	70	80
Monday to Friday - 1900 to 2200	601	651
Saturday - 0800 to 1630	65	75
Sundays and Bank Holidays - 0800 to 1630	601	651

1 Construction activity at these times, other than that required in respect of emergency works, will normally require the explicit permission of the relevant local authority

Potential construction noise effects can also be assessed using BS 5228-1 2009+A12014 'Code of practice for noise and vibration control on construction and open sites' (BS5228).

The 'ABC' method (detailed in BS5228 Section E.3.2) has been used to develop criteria. Using this method, the construction noise limits for the Proposed Development are determined by rounding the ambient noise levels (LAeq, T) to the nearest 5 dB and then comparing this level to the Category A, B and C values given in BS5228, as reproduced in Table 7-3.

Table 7-3 BS5228 Construction Noise Criteria

Assessment Category and Threshold Value Period	Threshold Value $L_{Aeq,T}$ dB		
	Category A (a)	Category B (b)	Category C (c)
Night-time (2300 - 0700)	45	50	55

[29] formerly the National Roads Authority (NRA)
[30] NRA Guidelines (2004). *Guidelines for the Treatment of Noise and Vibration in National Road Schemes.*

Assessment Category and Threshold Value Period	Threshold Value $L_{Aeq,T}$ dB		
	Category A (a)	Category B (b)	Category C (c)
Evenings and weekends (d)	55	60	65
Daytime (0700 - 1900) and Saturdays (0700 - 1300)	65	70	75

NOTE 1 A potential significant effect is indicated if the $L_{Aeq,T}$ noise level arising from the Site exceeds the threshold level for the category appropriate to the ambient noise level.

NOTE 2 If the ambient noise level exceeds the Category C threshold values given in the table (i.e., the ambient noise level is higher than the above values), then a potential significant effect is indicated if the total $L_{Aeq,T}$ noise level for the period increases by more than 3 dB due to site noise.

NOTE 3 Applies to residential receptors only.

(a) Category A Threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.

(b) Category B Threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as Category A values.

(c) Category C Threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than Category A values.

(d) 1900 - 2300 weekdays, 1300 – 2300 Saturdays, 0700 – 2300 Sundays.

For the purposes of this assessment, the criteria given in both the NRA Guidelines and BS5228 will be considered.

In either case, regardless of the limits adopted and period considered a detailed assessment of construction noise is scoped out because and the closest receptor is approximately 780m from the Proposed Development and it is screened from the Proposed Development by the existing Power Station. Further to this, the amount of construction plant that would be used is likely to be minimal given the small scale nature of the Proposed Development.

As the magnitude of any impact is likely to be negligible at human receptors, the significance and duration of effects of construction related activity from airborne noise is therefore considered Imperceptible and Temporary.

7.3.4.3 Criteria Vibration from Onsite Construction Activities

There are two types of construction vibration criteria those dealing with human perception and those dealing with structural damage to buildings. The main vibration source during the construction phase will be from the proposed excavation works. A variety of potential vibration-causing items of plant are likely to be used such as excavators, lifting equipment and dumper trucks. Vibration effects experienced in the immediate vicinity of the works can be controlled by the implementation of best construction practice. Given the short-term duration of construction works (three months) and the limited excavations proposed, assessment of vibration effects have been scoped out in relation to the Proposed Development.

The impact of construction activity related vibration on sensitive receptors is therefore considered to lead significance of effects rating of Imperceptible and Temporary.

7.3.4.4 Criteria Noise from Increased Traffic Flows on Existing Roads during the Construction Period

The potential increase in noise levels resulting from changes to road traffic flows during the construction period have been considered. Due to the very small number of construction vehicles required on a daily basis, it is determined that a change in noise levels due to an increase in traffic flows on public roads during construction would lead to significance and duration of effects rating of Imperceptible and Temporary.

Therefore, a more detailed assessment of increased traffic flows on existing roads during construction has been scoped out of this assessment.

7.3.4.5 Construction Phase Ecological Receptors

The impact of construction phase noise and vibration emissions on habitats and species of the SPA and other ecological receptors are discussed in Chapter 4 (Biodiversity).

7.3.5 Significance of Effects Operational Phase

7.3.5.1 Introduction

To determine the potential noise impacts during the operational phase, the following matters have been considered:

- Noise caused by site operations.
- Noise caused by increases in traffic on existing roads.

7.3.5.2 Operational Phase Site Noise Emission Criteria

It is expected the Proposed Development will comply with the requirements of the EU (Large Combustion Plants) Regulations 2012, S.I. No. 566 of 2012, under an IEL. It is assumed the Proposed Development will comply with the existing Power Station IEL noise limits.

Guidance on permissible noise emission limits for licensed facilities is contained in Guidance Note for Noise Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)[31]. NG4 refers to Best Available Techniques as a form of noise mitigation which is defined in Section 7 of the Protection of the Environment Act (2003) as:

> *'The most effective and advanced stage in the development of an activity and its methods of operation, which indicate the practical suitability of particular techniques for providing, in principle, the basis for emission limit values designed to prevent or eliminate or, where that is not practicable, generally to reduce an emission and its impact on the environment as a whole.'*

NG4 states that:

> ' *All reasonably practicable measures should be adopted at licensed facilities to minimise the noise impact of the activity, and BAT should be used in the selection and implementation of appropriate noise mitigation measures and controls*.'

NG4 also provides criteria for use in noise assessments, which vary depending on whether the location of the development is in a 'Quiet Area' or an 'Area of Low Background Noise'.

A 'Quiet Area' is defined as a location that meets the following criteria.

- At least 3km from urban areas with a population >1,000 people.
- At least 10km from any urban areas with a population >5,000 people.
- At least 15km from any urban areas with a population >10,000 people.
- At least 3km from any local industry.
- At least 10km from any major industry centre.
- At least 5km from any National Primary Route.
- At least 7.5km from any Motorway or Dual Carriageway.

An 'Area of Low Background Noise' is a location that meets the following criteria.

- Average Daytime Background Noise Level ≤40dB LAF90.
- Average Evening Background Noise Level ≤35dB LAF90, and
- Average Night-time Background Noise Level ≤30dB L_{AF90}.

The criteria presented in NG4 are detailed in Table 7-4.

Table 7-4 Recommended Operational Noise Emission Limit[32]

Scenario	Daytime Noise Criterion dB $L_{ar,T}$ (0700 to 1900 hours)	Evening Noise Criterion dB $L_{ar,T}$ (1900 to 2300 hours)	Night-time Noise Criterion dB $L_{Aeq,T}$ (2300 to 0700 hours)
Quiet Area	Noise from the licensed site to be at least 10 dB below the average daytime background noise level measured during the baseline survey.	Noise from the licensed site to be at least 10 dB below the average evening background noise level measured during the baseline survey.	Noise from the licensed site to be at least 10 dB below the average night-time background noise level measured during the baseline survey.
Areas of Low Background Noise	45 dB	40 dB	35 dB
All other Areas	**55 dB**	**50 dB**	**45 dB**

The criteria are given in terms of a Rated Noise Level (LAr, T) which is defined in NG4 as:

[31] EPA (2016). *Guidance Note for Noise Licence Applications, Surveys and Assessments in Relation to Scheduled Activities.*
[32] EPA (2016). *Guidance Note (NG4) for Noise Licence Applications, Surveys and Assessments in Relation to Scheduled Activities.*

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.

The method for applying adjustments for tonal and/ or impulsive characteristics are described in NG4 and have been considered in this assessment.

7.3.5.3 Noise from Increased Traffic Flows on Existing Roads during the Operational Phase

The potential increase in noise levels resulting from changes to road traffic flows during the operational phase have been considered. However, Chapter 11 (Traffic and Transport), has scoped out a detailed operational phase traffic assessment due to the minimal operational traffic associated with the Proposed Development.

The impact of operational phase traffic has been assessed in accordance with the short-term and long-term criteria provided Design Manual for Roads and Bridges DMRB LA 111[33]. Whilst DMRB does not apply outside of the UK, it has historically been used to assess road traffic noise change in the Republic of Ireland.

The short-term assessment considers the change in noise levels between the without and with Proposed Development scenarios in the year of opening. The long-term assessment considers the opening year without the Proposed Development scenario with the future year with scheme scenario (typically 15 years after opening).

Table 7-5 Magnitude of Impact Operational Phase Traffic - Short-term

Change in Noise Level ($L_{A10,18hr}$ dB)	Magnitude of Impact
0	No Change
0.1 to 0.9	Negligible
1.0 to 2.9	Minor
3.0 to 4.9	Moderate
5+	Major

Table 7-6 Magnitude of Impact Operational Phase Traffic - Long-term

Change in Noise Level ($L_{A10,18hr}$ dB)	Magnitude of Impact
0	No Change
0.1 to 2.9	Negligible
3.0 to 4.9	Minor
5.0 to 9.9	Moderate
10+	Major

Given the low number of Proposed Development related vehicle movements on existing roads during the operational phase, there is likely to be No Change in noise Level in both short and long-term scenarios.

The impact of operational phase traffic activity on local roads and nearby sensitive receptors is therefore considered Imperceptible and Temporary and no further assessment has been undertaken.

7.3.5.4 Operational Phase Ecological Receptors

The impacts of the operational phase noise emissions on ecological receptors are discussed in the ecological impact assessment included as Appendix C.

7.3.6 Limitations and Assumptions

The following limitations and assumptions apply to the assessment.

- The sound levels measured during the acoustic surveys are representative of the baseline acoustic environment generally.
- The precise size, configuration, performance, and layout of the equipment will be finalised following the award of a contract with an equipment supplier. For the purposes of this ECR, consideration of environmental impacts is on the basis of an indicative layout of the Site and that NSR are considered to be in the “far-field”. This means that site equipment can be treated as point-like sound sources.

[33] Highways England (2020). *Design Manual for Roads and Bridges (DMRB) LA111 Noise and vibration*.

- The calculated noise levels presented in the report have been established using standard calculations for the reduction of sound over distance from a hemispherical source propagating over a reflecting ground plane. This approach omits attenuation of sound due air absorption and screening from structures, buildings and land topography and therefore considered as a conservative approach.

7.4 Baseline Environment

7.4.1 Existing Receptors

The approximate distance of the closest approach to the Site boundary from the closest NSR have been provided in Table 7-7. The locations of these receptors are also shown in Figure 7-1.

Table 7-7 Approximate Distance to NSR from the Red Line Boundary

Receptor	Approximate Distance (m)
NSR 1	780
NSR 2	900
NSR 3	925
NSR 4	1334
NSR 5	1360
NSR 6	1410

Figure 7-1 Monitoring Locations, Sensitive Receptor Locations and Site Layout

7.4.2 Baseline Measurements

Baseline sound measurement data has been collected by third parties for NSR 1 and NSR 2 as part of the annual IEL compliance measurements and the information is summarised in Table 7-8 for NSR 1, the nearest receptor.

Table 7-8 NSR 1 Short-term Measured Baseline Sound Levels

Consultancy	Date	Period	$L_{Aeq,T}$ (dB)	L_{A90} (dB)
Hayes McKenzie	2016	Day	68	39
		Evening	64	45

Consultancy	Date	Period	$L_{Aeq,T}$ (dB)	L_{A90} (dB)
		Night	59	32
Hayes McKenzie	2017	Day	71	42
		Evening	68	37
		Night	63	34
Hayes McKenzie	2018	Day	74	45
		Evening	69	39
		Night	64	37
Allegro	2019	Day	73	45
		Evening	72	41
		Night	64	36
Allegro	2020	Day	75	48
		Evening	72	39
		Night	61	33
Allegro	2021	Day	74	40
		Evening	70	39
		Night	60	35
Allegro	2022	Day	67	43
		Evening	62	40
		Night	57	37

Short-term acoustic monitoring has also been conducted by AECOM at two receptors (NSR 1 and NSR 6) as these were the closest NSR to a different development at the Power Station. However, NSR1 and NSR2 are the two closest, the most exposed and likely the most sensitive to the Proposed Development.

Daytime monitoring was carried out from 11:15 - 12:15 and from 1500 - 1600 on the 19 September 2022. In addition to a 1-hour night-time survey was carried out between the hours of 2300 - 0200, commencing on the 18 September 2022. The results for the AECOM surveys are provided in Table 7-9.

AECOM surveys were conducted in accordance with BS 7445-1:2003 Description and measurement of environmental noise - Guide to quantities and procedures.

Table 7-9 Baseline Survey Results for NSR 1 and NSR 6 (September 2022)

Location	Date	Period	Time	$L_{Aeq,T}$ (dB)	$L_{A90,15min}$ (dB)
NSR 1	19/09/22	Day	1115 – 1130	70.8	35
	19/09/22	Day	1130 – 1145	70.8	36
	19/09/22	Day	1145 – 1200	70.4	33
	19/09/22	Day	1200 – 1215	71.5	38
	19/09/22	Day	1500 – 1515	71.1	35
	19/09/22	Day	1515 – 1530	70.6	37
	19/09/22	Day	1530 – 1545	71	37
	19/09/22	Day	1545 – 1600	71.7	37
	18/09/22	Night	2300 – 2315	62.1	23
	18/09/22	Night	2315 – 2330	62.4	21
	18/09/22	Night	2330 – 2345	59.9	22
	18/09/22	Night	2345 – 0000	61	22
NSR 6	19/09/22	Day	1000 – 1015	52.8	35
	19/09/22	Day	1015 – 1030	53.3	33
	19/09/22	Day	1030 – 1045	54.8	30

Location	Date	Period	Time	$L_{Aeq, T}$ (dB)	$L_{A90,15min}$ (dB)
	19/09/22	Day	1045 – 1030	55.7	31
	19/09/22	Day	1345 – 1400	58.2	34
	19/09/22	Day	1400 – 1415	58.3	32
	19/09/22	Day	1415 – 1430	58.8	33
	19/09/22	Day	1430 – 1445	59.7	36
	19/09/22	Night	0030 – 0045	43.2	23
	19/09/22	Night	0045 – 0100	47.4	23
	19/09/22	Night	0100 – 0115	49.6	25
	19/09/22	Night	0115 – 0130	46.1	23
	19/09/22	Night	0130 – 0145	29.9	24

Comparison of the compliance monitoring sound levels in Table 7-8and the more recent short-term measurement data in Table 7-9 shows that the levels are generally similar. From year to year the night-time $L_{Aeq, T}$ is approximately 10 to 13 dB below the daytime $L_{Aeq, T.}$ The night-time $L_{Aeq, T}$ also remains relatively high compared to the night-time $L_{A90,T}$, suggesting that there is some fluctuation in the instantaneous level at night rather than it being steady and continuous which would otherwise lead to the difference between the L_{A90} and L_{Aeq} being small. With reference to the monitoring observations presented in Table 7-9, the distant constant low level (when it is audible) “hum” from the direction of Aghada Power Station and overhead power lines does not suggest sound level fluctuation characteristics and as the meteorological conditions during the most recent survey suggest that wind was not a notable factor, the fluctuations in both day and night time $L_{Aeq,T}$ are considered likely to be due primarily to vehicle passing bays, birds/wildlife and aircraft.

Table 7-10 September 2022 Monitoring Observations at NSR 1 and NSR 6

Location	Time/Date	Weather	Temp. °C	Cloud Coverage	Average Windspeed (Max) Direction	Dominant Noise	Other Noise
NSR 1	18/09/22 2300	Dry, Hard Ground	13	4/8	No wind (NA), NA	Intermittent vehicle passbys	Distant constant hum from direction of Aghada Power Plant. Foxes, dogs
NSR 6	19/09/22 0030	Dry, Soft Ground	13	4/8	No wind (NA), NA	Overhead electrical pylon hum, distant noise from Corkbeg Island (horn like sound on and off)	Aeroplane, intermittent vehicle passbys on L3648.
NSR 6	19/09/22 1000	Sunny, dry, soft ground.	14	2/8	No wind (NA), NA	Crows, intermittent vehicle passbys	Crows, intermittent vehicle passbys
NSR 1	19/09/22 1115	Sunny, dry, hard ground	14	2/8	No wind (NA), NA	Vehicle passbys	Vehicle passbys
NSR 6	19/09/22 1345	Sunny, dry, soft ground.	18	4/8	2 (3), Southerly	Vehicle passbys	Distant intermittent construction works in Whitegate, hum from overhead electrical wires, distant aircraft, wind in trees
NSR 1	19/09/22 1500	Sunny, dry, hard ground	18	5/8	3 (4), Southerly	Vehicle passbys	Birdsong, distant aircraft

7.5 Potential Impacts

Noise emissions from the Proposed Development will occur in three distinct phases construction, operation, and decommissioning.

A detailed assessment of noise and vibration during the construction phase has been scoped out as discussed in section 7.3.4.2 and 7.3.4.3. A detailed assessment of road traffic noise due to construction vehicles on local roads has also been scoped out as discussed in section 7.3.4.4.

Noise levels during operational phase associated with operational road traffic has also been scoped out as discussed in section 7.3.5.3 and a more detailed assessment is not required.

Therefore, this section only considers operational noise emissions from the Site and that noise will be emitted principally from the three items of equipment:

- A Container - housing transformer (and control unit) (ID:1).
- A Hydrogen Processing Unit (HPU) (ID:7).
- A Compressor (ID:5)

The location of each item can be found using the ID provided in conjunction with drawing P000446-PM²5-0005.

Emissions during the operational phase will be subject to fixed permitted limits, which are more stringent during the night-time. However, it is understood that while unlikely, the plant may operate 24 hours a day, seven days a week.

As outlined in Chapter 2 (Description of the Proposed Development), in the event of decommissioning, measures would be undertaken by the Applicant to ensure that there would be no significant, negative environmental effects. The amount activity during the decommissioning phase in expected to be no worse than during construction phase.

As a result, additional potential impacts and associated effects arising during the decommissioning phase are not anticipated and a detailed assessment of noise impacts relating decommissioning is not required.

7.5.1 Operational Phase Site Operations

7.5.1.1 Criteria

The location of the Proposed Development does not meet the definition of a 'Quiet Area'. The assessment therefore evaluates potential adverse impact from noise emissions using criteria derived from existing baseline sound levels ($L_{A90,T}$) around the Site.

