

Shannon Technology and Energy Park (STEP) Power Plant

Non-Technical Summary (NTS) - Volume 1

Shannon LNG Limited

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1. Introduction

1.1 Background

This document presents a Non-Technical Summary (NTS) of the Environmental Impact Assessment Report ((EIAR) Volume 2)) that has been prepared by AECOM Ireland Limited (herein referred to as “AECOM”) on behalf of Shannon LNG Limited (‘hereafter referred to as the Applicant’), a subsidiary of New Fortress Energy (NFE).

The Applicant is seeking planning permission for a Combined Cycle Gas Turbine (CCGT) gas-powered power plant capable of electricity generation, Battery Energy Storage System, Above Ground Installation, and associated plant, equipment and infrastructure which will be known as the Shannon Technology and Energy Park Power Plant (STEP Power Plant) (herein referred to as the “Proposed Development”). The Site of the Proposed Development (herein referred to as “the Site”) is located between Tarbert and Ballylongford, County Kerry, as shown on **Figure 1.1** and **Figure 1.2**.



Figure 1.1: Site Location



Figure 1.2: Layout of the Site for the Proposed Development

The EIAR is presented in four volumes:

- **Volume 1:** Non-Technical Summary (NTS).
- **Volume 2:** Main Report - Environmental Impact Assessment Report (EIAR).
- **Volume 3:** Figures.
- **Volume 4:** Appendices.

This NTS (Volume 1) provides an overview of the Proposed Development, the Environmental Impact Assessment methodology and the structure of the main report – the EIAR (Volume 2).

The EIAR includes a consideration of reasonable alternatives and identifies the potential significant environmental effects arising from both the construction, operational and decommissioning phases of the Proposed Development. Where likely significant environmental effects have been identified, mitigation measures have been proposed to avoid, prevent, reduce or offset the effects. In addition, cumulative environmental impacts of the Proposed Development have been assessed, where appropriate.

The main objectives of the Proposed Development are to:

1. Provide 600 Megawatts (MW) of fast acting flexible thermal generation capacity to the Irish electricity market.

2. Provide a 120 Megawatt-hour (MWh) (1-hr) Battery Energy Storage System to participate in the electricity ancillary services market.
3. To ensure that Shannon LNG's award of a capacity contract in March 2023 from EirGrid, to deliver 353 MW of electricity generation capacity is delivered at the Site by no later than 1st October 2026, or any subsequent date extension approved by the Regulator.
4. To support the provisions of recent national policies with respect to security of electricity supply, including the *Climate Action Plan 2024*, the *National Energy Security Framework 2022*, the government's *Policy Statement on Security of Electricity Supply 2021* and the recently published '*Energy Security in Ireland to 2030*' which all point to the need for a significant uplift in the delivery of flexible gas-fired power generation capacity to 2030.

1.1.1 The Applicant

Shannon LNG Limited, trading as Shannon LNG, having its registered address at 32 Molesworth Street, Dublin 2, D02 Y512, is a subsidiary of New Fortress Energy (NFE). The Site, on which the Proposed Development is located, was purchased in December 2021 by NFE Shannon Holdings Limited, a subsidiary of New Fortress Energy.

1.2 Site Location

The Site of the Proposed Development is located approximately 4.5 km from Tarbert and 3.5 km Ballylongford in County Kerry. The area to be developed within the Site is 41 ha and is characterised by predominantly improved grassland in an agricultural setting. The field boundaries predominantly consist of hedgerows with small drainage ditches and a small section of the Ralappane Stream is located in the southernmost part of the Site (**Figure 1.1**).

1.3 Overview of Proposed Development

The Proposed Development will consist of the following components:

- Three (3 No.) blocks of Combined Cycle Gas Turbines (CCGT), each block with a capacity of approximately 200 MW for a total installed capacity of up to 600 MW (further details in Chapter 2 of the NTS).
- A 120 MWh (1-hr) Battery Energy Storage System (further details in Chapter 2 of the NTS).
- Above Ground Installation (AGI) compound (further details in Chapter 2 of the NTS).
- High voltage 220 kV Gas Insulated Substation.
- Auxiliary Boiler.
- Raw water treatment and storage.
- Structural / Architectural Buildings (including an administrative / control buildings).
- Sewerage drainage system.
- Process effluent collection system and sump.
- Firewater storage tanks and fire water pumps.
- Ancillary buildings.

- Secondary Fuel storage.

The Proposed Development will employ combined cycle natural gas technology and its design will comply with all relevant national and international codes.

The Proposed Development will provide additional and flexible power generation capacity to support intermittent renewable generation and resolve a predicted generation capacity shortfall, in line with national policy goals. For example, during periods of high wind (renewable) generation it is expected that the Power Plant would be turned down or off by the system operator (EirGrid) to give priority to renewable power.

The Proposed Development will generate power for its own needs and for sale to the market via the national electricity grid.

The previously consented 26 km natural Gas Pipeline (Planning Reference: PL08.GA0003), once constructed, will facilitate transport of the natural gas between the Site and the national gas network at Foynes. The total installed capacity of the Power Plant will be up to 600 MW.

The Proposed Development will include associated administrative / control buildings and an Above Ground Installation (AGI), refer to **Section 2.3**.

1.4 Regulatory Framework

Pre-application consultation with An Bord Pleanála has determined that the Proposed Development is strategic infrastructure within the meaning of Section 37A of the Planning and Development Act 2000 (as amended). A pre-application meeting was held with An Bord Pleanála on 28th September 2023.

An application will therefore be made directly to An Bord Pleanála under section 37E of the Planning and Development Act 2000 (as amended). This EIAR should be read in conjunction with all the particulars of the planning application.

Once operational, the Proposed Development will be regulated by the following bodies:

- Environmental Protection Agency (EPA).
- Commission for Regulation of Utilities (CRU).
- Health and Safety Authority (HSA).
- Local Planning Authority (Kerry County Council).

1.5 Environmental Impact Assessment Methodology

The EIA process can involve several stages, including: consultation, screening, scoping, baseline surveys, impact assessments, ongoing feedback into a project design, and preparation of the EIAR. For this Proposed Development, the EIAR will be submitted as part of a planning application to An Bord Pleanála (the Competent Authority), to enable An Bord Pleanála to assess the impacts and carry out an EIA before consenting or otherwise. This EIAR will also accompany the Industrial Emissions licence application to the Environmental Protection Agency following submission of the planning application.

The first step in the EIA process is 'Screening', which determines if an EIA is required, and usually commences at the project design stage. The EIA Directive lists those projects that require a mandatory EIA and those projects for which an assessment must be undertaken to determine if they are probable

to result in likely significant effects. In Ireland, generally the process of ascertaining whether a development requires an EIA is determined by the Planning and Development Act 2000 (as amended) and the Planning and Development Regulations 2001 (as amended), in particular Schedule 7 thereof.