Analysis of the measured baseline levels presented in Table 7-9 and Table 7-10 indicate that the background sound levels can be classed as 'All other Areas' as, for example, all night-time $L_{A90,T}$ values summarised in Table 7-8, are above 30 dB(A) suggesting that the Site cannot be classed as a 'Low Background Noise Area'. This is also consistent with the EPA license conditions referenced in the Site's annual compliance reports.

Therefore, to assess the impact of the Proposed Development with regard to operational noise, the 'All other Areas' criteria have been adopted from Table 7-4. It is understood that operations will occur in the day-time period 0700 to 1900. Therefore, the noise criterion of 45 dB $L_{Aeq,T}$ for the daytime at the nearest NSR location has been adopted.

7.5.1.2 Power Plant Proposed Operation

The precise size, configuration, performance, and layout of the equipment will be finalised at a later detailed design stage in conjunction with the appointed equipment supplier. However, this will not adversely affect the design of the buildings or emissions as described in this ECR.

Indicative details of the noise generating mechanical plant associated with the Proposed Development have been provided by the Applicant. They are provided as typical values for the equipment named and are detailed in Table 7-11 in terms of either sound pressure level (L_{pA}) at a defined distance from the plant item, and the sound power level (L_{wA}) emission from the plant item. It is worth noting here that the total sound power level of all items listed is equal to approximately 78 dB L_{wA}.

Table 7-11 Proposed Development Fixed Plant Noise Levels

ID	Item	Sound Pressure Level (dBA L_p) at 1 metre	Calculated Sound Power Level (dBA L_w)
1	A Container - housing transformer (and control unit) - External	66	74
5	A Compressor	62	70
7	A Hydrogen Processing Unit (HPU) External	< 65	73
			Total: 78 dB L_{wA}

7.5.1.3 Assessment

To determine the potential noise impact of the Proposed Development on the NSR locations identified, the sound level reduction due to the distance travelled has been subtracted from total sound power level of 78 dB L_{wA} to determine a sound pressure level at the nearest noise sensitive receptor.

The following sound propagation calculation approaches have been adopted.

- All noise sources have been represented as hemi-spherical point sources on the ground.
- Ground absorption and screening from varying ground height is not included as a conservative approach.
- Screening from buildings from the Proposed Development have not been included in the model and therefore provided no screening benefit as a conservative approach.

Section 5 of NG4 details the assessment of noise sources with tonal or impulsive elements and the appropriate penalties/corrections to apply where sources present these characteristics. In this instance, it is assumed that all sources can be designed such that they do not present tonal or impulsive characteristics at the location of nearby receptor positions. Therefore, no corrections have been applied.

The operational phase noise levels have been predicted at the NSR locations identified, as set out in Table 7-12.

Table 7-12 Operational Sound Levels at Receptors - Unmitigated

Receptor	Approximate Distance to Receptor	Predicted Sound Pressure Level at Receptor	Criterion ($L_{Aeq, T}$)	Compliant? (Y/ N)
NSR 1	780	12	45 dB	Y
NSR 2	900	11		Y
NSR 3	925	11		Y
NSR 4	1334	8		Y
NSR 5	1360	7		Y
NSR 6	1410	7		Y

The above assessment indicates that unmitigated noise emissions from the Proposed Development comply with the 45 dB $L_{Aeq, T}$ criterion at all NSRs.

Considering the numerical assessment, significant impacts associated with operational phase noise levels resulting are not expected at nearby NSR, the impacts would be defined as Imperceptible, Permanent but Reversible.

7.6 Mitigation Measures

7.6.1 Construction Phase

A detailed assessment of construction noise has been scoped out and therefore mitigation is not required in relation to construction noise and vibration from the Site and construction vehicle noise on local roads.

7.6.2 Operational Phase

An assessment of the operational phase was undertaken, and it was shown that based on the provided layout and sound power levels for the planned equipment that operational noise emissions are compliant and well below the assessment criteria of 45 dB $L_{Aeq, T.}$

The proposed plant incorporates embedded mitigation including insulated compressor housing which acts as a noise mitigation. Furthermore, compliance with the nominated criteria will be confirmed via repeated compliance noise monitoring in line with the existing permit conditions.

The Proposed Development will comply with the requirements of the EU (Large Combustion Plants) Regulations 2012, S.I. No. 566 of 2012, under an IEL. The terms and conditions of which are anticipated to be requiring a noise monitoring protocol to be adopted.

7.7 Residual Impacts

No Significant residual impacts are expected.

7.8 Cumulative Impacts

No cumulative impacts are expected to arise from the Proposed Development, during either the construction or operational phases. Significance of cumulative effects would be classified as Imperceptible or less for the following reasons:

- Construction activity on the Site is of short-duration and expected to require minimal machinery, this is also reflected in the number of construction vehicles on local roads as outlined in Chapter 2.
- Operational noise from the Site is expected to be 12 dB or below at NSRs which is not only below all NG4 for 'All other areas' it is generally considered not measurable by most standard sound level meters. The predicted operational is well below the existing ambient levels and therefore adding the Proposed Development to others already planned will cause no change to the magnitude of impact and significance of effect already predicted by other developments.
- The Proposed Development is not expected to generate significant traffic during its operational phase.

7.9 Summary

Noise emission related to the Proposed Development have been considered in this chapter relating to the construction and operational phases. The Proposed Development is situated in an area adjacent to an existing Power Station. The closest receptor has been identified at 780m to Proposed Development.

Impacts from the following activities were considered:

- Short-term impacts during the construction phase, including:
  - Noise generated by onsite construction activities.
  - Noise generated by changes to traffic flows on existing roads.
- Long-term impacts during the operational phase, including:
  - Noise generated by the Proposed Development once complete.
  - Noise generated by changes to traffic flows on existing roads.

All effects are defined in accordance with EPA Guidelines as Imperceptible. Construction effects would be defined as Temporary, whilst operational effects would be Permanent, although all would be Reversible.

7.10 References

- BSI Group (2003). BS 7445-12003 Description and measurement of environmental noise. Guide to quantities and procedures.
- BSI Group (2014). *BS 5228-12009+A12014 'Code of practice for noise and vibration control on construction and open sites'.*
- BSI Group (2014). *BS 82332014 Guidance on Sound Insulation and Noise Reduction for Buildings.*
- Department of Transport Welsh Office (1988). *Calculation of Road Traffic Noise*.
- EPA (2016). *Guidance Note for Noise Licence Applications, Surveys and Assessments in Relation to Scheduled Activities*.
- EPA (2022). Guidelines on the Information to be contained in Environmental Impacts Assessment Reports.
- European Parliament, Council of the European Union (2014). *EU Directive 2014/52/EU.*
- Highways England (2020). *Design Manual for Roads and Bridges (DMRB) LA111 Noise and vibration*.
- International Standards Organisation (1996). *ISO 9613-21996 Acoustics - Attenuation of sound during propagation outdoors - Part 2 General method of calculation.*
- National Roads Authority (NRA) (2004). *Guidelines for the Treatment of Noise and Vibration in National*

8. Material Assets

8.1 Introduction

This chapter of the ECR identifies the significant impacts of the Proposed Development on material assets (built services) during the construction and operational phases.

This chapter defines the study area. the methodology used for developing the baseline and impact assessment. provides a description of the baseline environment. presents the findings of the impact assessment. The potential impacts associated with the Proposed Development, if any, are assessed with regard to the following proposed material assets:

- Gas
- Electricity network.
- Telecommunications.

Potential impacts associate with surface water, wastewater and process effluent are dealt with in Chapter.

Full details on the Proposed Development are provided in Chapter 2 and the Planning Statement submitted with this planning application.

8.2 Legislation, Policy and Guidance

The legislation and guidance applicable to the material assets assessment include:

- CCC (2022), CCDP 2022-2028.
- Directive 2011/ 92/ EU of the European Parliament and the Council on the assessment of the effects of certain public and private projects on the environment, as amended by Directive 2014/52/EU (the 'EIA Directive').
- EPA (2022), Guidelines on the Information to be Contained in Environmental Impact Assessment Reports.
- EU (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018).

8.3 Methodology

There is no specific set of guidelines for the assessment of material assets. For this reason, the methodology used to assess the impact on built services is in accordance with best practice guidelines IEMA Guide to Materials and Waste in Environmental Impact Assessment.

A desktop assessment of information provided by the Applicant and publicly available information was undertaken to determine the baseline existing land use and utility arrangements within the study area which could be impacted as a result of the Proposed Development.

8.3.1 Study Area

The study area is the Site, as well as the surrounding area (within 200m) in relation to land use and utilities network that could be impacted by the Proposed Development. This is considered a reasonable distance in terms of sensitive material asset receptors (such as residential receptors) with respect to the Proposed Development. This study area has been used for the assessment associated with land use and utilities impact assessment.

As the Site lies within the administrative area of CCC, it is therefore subject to the land use policies and objectives of the Cork CDP 2022-2028 (including Variations to the Plan).

8.3.2 Determination of Sensitive Receptors

For the purpose of this assessment, the sensitive receptors are regarded as the existing utilities networks infrastructure in the study area. Terminology used to describe the sensitivity of the receptor has been adopted from the EPA Guidelines[3].

The criteria for the existing utilities infrastructure sensitivity are outlined in Table 8-1.

Table 8-1 Sensitivity Criteria for Utilities

Sensitivity	Description
Very High	Very high importance and rarity, international scale and very limited potential for substitution.

Sensitivity	Description
High	High importance and rarity, national scale and limited potential for substitution.
Medium	High or medium importance and rarity, regional scale, limited potential for substitution.
Low	Low or medium importance and rarity, local scale.
Negligible	Very low importance and rarity, local scale.

8.3.3 Describing Potential Effects

The methodology used for describing the potential effects considers the "quality" of the effects (i.e., whether it is adverse or beneficial), the "probability" of the event occurring and the "duration" of the effects (i.e., whether it is short or long-term) as per Section 3.7.3 and Table 3.4 of the EPA Guidelines.

8.3.4 Significance of Effects

A qualitative approach was used to determine the significance of effects as per the EPA Guidelines determination figure (Figure 3.4 page 53). Due account was taken of both the sensitivity of the attributes and the description of the potential effect.

8.3.5 Limitations and Assumptions

The description of existing conditions is based on the available desk study and information supplied by the Applicant.

8.4 Baseline Environment

This section provides a description of the relevant aspects of the baseline environment in relation to material assets.

8.4.1 Study Area

As noted above, the study area is the Site, as well as the surrounding area (within 200m) in relation in relation to land use and utility networks that could be impacted by the Proposed Development.

The Site is located at Ballincarroonig, near the village of Lower Aghada, which is sited approximately 770m northeast. The village of Whitegate is sited approximately 1.2km south of the Site.

8.4.2 Utilities

As the Site is located within the boundary of the existing Power Station, there a number of underground services and existing drainage networks which transverse the Site, the Proposed Development will utilise the existing network and extend where required to facilitate the works as shown in Drawing AGH/U/21084/R0 (P378250-EA36-0006) and AGH/U/21084/R0 (P378250-EA36-0007) accompanying this planning application.

8.4.2.1 Gas Network

The Power Station is one of the largest electricity generating facilities in Ireland, normally fuelled by natural gas. Therefore, the Power Station is supplied by a natural gas pipeline, the pipeline does not traverse the Proposed Development Site, therefore, the potential for impacts on gas infrastructure have been scoped out of the assessment.

8.4.2.2 Electricity Network

In terms of existing electrical infrastructure, there is a 220kV overhead powerline and an existing 220kV substation within Power Station which connects to this line to the east of the Site.

Within the Power Station, there are multiple existing underground cables that send the electricity generated in Power Station to the substation so it can then be transmitted around the national electricity transmission grid.

The Site is supplied via a medium voltage (MV) 10kV network and underground cabling; low voltage (LV) 400 V is provided via underground cabling from each ring main.

8.4.2.3 Telecommunications

There is an existing telecommunications compound within the southeast of the Power Station, the Proposed Development will connect to the existing network via underground cables.

8.4.2.4 Other Utilities

In terms of other utilities within the study area, there is a natural gas fired turbine, gas conditioning compound, gas compressor, electrical transformers and controls, fuel oil tank, emergency diesel generator and generator circuit breaker within the Power Station. None of these utilities will be impacted by the Proposed Development and consequently, have been screened out.

8.5 Potential Impacts

This section contains an assessment of the potential effects of the Proposed Development on material assets. The assessment takes both the construction and operational phases into account.

There is potential for disruption to existing materials assets onsite during the construction phase and these are outlined below. Construction works are likely to take place over a period of three months.

8.5.1 Construction Phase

8.5.1.1 Electricity Network

During the construction phase, a 6.6kV electricity cabling connections will be laid between the Proposed Development and the Power Station's 6.6kV power outlet to the east of the Site.

In terms of significance, there will be a Low sensitivity associated with the existing electricity network. The magnitude of impact will be Minor as there will be a minor change in utilities required. As a result, for the existing electricity network, the significance of impact without mitigation will be Not Significant/Slight, and short-term in duration.

8.5.1.2 Telecommunications

During the construction phase, communications supply to the Proposed Development will be laid. Power and communications supplies will be provided by buried cables in a below ground trench, covered where required with suitable traffic-bearing cover.

Existing telecommunications infrastructure is likely to be utilised during the construction phase.

A short-term connection outage may be required at the Power Station to facilitate this connection. In terms of significance, there will be a Low sensitivity associated with the existing telecommunications infrastructure. The magnitude of impact will be Negligible and the significance of impact without mitigation will be Not Significant/Slight, and Temporary in duration.

8.5.2 Operational Phase

8.5.2.1 Electricity Network

As noted above, power will be conveyed by means of underground cables to the Power Stations 6.6kV outlet. The existing grid infrastructure has a Low sensitivity as the substation already exists and only a connection is required. The magnitude of impact will be Moderate as there will be additional power generation created as a result of the Proposed Development. The significance of impact without mitigation will be Slight and Positive, and Long-Term in duration.

8.5.2.2 Telecommunications

During the operational phase the Proposed Development will connect to the existing telecommunications infrastructure on the Power Station, which will result in a marginal increase in demand. In terms of significance there will be a Low sensitivity associated with the existing telecommunications infrastructure. The magnitude of impact will be Negligible.

8.5.3 Decommissioning Phase

A Decommissioning Plan (which will include a Decommissioning Environmental Management Plan (EMP)) will be prepared and agreed with the EPA. The Decommissioning EMP will consider the potential environmental risks at the Site and provide guidance and appropriate mitigation procedures as necessary, to minimise risk.

Where decommissioning takes place, all above-ground equipment associated with the Proposed Development will be disassembled and removed from the Site. However, prior to the removal of plant, all residues and operating chemicals will be cleaned out from the plant and disposed of at a suitably licenced facility. The majority of the plant and equipment will have some limited residual value as scrap or recyclable materials and will be recycled at the time.

It is expected that decommissioning will take up to three months. Effects arising from the process of decommissioning of the Proposed Development are considered to be of a similar nature and duration to those arising from the construction phase and are therefore have not been considered separately.

8.6 Mitigation Measures

Construction phase mitigation measures include avoidance, reduction and remedy measures to reduce or eliminate any significant adverse impacts identified.

8.6.1 Construction Phase

As good practice, an up-to-date utilities plan should be produced and submitted to CCC prior to construction showing all utilities present on the existing Power Station site.

8.6.1.1 Outline Construction Environmental Management Plan (CEMP)

An oCEMP has been prepared as part of this planning submission (refer to Appendix B). The oCEMP will be further refined and expanded by the appointed Contractor following planning into a Contractor's CEMP, prior to the main construction works.

The appointed Contractor will expand and develop the oCEMP into a Contractor's CEMP to ensure that there are no impacts on any vector that would pose a significant risk to the environment. It is assumed the Contractor's CEMP would include regulatory pollution control measures as per best management practices.

8.6.1.2 General Mitigation Measures

The following best practice measures will be implemented by the appointed Contractor during the construction phase:

- Works during the construction phase, including service diversions and realignment will be carried out in accordance with relevant guidance documents, including Gas Networks Ireland's publication '*Safety advice for working in the vicinity of natural gas pipelines'*. the ESB's *Code of Practice for Avoiding Danger from Overhead Electricity Lines'*, and the Health and Safety Authorities (HSA) '*Code of Practice for Avoiding Danger from Underground Services',* or update guidance relevant at the time of construction.
- The appointed Contractor will be obliged to put measures in place during the construction phase to ensure that there are no interruptions to existing services and all services and utilities are maintained unless this has been agreed in advance with the relevant service provider and local authority. When service suspensions are required during the construction phase, reasonable prior notice will be given to the residents in the area. The disruption to services or outages will be carefully planned so the duration is minimised. The timing of local domestic connections will be addressed between the Contractor and the local community at the detailed design stage.

8.6.2 Operational Phase

There will be no requirement for additional mitigation measures during the operational phase.

8.7 Residual Impacts

All material assets after mitigation will have an Imperceptible or Not Significant and Positive residual effect once mitigation measure including those within the oCEMP are taken into account.

8.8 Cumulative Impacts

Should the construction of the listed projects in Table 1-5 and the Proposed Development occur concurrently, there is a potential for cumulative effects associated with further temporary disruptions to existing utilities and increased demands on existing utilities. There is also a potential for cumulative effects associated accidental spills and leaks and the use of concrete and lime (to the surface water network).

As noted above, potential disruptions to existing utilities will be Slight, Not Significant/Slight or Moderate. It is not unreasonable to assume that the committed developments listed above, which have also gone through the planning process, will also implement standard and best practice mitigation measures to the extent that impacts are not significant. Providing standard best practice control measures are implemented as required on all sites, the cumulative impact will Not Be Significant.

8.9 Summary

It has been assessed that the residual effects once mitigation measure including those within the oCEMP are taken into account will have an Imperceptible or Not Significant and Positive effect on material assets.

There is a potential for cumulative effects associated with further temporary disruptions to existing utilities and increased demands on existing utilities. However, providing standard best practice control measures are implemented as required on all sites, the cumulative impact will Not Be Significant.

There will be no requirement for additional mitigation measures during the operational phase. However, routine annual maintenance will be carried out in accordance with the maintenance procedures provided by the Contractor and manufacturer.

8.10 References

- CSO (2016). *Small Area Population Statistics.* Available at https//www.CSO.ie/en/census/census2016reports/census2016smallareapopulationstatistics/
- CCC (2022). Cork County Development Plan (CDP) 2022-2028.
- Directive 2011/ 92/ EU of the European Parliament and the Council on the assessment of the effects of certain public and private projects on the environment, as amended by Directive 2014/ 52/ EU (the 'EIA Directive').
- EPA (2003). *Advice Notes on Current Practices in the Preparation of Environmental Impact Statements*.
- EPA (2015). *Draft Advice Notes for Preparing Environmental Impact Statements.*
- EPA (2022). *Guidelines on the information to be contained in Environmental Impact Assessment Reports.*
- ESB (2008). Code of Practice for Avoiding Danger from Overhead Electricity Lines.
- EU (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018).
- Gas Networks Ireland (GNI) (2020). Safety Advice for Working in the Vicinity of Natural Gas Pipelines.
- Health and Safety Authorities (HSA) (2010). Code of Practice for Avoiding Danger from Underground Services.
- IEMA (2020). *IEMA Guide to Materials and Waste in Environmental Impact Assessment*.
- Irish Water (2022). *Wastewater Project. Whitegate/Aghada Sewerage Scheme*. Available at https//www.water.ie/projects/local-projects/whitegateaghada-sewerage-/ accessed October 2022.
- Irish Water (2022). *Whitegate Water Treatment Plant.* Available at https//www.water.ie/news/land-acquired-for-new-sta/ accessed August 2023.

9. Cultural Heritage

9.1 Introduction

This chapter of the ECR describes and assesses the cultural and heritage, archaeological and architectural implications of the Proposed Development on existing cultural heritage assets.

This chapter defines the study area, focussing on heritage assets in the vicinity of the Proposed Development which could be impacted by the proposed works. The methodology used for developing the baseline and impact assessment is described, the chapter provides a description of the baseline environment in relation to heritage and presents the findings of the impact assessment.

Full details on the Proposed Development are provided in Chapter 2 and the Planning Statement submitted with this planning application.

9.2 Legislation, Policy and Guidance

This chapter has been undertaken in accordance with all relevant legislation, policies and guidelines. The documents utilised in the preparation of this study include:

- National Monuments (amendment) Acts 1930-2014.
- Record of Monuments and Places (RMP) established under Section 12 of the National Monuments (amendment) Act 1994.
- Planning and Development Acts 2000 (and amendments).
- Heritage Act 1995. Architectural Heritage (national inventory).
- Historic Monuments (miscellaneous provisions) Act 1999.
- Cork County Development Plan (CCDP) 2022-2028.
- Department of Arts, Heritage and the Gaeltacht (1999a). Frameworks and Principles for the Protection of the Archaeological Heritage.
- Department of Arts, Heritage and the Gaeltacht (2004) (revised 2011). *Architectural Heritage Guidelines*.

9.2.1 Local Policy Framework

Local planning policy within the study area is contained within the current Cork CDP 2022-2028. There are a number of strategic objectives providing a framework for development which may affect heritage assets. These are presented in chapter 12 of the Cork CDP and deal with both archaeological and architectural heritage. The Strategic Objectives for Built Heritage and Archaeology are outlined in Objective 9.1. Objective 9.1 sets out the following project-relevant objectives and policies in relation to Archaeological Heritage which are contained in Section 12 of the Cork CDP.

HE 3-1 Protection of Archaeological Sites

> a) Safeguard sites and settings, features and objects of archaeological interest generally. b) Secure the preservation (*i.e.*, preservation in situ or in exceptional cases preservation by record) of all archaeological monuments including the Sites and Monuments Record (SMR) (see www.archeology.ie) and the Record of Monuments and Places as established under Section 12 of the National Monuments Act, 1994, as amended and of sites, features and objects of archaeological and historical interest generally. In securing such preservation, the planning authority will have regard to the advice and recommendations of the Department of Arts, Heritage and Gaeltacht as outlined in the Frameworks and Principles for the Protection of the Archaeological Heritage.

HE 3-2 Underwater Archaeology

> Protect and preserve the archaeological value of underwater archaeological sites and associated features. In assessing proposals for development, the Council will take account of the potential underwater archaeology of rivers, lakes, intertidal and subtidal environments.

HE 3-3 Zones of Archaeological Potential

> Protect the Zones of Archaeological Potential (ZAPs) located within historic towns and other urban areas and around archaeological monuments generally. Any development within the ZAPs will need to take cognisance of the potential for subsurface archaeology and if archaeology is demonstrated to be present appropriate mitigation (such as preservation in situ/buffer zones) will be required.

HE 3-4 Industrial and Post Medieval Archaeology

Protect and preserve the archaeological value of industrial and post medieval archaeology such as mills, limekilns, bridges, piers, harbours, penal chapels and dwellings. Proposals for refurbishment, works to or redevelopment/conversion of these sites should be subject to careful assessment.

HE 3-6 Archaeology and Infrastructure Schemes

Have regard to archaeological concerns when considering proposed service schemes (including electricity, sewerage, telecommunications, water supply) and proposed roadworks (both realignments and new roads) located in close proximity to Recorded Monuments and Places and their known archaeological monuments.

9.2.2 Guidance

The assessment of baseline conditions was carried out in accordance with the following guidance:

- EPA (2022). Guidelines on the information to be contained in environmental impact assessment reports.
- Department of Arts, Heritage, Gaeltacht and the Islands (2005a). Frameworks and Principles for the Protection of the Archaeological Heritage.
- Department of the Environment, Heritage and Local Government (2009) Government Policy on Architecture 2009-2015.
- Department of Arts, Heritage and the Gaeltacht's (2011). Architectural Heritage Guidelines.
- NRA (2005a). Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes.
- This assessment follows the methodologies contained in the 'Guidelines for the Assessment of Archaeological Heritage Impact of National Road Schemes' and the 'Guidelines for the Assessment of Architectural Heritage Impact of National Road Schemes' (NRA 2006). It also takes note of the guidance and methodology outlined within the draft TII Cultural Heritage Impact Assessment (CHIA) of TII Projects – Overarching Technical Document (AMS, 2023) which is expected to be issued during the lifetime of this project thereby replacing the existing 2006 NRA guidelines.

9.3 Setting Assessment Methodology

This assessment has been guided by *Historic England Historic Environment Good Practice Advice in Planning Note 3 (Second Edition) – The Setting of Heritage Assets*[34]. The Setting of Heritage Assets provides guidance on setting and development management, including assessing the implications of development proposals, a counterpart to which has not yet been produced in the Republic of Ireland.

A staged approach is recommended for setting assessments, the first step of which is to identify the settings of the cultural heritage assets that may be affected. The second step is to assess whether, how and to what degree these settings make a positive contribution to the importance of the heritage asset(s), *i.e.,* "what matters and why". This includes a description of the key attributes of the cultural heritage asset itself, then consider the physical surroundings of the asset. This includes its relationship with other heritage assets, the way the cultural heritage asset is appreciated, and the asset's associations and patterns of use. The third step (where appropriate) is to assess the effect of a Proposed Development on the significance of assets, through the consideration of the key attributes of the Proposed Development in terms of its location and siting, form and appearance, wider effects, and permanence.

The assessment methodology has also been guided by the DEHLG *Architectural Heritage Protection, Guidelines for Planning Authorities which was published in 2004 and revised in 2011*[35]. This contains the relevant guidance which is detailed below. It is important to note that paragraph 13.8.1 of the guidance states that Proposed Developments outside the curtilage or grounds of a Protected Structure or Architectural Conservation Area (ACA) should be given similar consideration as for Proposed Developments within the attendant grounds. This methodology has been combined with the Historic England methodology[36], in order to conduct a similar and more robust assessment of the impacts of the Proposed Development on recorded archaeological monuments, in addition to architectural heritage.

The following guidance taken from the DAHG's *Architectural Heritage Protection, Guidelines for Planning Authorities*[37], is provided regarding development within the attendant grounds:

"Development Within the Attendant Grounds

[34] Historic England (2017). *Historic Environment Good Practice Advice in Planning Note 3. 2nd edition.*
[35] DAHG (2011). *Architectural Heritage Protection, Guidelines for Planning Authorities*
[36] Historic England (2017).
[37] DAHG (2011).

13.7.1 It is essential to understand the character of a site before development proposals can be considered. Where attendant grounds of particular significance are proposed for development, a conservation plan could be prepared in advance of any planning application which would identify the significance of the Site and locate areas within the designed landscape, if any, which could accept change and development and those areas which could not without damaging the architectural heritage of the place.

13.7.2 When dealing with applications for works within the attendant grounds of a protected structure, a visit to the Site should be considered an essential part of the assessment. The planning authority should consider

a) Would the development affect the character of the protected structure?

b) Would the proposed works affect the relationship of the protected structure to its surroundings and attendant grounds?

c) Would the protected structure remain the focus of its setting? For example, a new building erected between a structure and a feature within the attendant grounds will alter the character of both.

d) Do the proposed works require an alteration of the profile of the landscape, for example, the creation of a golf course? How would this affect the character of the protected structure and its attendant grounds?

e) Do the proposals respect important woodland and parkland? Do they conserve significant built features and landscape features?

f) Are there important views of or from the structure that could be damaged by the Proposed Development? Would important vistas be obstructed by new development?

g) Would distant views of important architectural or natural landmarks be blocked or changed? Would a significant skyline be altered?

h) Even where the Proposed Development is at a distance from the protected structure, could it still have an impact? This could include tall or bulky buildings interrupting views of or from the protected structure and other features of the designed landscape.

i) Where the new works would not be directly visible from the protected structure, would they be visible from the approaches to the structure or from other important sites or features within the attendant grounds? If so, would this be acceptable?

j) What effect would the scale, height, massing, alignment or materials of a proposed construction have on the protected structure and its attendant grounds?

Other Development Affecting the Setting of a protected structure or an Architectural Conservation Area

13.8.1 When dealing with applications for works outside the curtilage and attendant grounds of a protected structure or outside an ACA which have the potential to impact upon their character, similar consideration should be given as for Proposed Development within the attendant grounds. A visit to the Site should be considered an essential part of the assessment.

13.8.2 New development both adjacent to, and at a distance from, a protected structure can affect its character and special interest and impact on it in a variety of ways. The Proposed Development may be sited directly about the protected structure, as with buildings in a terrace. Alternatively, it may take the form of a new structure within the attendant grounds of the protected structure. A new development could also have an impact even when it is detached from the protected structure outside the curtilage and attendant grounds but is visible in an important view of or from the protected structure.

13.8.3 The extent of the potential impact of proposals will depend on the location of the new works, the character and quality of the protected structure, its designed landscape and its setting, and the character and quality of the ACA. Large buildings, sometimes at a considerable distance, can alter views to or from the protected structure or ACA and thus affect their character. Proposals should not have an adverse effect on the special interest of the protected structure or the character of an ACA."

In addition to the legislation and guidance detailed, the setting assessment methodology has also utilised the guidance contained within Cork County Council (CCC), 2006, *Guidance Notes for the Appraisal of Historic Gardens, Demesnes, Estates and their Settings*[38]. This document was prepared by CCC in response to increasing adaptation and redevelopment of planned landscapes within the county. The guidance notes advise the following stepped approach, which also has relevance to development beyond Cork:

[38] Cork Co. Co. (2006). *Guidance Notes for the Appraisal of Historic Gardens, Demesnes, Estates and their Settings.*

- Identification and description of development, history, features and boundaries of the designed landscape using scoping, archival research and fieldwork.
- Evaluation and assessment of significance including historical landscape description, archaeological and horticultural aspects.
- Assessing development proposals through an assessment of the heritage impact.
- Recommendations for mitigation and management including future research.

9.4 Methodology

9.4.1 Study Area

The cultural heritage impact assessment considers all recorded cultural heritage assets within a study area that extends 1km from the Site of the Proposed Development. The extent of this study area was determined by the nature of the Proposed Development, which consists of a limited surface area of disturbed ground within an operational power plant and, therefore, is unlikely to impact upon cultural heritage assets located beyond this distance. The aim of this assessment was to inform decisions about further field survey techniques or mitigation to be applied, if necessary.

Additionally, an assessment of setting was made for designated heritage assets (National Monuments, Protected Structures as recorded on the Cork CDP 2022-2028 and Architectural Conservation Areas) within a wider study area around the Proposed Development. No significant effects were anticipated in regard to the settings of non-designated assets. Therefore, the settings assessment focused on designated assets only. Designated heritage assets up to 1km from the Site of the Proposed Development were assessed under this methodology. This was based on the intervisibility between the Proposed Development and the designated heritage assets, taking into account topography, vegetation and buildings, determined through initial desktop assessment using Google Streetview.

9.4.2 Determination of Baseline Environment

A Cultural Heritage asset is defined as a monument, building, group of buildings or site which are the works of man or the combined works of nature and man constituting the historic or built environment[39]. A heritage asset's value is not solely expressed through any designated status but can also be exhibited through a series of values or special interests. These include architectural, historical, artistic, archaeological, cultural, scientific, social or technical interests. There is the potential for non-designated assets to display special interests equivalent to a designated asset. Therefore a "designated" status does not necessarily confer a set level of importance on an asset, rather a level of importance is assigned based on an assessment of the special interest displayed by that asset and professional judgement.

Section 2 of the 1930 National Monuments Act defines a 'national monument' as "*a monument or the remains of a monument the preservation of which is a matter of national importance by reason of the historical, architectural, traditional, artistic, or archaeological interest attaching thereto*." National Monuments are considered nationally important.

National Monuments and Record of Monuments and Places (RMP) sites/Register of Historic Monuments (RHM) sites are not clearly differentiated in the National Monuments Act 1930-2014. However, not all RMP and RHM sites and associated constraint areas demonstrate the same level or degree of heritage special interest as can be found in National Monuments. Therefore, they can be of either national or regional importance. An assessment of the special interest of the asset and professional judgement is used to identify the appropriate level of importance.

Some archaeological and architectural heritage assets are also included on the Record of Protected Structures (RPS) of each County or City Development Plan, under Section 51(1) of the Planning and Development Act, 2000 (Revised). These protected structures are included in the RPS due to their special architectural, archaeological, artistic, cultural, historical, scientific, social or technical interest. Protected Structures are considered to be of international, national or regional importance.

Architectural Conservation Areas (ACAs) are areas which are designated in a County Development Plan, under Section 81(1) of the Planning and Development Act, 2000 (Revised), in order to "*preserve the character of a place, area, group of structures or townscape"* that are of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest or value, or *"contributes to the appreciation of protected structures."* ACAs are considered to be of either national or regional importance.

[39] UNESCO (1972). *Convention concerning the Protection of the World Cultural and Natural Heritage.*

The National Inventory of Architectural Heritage (NIAH) was established to assist councils in assessing whether structures should be added to their RPS. These architectural heritage assets are rated to be of either international, national, regional, local or 'record only' importance.

The NIAH also contains a Garden Survey which includes designed landscapes such as parks, gardens and demesnes. These can be divided into those with substantially intact landscapes and features. those where the landscape has been significantly eroded by later changes with only peripheral features intact. For the purposes of this assessment, the substantially intact landscapes are judged to be of international, national or regional importance while the denuded landscapes are judged to be of local importance.

Townlands are the lowest level, officially defined geographical area in Ireland and date to before the Anglo-Norman period (12th century). The boundaries of townlands are often visible in the landscape as walls, tree-lined ditches and embankments or natural features such as streams. They provide visible physical evidence of historical territory or political boundaries and are regarded as being of local importance as historic, cultural heritage features.

9.4.3 Determination of Sensitive Receptors

In order to assess the potential effects of a development upon a heritage asset, it must first be assigned a level of importance. This can be done in accordance with a four-point scale, refer to Table 9-1.

Table 9-1 Factors Determining the Value of Heritage Asset

Importance	Criteria
International /Very High	• World Heritage Sites. • Protected Structures deemed to be of very high importance using legislation, EPA guidance, National Inventory of Architectural Heritage (NIAH) rating criteria and professional judgement. • Structures and Designed Landscapes recorded by the NIAH. • Building and Garden Survey with an International Rating.
National/ High	• National Monuments. • Recorded Monuments deemed to be of high importance using legislation, EPA guidance, NRA Significance Criteria and professional judgement. • Protected Structures deemed to be of high importance using legislation, EPA guidance, NIAH rating criteria and professional judgement. • Structures recorded by the NIAH Building Survey with a National Rating or deemed to be of high importance using legislation, EPA guidance, NIAH rating criteria and professional judgement. • Designed landscapes recorded by the NIAH Garden survey with main features substantially present and deemed to be of high importance using legislation, EPA guidance, NIAH rating criteria and professional judgement. • Architectural Conservation Areas containing structures and/or designed landscapes of predominantly national importance. • Undesignated archaeological remains which are rare or complex in nature, and deemed to be of high importance using legislation, EPA guidance, NRA Significance Criteria and professional judgement.
Regional/ Medium	• Recorded Monuments deemed to be of medium importance using legislation, EPA guidance, NRA Significance Criteria and professional judgement. • Protected Structures deemed to be of medium importance using legislation, EPA guidance, NIAH rating criteria and professional judgement. • Structures recorded by the NIAH Building Survey with a Regional Rating or deemed to be of medium importance using legislation, EPA guidance, NIAH rating criteria and professional judgement. • Designed landscapes recorded by the NIAH garden survey with main features substantially present and deemed to be of medium importance using legislation, EPA guidance, NIAH rating criteria and professional judgement. • Architectural Conservation Areas containing structures and/or designed landscapes of predominantly regional importance. • Undesignated architectural heritage assets which are deemed to be of medium importance using legislation, EPA guidance, NIAH rating criteria and professional judgement. • Undesignated archaeological remains which are neither particularly common nor uncommon, and/or of moderate complexity, and deemed to be of medium importance using legislation, EPA guidance, NRA Significance Criteria and professional judgement.
Local/Low	• Structures recorded by the NIAH Building Survey with a Local or Record Only Rating or deemed to be of low importance using legislation, EPA guidance, NIAH rating criteria and professional judgement. • Designed landscapes recorded by the NIAH garden survey with only peripheral features surviving, and deemed to be of low importance using legislation, EPA guidance, NIAH rating criteria and professional judgement. • Townland Boundary Features. • Undesignated architectural heritage assets which are deemed to be of low importance using legislation, EPA guidance, NIAH rating criteria and professional judgement.