An EIAR is mandatory for the Proposed Development in line with paragraph 2(a) of Annex I and paragraph 3(a) of Annex II of the EIA Directive, as transposed, respectively, by paragraph 2(a) of Part 1 of Schedule 7 to the 2001 Regulations and paragraph 3(a) of Part 2 of Schedule 7 to the 2001 Regulations. In addition, the Proposed Development falls under the Seventh Schedule of the Planning and Development Act 2000 (as amended).

An EIAR is prepared as part of the EIA process. Typically, the EIAR includes a baseline assessment to determine the status of the existing environment; impact prediction and evaluation to identify impacts and effects and determine the likely significance of effects (this can include cumulative effects); delineation of mitigation and monitoring measures to reduce the impacts identified; and a residual impact assessment of the significance of effects once any mitigation and monitoring measures have been implemented.

For each technical EIAR chapter, the classification and significance of effects is generally evaluated in accordance with the EIA Directive and the methodology outlined in the Environmental Protection Agency's '*Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*' (2022). Where more relevant and specific standards and methodologies exist, they are adopted and outlined in the respective methodology sections within each technical chapter (for example, specific criteria and assessment terminology used to assess ecology impacts).

The assessment also takes into consideration cumulative impacts with consented, planned and reasonably foreseeable projects.

This includes the cumulative impact of the Proposed Development with the Strategic Gas Reserve Facility, Data Centre Campus and the 220 kV high voltage and the medium voltage (10 / 20 kV) grid connections, as part of the masterplan vision for the expansion of the site.

It is expected that it would be a condition of the Industrial Emissions licence for the Proposed Development that a closure and residuals management plan, including a detailed decommissioning plan, be submitted to the Environmental Protection Agency for their approval. A detailed assessment of impacts during the decommissioning stage will be undertaken at that time to inform the decommissioning plan.

2. Description of the Proposed Development

2.1 Introduction

This chapter of the NTS describes the design, construction, commissioning operation and decommissioning of the Proposed Development, which comprises Power Plant, Above Ground Installation (AGI) compound and ancillary facilities.

The purpose of this chapter is to provide the reader with the details of the scope of works for which planning permission is being sought and the basis upon which the EIAR has been prepared.

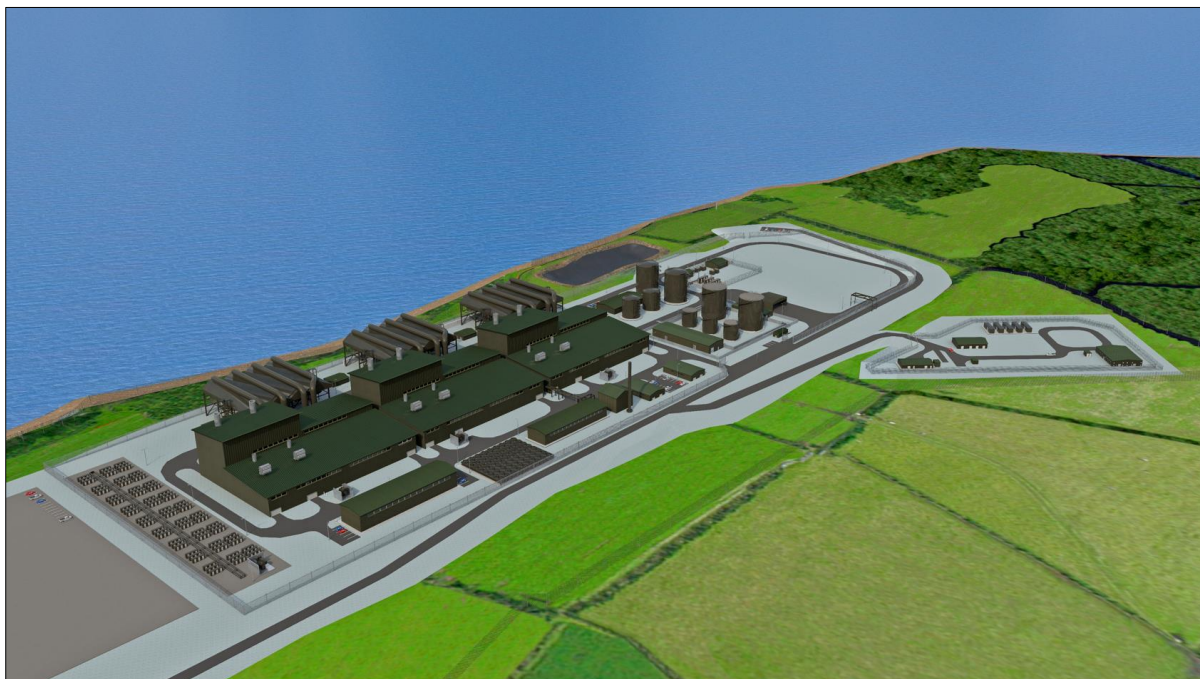


Figure 2.1: Overview of the Proposed Development

2.2 Proposed Development

The Proposed Development will comprise:

- A flexible modular Power Plant design with three blocks (3 No.) each with one Combined Cycle Gas Turbines, each block with a capacity of approximately 200 MW for a total installed capacity of up to 600 MW. Each of the three blocks will of comprise two gas turbine generators, two heat recovery steam generator and one steam turbine generator and an air-cooled condenser. The proposed design is ideally suited to support increased intermittent renewable generation.
- A 120 MW for 1 hour (120-Megawatt hour (MWh)) Battery Energy Storage System. The Battery Energy Storage System will comprise 27 No. battery containers and will allow the Proposed Development to provide electricity and supports intermittent renewable generation.

In each block, gas turbines will burn natural gas and will be connected to a generator for electricity production. Exhaust gases from the gas turbines will pass through heat recovery steam generators to generate steam at several different pressures. The steam generated will be routed through a steam turbine, which will also be connected to a generator to produce further electrical power. The spent steam

exiting the steam turbine will then be directed into an air-cooled steam condenser. The resulting condensate will then be pumped back into the heat recovery steam generator to repeat the steam cycle.

The Proposed Development will be operated using natural gas as its primary fuel (delivered to Site via the consented 26 km natural Gas Pipeline which will facilitate connection from the Site to the transmission network west of Foynes) and generate power to be exported via the proposed 220 kV connection to the national electricity grid. The 220 kV connection, which is subject to a separate application, will be installed prior to commencing operation of the Proposed Development.

The Proposed Development will use approximately 25.5 GWhr per day of natural gas when operating at full capacity. The Proposed Development will be required under the Grid Code Secondary Fuel Obligations to maintain a secondary fuel supply. Low sulphur gas oil will be required as a backup fuel in the event of interruption to natural gas supply, *i.e.*, the loss of a flow from the transmission pipeline during a period of high electricity demand. The use of secondary fuel is only expected to occur during an emergency scenario. The Proposed Development will be required to storage a total of five days' worth of fuel consumption. The fuel will be contained in two (2 No.) storage tanks and three-day tanks within a bunded area.

An application to connect to the national electrical transmission network via a high voltage (HV) 220 kV grid connection is required to export power from the Proposed Development, when operational. The exact route cannot be confirmed until the detailed design is completed, however this process is currently underway. It is expected that the connection will run 5 km east of the Site, under the L1010 road to the ESBN / EirGrid Kilpaddocke 220 kV substation.

The Proposed Development will not be operational at full load all year round. For example, during periods of high wind (renewable) generation it is expected that the Proposed Development could be turned down or off by the system operator (EirGrid) to give priority to renewable energy generation.

If the 220 kV grid connection is not available, for example due to a cable malfunction, a medium voltage (10 / 20 kV) grid connection will be used as a backup power supply. This connection will be subject to a separate planning application and has been considered in the cumulative impact assessment within each technical chapter of the EIAR (Volume 2). It is likely that the medium voltage connection will be via a new onsite substation and underground cable from the existing ESBN / EirGrid Kilpaddocke 220 kV substation.

A drainage outfall into the Shannon Estuary will also be constructed. Surface water runoff from paved / impermeable areas from the Proposed Development and access road will be collected via a dedicated, sealed storm drainage network, which will pass through a silt trap and Class 1 hydrocarbon interceptor, and discharge to the shared constructed outfall to the Shannon Estuary. There will be a stormwater discharge point at the Ralappane D1 stream crossing located 50 m from the Site entrance, and a second stormwater discharge point will be located at the D2 stream crossing located 20 m from the construction laydown area. Both will be fitted with Class 1 hydrocarbon interceptors. The resulting discharge will be similar in composition and will have similar flow rates to existing drainage, which discharges directly from the agricultural lands to the Ralappane Stream and the Shannon Estuary.

2.3 Above Ground Installation (AGI) Connection

The AGI will include valves and control equipment to facilitate the connection to the already consented 26 km natural Gas Pipeline. It will facilitate the transportation of gas between the national gas transmission network and the pipeline and will include fiscal metering and pressure control of the gas flow.

The AGI is located in a separate fenced compound within the Site. Access to the AGI will be via a dedicated access road off the main Site access road.

2.4 Construction Phase

The Applicant will appoint an Engineering, Procurement and Construction (EPC) Contractor for the duration of the construction phase. The EPC Contractor will appoint sub-contractors to undertake all the specific construction and civil works.

The construction phase of the Proposed Development will comprise:

- Temporary construction and laydown areas (hardstanding).
- Open storage areas, temporary facilities and plant storage areas.
- Construction compound to include the staff office and welfare facilities.
- Temporary parking facilities.
- Security fencing / gates and signage.

Subject to planning consent and other approvals an anticipated start date of January 2026 is taken as a construction start date (however this is subject to change).

The construction programme is anticipated to take 32 months, subject to seasonal and other planning constraints. During construction, approximately 1,070 No. people will be employed onsite at peak. An additional period of up to six months will be required for commissioning prior to operation. Construction phase works will take place between the hours of 07:30 to 18:00 (Monday to Friday) and 08:00 to 14:00 (Saturday). No works will take place on Sundays or Bank Holidays.

The construction phase will comprise:

- Enabling, earthworks and site preparation.
- Construction of the 220 kV and medium voltage (10 / 20 kV) connections.
- Construction of the Power Plant blocks and AGI.
- Construction of the drainage outfall.

The proposed location of the construction compound will be entirely within the Site of the Proposed Development. The construction compound will be secured with temporary fencing and will accommodate employee parking, canteens, offices, medical, changing, and welfare facilities, drying rooms and temporary services on the Site.

Construction traffic will access the Site via a new priority junction and right turn pocket along the upgraded L1010 road.

During the construction phase of the Proposed Development, electricity will be supplied via a series of portable site units prior to the medium voltage electricity connection becoming available.

Foul water from the Site offices, canteens, toilets and showers will be collected in tanks and self-contained toilet units for removal by road tanker by a licensed haulier to a licensed facility.

Water will be required for the construction personnel, for general construction works and for wheel wash facilities and dust suppression. It is anticipated that the water supply will be obtained from a water main along the L1010 road.

A Construction Environmental Management Plan (CEMP) has been produced as part of this planning submission. A Contractor's CEMP will be prepared by the EPC Contractor. The CEMP will set out the necessary approach to managing the environmental aspects and impacts associated with the construction of the Proposed Development. It will also contain details of the monitoring and reporting system which will be implemented to document compliance with the following:

- Environmental commitments identified in the environmental assessment.
- The conditions of the relevant statutory consents including the planning consent and the foreshore licence associated with the Proposed Development.

The CEMP will be treated as a 'live document' and periodically reviewed and updated as required during the course of construction.

2.5 Commissioning Phase

Following completion of construction and installation of equipment, and before the Proposed Development commences operations, there will be a testing and commissioning phase. The commissioning phase will be similar to the operational phase but may have a greater number of start-ups and shutdowns. This phase will comprise:

- Installation compliance checks.
- Commissioning tests.
- Performance demonstration tests.

2.6 Operational Phase

During the operational phase, the Proposed Development will comply with the requirements of EU Regulations¹, under an Industrial Emissions licence. The emissions which have the potential to impact to air, soil, surface water and groundwater and human health, will be mitigated against and avoided where possible.

An Industrial Emissions licence is required for operation of the Proposed Development.

An Environment Management System which will be implemented by the operator and will set out the requirements required to ensure that the Proposed Development is operating to appropriate standards. Environmental monitoring will be carried out, where required, including monitoring of exhaust emissions levels, in accordance with the Industrial Emissions licence.

The Proposed Development will be manned and operational 24 hours, seven days a week outside of outages. It is anticipated that a total of 34 No. staff will be required for the operational phase, as follows:

¹ EU (*Large Combustion Plants*) Regulations 2012, S.I. No. 566 of 2012.

- 26-day staff (08:30 – 17:00).
- 40 No. shift staff: five shifts of eight employees.

2.7 Decommissioning Phase

The Proposed Development is expected to have a design life of 25 years, but this could be extended, by maintenance, equipment replacement and upgrades or by the transition of the Site to use hydrogen capability (which will be subject to a future planning application).

Decommissioning activities will include, as a minimum:

- All wastes at the facility at time of closure will be collected and recycled or disposed of by an authorised waste contractor, as appropriate.
- Utilities will be drained of all potential pollutants such as lubricating oils or sealed to prevent leakage if being moved offsite or reused elsewhere.
- All raw materials, oils, fuels, etc. onsite at the time of closure will be returned to the supplier, or collected and recycled or disposed of by an authorised waste contractor, as appropriate.
- All buildings and equipment will be decontaminated, decommissioned and demolished in accordance with a phased demolition plan, and either sold for reuse or recycled, or disposed of by an authorised waste contractor, as appropriate. In general, specialist equipment, pipelines and storage tanks will be sold for reuse, where possible, or disposed of offsite.
- Roadways to be broken up and removed and security fences dismantled.
- All hazardous and non-hazardous process substances to be removed.
- All roads and hardstanding areas to be removed and recycled or disposed of by an authorised waste contractor, as appropriate.
- Landscaped will be reinstated in accordance with a landscape reinstatement plan.
- On completion of safe decommissioning of equipment, the potable water, fire water and electrical power supplies could be disconnected, and removed or abandoned in place.