Importance	Criteria
	• Undesignated archaeological features which are particularly common or in poor condition, and deemed to be of low importance using legislation, EPA guidance, NRA Significance Criteria and professional judgement. • Townland Boundary Features. • Parks/Gardens/Demesnes recorded by the NIAH Garden Survey which have poor historic legibility. • Undesignated architectural heritage assets. • Undesignated archaeological features which are particularly common or in poor condition.

9.4.4 Describing Potential Impacts

The methodology used for describing the potential effects considers the "quality" of the effects (i.e., whether it is adverse or beneficial), the "probability" of the event occurring and the "duration" of the effects (i.e., whether it is short or long-term) as per Section 3.7.3 and Table 3.4 of the EPA Guidelines.

9.4.5 Significance of Effect

Once the magnitude of the impact has been identified, this can be cross-referenced with the importance of the asset to derive the overall significance of effect, or the consequence of the change resulting from a Proposed Development, refer to the matrix in **Table 9-2**. The significance can be judged on a seven-point scale:

- **Imperceptible** - a change capable of measurement, but without significant consequences.
- **Not significant** - a change which causes noticeable changes in the character of the asset, but without significant consequences.
- **Slight effect** - a change which causes a noticeable change without affecting the special interests or qualities of the asset to any particular degree.
- **Moderate effect** - a change which alters the character or special qualities of an asset in a manner that is consistent with existing and emerging baseline trends.
- **Significant effect** - a change which, by its character, magnitude, duration or intensity, alters the special interests or qualities of an asset.
- **Very significant** - a change which, by its character, magnitude, duration or intensity significantly changes the special interests or qualities of an asset.
- **Profound effect** - a change which obliterates the special interest or qualities of an asset.

Table 9-2 Significance of Effect Matrix

Magnitude of Impact	Importance of Cultural Heritage Asset			
	Local	Regional	National	International
Very High	Significant	Significant	Profound	Profound
High	Moderate	Significant	Significant	Profound
Medium	Slight	Moderate	Significant	Significant
Low	Imperceptible	Slight	Slight	Moderate

For the purposes of this chapter, moderate to profound effects are classed as significant. Once a significant effect has been identified, additional mitigation can be applied to offset, reduce or compensate for any significant adverse effects, or to enhance positive effects. Reassessing the significance of effect after applying additional mitigation reflects the success rating of the mitigation and allows the level of residual effect to be assessed.

9.4.6 Limitations

The assessment is based upon currently available information at the time of writing including the previous surveys. The previous surveys are considered relevant, robust and representative and no additional fieldwork has been undertaken as part of this assessment.

9.5 Baseline Environment

9.5.1 Geology and Topography

The Site for the Proposed Development is located at Ballincarroonig, near the village of Lower Aghada, which is sited approximately 1.6km to the northeast. The Site is approximately 12km southeast of Cork City, on the eastern side of Cork Harbour. The Site is located within the boundary of the existing Power Station ('Power Station').

The Site is located on the foreshore known locally as 'Long Point'. This formerly comprised a spit of land extending into the Port of Cork, consisting mainly of sandstone and mudstone formed during the Upper Devonian period of the Palaeozoic, with the northern extent comprising sandstone, mudstone and limestone laid down during the Carboniferous period of the Palaeozoic. The foreshore around Long Point has been reclaimed as part of the works for the construction of the Power Station.

The topography comprises level ground within Power Station on the foreshore, with steeply rising terrain to the east. Further information on site topography is provided in Section 5.4.2.

9.5.2 National Monuments

There are no National Monuments either within the Site or the surrounding 1km study area or settings assessment area.

9.5.3 Record of Monuments and Places (RMP) Within the 1km Study Area

There are no assets recorded on the RMP within the Site, with the closest being a burial ground (CO088-029), shown on the 1902 and 1935 OS 6-inch maps only, towards the tip of Long Point, 150m to the south-southwest. There are no surface traces of this asset, believed to contain victims of cholera and other infectious diseases, with the location now occupied by buildings associated with the Power Station. ESB has erected a monument commemorating these victims, although no remains have been uncovered during groundworks associated with the development of the current ESB facilities. This includes archaeological monitoring of engineering trial holes at the location in 2005[41].

One further archaeological site is recorded on the RMP just outside the 1km study area. It is located 1.1km to the southeast and consists of a partially collapsed early 19th century house (CO088-057). This is the former Careystown House, which was set within the surrounding grounds of Careystown (NIAH 3105). The house was burnt down during the 1920s and the surrounding grounds are now greatly denuded.

Careystown House (CO088-057) was supposedly located on the Site of Aghada Castle (CO088-057001), which was shown on a map from 1587 (Hayes-McCoy, 1964) and named 'Longeforde'. Interpretation of the name Longeforde is open to debate, with Power (1940) giving Aghada as Acadh Fhada, or 'the Long Field', while Edwards (1990) argues that 'Longeforde' probably derived from 'longphort', which was a Viking naval camp with the name surviving at nearby Long Point. This could indicate potential activity dating to the Early Medieval period on the foreshore and within the Site. However, there is no recorded evidence for this. There are no visible remains of Aghada Castle (CO088-057001).

9.5.4 Record of Protected Structures (RPS) Within the 1km Study Area

There is one Protected Structure recorded on the Cork CDP 2022-2028, just within the 1km study (refer to Appendix G.2). This is Whitegate House (RPS 593), which is located 1km to the southeast of the Site in the village of Whitegate. Comprising a detached, four-bay, two-storey house, which was built c. 1780, it has a single-bay, single-storey gabled porch to the front and a two-storey bow to the front elevation, west bay and a two-storey bow to the west elevation, north bay. Whitegate House is also recorded as 20831002 on the National Inventory of Architectural Heritage (NIAH).

9.5.5 Architectural Conservation Areas (ACAs) Within the 1km Study Area

There are no ACAs within the 1km study area around the Site.

9.5.6 National Inventory of Architectural Heritage (NIAH) Building Survey Within the 1km Study Area

There are two assets recorded on the NIAH within the 1km study area (refer to Appendix G.2). Of these, Whitegate House (NIAH 20831002) is also a Protected Structure and has been discussed above under this higher designation.

Located 200m to the southeast of the Site, Aghada Generating Station (NIAH 20908853) is a detached gas-fired power station built in 1978. It comprises a rectangular-plan, seven-storey turbine hall and twelve-storey boiler house of steel framed construction over brick base, with profiled metal cladding exterior. The towering stack and stepped Generating Station are considered to form a well-proportioned cluster which is visible from many parts of the harbour.

9.5.7 National Inventory of Architectural Heritage Gardens Survey

There are two Planned Landscapes present within the 1km study area (refer to Appendix G.2). These bound one another, comprising Hadwell Lodge (NIAH 3100) and Careystown (NIAH 3105). Both belonged to the Uniacke Penrose Fitzgerald family, who owned sizeable estates within the area. The family was responsible for the construction of a number of large houses during the 18th and 19th centuries including Hadwell Lodge, Careystown House (CO088-057) and Whitegate House (RPS 593). They were also responsible for the development of the fishing village of Whitegate to the south of the Proposed Development[40].

Hadwell Lodge (NIAH 3100), located 500m to the east, was known as the Hadwell (Penrose) Estate[40]. This estate was established during the 18th century and is clearly marked on the 1st edition OS map (1840) occupying the shoreline northeast of Long Point. Hadwell Lodge was set centrally within the garden, with outbuildings to the immediate east and a formal garden to the southeast. The Lodge was accessed via a treelined avenue leading from the south, while the garden boundaries were formed with dense planting. The Estate remained extant until the 20th century when the house was marked as in ruins. It is now occupied by Power Station, with all built remains removed. Elements of the dense boundary planting are still extant along the Shore Road.

The Historic Garden of Careystown (NIAH 3105) is located to the immediate south of Hadwell Lodge. It was constructed around Careystown House (CO088-057), dating to the early 19th century, although the house may be built on the Site of Aghada Castle (CO088-057001), which would have been surrounded by its own estate. The 1st edition OS map (1840) shows Careystown House (CO088-057) set centrally within the property accessed via a treelined avenue leading to the southwest. Formal gardens and an orchard are set to the immediate east of the house, with the majority of the property comprised of large rectangular fields bounded with mature vegetation.

Careystown (NIAH 3105) extended to the coast and appears to incorporate Whitegate House (RPS 593) at its southwest extent. A band of dense planting is located at the western edge of the property at the coast, and this extends to Whitegate House (RPS 593) with a network of paths extending north linking the two. Careystown (NIAH 3105) remained extant until the early 20th century, when the house was burned down during the War of Independence. The building and site footprint are still visible, although the garden is greatly denuded with modern housing constructed in the southwest as an extension to Whitegate village.

9.5.8 Townland Boundaries

The Site of the Proposed Development is located on reclaimed land on the coast. As such, it is not located within a townland and no townland boundaries cross it.

9.5.9 Previous Archaeological Investigations

Four archaeological investigations have taken place in association with the ESB plant at Aghada. The earliest of these took place in 2005 and related to the archaeological monitoring of geotechnical trial pits in the environs of the burial ground (CO088-029), in advance of the construction of the CCGT Plant[41]. This did not reveal any subsurface features of archaeological interest.

The other three archaeological investigations all related to work within the intertidal and marine environments adjacent to the ESB plant. Archaeological survey, both intertidal and subtidal, as well as the monitoring of construction groundworks on the foreshore revealed nothing of archaeological significance[42].

9.5.10 Historic Cartographic Evidence

The area was granted to the Carew family after the Anglo-Norman invasions of the late 12th century[40]. The Carew family constructed Aghada Castle (CO088-057001), which is shown on Candell's 'Map of Corke Harbour' drawn in 1587 (map not reproduced), and also giving the name to the surrounding townland of Baile na Charrunaigh (Carew's Town). The 1587 map shows the area in general terms, with only local fortifications shown. These are marked with a standardised icon and do not represent accurate depictions of the actual buildings. The Aghada Castle (CO088-057001) is labelled 'Longeford', and no other details are shown within the area.

The Civil Survey of 1656-8 gives general details of the townlands, noting that Aghada comprised 93 plantation acres and Ballincarroonig 63 plantation acres. Both were owned by Edmund Fitzgerald of Ballymaloe in 1641 but had passed to Sir William Penn by 1670. The accompanying map only shows outlines of each townland, with no details of topography or buildings given (map not reproduced).

[40] Byrne Mullins & Associates (2019). *BESS, Aghada Generating Station, Whitegate, County Cork. Cultural Heritage Report.*
[41] Byrne Mullins & Associates (2019). Battery Energy Storage System (BESS), Aghada Generating Station, Ballincarroonig.
[42] Bangerter (2008). *Aghada Power Station, Aghada, Cork in Bennett, I (Ed) Excavations.ie Database of Irish Excavation Reports.*

The 1st edition OS map (1840) shows the location of the Site in good definition (map not reproduced). The Site of the Proposed Development is located on the coast and comprising intertidal shoreline at this time. This shoreline is undeveloped, with Long Point being the only distinguishing feature. It is labelled Ring Point on this map edition. There are no indications of the burial ground (CO088-029). The adjacent inland areas are occupied by the planned landscapes of Hadwell Lodge (NIAH 3100) and Careystown (NIAH 3105).

The 2nd edition OS map (1902) shows the location of the Site of the Proposed Development at the start of the 20th century (map not reproduced). This map edition still shows the location as foreshore, although the detail shown suggests that the Site of the Proposed Development is located on sand with mud flats further seawards. No evidence for maritime activity such as quays or landing places are shown. Long Point is now named as such, with the location of the burial ground (CO088-029) also marked. The map also indicates that Long Point is submerged by Spring Tides, which denotes it is low lying. perhaps not surprisingly, there are no indications for structures on Long Point. The only major change from the 1st edition OS map is Shore Road, which now extends south along the coast.

The 3rd edition OS map (1935) shows the location of the Site of the Proposed Development during the 1930s (map not reproduced). There is little change from the previous map edition, with the location still shown as sandy foreshore. The burial ground (CO088-029) on Long Point is still marked and this is the only indication for human activity on the foreshore. The planned landscapes of Hadwell Lodge (NIAH 3100) and Careystown (NIAH 3105) are still very evident immediately inland, although this map post-dates the War of Independence and both Hadwell Lodge and Careystown House are identified as in ruins. On the map, these heritage gardens still consist of open ground and some dense planting within the location of the Site.

9.5.11 Aerial Photographic Evidence

Current aerial photographic evidence (www.google.ie) shows the existing layout of the Site of the Proposed Development (not reproduced). The Site of the Proposed Development is occupied by the Power Station which has completely transformed the shoreline, subsuming Long Point and the immediate area inland. The Site of the Proposed Development is located upon ground that extends into the tidal area and clearly comprises made ground. This is occupied by hard surfaces and tanks at the south and buildings jutting out into the tidal area to the north. An attenuation pond is located immediately to the southwest while a much large attenuation pond is located to the northeast.

The area immediately to the south of the Site of the Proposed Development is dominated by the Aghada Generating Station (NIAH 20908853), with its 120m high stack clearly visible in the aerial photographs. Similarly, the OCGT Plant is prominent to the west of the Generating Station. The Generating Station also extends east into the former planned landscape of Hadwell Lodge (NIAH 3100). There has been significant development here, with plant, tanks and infrastructure evident. Neither of the Historic Gardens of Hadwell Lodge (NIAH 3100) or Careystown (NIAH 3105) are now readily apparent. Whitegate House (RPS 593) is visible with its former walled garden apparent as a square area to its east. However, modern development has encroached northeast of the walled garden.

9.5.12 Designated Assets within the Wider Surrounding Area

The wider surrounding area was assessed for the impact that the Proposed Development, in particular its 7.5m high emissions stack, will have on the settings of designated heritage assets, including ACAs and Protected Structures. The majority of these assets are also recorded on the NIAH but are referenced here under their higher designations.

The Power Station is a particularly visible feature within the area, made especially noticeable by the existing 152m high emissions stack, and one OCGT and three plant emissions stacks each 65m high. The height of the proposed emissions stack for the Proposed Development will be approximately 7.5m in height and so considerably shorter than the existing emissions stacks. Additionally, the Proposed Development will be largely screened by existing structures and vegetation with the only views from the west and north across Cork Harbour. From these views, the Proposed Development will appear as part of a larger industrial complex blending against the existing industrial skyline, and the much larger OCGT and the Aghada Generating Station (NIAH 20908853). Additionally, the ground to the rear (east) of Power Station is a ridge with the result that the existing structures, including the shorter 65m high emissions stack, blend against the higher ground. The Proposed Development will similarly blend against the higher ground and will not create alter or change the existing views or the setting of designated heritage assets located across Cork Harbour.

9.5.13 Baseline Summary

Designated Heritage assets (National Monuments and Protected Structures) within 1km of the Site of the Proposed Development were assessed. Non-designated heritage assets including recorded monuments, structures and designed landscapes recorded by the NIAH within 1km of the Site were also assessed.

One Protected Structure, one Recorded Monument and three heritage assets recorded on the NIAH were assessed using Google Streetview, aerial/satellite imagery and mapping. Sites which were evidently screened by intervening modern development or dense vegetation during this review were scoped out of further assessment, as their settings were not considered to include the Site.

The closest heritage asset to the Proposed Development is the Aghada Generating Station (NIAH 20908853), which is located 200m to the southeast of the redline boundary. This asset is undesignated and is considered to be of local importance. The Site will be partially visible from the Aghada Generating Station (NIAH 20908853) with views mostly screened by the CCGT plant.

The burial ground (CO088-029) is 150m to the southwest of the Proposed Development on Long Point with the location now occupied by the CCGT Plant. There are no visible remains of this asset which is considered to be of local importance. The Proposed Development will be directly visible from the location of the burial ground (CO088-029).

The former Historic Garden of Hadwell Lodge (NIAH 3100) is located 500m to the east and has been greatly denuded with the existing Power Station site constructed upon it. It is considered to be of local importance. The construction of the Proposed Development will not impede views of this asset which is no longer apparent as a planned landscape.

The Historic Garden of Careystown (NIAH 3105) is located to the immediate south of Hadwell Lodge (NIAH 3100) and originally extended southwest to the village of Whitegate. The western boundary of the Historic Garden comprises dense mature vegetation and there are no views into this asset, which is denuded and considered to be of local importance.

Whitegate House (RPS 593) is a Protected Structure considered of regional importance located on the Shore Road. The Proposed Development will be located within the existing Power Station site on the shoreline directly to the north of Whitegate. While this complex is clearly visible from the shoreline within the village, the asset is orientated towards the sea, to the west with its principal views seawards that do not contain the location of the Proposed Development. Additionally, the location of the Proposed Development is totally screened by existing buildings within the Power Station site and dense vegetation. The location of the Proposed Development does not form part of views to or from Whitegate village.

9.6 Potential Impacts

9.6.1 Construction Phase

Construction of the Proposed Development under consideration has the likelihood to impact heritage assets in the following ways:

- Partial or total removal of heritage assets during Site clearance and construction of the Site and associated features and infrastructure within the existing Power Station site. This includes the erection of a 7.5m high emissions stack which will be constructed on the centre of the Proposed Development.
- Change to the setting of heritage assets, including visual and noise intrusion, and changes in traffic levels (construction phase only).