When operations at the Proposed Development have ceased, and assuming confirmation from the monitoring programme that all emissions have ceased, it is expected that there would be no requirement for long-term aftercare management at the Site of the Proposed Development.

3. Need and Consideration of Alternatives

3.1 Introduction

This chapter of the NTS outlines the need for the Proposed Development and discusses reasonable alternatives, and the design progression that has been considered during the evolution of the Proposed Development.

Consideration of alternatives is an important aspect of the environmental impact assessment process and is necessary to evaluate the likely environmental consequences of a range of development strategies for the Site.

3.2 Need for the Proposed Development

The Proposed Development will address Ireland's security of energy supply risks, supports intermittent renewable generation, and resolves a predicted generation capacity shortfall.

As electricity from renewable sources increases, a simultaneous increase in electricity demand, and closure of coal, oil and peat-fired electricity generation, means that natural gas is predicted to play an increasingly important role as a backup fuel.

The Government's National Energy and Climate Plan 2021-2030 forecasts that natural gas demand will increase from 4.4 million tonnes of oil equivalent to between 6.38 to 8.06 million tonnes of oil from now until 2040. Renewable energy generation is weather dependent, and its output fluctuates considerably. For this reason, conventional power plants are required to fill the fluctuating gap between electricity demand and renewable generation. Natural gas is the only major energy source currently available to back-up renewable generation and thereby maintain a resilient electricity supply to the country while supporting the transition to 80% renewable generation by 2030.

The Climate Action Plan 2024 (December 2023) commits Ireland to becoming a carbon-neutral economy by no later than 2050. A key component of meeting this reduction target is the decarbonisation of electricity generation in Ireland. To drive this change, Ireland has set a target to generate 80% of grid electricity from renewable sources by 2030, largely from wind. To allow this uptake of renewable energy to happen it is necessary to have in place back up sources of energy generation that can be efficiently dispatched when the wind is not blowing.

Flexible gas-powered generation is a critical part of that strategy, given the highly variable nature of wind energy generation.

3.3 Alternatives to the Proposed Development

The fast-acting flexible Power Plant in combination with the Battery Energy Storage System are exactly the type of new generation units that are required to facilitate increased intermittent renewables on the system. A review of the minimum stable generation of existing plant and in development power stations shows that the Power Plant (Combined Cycle Gas Turbine) units will be amongst the lowest stable minimum generation while maintaining a high relative level of efficiency. The Battery Energy Storage System will provide the rapid response necessary in the timeframe of seconds to minutes as well as providing energy to the system while the Combined Cycle Gas Turbine units are ramping up.

The Proposed Development supports the resilient transition of Ireland's electricity system to renewables, will provide additional and flexible power generation capacity to support intermittent renewable generation and resolve a predicted generation capacity shortfall, in line with national policy goals.

The Site layout for the Proposed Development has been condensed since the previous 2007 and 2012 application. The Site of the Proposed Development is now located to the east of Knockfinglas Point and the proposed layout is more efficient and minimises the total site footprint. The Site layout and the associated design minimises visual impacts by utilising natural screening and avoiding designated ecological sites.

The location of the Proposed Development was selected to minimise overall land take and to minimise environmental impact including:

- Reduced impacts on biodiversity by reducing the overall footprint.
- Reduced visual impact.
- Optimised platform level at 18m OD by balancing cut / fill requirements.
- Reduced impacts on Cultural Heritage assets.
- Reduction in carbon sequestration.

Alternative Power Plant technologies were also considered. Technology options considered against the proposed multi-shaft combined cycle configuration included:

- Combined heat and power.
- Open cycle gas turbines.
- Single-shaft Combined Cycle Gas Turbine.
- Multi-shaft Combined Cycle Gas Turbine.

In determining the optimum configuration, studies and extensive consultation were carried out to identify the key functional requirements of the power generation capability to be developed:

1. Be capable of fast response to sudden instructions from the System Operator to support intermittent wind generation.
2. Enable low minimum stable generation to allow the System Operator to keep units on the system at a minimum level to ensure a sufficient level of system inertia is maintained.
3. Natural gas fuelled to meet with national Climate Change Policies and objectives.
4. Be able to accommodate faster or slower than forecast development of renewables power generation, and consequently be flexible in build out.
5. Support transitioning to deliver Ireland's net zero carbon emission by 2050 ambition.

In summary, the proposed Power Plant is the most efficient, flexible and reliable option with the lowest CO₂ emissions profile of the alternatives considered.

4. Energy and Planning Policy

4.1 Introduction

This chapter of the NTS sets out the context governing planning and development for the Proposed Development.

The Proposed Development will enhance Ireland's energy security, address power capacity shortfalls, and support the national target to achieve 80% renewables by 2030. The Proposed Development will provide flexible generation capacity and significant grid infrastructure which will help to maintain security of supply while supporting Ireland in its transition to a low carbon economy.

4.2 Energy Policy

The EIAR has been prepared with reference to the following energy policy:

- Climate Action Plan 2024.
- Government Policy Statement on Security of Electricity Supply (30th Nov 2021).
- National Energy and Climate Change Plan 2021 to 2030.
- CRU Information Note on Electricity Security of Supply Programme of Work – Update.
- Energy Security in Ireland to 2030 - Energy Security Package.
- National Energy Security Framework (April 2022).
- Ireland's Long-term Strategy on Greenhouse Gas Emissions Reduction.
- Electricity & Gas Networks Sector Climate Change Adaptation Plan.
- National Adaptation Framework Planning for a Climate Resilient Ireland.
- National Adaptation Framework (NAF) Review.
- National Policy Position on Climate Action and Low Carbon Development.
- Climate Action and Low Carbon Development Act.
- Compliance with Carbon Budgets and Sectoral Emission Ceilings.
- Climate Change Advisory Council Carbon Budget Technical Report (October 2021).
- CRU Testimony to the Oireachtas Committee on Environment and Climate Action (March 2022).
- CRU Testimony to Oireachtas (July 2021).
- EirGrid Testimony to the Oireachtas Joint Committee on Environment and Climate Change (22nd March 2022).
- Failure of the Capacity Auctions.
- Recent Award of Capacity Contract.

Taking account of recent developments in Ireland's response to climate change, including an objective for 80% of Ireland's electricity to come from renewable sources by 2030, the Proposed Development supports the resilient transition of Ireland's electricity system to renewables.