The Site of the Proposed Development is located on land occupied by the existing Power Station. Power Station is set on reclaimed land on the former foreshore at Long Point. One archaeological site is recorded within the Power Station site. This is the mid- to late 19th century burial ground (CO088-029), the location of which is now occupied by the OCGT. No recorded evidence for the burial ground has been uncovered during groundworks associated with Power Station. The purported location of the burial ground is on Long Point and outside the boundaries of the Proposed Development. There will be no direct physical impacts to the burial ground (CO088-029).

There are no recorded archaeological remains within the footprint of the Proposed Development on the foreshore. Any such remains would likely comprise maritime related features which would have been destroyed when the area was infilled during the 1970s. The original construction of Power Station involved the excavation of 500,000 cubic metres from the hillside within the former Historic Garden (NIAH 3100), with the excavated spoil used to infill the foreshore[43].

Given these conditions, no previously unrecorded heritage assets, of likely local importance, will be impacted by groundworks associated with the Site. The magnitude of impact is assessed as Low resulting in a significance of effect of Neutral.

The Aghada Generating Station (NIAH 20908853) is located 10m to the south of the Proposed Development. This asset is considered to be of local importance and low interest. This asset is an industrial structure set within an

[43] Byrne Mullins & Associates (2019).

associated modern industrial complex and is subject to associated noise, dust, vibration and visual intrusion. The ability to understand and appreciate the Aghada Generating Station (NIAH 20908853) will not be lessened by the presence of the Proposed Development. The change to setting would be such that the special interests or qualities are slightly affected without a noticeable change, leading to a magnitude of impact of Low, leading to a significance of effect of Imperceptible. The quality of the Imperceptible significance of effect is judged as Neutral while its duration is Long-Term.

The mid- to late 19th century burial ground (CO088-029), known from historic mapping, is located 150m to the southwest of the Proposed Development on Long Point. There are no visible remains of this asset, which is considered to be of local importance and of low interest. The location of this asset is occupied by an industrial building, while its wider setting is an industrial complex. It is subject to associated noise, dust, vibration and visual intrusion. The change to setting would be such that the special interests or qualities of the asset are not affected. The magnitude of impact is assessed as Low resulting in a significance of effect of Neutral.

The Proposed Development is located 422m to the west of the former Historic Garden of Hadwell Lodge (NIAH 3100). This Historic Garden has been greatly denuded and now contains the industrial buildings associated with Power Station. It is considered to be of local importance and low interest. The setting of Hadwell Lodge (NIAH 3100) is now that of an industrial complex and subject to associated noise, dust, vibration and visual intrusion. The construction of the Proposed Development will not change this. The magnitude of impact is assessed as Low resulting in a significance of effect of Imperceptible. By the definitions outlined in the EPA Guidelines (Section 10.3.4), the quality of the Imperceptible significance of effect is judged as Neutral while its duration is Long-Term.

The Historic Garden of Careystown (NIAH 3105) is located 523m to the southeast of the Proposed Development. The former Historic Garden has been greatly denuded and its setting is subject to noise, dust, vibration and visual intrusion from the adjacent Power Station site. It is considered of local importance and low interest. The change to setting would be such that the special interests or qualities are slightly affected without a noticeable change, leading to a magnitude of impact of Low and a significance of effect of Imperceptible. The quality of the Imperceptible significance of effect is judged as neutral while its duration is Long-Term.

Whitegate House (RPS 593) is located in Whitegate, 843m to the southeast of the Proposed Development. It is a Protected Structure and the closest designated asset to the Proposed Development. Whitegate House (RPS 593) is located on Strand Road, which is a busy regional road and serves industrial complexes including the nearby Whitegate Oil Refinery and the Power Station. The setting of the asset is already impacted by passing HGV traffic and any change resulting from HGV site traffic during the construction phase will be Low. Similarly, the setting of this asset will not be impacted by noise, dust and vibration during the construction works being largely screened by the existing power station buildings and topography.

While the Power Station is visible from Whitegate House (RPS 593), the Site of the Proposed Development will be screened by the existing buildings, dense vegetation and topography. Additionally, Whitegate House (RPS 593) is orientated so that its principal views face west towards Cork Harbour. The Site cannot be seen within views to or from Whitegate House (RPS 593). The ability to understand and appreciate Whitegate House (RPS 593) will not be lessened by the presence of the Proposed Development. The change to setting would be such that the special interests or qualities of Whitegate House (RPS 593) are only slightly affected without a noticeable change, leading to a magnitude of impact of Low, leading to a significance of effect of Slight. The quality of the Slight significance of effect is judged as Neutral while its duration is Long-Term.

9.6.2 Operational Phase

Significant effects for the operation of the Proposed Development derive from changes to the setting of heritage assets. These largely mirror the effects assessed for the permanent presence of the Proposed Development as detailed above in the assessment of the construction phase. There would be no change to the effects assessed for the heritage assets within the study area due to the permanent presence of the Proposed Development during the operational phase.

9.7 Mitigation Measures

9.7.1 Construction Phase

The assessment has determined that the Proposed Development is located within an industrial complex and within the context of a modern industrial development. The Site for the Proposed Development has been previously disturbed by the construction of the Power Station. Any archaeological remains which may have been present on the foreshore, intertidal or subtidal zone within the footprint of the development (situated on reclaimed and infilled land) will have been destroyed during these modern reclamation works which would have involved the dumping of tonnes of rock from the excavation of the hillside to the southwest.

The Proposed Development will not physically impact upon previously unknown archaeological remains. Given this, no archaeological mitigation is required either prior to or during the construction phase.

The Proposed Development will have an Imperceptible impact upon the settings of heritage assets during construction. Consideration of visual intrusion and noise impacts are addressed in Chapter 7 (Noise) and Chapter 0 (Traffic and Transport), while embedded mitigation measures are included within the Proposed Development design.

9.7.1.1 Embedded Mitigation to be Adopted During Construction Phase

During the construction phase procedures would be adopted, as described in the oCEMP (Appendix B), to reduce the impact of noise, dust and vibration during construction. Toolbox talks would be undertaken when necessary to inform construction supervision staff and site operatives of the requirements.

9.7.2 Operational Phase

Appropriate measures will have been implemented at construction phase to avoid or reduce adverse visual impacts. No further mitigation will be required at the operational phase (including maintenance periods).

9.8 Residual Impacts

This sub-section describes the resultant residual significance of effects on cultural heritage assets, following mitigation. This assessment has identified that, after mitigation, there would be impacts upon the settings of a number of heritage assets, resulting in Neutral effects upon the setting of five heritage assets, of which one is designated. None of these effects are assessed as significant (see summary below).

9.8.1 Assets of Medium Interest

There is one designated asset considered to be of medium value, comprising a Protected Structure. No specific mitigation for setting has been proposed in this chapter, as it is noted that appropriate mitigation for the construction phase is addressed in Section (Landscape and Visual) and Section 11 (Traffic and Transport). The residual effect would remain Long-Term and Slight, leading to a Neutral effect, which is Not Significant.

9.8.2 Assets of Low Interest

The remaining four assets are undesignated and considered of low interest. They comprise one archaeological asset, one building recorded on the NIAH and two Historic Gardens recorded on the NIAH. No specific mitigation for setting has been proposed in this chapter. The residual effect would remain Long-Term, Imperceptible and Neutral.

9.9 Cumulative Impacts

Should the construction of the listed projects in Table 1-5 and the Proposed Development occur concurrently, there is potential for cumulative effects to occur in combination with other sources in the local area.

As the Proposed Development will not physically impact upon previously unknown archaeological remains, no cumulative impact will occur as there are no direct impacts to archaeological remains that will give rise to a significant impact.

9.10 Summary

The Proposed Development comprises the construction of a hydrogen production demonstration project and associated plant within the existing Power Station site. This is an industrial location which has undergone previous disturbance, with the area of coast west of the R630 infilled with rock derived from the excavation of the hillside to the east of the R630. Any archaeological remains which may have been present will have been destroyed during these reclamation works associated with the construction of the Power Station. No archaeological mitigation is proposed.

The area of Power Station to the east of the R630 is constructed within the boundaries of the former Historic Garden of Hadwell Lodge (NIAH 3100), which is now greatly denuded. The existing Aghada Generating Station (NIAH 20908853) is located 10m to the south of the Proposed Development, while a mid- to late 19th century burial ground (CO088-029) is situated 150m to the southwest of the Proposed Development on Long Point. there are no visible remains of this asset, and no remains were observed of it during the construction of the Power Station CCGT plant.

The three heritage assets within the Power Station site are considered of local interest and low importance. No specific mitigation measures for setting have been proposed in this chapter. The residual effect would remain Long-Term, Imperceptible and Neutral.

The height of the proposed emissions stack for the Proposed Development will be 7.5m in height, which will not create a visual effect to the settings of designated heritage assets within the surrounding area.

9.11 References

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10. Traffic and Transport

10.1 Introduction

This chapter of the ECR assesses and evaluates the likely impact of the Proposed Development.

The Site is approximately 12km southeast of Cork City, on the eastern side of Cork Harbour. The Proposed Development is located at Ballincarroonig, near the village of Lower Aghada, which is sited approximately 770m northeast. The village of Whitegate is sited approximately 1.2km south of the Site. Access to the Site is by way of the N25 national primary road which forms the route from Cork to Rosslare Euro port via the R630 regional road.

Full details on the Proposed Development are provided in Chapter 2 and the Planning Statement submitted with this planning application.

Due to the existing operations at the Power Station site, the assessments of the road network were assumed to be able to have capacity for the Proposed Development construction traffic. It is understood that the operational phase traffic for the Proposed Development will be a low volume.

During the study of the Site there have been no limitations or assumptions in place throughout the document. Traffic volumes are based on predicted constructions volumes and junction impact is consulted using the traffic survey results obtained for the Site.

10.2 Legislation, Policy and Guidance

The following is a list of sources of information consulted for use in this chapter:

- CCC (2022). Cork County Development Plan 2022-2028.
- GOI (2021). National Development Plan 2021-2030.
- DTTS (2019). The Design Manual for Urban Roads and Streets.
- DTTS (2019). Traffic Signs Manual.
- TII (2014). PE-PDV-02045, Traffic and Transport Assessment Guidelines.
- TII (2016). PE-PAG-02016, Project Appraisal Guidelines for National Roads Unit 5.2 – Data Collection.
- TII (2016). PE-PAG-02039, Project Appraisal Guidelines for National Roads Unit 16.1 – Expansion Factors for Short Period Traffic Counts.
- TII (2017). DN-GEO-03031, Rural Road Link Design.
- TII (2017). DN-GEO-03060, Geometric Design of Junctions (Priority Junctions, Direct Accesses, Roundabouts, Grade Separated, And Compact Grade Separated Junctions.
- TII (2019). PE-PAG-02017, Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand Projections.

10.3 Methodology

10.3.1 Desktop and Site Audit Assessment

A desktop assessment was undertaken to identify the policy and legislation that is relevant to traffic and transport, to describe the baseline traffic conditions, and to identify the potential impacts associated with the Proposed Development upon the surrounding road network.

10.3.2 Significance of Impacts Methodology

Potential impacts of the Proposed Development (both positive and negative) are predicted for all significant transportation impacts. In accordance with Table 3.4 of the EPA Guidelines[3].

10.3.3 Significance of Effects

A qualitative approach was used in this evaluation, generally following the significance classification in Section 1.3.2 and through professional judgement. The significance of a predicted impact is based on a combination of the sensitivity or importance of the attribute and the predicted magnitude of any effect. The effects are identified as beneficial, adverse or negligible, temporary or permanent and their significance as major, moderate, minor or not significant (negligible).

Once the description of the effect, including magnitude, character, duration etc. has been identified, this can be cross-referenced with the importance of the sensitivity of the receptor to derive the overall significance of effect as per the EPA Guidelines.

10.3.4 Study Area Description

The study area for the chapter was established based on the anticipated routing to the Site for construction and operational vehicles at points in which traffic could be most intensive, e.g., in proximity to the Site.

10.4 Baseline Environment

10.4.1 Existing Road Network

This section sets out transport characteristics of the study area environment. The study area has been reviewed taking cognisance of the following:

- Road network.
- Road safety.
- Walking infrastructure.
- Cycling infrastructure.

The Power Station site is bisected by the R630 regional road, the Midleton-Whitegate Road. Access to the Site is provided off the R630, using the existing gated entrance (northern entrance) as shown in Figure 2-1.

The R630 is a regional road consisting of two 3.5m lanes in both directions with a grass strip to the north followed by a pedestrian footway along the coastal side of the road. This route is considered suitable access from Cork Port for potential heavy construction vehicles for the Site. The road surface is considered to be in good condition through desktop study imagery. Street lighting is provided on both sides of the R630. Residential dwellings exist sporadically on the eastern side of the Site. There are pedestrian footway facilities located in close proximity to the Site access point as shown in Photograph 10-1. However, these facilities do not continue for the entirety of the R630 network. Road safety on the R630 is considered an adequate standard based on the level of facilities provided to road users throughout the R630 network. The speed limit of the R630 is 80km/hr. Due to the existing operation at the Power Station site the proposed construction access is assumed adequate and further considered to be of the required standard. Therefore, there will be no changes to the proposed access point to the Site.

Photograph 10-1 R630[44]

The closest national road to the Site is the N25 which is located 12km north of the Site. There is roadway lighting on both sides of the road and a speed limit of 100km/hr. There are sporadic pedestrian footways throughout the road

[44] Google Earth Streetview

network. The N25 would facilitate construction loads accessing the Site adequately due to the good current working condition of the road.

10.4.2 Road Safety

As part of the road network analysis a review of the Road Safety Authority (RSA) traffic collision database would routinely be undertaken for the road network in the vicinity of the Site to identify any collision trends. This review is aimed to assist to identify any potential safety concerns in relation to the existing road network.

10.5 Potential Impacts

10.5.1 Construction Phase

The construction phase is predicted to take a period of approximately three months. Additional traffic movements are expected to peak at 10 vehicles per day, with four of those being HGV (i.e., a total of eight trips per day – four inbound and four outbound). The traffic assessment has been based on the period within this phase generating the peak or maximum amount of vehicular traffic i.e., the worst-case scenario to provide a robust assessment.

10.5.1.1 Access

Construction phase traffic will use the existing gated entrance (northern entrance) to the Site. Access to the Site will be off the R630, via an existing standard priority-controlled junction with a right turn pocket provided into the Site.

10.5.1.2 Walking Infrastructure

Construction traffic will use the existing gated entrance (northern entrance) to the Site. There is a pedestrian footway on the western side of the R630 at the Power Station's main access point.

10.5.1.3 Car Parking

Parking will be available onsite for construction staff vehicles and will be provided at one of the construction compounds. The precise amount of parking is not currently known but will be based on a first principles approach considering the volume of construction personnel predicted.

10.5.1.4 Haulage Routes

Construction materials will be brought to site by road along the R630 and the wider national road network. Construction materials will be transported in clean vehicles and lorries/trucks will be properly enclosed or covered during transportation of friable construction materials and spoil to prevent escape of material along the public roadway.

10.5.1.5 Works Programme

An outline programme of works is presented below and will be finalised by the appointed Contractor. The construction phase of the Proposed Development will be approximately three months.

10.5.1.6 Hours of Working

Hours of working onsite will be between 07.00 and 19.00 Monday to Friday and 08.00 to 14.00 on Saturday. This excludes public holidays, emergency work provisions and other working periods which would be agreed in writing with the Planning Authority. It is envisaged that employees may travel to and from work areas by car or light commercial vehicles outside of these hours.

10.5.1.7 Construction Traffic Management Plan (CTMP)

All environmental protection measures contained within this ECR will be incorporated into a detailed CTMP by the appointed Contractor.

Prior to commencement of construction works the appointed Contractor will draw up detailed Method Statements, environmental protection measures included within the planning application, and the guidance documents and best practice measures to be implemented in full during the construction phase.

10.5.2 Operational Phase

The operational phase has been scoped out of the assessment as minimal operational traffic will be generated. It is expected that two hydrogen filled tube HGV trailers would leave the Site and two empty trailers would be returned to the Site per day (i.e., a total of four trips per day – two inbound and two outbound).

Delivery by road will be limited to the hours of 07:00 and 19:00 Monday through Saturday, and no deliveries will take place on Sundays or at night, except in the case of extended emergency operations.

10.5.3 Decommissioning

It is expected that the Proposed Development will be operational for five years. At the end of the operational phase, the Proposed Development will either be decommissioned, or the operational lifetime will be extended via a separate application. It is expected that decommissioning will take approximately three months. Effects arising from the process of decommissioning of the Proposed Development are considered to be of a similar nature and duration to those arising from the construction phase and are therefore have not been considered separately.

10.6 Mitigation Measures

10.6.1 Construction Phase

A detailed CTMP will be prepared by the appointed Contractor in consultation with CCC, ESB and other stakeholders should consent be granted. The detailed CTMP would include but is not limited to the following:

- Warning signs/advanced warning signs will be installed at appropriate locations in advance of the construction access locations. For example, warnings advise other road users of times of slow-moving vehicles during abnormal load deliveries.
- Details of the advanced notification to the general public warning of any construction transport movements, specifically abnormal loads.
- The necessary agreements and timing restrictions for construction traffic.
- Consideration will be given to reduce the volume of construction traffic accessing the Site through reduce – reuse and recycle methods. Delivery control will also be adopted to reduce potential heavy vehicle convoys.
- Material deliveries and collections from Site will be planned, scheduled and staggered to avoid unnecessary build-up of demolition/construction works related traffic.
- HGV trips are anticipated to arrive and depart the Site at a uniform rate throughout the day to avoid pressure on the morning and evening peak hour periods.
- Appropriate vehicles will be used to minimise environmental impacts from transporting construction material, for example the use of dust covers on trucks carrying dust producing material.
- Speed limits of construction vehicles to be managed by appropriate signage, to promote low vehicular speeds within the Site.
- Parking of site vehicles will be managed and will not be permitted on the public road, unless proposed within a designated area that is subject to traffic management measures and agreed with CCC.
- A road sweeper will be employed to clean the public roads adjacent to the Site of any residual debris that may be deposited on the public roads leading away from the construction works, as required.
- All vehicles will be suitably serviced and maintained to avoid any leaks or spillage of oil, petrol or diesel. Spill kits will be available on site. All scheduled maintenance carried out offsite will not be carried out on the public highway.
- Safe and secure pedestrian facilities are to be provided where construction works obscure any existing pedestrian footways. Alternative pedestrian facilities will be provided in these instances, supported by physical barriers to segregate traffic and pedestrian movements, and to be identified by appropriate signage. Pedestrian facilities will cater for vulnerable users including mobility impaired persons.
- Proposals for maintenance of the agreed routes for the duration of the construction phase.
- Proposals for monitoring and agreeing maintenance costs.
- The mechanism for managing and monitoring the CTMP manage all aspects of the plan.
- Route signage. Temporary signage designating permissible HGV routes.