The Proposed Development is aligned with European Union (EU) and Irish policy on energy and climate action as follows:

- **Delivery of 2 GW of Flexible Gas Fired Generation:** The Climate Action Plan 2024 commits to the delivery at least 2 GW of new flexible gas-fired generation to back up intermittent renewable generation.
- **Address power capacity shortfalls:** Since 2016, EirGrid has warned of an increasing tightness between supply and demand in the electricity system. The current outlook is serious. It is likely that in the coming years, Ireland will experience increased system alerts and will need to work proactively to mitigate the risk of more serious impacts. The Proposed Development's Power Plant can be delivered in a realistic timeframe to address the looming shortage.

4.3 Planning Policy

The EIAR has been prepared with reference to the following planning policy:

- National Planning Framework 2018.
- National Development Plan 2021-2030
- Strategic Integrated Framework Plan for the Shannon Estuary 2013-2020.
- Southern Assembly Regional Spatial and Economic Strategy.
- Kerry County Development Plan 2022-2028.
- Clare County Development Plan 2023-2029.
- Shannon Estuary Economic Taskforce Report.
- Listowel Municipal District Local Area Plan 2020-2026.

The Proposed Development is aligned with European, national, regional, and local energy and climate planning policy. It is clear across all levels of planning policy that maintaining security of energy supply for Ireland is a key priority for the coming decade and beyond. The Proposed Development will operate to support the electricity transmission system at times of peak demand and at times when other electricity generation sources are not sufficient to meet demand.

Under the Kerry County Development Plan 2022-2028, the Site is part of 430.6 hectares of land which are zoned as a Strategic Development Location (SDL). This Strategic Development Location is recognised in the Kerry County Development Plan for its potential as an Energy Hub and for industrial development at a regional and national level.

5. Land, Soils and Geology

Introduction

This chapter of the NTS describes the potential impact on the land, soils and geology of the Site of the Proposed Development and surrounding area.

In order to assess baseline conditions, a desk-based review of publicly available information and previous and directly relevant site investigation data pertaining to the Site was carried out.

The assessment considers the likely significant effects associated with construction and operational phases of the Proposed Development on land, soils and geology.

Existing Environment

The Site covers an area of approximately 41 ha and comprises undeveloped grassland on the southern shore of the Shannon Estuary with an offshore site outfall pipe.

Geological / geotechnical site investigations were undertaken at the Site in 2006 and 2007. A Site walkover was undertaken in 2020 and a desktop study was completed in 2024.

The wider (2 km) study area surrounding the Proposed Development is generally low-lying, rolling agricultural pastureland. The Environmental Protection Agency Corine 2018 landcover mapping describes the landcover around the Site primarily as 'agricultural areas'. An area of 'Wetlands' described as 'coastal wetlands' is located 1.3 km west of the Proposed Development. An area of forest and semi-natural areas described as 'scrub and / or herbaceous vegetation associations' is located 1.4 km west of the Site, immediately to the south of the 'coastal wetlands'.

Soil deposits comprise predominantly 'till derived from Namurian era sandstones and shales' with small amounts of alluvium in localised areas, up to 4.2 m thick in total.

Groundwater was encountered in places within the till, with low rates of inflow. Permeabilities of 3 to 4 x 10⁻⁶ m/s were calculated for the upper till. Geotechnical testing showed the upper till loses strength rapidly with increasing moisture content and behaves like a clay / silt and clay, despite its high granular content. The lower till layer overlying bedrock is stiff, of low permeability and no water strikes were recorded in this material. Soils and stream sediments in the vicinity of the Site have not been mapped under the Geological Survey Ireland TELLUS soil geochemical sampling programme and soils are assessed by the Geological Survey Ireland as having low to no aggregate potential.

The bedrock underlying the Site is described as mudstone, siltstone and sandstone of the Shannon Group, of Namurian age. The bedrock outcrops along the majority of the Site's northern coastline. Groundwater in the bedrock is classified as a '*Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones*'. Groundwater was encountered in the upper fractures / weathered zone of the bedrock and artesian conditions were noted in a number of isolated locations across the Site.

Depth to rock varies from 0.75 m in the east of the Site to up to 9.8 m. A number of inactive faults orientated from north-west to south-east were inferred in the area. The bedrock is described as moderately strong, has High to Very High crushed rock aggregate potential and is therefore suitable for use as aggregate on-site.

There are no Geological Survey Ireland geotechnical sites, geological heritage areas, recorded landslide / geohazard events, mineral localities or active quarries mapped within the Site, however there is potential for very limited erosion along short sections of the coastline, therefore the proposed onshore works are set back 10 m from the cliff edge.

The Landslide Susceptibility Classification assigned by Geological Survey Ireland to the Site and immediately surrounding lands is generally 'Low', but with a small area mapped as 'Moderately Low' and 'Moderate' in the north of the Proposed Development within the redline boundary. These areas coincide with areas identified as having 'bedrock at surface'.

A study of the seismic hazard potential carried out in 2007 concluded that *'In general, typical structures built to comply with the existing design and construction codes will be capable of dealing with all reasonably expected seismic activity in Ireland'*.

Radon potential risk is considered 'Moderate' across the majority of the Site, however, a small area to the in the north-western corner of the red line boundary is in an area where about 20% of homes are estimated to be above the reference level of 200 becquerels per cubic metre (Bq/m³). Radon potential risk in this area of the Proposed Development is considered 'High'. A radon test is legally required for ground floor and basement workplaces located in a high radon area.

The land use is agricultural and no significant contamination of soils is anticipated based on previous uses.

Soils and bedrock geology encountered at the Site are considered favourable for the construction of the Proposed Development, with most plant to be founded on bedrock at the cut platform level of 18 m above Ordnance Datum (m OD). All excavated soil and rock material (of the order of 480,000 m³) are expected to be suitable for re-use on the Site as general or structural fill, giving the Proposed Development a net zero cut / fill balance.

Overall, the soils and geology are considered to be of **Low** environmental sensitivity.

Impact Assessment

Construction Phase

Accidental construction phase spill and leaks and the use of concrete and lime products may give rise to **Small Adverse** impacts of **Temporary** duration and **Negative** quality on an environment of **Low** sensitivity and the significance of the impacts is **Imperceptible**.

Other construction phase risks arise from changes to topography and impacts of construction of soils and geology result in **Small** or **Moderate** impacts of **Permanent** duration and **Neutral** or **Positive** quality on an environment of **Low** sensitivity and the significance of the impact is **Imperceptible** or **Slight**.

Operational Phase

Operational phase risks to soils and geology will arise principally from diesel and low sulphur gas oil fuel tanks (required as a secondary fuel source), maintenance oils and cleaning chemicals, which will be managed by siting this equipment within designated bunded areas. Accidental emissions of diesel or other hazardous substances during the operational phase can cause contamination should they enter

the soil environment. They will be considered a **Moderate Adverse** impact of **Short-Term** duration and **Negative** quality on an environment of **Low** sensitivity and the significance of the impact is **Slight**.

The removal of agricultural land can be considered to have a **Small Adverse** impact of **Permanent** duration and **Negative** quality on an environment of **Low** sensitivity and the significance of the impact is **Imperceptible**.

Mitigation Measures

Mitigation measures associated with both the construction and operational phases of the Proposed Development have been embedded within the design and proposed based on the assessment.

A CEMP has been produced as part of the planning submission. A detailed CEMP will be produced by the EPC Contractor prior to the main construction works and will take account of the measures included in the CEMP and any commitments included within the statutory approvals.

Construction phase mitigations include:

- Foundation solutions will be designed based on the properties of the underlying soils and bedrock.
- Temporary storage of soil and crushed rock will be managed to prevent potential negative impact on the receiving environment.
- Soils and crushed rock will be tested for their chemical and geotechnical suitability prior to reuse as fill.
- Fill placement and compaction will be undertaken in line with defined procedures and will be inspected by a geotechnical engineer.
- Where possible, earthworks will be undertaken during dry weather in view of the sensitivity of the overburden soils to moisture content.
- Fuels, oils and other potentially hazardous chemicals will be stored in bunds in designated areas.
- 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.
- Fill material from external sources, if required, will be vetted in order to ensure that it is of a reputable origin and that it is 'clean' (*i.e.* will not introduce contamination to the environment).

Operational phase mitigations include:

- Handling all hazardous or water-polluting materials in a manner to prevent / minimise potential impact on soil.
- The access road levels will be profiled to drain road runoff to an engineered swale adjacent to the road, the majority of which will drain to the engineered storm drainage system at the Power Plant site and discharge to the shared constructed outfall to the Shannon Estuary. There will also be a stormwater discharge point at the Ralappane D1 stream crossing located 50 m from the Site entrance, and a second stormwater discharge point will be located at the D2 stream

crossing located 20m from the construction laydown area. Both will be fitted with Class 1 hydrocarbon interceptors.

- Fuels, oils, and other potentially hazardous chemicals will be stored in bunds in designated areas.
- Secondary containment and spill kits will be provided for other hazardous materials to be stored on the Site, such as maintenance oils and cleaning chemicals.
- Provision of an attenuation system, including a Class 1 interceptor fitted with control valves.
- Provision of a firewater impoundment basin.
- Provision of tertiary containment and designated bunded storage facilities for potentially-contaminating chemicals and fuels.
- An environmental management plan will be prepared for the operational phase.

Summary of Impact

The residual impact of the Proposed Development on the surrounding land and geological environment is considered to be **Imperceptible** at the construction phase and **Imperceptible to Slight** at the operational phase.

Cumulative impacts arising from the related to proposed future Strategic Gas Reserve, SLNG Pipeline, Data Centre and medium voltage (10 / 20 kV) / 220 kV power supply are considered to be **Imperceptible to Slight**.

6. Water

Introduction

This chapter of the NTS describes the likely significant effects upon the water environment and hydrology as a result of the construction and operational phases of the Proposed Development. The assessment aims to ensure the need for the avoidance and reduction of impacts on the water environment is taken fully into account and the selection of appropriate means of preventing any significant predicted impact is made through modification of the drainage design, choice of discharge locations (s) and / or adoption of runoff treatment methods.

Existing Environment

The Site is located on agricultural land, predominantly as pastureland though there is tillage (barley) reported to the south and west of the Site.

The Site is not a designated site but is bordered to the west, north and east by designated sites (Lower River Shannon Special Area of Conservation (SAC), Ballylongford Bay proposed Natural Heritage Area (pNHA) and River Shannon and River Fergus Estuaries Special Protection Area (SPA)).

Onshore geological / geotechnical and environmental site investigations were undertaken in 2006 and 2007. The Site and its surroundings have shown no change in use or significant development since an extensive surface water assessment was undertaken in 2007.

Soil deposits are 'till derived from Namurian sandstones and shales', from 0.5m to 8.0m depth, with small amounts of alluvium in localised areas. Groundwater was encountered in place in the till, with low rates of inflow. The upper till is moderately permeable (hydraulic conductivity of 3×10^{-6} m/s to 4×10^{-6} m/s (metres per second)). The lower till layer overlying bedrock is stiff and is of low permeability and no water strikes were recorded in this material. The till thickens offshore and is overlain by soft alluvium, also thickening offshore.

The bedrock underlying the Proposed Development is mudstone, siltstone and sandstone of the Shannon Group and outcrops at the coast along the majority of the site's northern boundary. Groundwater in the bedrock is classified as a 'Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones'. The Site is not located within a groundwater drinking water source protection area and public records indicate no springs and a relatively small number of low-yielding groundwater abstraction wells between 1 km and 2 km from Site.

Depth to bedrock at the Site varies from 0.75 m to up to 8 m.

Groundwater vulnerability is classified as 'High to Extreme' due to the limited subsoil thicknesses. Hydraulic properties derived from testing of monitoring wells in bedrock within the Site generally have moderate permeability and a poor yield.

Groundwater yield from a shallow bedrock trial well indicated insufficient groundwater yield (<1 L/s) to meet the needs of a previous proposal for a comparable facility.

The Site is currently drained by a number of shallow drainage channels which are not clearly visible on satellite imagery. These drainage features are found across the southern portion of the Site, generally flowing in a west or north-west direction. The drainage features along the access road all ultimately

drain to a single surface watercourse, the Ralappane Stream. The Ralappane Stream drains directly to the Shannon Estuary. Transitional Water Quality data for the Lower Shannon Estuary, during 2018 – 2020, indicated the estuary to be classified as Unpolluted.

Groundwater wells and surface watercourses on the Site were sampled in February 2020 and were found to be relatively unpolluted, other than pressures associated with the coastal, agricultural setting, including anaerobic conditions, slightly elevated salinity and some localised hydrocarbon detections.

Impact Assessment

Construction Phase

Any construction activities carried out close to surface waters involve a risk of pollution due to accidental spillage and leaks. The refuelling of construction plant also poses a significant risk of pollution, depending on how and where it is carried out. Pollution as a result of accidental spillage can potentially affect fish, aquatic flora and can also have an effect on invertebrate communities.

Construction works will be managed in accordance with the CEMP resulting in a **Negligible** impact from spills and leaks after mitigation to a receptor of extremely high sensitivity. This will result in an **Imperceptible** effect.

Other construction phase risks arise from onshore excavation, localised dewatering near rock cuttings and silt runoff to surface waters from material stockpiles on the Site. Dewatering of bedrock will be a permanent, localised, direct impact but will not lead to a net volume change in groundwater discharge to the estuary, resulting in an **Imperceptible** effect. Excavated materials storage areas and stormwater runoff will be carefully managed in accordance with the CEMP to prevent negative effects on the receiving environment. Stormwater discharge from the Proposed Development will be carried out under a discharge permit.

With the exception of crossings of the existing watercourses for the access road, there is no development proposed within potentially flood-susceptible areas of the Proposed Development. Therefore, the Proposed Development will have **Negligible** impact on the existing flood regime. The **Negligible** impact to a receptor of extremely high sensitivity will result in an **Imperceptible** effect.