- Preparation of a Travel Plan for staff.
- Onsite wheel washing will be undertaken for construction trucks and vehicles to remove any debris prior to leaving the Site, to remove any potential debris on the local roads.
- Contractor speed limits.
- Community and emergency services liaison details.
- Using Garda escorts for abnormal loads where required.
- In addition to the preparation of an outline CTMP, other mitigation measures to reduce the traffic impact of the construction phase of the Proposed Development would also be considered subject to further investigation and landowner agreements. These include:
  - The use of Park and Share facilities for construction staff.
  - Any potential mitigation to consider cumulative construction traffic can be addressed via the final CTMP.

10.7 Residual Impacts

The temporary increase in construction traffic is likely to result in a slight residual environmental effect in terms of temporary construction phase traffic. The management of these effects will be achieved within the detailed CTMP.

Once the identified mitigation and monitoring measures, appropriate design standards and operational management plans are adhered to, it is considered that any impacts from the Proposed Development will result in a **Temporary Negative** effect **Moderate** in significance during the construction phase.

Table 10-1 Residual Impacts

Mode	Impact	Effect significance	Mitigation	Residual effect significance	Quality of Effects	Duration of Effect
Traffic	Increased construction traffic flows on the road network resulting in an increase in local traffic volumes.	**Moderate**	A detailed CTMP will be prepared by the appointed Contractor and agreed with CCC	**Slight**	**Negative**	**Temporary**

10.8 Cumulative Impacts

Should the construction of the listed projects in Table 1-5 and the Proposed Development occur concurrently, there is potential for temporary indirect cumulative effects traffic and transport.

Traffic volumes associated with the Proposed Development are relatively low in number and relate primarily to the delivery of construction equipment, materials and operations. The implementation of an approved CTMP put in place by the appointed Contractor prior to construction will minimise the potential for traffic and transport impacts during construction activities and the residual impact will be Moderate and Temporary.

10.9 Summary

The Proposed Development will utilise the existing regional road network, comprising the R630 and N25 for the Proposed Development construction traffic. Traffic volumes associated with the Proposed Development are relatively low in number and relate primarily to the delivery of construction equipment, materials and operations. The implementation of an approved CTMP put in place by the appointed Contractor prior to construction will minimise the potential for traffic and transport impacts during construction activities and the residual impact will be Moderate and Temporary.

It is expected that the Proposed Development will have a design life of at least 5 years. After 5 years in operation, the Proposed Development will either be upgraded to extend its operational life or will be decommissioned, depending on the electricity system requirements.

10.10 References

- CCC (2022). *Cork county development plan 2022-2028*.
- Department of Housing, Local Government and Heritage (DHLGH) (2018). Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment.
- Department of Transport, Tourism and Sport (DTTS) (2019). *The Design Manual for Urban Roads and Streets*.

- DTTS (2019). *Traffic Signs Manual.*
- EPA (2022). Guidelines on the Information to be Contained in Environmental Impact Assessment Reports.
- EC (2017). Environmental Impact Assessment of Projects Guidance on the Preparation of the Environmental Impact Assessment Report.
- Government of Ireland (GOI) (2021). *National Development Plan 2021-2030*.
- IEMA (UK Based) (2003). *Guidelines for the Environmental Assessment of Road Traffic.*
- TII (2014). PE-PDV-02045, *Traffic and Transport Assessment Guidelines*.
- TII (2016). PE-PAG-02016, Project Appraisal Guidelines for National Roads Unit 5.2 - Data Collection.
- TII (2016). PE-PAG-02039, Project Appraisal Guidelines for National Roads Unit 16.1 - Expansion Factors for Short Period Traffic Counts.
- TII (2017). Dn-geo-03031, *rural road link design.*
- TII (2017). DN-GEO-03060, Geometric Design of Junctions (Priority Junctions, Direct Accesses, Roundabouts, Grade Separated, and Compact Grade Separated Junctions.
- TII (2019). PE-PAG-02017, Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand Projections.

11. Major Accidents and Disasters

11.1 Introduction

This chapter is an assessment of major accident hazards and disasters based on the engineering design, drawings, and documentation. The likely significant impacts of major accidents and disasters regarding issues such as land and soils, geology and hydrogeology, hydrology, air quality, noise and vibration, human health and biodiversity are addressed in detail within this ECR. Full details on the Proposed Development are provided in Chapter 2 and the Planning Statement submitted with this planning application.

11.2 Legislation, Policy and Guidance

The following relevant legislation, policy, and guidance has informed the preparation of this chapter:

- EPA (2022), Guidelines on the Information to be Contained in Environmental Impact Assessment Reports.
- Health and Safety Authority (HSA) (2023), Guidance on Technical Land-Use Planning Advice, for planning authorities and COMAH establishment operators.
- Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015.

11.2.1 Background to (COMAH) Regulations

The Seveso III Directive (2012/18/EU) requires Member States to apply land-use or other relevant policies to ensure that appropriate distances are maintained between residential areas, areas of substantial public use and the environment, including areas of particular natural interest and sensitivity and hazardous establishments. For existing establishments, Member States are required to implement, if necessary, additional technical measures so that the risk to persons or the environment is maintained at an acceptable level.

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

The HSA is the Competent Authority in Ireland as defined by Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015, (COMAH Regulations 2015) which implement the Seveso III Directive in Ireland. The HSA is responsible for ensuring that the impacts of facilities which fall within the remit of this legislation are taken into account with respect to land use planning. This is achieved through the provision of technical advice to planning authorities.

The Proposed Development is a 0.5 ha site located inside the power station, which is licenced by the Environmental Protection Agency under an Industrial Emissions (IE) Licence [Ref.P0561-05] and a Lower Tier COMAH site; therefore, falls under the requirements of the Control of Major Accident Hazard Regulations (COMAH) Regulations, S.I. No. 209 of 2015.

11.3 Methodology

The analysis of the predicted impacts of the Proposed Development on human health and the environment during construction and operation are presented in this Chapter. The risk assessment identifies and quantifies risks focusing on unplanned, but plausible events occurring due to the Proposed Development. The approach to identifying and quantifying risks associated with the Proposed Development by means of a sites specific risk assessment is derived from the EPA Guidelines and all other documents outlined above.

Assessment methods quantify and predict the magnitude and significance of impacts. The methods employed for assessment and evaluation of the environmental topics for this Chapter are as follows:

- Risk assessment following Schedule 6 of the Planning and Development Regulations, 2001, as amended:
    - “a description of the expected significant adverse effects on the environment of the Proposed Development deriving from its vulnerability to risks of major accidents and/or disasters which are relevant to it. Relevant information available and obtained through risk assessments pursuant to European Union legislation such as the Seveso III Directive or the Nuclear Safety Directive or relevant assessments carried out pursuant to national legislation may be used for this purpose, provided that the requirements of the Environmental Impact Assessment Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for, and proposed response to, emergencies arising from such events”.

- Expert opinion.
- Review of Strategic Environmental Assessment prepared for the Cork County Development Plan 2022-2028 (including a review of the Development Plan itself). According to the EPA Guidelines, 2022, this can reduce the number of cumulative effects that need to be considered.
- Land Use Planning Assessment[45] following the Health and Safety Authority Guidance on Technical Land-Use Planning Advice (2023) which accompanies this application.
- Flood Risk Assessment following The Planning System and Flood Risk Management Guidelines for Planning Authorities published by the OPW[46].

11.3.1 Site Specific Risk Assessment Methodology

The site-specific risk assessment identifies and quantifies risks focusing on unplanned, but plausible events occurring due to the Proposed Development. The approach to identifying and quantifying risks associated with the Proposed Development by means of a sites specific risk assessment is derived from the EPA Guidelines.

The criteria for categorising risk are derived from the EPAs Guidance on Assessing and Costing Environmental Liabilities[47]. In this guidance, the risk assessment methodology commences with the establishment of risk classification criteria, based on likelihood and consequence, followed by risk analysis based on these criteria. Risk classification tables are required in order to evaluate and rank the risks compared with each other. They form the basis for rating the likelihood of an event occurring and the consequence of impact if the event occurs. The likelihood and consequence ratings are combined to form a risk score for risk evaluation.

Table 11-1 Risk Classification – Likelihood

Rating	Category	Description
1	Very low	Very low chance of hazard occurring
2	Low	Low chance of hazard occurring
3	Medium	Medium chance of hazard occurring
4	High	High chance of hazard occurring
5	Very high	Very high chance of hazard occurring

Table 11-2 Risk Classification - Consequence

Rating	Category	Description
1	Trivial	No impact of negligible change to the environment
2	Minor	Minor impact/localised or nuisance occurring
3	Moderate	Moderate impact to environment or human health
4	Major	Severe impact to environment or human health
5	Massive	Massive impact to a large area

The risks are then ranked according to their own risk score (1-5) in a colour coded matrix table which allows risks to be easily displayed and prioritised. The colour codes are as follows and indicated in Table 12.3 below:

- Red – high level risks requiring priority action (overall risk scores of 15-25).
- Yellow – medium-level risks requiring action, but not as critical as red-coded risks (overall risk scores of 8-12); and
- Green (light and dark) – low-level risks requiring continuing awareness and monitoring on a regular basis (overall risk scores of 1-6).

[45] AWN (2023), Land Use Planning Assessment for proposed Hydrogen Demonstration Project at Aghada Power Station
[46] OPW (2009), The Planning System and Flood Risk Management Guidelines for Planning Authorities
[47] EPA (2014), Guidance on Assessing and Costing Environmental Liabilities

Figure 11-1 Example Risk Matrix

Likelihood	Consequence: Trivial	Minor	Moderate	Major	Massive
Very High	Low	Medium	High	High	High
High	Low	Medium	Medium	High	High
Medium	Low	Low	Medium	Medium	High
Low	Low	Low	Low	Medium	Medium
Very Low	Low	Low	Low	Low	Low

11.3.2 Limitations

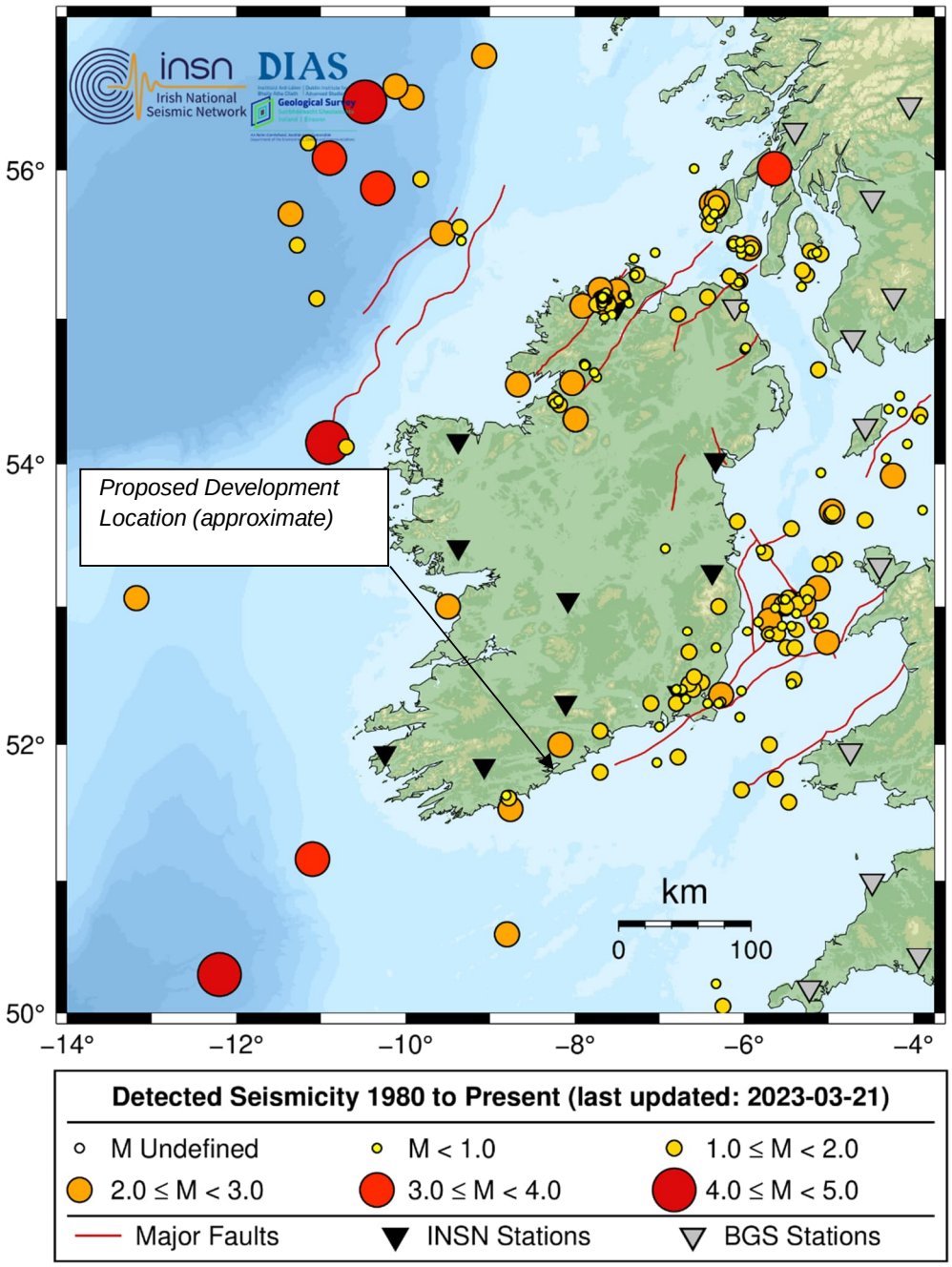
The description of existing conditions is based on the available desk study and information supplied by the design team as outlined in Chapter 2 – Description of Proposed Development.

11.4 Baseline Environment

11.4.1 Seismic Activity

In Ireland, seismic activity is recorded by the Irish National Seismic Network. The Geophysics Section of the School of Cosmic Physics, Dublin Institute for Advanced Studies, has been recording seismic events in Ireland since 1978 (www.dias.ie). This network consists of several seismometers that are located throughout Ireland. Figure 11-2 illustrates historical and recorded seismic events since 1980.

Figure 11-2 Ireland Seismic Activity Map



Seismic activity and earthquake risk in Ireland are generally considered to be low. This is because Ireland is located on the western edge of the Eurasian Plate, which is a tectonic plate that is not known for its seismic activity. However, earthquakes can still occur in Ireland, although they are typically small and have little impact.

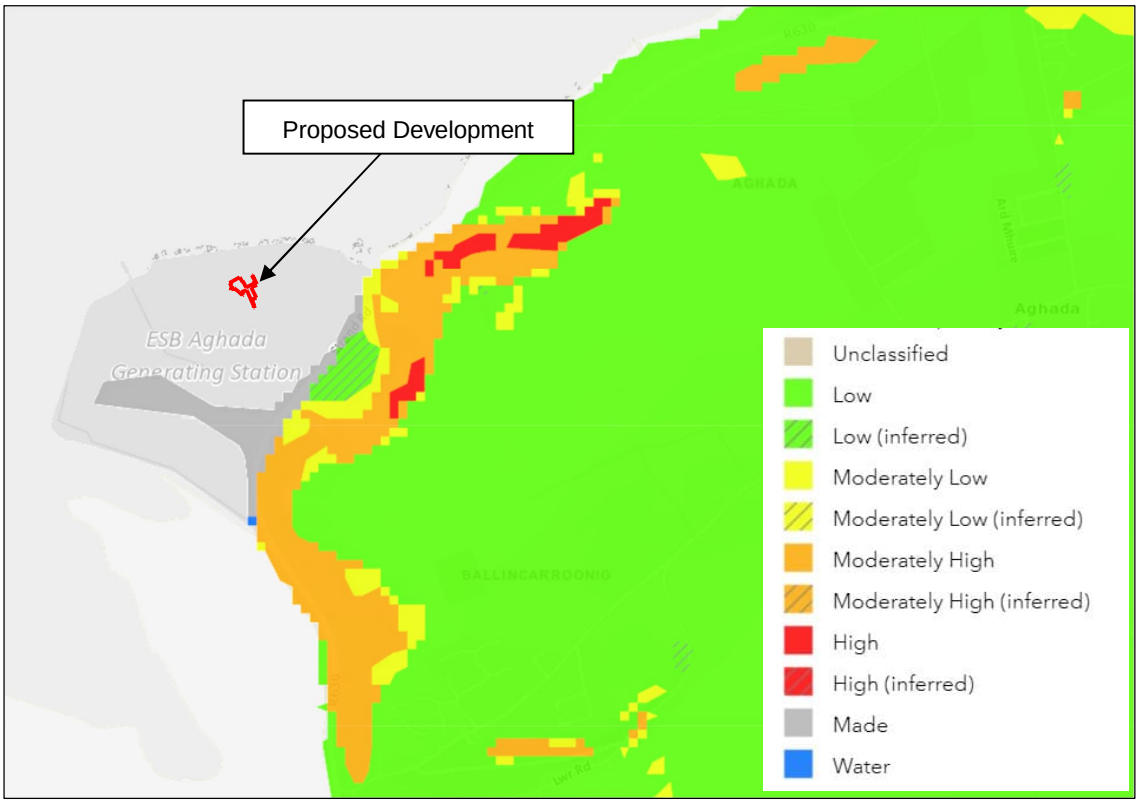
It can be seen in Figure 11-2 that there is no significant seismic activity recorded in the vicinity of the Proposed Development. Therefore, the likelihood of seismic activity initiating a major accident at the Proposed Development is negligible; therefore, not significant.