Operational Phase

Operational phase risks to groundwater, surface water and marine waters will arise principally from onshore effluent streams will be collected via separate constructed drainage networks and will be treated and monitored prior to discharge as required by the Site's IE licence from the Environmental Protection Agency.

Other operational phase risks to groundwater and surface water may arise from accidental losses of diesel fuel, transformer oils, odorant chemical and other chemicals used onsite. These risks will be managed by siting sensitive chemical storage and equipment within bunded areas, resulting in a low adverse effect to an extremely high sensitivity environment and the residual significance will be **Imperceptible**.

Mitigation Measures

Mitigation measures have been embedded with the design and have been proposed based on the assessment. These mitigation measures will be implemented for the construction and operational

phases of the Proposed Development, which may also interact with waste management and land and soils aspects of the development.

A CEMP will be prepared for the construction phase of the Proposed Development which will incorporate relevant environmental avoidance or mitigation measures to minimise generation of suspended sediments offshore, reduce potential environmental impact of onshore temporary storage of soil or rock fill, road runoff, runoff of contaminated waters from constructions areas, storage and use of oils, chemicals, fuels and waste material on site, control of concreting operations and vehicles on site. Site waste management, including control of solid waste, sewage and other waste stream inventories will be managed under the CEMP.

Operational phase mitigations include:

- All hazardous or water polluting materials will be handled or stored in a manner to prevent / minimise potential impact to surface water.
- Secondary Fuel will be stored in two (2 No.) storage tanks. Tertiary containment, bunding and associated pipework will be designed in accordance with EPA *Guidance Note on Storage and Transfer of Materials for Scheduled Activities*.
- Emissions from chemical spills / leaks or runoff from rainwater that has passed over impermeable surfaces will be prevented from polluting local surface water, as all surface water runoff from Power Plant and parking areas will be directed to hydrocarbon interceptors prior to discharge to the Shannon Estuary or Ralappane Stream. The use of hydrocarbon interceptors will significantly reduce the likelihood of water contamination from vehicle fuel or chemical spills.
- In the event of a fire, the fire water will drain through the storm sewerage system and hydrocarbon interceptors (where present) and be diverted to the firewater impoundment basin, sized and designed in accordance with the Irish EPA *Guidance on Retention of Firewater*, prior to inspection and discharge to the estuary.
- All foul water from the Proposed Development will be pumped or fall by gravity to a Wastewater Treatment Plant.
- The water supply system will be metered to determine water consumption and facilitate leakage detection and will be in accordance with Irish Water requirements.
- Operation of the Proposed Development in compliance with the requirements of the IE licence, to be issued and enforced by the Environmental Protection Agency.

Summary of Impact

Cumulative impacts arising from the related SLNG Gas pipeline (previously consented), SLNG Strategic Gas Reserve Facility, Data Centre Campus and High Voltage 220 kV / Medium Voltage (10 / 20 kV) Power Transmission Networks developments envisaged under the Masterplan were considered. No significant residual impacts were identified to groundwater and surface water and the cumulative operational impact is considered to be **Imperceptible**. The Power Transmission and Data Centre developments will be subject to separate EIAR.

The residual effect of the Proposed Development on the surrounding groundwater and surface water environments is considered to be **Imperceptible** during both the construction and operational phases.

7. Biodiversity

7.1 Marine Ecology

Introduction

This chapter of the NTS describes the likely significant effects of the Proposed Development on marine ecology and biodiversity including flora, fauna and habitats. This chapter provides a comprehensive assessment of the potential impact mechanisms associated with the Proposed Development.

Existing Environment

The River Shannon Estuary is of significant ecological importance and comprises protected sites that support a diverse range of habitats and species. The sites, which are protected under national and international law, are the Lower River Shannon SAC and the River Shannon and River Fergus Estuaries SPA. The SAC and SPA site overlap with the Site.

The SAC has been established for the protection of a range of marine and terrestrial habitats and species. Marine habitats include intertidal and subtidal habitats, coastal lagoons and marsh areas while marine species include marine mammals and fish. The SPA has been established for the protection of wild bird species and the coastal wetland and marine habitats they use.

A range of targeted surveys were conducted to identify the presence of protected habitats and species within and adjacent to the Site. Protected marine habitats include intertidal and subtidal areas, while protected species include the Bottlenose Dolphin, a resident species of the Shannon Estuary.

The estuary is also host to a wide range of fish species, many of which are protected species. The species include the migratory species salmon (*Salmo salar*), lamprey (*Petromyzon marinus* and *Lampetra fluviatilis*), eel (*Anguilla Anguilla*), twait shad (*Allosa fallax fallax*) and sea trout (*Salmo trutta*) while other fish species commonly found in the estuary include juvenile flatfish (Pleuronectiformes spp.), gobies (*Gobiiformes spp.*) and sticklebacks (*Gasterosteidae spp.*), and adult and juvenile bass (*Dicentrarchus labrax*), plaice (*Pleuronectes platessa*) and flounder (*Platichthys flesus*).

The impact assessment built upon previous studies which were undertaken to inform the previous planning application.

Impact Assessment

Construction Phase

The impacts which were considered in the assessment included the release of sediment and pollutants during construction, impacts on underwater noise from onshore blasting during construction. The impact on underwater noise from onshore blasting is temporary and restricted to a narrow bang along the shoreline.

Operational Phase

The impacts which were considered in the assessment included the discharge of wastewater and heated effluent during the operation of the Proposed Development and finally the loss of habitat due to the installation of an outfall pipe across the shoreline.

The studies showed that discharges from the Proposed Development would not result in significant environmental impacts on the highly dynamic environment of the Shannon Estuary. The area of habitat

lost resulting from the installation of the outfall pipe is small and Negligible. The extent of habitat loss will not impact on the functioning and structure of habitats or the integrity of the Lower River Shannon SAC.

Mitigation Measures

Mitigation measures presented in the Construction Environmental Management Plan (CEMP) regarding construction activities include any that are required to ensure no significant release of pollutants, sediment laden water, runoff chemicals or other waste material pollution into the nearby habitats, watercourses and waterbodies.

Measures will include standard construction best practice used to manage the risk of potential for loss of hydrocarbons such as diesel and hydraulic fluids. Careful supervision of construction operations and general construction practice will reduce the risk from impacts so that the likelihood of impacts is best described as low.

At a minimum the oil spill response equipment will include the following: absorbent mats, waste- bags, oil splash goggles, gloves and vinyl or rubber shoe covers to protect the user from the harmful effects of the spilled material.

Imported backfill material will be washed (cleaned) to remove fines and checked for invasive species before use.

Imported material to be used backfill will be stored on the Site; measures to avoid the release of sediment will be implemented (including silt fences).

A number of noise mitigation measures will be in place to protect marine mammals during blasting.