11.4.2 Landslides

Much of the Earth's surface is covered by unconsolidated sediments which can be especially prone to instability. Water often plays a key role in lubricating the slope failure. Instability is often significantly increased by man's activities in building houses, roads, drainage, and agricultural changes. Landslides, mud flows, bog bursts (in Ireland) and debris flows are a are a natural hazard that can occur. These can cause damage to property, infrastructure, and the natural environment, and can also pose a risk to human life.

In general, risk of landslides in Ireland is considered to be low, as the country is not located in a region with high seismic activity or large mountain ranges. Landslides are more common in unconsolidated material than in bedrock, and where the sea constantly erodes the material at the base of a cliff landslides and falls lead to recession of the cliffs. Landslides have occurred in Ireland in recent years in upland peat areas due to disturbance of peat associated with construction activities.

Figure 11-3 Landslide Susceptibility Map (GSI Ireland)



The landslide susceptibility map identifies areas which are subject to landslides and is measured from low to high. The landslide susceptibility map considers the location and potential causes of landslides (*e.g.,* slope, soil type and the impact of the flow of water). The landslide susceptibility for the Proposed Development is shown in Figure 11-3, this mapping confirms that the area surrounding the Proposed Development is made ground; therefore, the Site has a landslide susceptibility of Low (inferred)

Considering the Low (inferred) landslide susceptibility of the Site, the likelihood of a landslide initiating a major accident at the Proposed Development is negligible. The Proposed Development will be designed and constructed in accordance with established engineering and environmental standards ensuring the likelihood of the project initiating a landslide is considered negligible. Therefore, the project risk in relation to landslides is not significant.

11.4.3 Flood Risk

The Site-Specific FRA (refer to Appendix E.1) concluded that there is no significant risk of flooding to the Proposed Development. The Site-Specific FRA concluded that the Proposed Development is located within Flood Zone C for coastal flood risk/ and is not subject to flood in the 1:1000-year event (0.1% Annual Exceedance Probability). Therefore, there is no significant risk of flooding to the Proposed Development.

11.4.4 Metrological

The climatic conditions were assessed using data obtained from the Met Eireann Meteorological database between 2005 - 2023.

- Precipitation
  - The monthly mean total rainfall was 84.17 mm.
  - The maximum annual gust over the 18-year period was 84 knots.
- Temperature
  - The maximum temperature was 27.1ºC and the minimum temperature was -6.4ºC.

The Proposed Development, including the equipment and buildings are not considered to be at vulnerable to storms or during extreme heat or cold event, any more so than other significant buildings or structures. Therefore, the likelihood of extreme weather initiating a major accident at the Proposed Development is negligible; therefore, not significant.

11.4.5 Major Accident Hazards

Operations at the Aghada Power Station are such that the establishment is classified as a Lower Tier COMAH establishment under the Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015 (S.I. 209 of 2015). The major accident hazards identified in the Land Use Planning Assessment[45] for the Proposed Development, are presented in Table 11-3. The potential for impacts to human health and impacts to the environment were assessed.

Table 11-3 Major Accidents

Installation	Loss of Containment scenario	Consequence/Event
Indoor equipment (release in electrolyser room as representative of an indoor release) (*Note 1*)	Instantaneous failure	VCE
	Continuous leak over 10 minutes	VCE, jet fire or flash fire
	10 mm pipe leak over 10 minutes	VCE, jet fire or flash fire
Hydrogen Storage: tube trailers, MCP (30 bar(g) & 300 bar(g)	Instantaneous failure	VCE/Fireball
	Loss of entire contents (complete cylinder array) through largest connection	Jet fire
		VCE
		Flash fire
Refuelling station	Rupture or loading hose	Jet fire/Fireball
		VCE
		Flash fire
	Leak of loading hose (10% diameter)	Jet fire
		VCE
		Flash fire
Hydrogen Pipeline	Hydrogen Pipeline Rupture	Jet fire/Fireball
		VCE
		Flash fire
	Hydrogen Pipeline Leak (0.1 *x* Diameter)	Jet fire
		VCE
		Flash fire

The Land Use Planning Assessment concluded that the level of risk to persons off-site is acceptable and there is no risk of a major accident to the environment. There are no impacts, from the major accident hazards identified at the Proposed Development, to the Cork Harbour SPA. Therefore, it is concluded that the risk from a major accident, at the Proposed Development, to human health and environment in the surrounding area, will not be significant.

11.5 Potential Impacts

The main potential impacts on population and human health from the Proposed Development are potential for spills/leaks, air emissions, noise, visual, and traffic impacts. The baseline environment, pollution pathways, relevant mitigation measures and residual impacts have been assessed in greater detail within the corresponding specialist chapters of this ECR including Chapter 3 – Population and Human Health, Chapter 4 – Biodiversity, Chapter 5 – Land and Soils, Chapter 6 – Water and Chapter 7 – Noise and Vibration.

The major accident hazards identified in the Land Use Planning Assessment[45] for the Proposed Development, are presented in Table 11-3. The natural disaster hazards are presented in Table 11-4.

Table 11-4 Assessment of Natural Disasters

Natural Disaster	Phase	Impact	Consequence Rating	Basis of Consequence	Unmitigated Likelihood Rating	Basis of Unmitigated Likelihood	Unmitigated Risk Score	Mitigated Likelihood Rating	Basis of Mitigated Likelihood	Mitigated Risk Score
Extreme heat or cold weather resulting in result structural damage and/or pollution to soils, groundwater or surface waters	Construction/Operation	Human health, biodiversity, soils and geology, hydrology and hydrogeology	2	The Proposed Development will be constructed, and operated in accordance with all relevant planning, building and environmental licencing codes.	2	The oil storage tanks, and ammonium hydroxide tanks are not considered to be at risk during storms or during extreme heat or cold event, any more so than other significant buildings or structures.	4	1	• All construction activities will be suspended during extreme weather events.	2
Storm events resulting in structural damage and/or pollution to groundwater and surface waters	Construction/Operation	Human health, biodiversity, soils and geology, hydrology and hydrogeology	2	As above	2	As above	4	1	• As above	2
Flooding	Construction/Operation	Flooding	2	A Flood Risk Assessment was prepared in accordance with 'The Planning System and Flood Risk Management -Guidelines for Planning Authorities' issued by the Department of Environment, Heritage and Local Government in November 2009.	2	The Flood Risk Assessment concluded that the Proposed Development is within Flood Zone C, there is no significant risk of flooding to the Proposed Development.	4	1	• The Site-Specific FRA concluded that a regularly maintained drainage system would ensure the network remains effective should a large pluvial storm occurs. • The Proposed Development yard will be located at a minimum height of 3.65mOD. This is above the mid-range-future scenario (MRFS) level of 3.54mOD. • Surface water runoff associated with the Proposed Development will be collected on site in a dedicated drainage network and will ultimately discharge to Cork harbour. Surface water storage up to the 100-year flood event will be provided on site within the proposed concrete yard compound. The yard is proposed to act as a storage tank and will retain water during flood events. A low height reinforced concrete perimeter wall will be constructed along the edge of the proposed concrete slab with the access road into the yard compound ramped down locally at the entrance to ensure water can be retained within the yard compound.	2
Pollution to soils/groundwater/surface waters	Construction/Operation	Human health, biodiversity, soils and geology, hydrology and hydrogeology	2	Best practice construction methods will be implemented in order to prevent water (surface water and groundwater) pollution. The following has been implemented: • SuDS measures incorporated. • A flow control device will be installed to restrict the outflow into the existing network.	2	The construction phase of the Proposed Development will be carried out in accordance with good practice construction methodologies, all relevant health and safety guidance and legislation.	4	1	• Implementation of Construction Environmental Management Plan (CEMP) during demolition/construction, and ECR conditions during operations. • The proposed project will have petrol interceptors and silt traps at the outflow. These devices would have to fail in order for there to be a release to the surrounding environment.	2

11.5.1 Construction Phase

The following scenarios have been identified that could impact the construction phase of the project:

- Extreme heat or cold weather resulting in structural damage and/or pollution to soils, groundwater, or surface waters.
- Storm events resulting in structural damage and/or pollution to groundwater and surface waters.
- Flooding.
- Pollution to soils/groundwater/surface water.

The impact and likelihood of these scenarios is assessed in Table 11-4. There are no likely impacts on the project or to offsite receptors during the construction phase in relation to major accidents and disasters.

11.5.2 Operational Phase

The potential hazards associated with substances stored and process at for the Proposed Development, which have the potential to cause a major accident, are summarised in the following section. All hazards identified require a loss of containment to occur, such as, catastrophic damage or failure of pipework and/or processing units.

- Fire
  - Flash Fire: A flash fire can occur following a loss of containment of hydrogen from the hydrogen pipeline, hydrogen storage cylinders or hydrogen tube trailers, which results in a flame which passes through the mixture at less than sonic velocity such that explosion overpressures are negligible. A flash fire may be caused by releases at high or low pressure into an open, unconfined area which contacts an active source of ignition.
  - Jet Fire: A jet fire can occur following a loss of containment of hydrogen from the hydrogen pipeline, hydrogen storage cylinders or hydrogen tube trailers, which contacts an active source of ignition.
- Explosion
  - Vapour Cloud Explosion (VCE): A VCE can occur following a loss of containment of hydrogen from the hydrogen pipeline, hydrogen storage cylinders or hydrogen tube trailers, which does not ignite immediately may form a cloud of flammable material depending on the conditions of the release. If this cloud contacts an active source of ignition, a VCE can result and generate potentially harmful overpressures.

The impact and likelihood of these scenarios was assessed in the Land Use Planning assessment, and it was concluded that there are no likely impacts to off-site receptors, as a result of the Proposed Development, during the operational phase, in relation to major accidents and disasters.

The Land Use Planning Assessment has determined the risk zones for the Proposed Development. Section 7 of the Land Use Planning Assessment illustrates the Land Use Planning risk contours for the Proposed Development. The assessment concluded that there are no likely impacts to offsite receptors.

11.6 Mitigation Measures

The Proposed Development has been designed in line with good industry practice, and, as such, mitigation against the risk of major accidents and/or disasters is embedded through the design and in accordance with planning and legislative requirements.

The Proposed Development will comply with the requirements of the existing Power Station's IEL (Ref. P0561-05).

The EMS which will be amended to include the Proposed Development which will set out the requirements and procedures required to ensure that the Proposed Development is operating to appropriate standards. Licensed facility's, are required to comply with specific licence conditions, including monitoring and reporting on their emissions (such as emissions into the air, water, and soil), to ensure that they do not pose a risk to human health or the environment.

The proposed project will have petrol interceptors and silt traps at the outflow. These devices would have to fail in order for there to be a release to the surrounding environment.

All construction activities will be suspended during extreme weather events.

The Proposed Development will be carried out in accordance with the oCEMP submitted as part of this planning application. In advance of work starting onsite, the appointed Contractor will expand and develop the oCEMP into a

Contractor's CEMP and provide a documented account of the implementation of the environmental commitments set out in the ECR and any measures stipulated in the planning conditions.

The Proposed Development yard will be located at a minimum height of 3.65mOD. This is above the MRFS level of 3.54mOD. Surface water runoff associated with the Proposed Development will be collected onsite in a dedicated drainage network and ultimately discharge to Cork Harbour. Surface water storage up to the 100-year flood event will be provided on site within the proposed concrete yard compound. The yard is proposed to act as a storage tank and will retain water during flood events. A low height reinforced concrete perimeter wall will be constructed along the edge of the proposed concrete slab with the access road into the yard compound ramped down locally at the entrance to ensure water can be retained within the yard compound.

It is concluded that, there are no foreseeable scenarios that would result in a release of environmentally hazardous substances to the environment.

The existing Power Station site is a Lower Tier COMAH facility; therefore, is required to have a Major Accident Prevent Plan (MAPP) and Safety Management System (SMS) under the COMAH Regulations, S.I. No. 209 of 2015. These documents detail the potential hazards for the Power Station, Emergency Response Procedures and the training requirements for employees to ensure safe operation. These documents will be updated prior to operation of the Proposed Development, to ensure all major accident hazards at the Proposed Development are considered in employee training and emergency response. Therefore, it is concluded that the risk to personnel at the Proposed Development, from major accidents at the existing Power Station, is low.

11.7 Cumulative Impacts

The cumulative construction and operational impacts of the Proposed Development have been assessed upon evaluation of the size, scale, spatial reach, magnitude, and separation distances of nearby permitted, and future developments.

The Proposed Development is located in the existing Power Station. The existing Power Station is a notified Lower Tier COMAH facility. Therefore, there are potential for domino effects from the major accident hazards at the existing Power Station to the Proposed Development. The existing Power Station facility is required to maintain a MAPP, SMS and ERP; therefore, it is concluded that the risk to personnel at the Proposed Development, from major accidents at the existing Power Station, is low.

There are no other COMAH sites in the vicinity of the Proposed Development.

It is concluded that the cumulative impacts, from major accident hazards, will not be significant.

11.8 Residual Impacts

The residual effects are the final predicted or intended effects which occur after the proposed mitigation measures have been implemented. It will not always be possible or practical to mitigate all adverse effects.

This assessment has identified the potential for major accident hazards to occur. These scenarios can have significant consequences; however, the likelihood of these events occurring is low due to engineering and operational safeguards that will be implemented at the development.

The Land Use Planning Assessment concluded that the risk contours do not extend offsite; therefore, there are no likely impacts to off-site receptors and the level of individual risk on-site is acceptable. It can be concluded that the risk of major accidents and disasters associated with the proposed project will not be significant.

11.9 References

- Health and Safety Authority Guidance on Technical Land-Use Planning Advice, for planning authorities and COMAH establishment operators (2023)
- Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations, 2015 (COMAH Regulations 2015)
- AWN (2023), Land Use Planning Risk Assessment, *COMAH Land Use Planning Assessment for Proposed Hydrogen Project at Aghada Power Station*.

12. Mitigation, Monitoring, Residual Effects and Conclusions

12.1 Introduction

This chapter is a collation of the impacts assessed. assessment findings and the mitigation and monitoring measures (or commitments) identified within this ECR. The assessment findings and measures are summarised in Table 12-1.

Table 12-1 Environmental Impact Assessment Summary and Mitigation and Monitoring Commitments

Environmental Aspect	Phase	Section	Mitigation and Monitoring Measures
General	**Construction**	Section 2.6.12	The Proposed Development incorporates embedded measures that avoid or reduce as far as reasonably practicable the potential for adverse effects on the environment including the following: • The construction contractor will be required to implement appropriate communications including reporting of environmental practice onsite, toolbox talks, daily briefings, an environmental noticeboard (with ecological information, spill/emergency response, refuelling area/procedure and any particularly relevant environmental related information to ongoing works) and signage. • The Proposed Development will be carried out in accordance with the outline Construction Environmental Management Plan (oCEMP) submitted as part of this planning application. In advance of work starting onsite, the appointed Contractor will expand and develop the oCEMP into a Contractor's CEMP and provide a documented account of the implementation of the environmental commitments set out in the ECR, NIS and any measures stipulated in the planning conditions. Best practice guidance on pollution prevention will be followed at all times during the construction/decommissioning and operation of the Proposed Development, which will include: • Controls and contingency measures will be provided to manage runoff from construction areas and to manage sediment. • Dust and particular matter mitigation measures in accordance with the Institute of Air Quality Management guidance documents (Holeman *et al*, 2016 and IAQM, 2016) will be implemented. • All oils, fuels, lubricants or other chemicals will be stored in an appropriate secure container in a suitable storage area, with spill kits provided at the storage location and at places across the Site. There will be no storage of any oils, fuels, lubricants or other chemicals stored or batched within 30m of any aquatic feature. • In order to avoid potential pollution impacts to waterbodies, soils or vegetation from machinery during construction, all refuelling and servicing of vehicles and plant will be carried out in a designated area which is bunded and has an impermeable base. This will be situated at least 30m from any aquatic feature. • Concrete batching will only occur outside the setback zone of 30m from aquatic features and will be carefully controlled to avoid spillage. Washout from concrete chutes will be carried out only in a designated contained impermeable area. • Temporary soil storage should be located at least 10m from any aquatic feature. • Soil exposure during the construction works will be minimised and exposed soil will be reinstated as rapidly as possible. • The construction contractor will not be permitted to use materials that could cause heavy metal, sulphide or strong acid pollution of runoff and must use aggregates free of excessive fines/clays. • The appointed contractor will ensure pumping of water from excavations (if required) is controlled, to prevent excessive dewatering. • A pollution prevention plan (or similar document) will be prepared by the appointed contractor and will include procedures and diagrams for: – Notification of a water quality incident and actions to remediate the incident. – Dewatering of excavations to designated treatment area. – Temporary soil storage. – Fuel storage/refuelling. – Concrete wash-out area. – Controlling surface water entering site. – Preventing existing drainage features becoming pathways for construction runoff. – Reducing soil exposure and reinstating as rapidly as possible. – Temporary construction mitigation measures such as silt fencing and straw bales. – Contingency measures.

Environmental Aspect	Phase	Section	Mitigation and Monitoring Measures
			A range of best practice control measures in relation to noise and vibration will be implemented with a view to maintaining noise emissions at reduced levels. The following mitigation measures will apply during the construction and/or decommissioning phase of the Proposed Development: • All plant used on the Site will comply with the EC Directive on noise emissions for outdoor equipment (2000/14/EC), where applicable. • Operation of plant in accordance with the manufacturer's instructions. • All plant used on the Site will be regularly maintained, paying particular attention to the integrity of silencers and acoustic enclosures. • Construction machinery and plant in intermittent use will be shut down in the intervening periods between work or throttled down to a minimum. • Drop heights of materials from lorries and other plant will be kept to a minimum. • Adherence to the codes of practice for construction working and piling given in British Standard (BS) 5228 and the guidance given therein for minimising noise emissions from the Site. • Compliance with normal construction working hours of 07:00 to 19:00hrs Monday to Friday, 08:00 to 14:00hrs on Saturdays. This excludes public holidays, emergency work provisions and other working periods which would be agreed in writing with the planning authority. If works are undertaken during peak winter months, works will operate from 08:00 to 17:30hrs Monday to Friday (November to January) to reduce disturbance of any roosting special conservation interest (SCI) birds. • Periodically check that mitigation measures are being implemented and are fit for purpose during the works with corrective action mechanisms in place.
General	**Operational**	Section 2.7.1	The Proposed Development will comply with the requirements of the existing Power Station's IEL (Ref. P0561-05). The EMS for the Power Station which will be amended to include the Proposed Development. The EMS will set out the requirements and procedures required to ensure that the Proposed Development is operating to appropriate standards. The Proposed Development will comply with the requirements of the EU (Large Combustion Plants) Regulations 2012, S.I. No. 566 of 2012, under an IE Licence.
Population and Human Health	**Construction**	Section 3.6	An oCEMP (Appendix B) has been prepared as part of the planning application. In advance of work starting onsite, the appointed Contractor will expand and develop the oCEMP into a Contractor's CEMP to ensure that there are no impacts on any vector that would pose a risk to human health. No additional mitigation measures related to Population and Human Health are proposed during the operation of the Proposed Development. No additional monitoring measures are proposed.
Biodiversity	**Construction/ Decommissioning**	Appendix C	• A visual screen in the form of a windbreak or mesh netting of between 2 and 4m in height will be installed along the edge of the western and northern perimeters of the Proposed Development for construction and decommissioning phases. • Works within 30m of the Cork Harbour SPA will not be permitted to take place during hours of darkness. • Elsewhere within the Site of the Proposed Development, any lighting required during the construction and decommissioning phases will be directional and will be prevented from spilling light onto watercourses or other habitats through the use of cowling. As also described for mitigation of Cork Harbour SPA in the AA Screening and NIS (AECOM, 2023a), a visual screen in the form of a windbreak or mesh netting of between 2m and 4m in height will be installed along the edge of the western and northern perimeters of the Proposed Development for construction and decommissioning phases. • As good practice, it is recommended that biosecurity measures are implemented as practicable to prevent the further spread of these species. These measures must be clearly set out in a Method Statement for the works.
Land and Soils	**Construction/ Decommissioning**	Section 5.7.1	**Fuel and Chemical Handling, Transport and Storage** The following mitigation measures will be taken at the Site in order to prevent any spillages to ground of fuels and prevent any resulting soil and / or groundwater quality impacts: • Designation of bunded re-fueling areas on the Site (if required).

Environmental Aspect	Phase	Section	Mitigation and Monitoring Measures

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

Excavation and Infilling

- The Proposed Development will incorporate the reduce, reuse and recycle approach in terms of soil excavations onsite. The construction will be carefully planned to ensure only material required to be excavated will be excavated, with as much material left in-situ as possible. All excavation arisings will be reused onsite where possible/if suitable.
- Soil stripping, earthworks and stockpiling of soil will be carried out during the works. Stockpiles have the potential to cause negative impacts on air and water quality. The effects of soil stripping and stockpiling will be mitigated through the implementation of an appropriate earthworks handling protocol during construction. It is anticipated that only local/low level of stockpiling will occur as the bulk of the material will be excavated either straight into trucks for transport off site or will be reused in other areas of the Site as fill.
- Dust suppression measures (e.g., damping down during dry periods), vehicle wheel washes, road sweeping and general housekeeping will ensure that the surrounding environment are free of nuisance dust and dirt on roads.
- Where material cannot be reused offsite, it will be sent for recovery/disposal at an appropriately permitted/licenced site. Provisions of possible offsite management of excavation waste will be outlined in oCEMP to be finalised by the appointed Contractor prior to works starting onsite.
- Runoff from excavations/earthworks cannot be prevented entirely and is largely a function of the prevailing weather conditions. Earthwork operations will be carried out such that surfaces, as they are being raised, shall be designed with adequate drainage, falls and profile to control runoff and prevent ponding and flowing. Care will be taken to ensure that exposed soil surfaces are stable to minimise erosion. All exposed soil surfaces will be within the main excavation site, which limits the potential for any offsite impacts. Any runoff will be prevented from directly entering any watercourses or Cork Harbour.
- Should any discharge of construction water be required during the construction phase, discharge to foul sewer will be regulated under a Discharge Licence obtained from the Regulator (Uisce Eireann) issued under the Water Pollution Act. Attenuation, pre-treatment and monitoring of discharge water will likely be required under any Discharge Licence (Section 16 Licence). Pre-treatment and silt reduction measures onsite will include a combination of silt fencing, settlement measures (silt traps, silt sacks and settlement tanks) and hydrocarbon interceptors. Active treatment systems such as Siltbusters or similar may be required depending on turbidity levels and discharge limits. Qualitative and quantitative monitoring will be implemented as per the Conditions of any Discharge Licence. The Applicant's environmental consultant will audit the sampling and analysis results as required to ensure conformance to the discharge licence limits and testing frequency requirements.

Sources of Fill and Aggregates for the Proposed Development

All fill and aggregate for the Proposed Development will be sourced from reputable suppliers as per the project Contract and Procurement Procedures. All suppliers will be vetted for:

- Aggregate compliance certificates/declarations of conformity for the classes of material specified for the Proposed Development.
- Environmental management status.
- Regulatory and legal compliance status of the suppliers.

Control of Concrete and Lime

- Ready-mixed concrete will be brought to the Site by truck.
- A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters, or contaminated water to the underlying subsoil and groundwater, or wash-water to the surface water drainage system or to the underlying subsoil.
- The pouring of concrete will take place within a designated area protected to prevent concrete runoff into the soil / groundwater media.

Environmental Aspect	Phase	Section	Mitigation and Monitoring Measures
			• Wash down and washout of concrete transporting vehicles will take place at an appropriate facility, offsite where possible. Alternatively, where wash out takes place on-site, it will be carried out in carefully managed designated on-site wash out areas and direct discharge of wash-water to surface waters will be strictly prohibited. **Discharge of contaminated water to sewer** • The appointed Contractor will be supplied with the most recent groundwater sampling results and any subsequent groundwater analytical results. The Contractor will design an onsite pre-treatment system (if required). Any discharge to sewer will be carried out under a discharge licence. **Storage of Hazardous Material/Accidental Spills** • Good housekeeping and proper handling, storage and disposal of any potentially polluting substances can prevent soil and/or water contamination. Designated and bunded storage areas will be maintained. **Import/Export of Materials** • All suitable surplus subsoil, if any exists, will be exported for reuse off site where a suitable reuse site can be identified. Soil reuse will be subject to the requirements under the Waste Management Act (e.g., Article 27 or 28). Where material cannot be reused it will be recovered or disposed of in accordance with the Waste Hierarchy and Waste Management Act. • Aggregates will be required for sub-base under roads and buildings. All sub-base materials must meet the relevant engineering specification. The use of recycled or secondary aggregates will be considered as a replacement for primary aggregates. **Potential Contaminated Runoff Percolating to Ground and the Underlying Aquifer** • There will be no direct discharge to groundwater during construction. • Protection of groundwater from potentially polluting substances will be dealt with through a number of measures including correct handling and storage of potentially polluting substances. • Concrete use and wash-out areas will be in designated areas, with measures to prevent alkaline wastewaters or contaminated storm water runoff to the underlying subsoil or to the surface water or marine environment.
Land and Soils	**Operational**	Section 5.7.2	• The Proposed Development will incorporate mitigation measures for potential spills of oils and/or chemicals in accordance with best practices which will suffice to reduce the impact of such events if they occur. • In addition, the Site is located within a facility already licenced by the EPA. The existing Power Station IEL requires regular monitoring of environmental receptors (groundwater, etc.). • There will be no direct discharge to groundwater during construction. Protection of groundwater from potentially polluting substances will be dealt with through a number of measures including correct handling and storage of potentially polluting substances. Concrete use and wash-out areas will be in designated areas, with measures to prevent alkaline wastewaters or contaminated storm water runoff to the underlying subsoil or to the surface water or marine environment. • Good housekeeping and proper handling, storage and disposal of any potentially polluting substances can prevent soil and/or water contamination. Designated and bunded storage areas will be maintained. Integrity testing of bunds will mitigate against any risk of leaks.
Water	**Construction/ Decommissioning**	Section 6.6.1 Section 6.6.3	**Sedimentation of Surface Waters** • Excavations will only remain open for the shortest possible time to reduce groundwater ingress. Silt traps will be placed around the Site to reduce silt loss and these will be inspected and cleaned or replaced regularly. • Runoff from spoil heaps will be prevented from entering watercourses by diverting it through settlement ponds and removing material offsite as soon as possible to designated storage areas. • Silt traps will be placed at any crossing points to avoid siltation of drainage channels and, if the need arises, silt fences will be used during the works in order to reduce the potential for pollution of watercourses. These will be maintained and cleaned regularly throughout the construction phase. • Good construction practices will also be used during the construction phase, such as wheel washers and dust suppression onsite roads and at the Site access points.

Environmental Aspect	Phase	Section	Mitigation and Monitoring Measures
			• Surface water runoff from working areas will not be allowed to discharge directly to Cork Harbour. To achieve this, the drainage system will be constructed prior to the commencement of major site works. All design and construction will be carried out in accordance with CIRIA C532 Control of Water Pollution from Construction Sites Guidance for Consultants and Contractors. **Fuel and Chemical Handling** • Designate a bunded storage area at the Contractor's compound(s) and away from surface water gullies or drains for oils, solvents and paints used during construction. The fuel storage tanks will be bunded to a volume of 110% of the capacity of the largest tank/container within the bunded area. • Drainage from the bunded area will be diverted for collection and safe disposal. All containers within the storage area will be clearly labelled so that appropriate remedial action can be taken in the event of a spillage. When moving drums from the bunded storage area to locations within the Site, a suitably sized spill pallet will be used for containing any spillages during transit. • Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles, will take place in designated impermeable refuelling areas isolated from surface water drains. Spill kit facilities will be provided at the fuelling area in order to provide for any accidental releases or spillages in and around the area. Any used spill kit materials should be disposed of via a hazardous waste contractor. • Where mobile fuel bowsers are used on the Site in the event of a machine requiring refuelling outside of the designated area, fuel will be transported in a mobile double skinned tank. Any flexible pipe, tap or valve must be fitted with a safety lock where it leaves the container and locked shut when not in use. Each bowser should carry a spill kit and each bowser operator must have spill response training. No refuelling will be allowed within 30m of Cork Harbour. • Adequate stocks of hydrocarbon absorbent materials (e.g., spill-kits and/or booms) will be held onsite in order to facilitate response to accidental spills. Spill response materials will also be stored on all construction vehicles. **Water Demand** • While the water demand associated with the Proposed Development is low, the Site water main system will be managed to facilitate detection of leakage and the prevention of water loss. • Dual & low flush toilets, water economy outlets and rainwater harvesting will be considered to reduce the water demand. **Control of Concrete and Lime** • All ready-mixed concrete will be brought to site by truck. • A suitable risk assessment for wet concreting will be completed prior to works being carried out, which will include measures to prevent discharge of alkaline wastewaters or wash-water to the surface water drainage system or to the underlying subsoil. • Wash down and washout of concrete transporting vehicles will take place at an appropriate bunded area and direct discharge of wash-water to surface waters will be strictly prohibited.
Water	**Operational**	Section 6.6.2	**Water Demand** • While the water demand associated with the Proposed Development is low, the Site water main system will be managed to facilitate detection of leakage and the prevention of water loss. • Dual & low flush toilets, water economy outlets and rainwater harvesting will be considered to reduce the water demand. **Accidental Spillage and Leaks** • Routine maintenance will be carried out in accordance with the maintenance procedures provided by the contractor and manufacturer. The Proposed Development will be required to undertake an annual inspection, as per the manufacturer's requirements.
Noise & Vibration	**Construction/ Decommissioning**	Section 7.6.1	A detailed assessment of construction noise has been scoped out and therefore mitigation is not required in relation to construction noise and vibration from the Site and construction vehicle noise on local roads.
Noise & Vibration	**Operational**	Section 7.6.2	An assessment of the operational phase was undertaken, and it was shown that based on the provided layout and sound power levels for the planned equipment that operational noise emissions are compliant and well below the assessment criteria of 45 dB LAeq, T.

Environmental Aspect	Phase	Section	Mitigation and Monitoring Measures
			The proposed plant incorporates embedded mitigation including insulated compressor housing which acts as a noise mitigation. Furthermore, compliance with the nominated criteria will be confirmed via repeated compliance noise monitoring in line with the existing permit conditions. The Proposed Development will comply with the requirements of the EU (Large Combustion Plants) Regulations 2012, S.I. No. 566 of 2012, under an IEL. The terms and conditions of which are anticipated to be requiring a noise monitoring protocol to be adopted.
Material Assets	**Construction/ Decommissioning**	Section 8.6	• • Works during the construction phase, including service diversions and realignment will be carried out in accordance with relevant guidance documents, including Gas Networks Ireland's publication 'Safety advice for working in the vicinity of natural gas pipelines'. the ESB's Code of Practice for Avoiding Danger from Overhead Electricity Lines', and the Health and Safety Authorities (HSA) 'Code of Practice for Avoiding Danger from Underground Services', or update guidance relevant at the time of construction. • • The appointed Contractor will be obliged to put measures in place during the construction phase to ensure that there are no interruptions to existing services and all services and utilities are maintained unless this has been agreed in advance with the relevant service provider and local authority. When service suspensions are required during the construction phase, reasonable prior notice will be given to the residents in the area. The disruption to services or outages will be carefully planned so the duration is minimised. The timing of local domestic connections will be addressed between the Contractor and the local community at the detailed design stage.
Cultural Heritage	**Construction/ Operational**	Section 9.9	• The Proposed Development will not physically impact upon previously unknown archaeological remains. Given this, no archaeological mitigation is required either prior to or during the construction or operational phase.
Traffic and Transport	**Construction/ Decommissioning**	Section 10.6	A detailed CTMP will be prepared by the appointed Contractor in consultation with CCC, ESB and other stakeholders should consent be granted. The detailed CTMP would include but is not limited to the following: • Warning signs/advanced warning signs will be installed at appropriate locations in advance of the construction access locations. For example, warnings advise other road users of times of slow-moving vehicles during abnormal load deliveries. • Details of the advanced notification to the general public warning of any construction transport movements, specifically abnormal loads. • Consideration will be given to reduce the volume of construction traffic accessing the Site through reduce – reuse and recycle methods. Delivery control will also be adopted to reduce potential heavy vehicle convoys. • Material deliveries and collections from Site will be planned, scheduled and staggered to avoid unnecessary build-up of demolition/construction works related traffic. • HGV trips are anticipated to arrive and depart the Site at a uniform rate throughout the day to avoid pressure on the morning and evening peak hour periods. • Appropriate vehicles will be used to minimise environmental impacts from transporting construction material, for example the use of dust covers on trucks carrying dust producing material. • Speed limits of construction vehicles to be managed by appropriate signage, to promote low vehicular speeds within the Site. • Parking of site vehicles will be managed and will not be permitted on the public road, unless proposed within a designated area that is subject to traffic management measures and agreed with CCC. • A road sweeper will be employed to clean the public roads adjacent to the Site of any residual debris that may be deposited on the public roads leading away from the construction works, as required. • All vehicles will be suitably serviced and maintained to avoid any leaks or spillage of oil, petrol or diesel. Spill kits will be available on site. All scheduled maintenance carried out offsite will not be carried out on the public highway. • Safe and secure pedestrian facilities are to be provided where construction works obscure any existing pedestrian footways. Alternative pedestrian facilities will be provided in these instances, supported by physical barriers to segregate traffic and pedestrian movements, and to be identified by appropriate signage. Pedestrian facilities will cater for vulnerable users including mobility impaired persons. • Proposals for maintenance of the agreed routes for the duration of the construction phase. • Proposals for monitoring and agreeing maintenance costs. • The mechanism for managing and monitoring the CTMP manage all aspects of the plan.

Environmental Aspect	Phase	Section	Mitigation and Monitoring Measures
			• Route signage. Temporary signage designating permissible HGV routes. • Preparation of a Travel Plan for staff. • Onsite wheel washing will be undertaken for construction trucks and vehicles to remove any debris prior to leaving the Site, to remove any potential debris on the local roads. • Contractor speed limits. • Community and emergency services liaison details. • Using Garda escorts for abnormal loads where required. • In addition to the preparation of an outline CTMP, other mitigation measures to reduce the traffic impact of the construction phase of the Proposed Development would also be considered subject to further investigation and landowner agreements. These include: – The use of Park and Share facilities for construction staff. – Any potential mitigation to consider cumulative construction traffic can be addressed via the final CTMP.
Major Accidents and Disasters	**Construction/ Decommissioning/ Operational**	Section 11.6	• The Proposed Development will comply with the requirements of the existing Power Station's IEL (Ref. P0561-05). • The EMS which will be amended to include the Proposed Development which will set out the requirements and procedures required to ensure that the Proposed Development is operating to appropriate standards. Licensed facility's, are required to comply with specific licence conditions, including monitoring and reporting on their emissions (such as emissions into the air, water, and soil), to ensure that they do not pose a risk to human health or the environment. • The proposed project will have petrol interceptors and silt traps at the outflow. These devices would have to fail in order for there to be a release to the surrounding environment. • All construction activities will be suspended during extreme weather events. • The existing Power Station site is a Lower Tier COMAH facility; therefore, is required to have a Major Accident Prevent Plan (MAPP) and Safety Management System (SMS) under the COMAH Regulations, S.I. No. 209 of 2015. These documents detail the potential hazards for the Power Station, Emergency Response Procedures and the training requirements for employees to ensure safe operation. These documents will be updated prior to operation of the Proposed Development, to ensure all major accident hazards at the Proposed Development are considered in employee training and emergency response.