Summary of Impact

The risk of pollutants being discharged during the construction phase of the project is low and the implementation of the construction best practice measures in the CEMP will further reduce this risk. Following implementation of mitigation measures there will be **No Adverse Impacts** on designated sites overlapping with the elements of the Proposed Development.

The potential impact of noise pollution is greatly reduced in the current proposal with the main source of noise pollution coming from onshore blasting during the construction phase of the Proposed Development.

The loss of habitat due to the installation of the trenched water outfall is **Negligible**.

7.2 Terrestrial Ecology

Introduction

This chapter of the NTS describes and evaluates the habitats within the Site along with their representative flora and fauna in order to describe and assess the impacts that will result from the Proposed Development.

Existing Environment

To assess the ecological impacts of the Proposed Development, a range of assessments and surveys were undertaken. Surveys were conducted to identify the presence or likely presence of protected species and habitats within the Site. The value of these ecological receptors was determined and the possible impacts that the Proposed Development may have upon them was assessed. The National Parks and Wildlife Service and Inland Fisheries Ireland were consulted and their findings integrated into the assessment.

The Lower River Shannon SAC and the River Shannon and River Fergus Estuaries SPA overlap with a small section of the Site. The impacts on these sites are discussed in the Appropriate Assessment Screening and Natura Impact Statement which accompanies this application. There will be no direct impacts on proposed Natural Heritage Areas (pNHAs) or Natural Heritage Areas (NHAs).

Habitat surveys determined that the terrestrial habitats within the Proposed Development were of high to low local value. No Annex I habitats were recorded within the Site boundary. No rare plant species were recorded within the Site boundary during the survey.

Surveys for volant and non-volant mammals were conducted within and around the boundary of the Site. One outlier Badger (*Meles meles*) sett was recorded within the Site boundary as well as one inactive sett. No signs of Otter (*Lutra lutra*) were recorded within the Site; however signs of Otter were found in the vicinity. Small numbers of bat species were recorded within the Site *i.e.* Common Pipistrelle *Pipistrellus pipistrellus*, Soprano Pipistrelle *Pipistrellus pygmaeus*, Leisler's Bat *Nyctalus leisleri*, Brown Long-eared Bat *Plecotus auritus* and an unidentified Myotis bat. These were recorded foraging and commuting mainly along hedgerow / treelines, woodland and scrub habitats. However, no mature trees or buildings, with the potential to be used as significant bat roosting sites, were recorded within the Site boundary. A small night roost (2 individuals) of Lesser Horseshoe Bat *Rhinolophus hipposideros* was recorded in an old farmhouse c.170 m west of the Site boundary. However, no signs of Lesser Horseshoe were recorded within the Site boundary. Irish Hare (*Lepus timidus*) and Common Frog (*Rana temporaria*) were also recorded at the Site. No reptile species were recorded.

Breeding bird surveys concentrated on habitats within the Site boundary. Overall, the Site is of high local value for a range of terrestrial bird species.

Estuarine bird surveys were carried out monthly over a 2-year period from 2021 to 2023 along the shoreline of the Shannon Estuary. While moderate numbers of birds were recorded approximately 1 km west of the Site, very small numbers of birds use the intertidal and subtidal habitats to the north of the Site, largely due to the lack of intertidal mudflat habitat here. No nationally or internationally important numbers of birds were recorded during the estuarine bird surveys.

The Ralappane Stream, which flows through the Site to the Shannon Estuary is of low value for fish.

Impact Assessment

Construction Phase

Overall, the majority of ecological impacts will arise during the construction phase as a result of disturbance to Badger, bats, otter, birds, fish and common frog, damage to and loss of small areas of habitats (including 1 outlier Badger sett), hedgerows / treelines, scrub, woodland and wet grassland and potential water pollution incidents.

In the absence of mitigation these impacts range from **Not Significant** to **Moderate**.

Operational Phase

In the absence of mitigation measures, significant operation phase impacts could include light spill onto retained vegetation outside the Site boundary (it is assumed that all habitats within the site would be removed) used for feeding or breeding by protected species. Disturbance to protected species could occur from noise associated with human use of the Site.

Mitigation Measures

A range of mitigation and monitoring measures have been proposed in the EIAR to offset potential negative impacts including noise mitigation, lighting mitigation, replacement planting and pollution prevention measures. All construction works and mitigation measures relating to ecology will be monitored by a suitably qualified ecologist.

The works will incorporate the relevant elements of the guidelines outlined below:

- *Control of water pollution from construction sites. Guidance for consultants and contractors (C532)*. CIRIA. Masters-Williams *et al.*, (2001).
- *Control of water pollution from linear construction projects. Technical guidance (C648)*. CIRIA. Murnane, *et al.*, (2006).

All personnel involved with the Proposed Development will receive an onsite induction relating to construction and operations and the environmentally sensitive nature of European sites and to re-emphasise the precautions that are required as well as the precautionary measures to be implemented. Site managers, foremen and workforce, including all subcontractors, will be suitably trained in pollution risks and preventative measures.

Summary of Impact

Following the implementation of mitigation measures, impacts will be **Not Significant** above a Local geographic scale of significance.

8. Air Quality

Introduction

This chapter describes the potential impact on air quality as a result of the Proposed Development. This has focused on impacts associated with dust and particulates, during the construction and decommissioning phases, and emissions associated with combustion sources (energy plant stacks and road vehicle exhausts) during the operational phase.

Existing Environment

Baseline air quality has been characterised through the review of publicly available data sources, including monitoring data reported by the Environmental Protection Agency. Baseline air quality was found to be of a good standard and well below the health-based Air Quality Standards set by the Government for the protection of human health and the Environmental Assessment Levels used as the threshold for pollutants not covered by the Government standards.

Local air quality sensitive receptors include residential properties located closest to the Proposed Development in each direction, and properties located adjacent to the local road network on the approach to and from the Site. Receptors considered in the assessment also include air quality sensitive habitats within the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA.

Impact Assessment

Construction Phase

The construction dust assessment considered the risk of dust impacts occurring based on the scale of construction works and the number and sensitivity of locations that are sensitive to dust impacts, such as the nearest residential dwellings, including those located within 25 m of the Site access. This then informed the level of recommended dust control measures required to ensure that any effect will not be significant. The dust control measures taken forward by the Applicant and the EPC Contractor will be set out with the CEMP.

The impact of significance from dust emissions during the construction phase is considered to be **High**. However, this is offset by the **Low** sensitivity of the area and equates to an **Imperceptible** to **Slight** risk of dust impacts that is **Not Significant**.

Operational Phase

The operational phase assessment considered the impact emissions from the Proposed Development activities site at sensitive receptors *i.e.* nearby residential properties. A normal operational scenario forms the focus of the assessment, based on the Proposed Development operating on natural gas and operating continuously on natural gas constantly throughout the year, and startup and backup plant is operational for 52 hours per year for testing and maintenance.

An alternative scenario has also been considered, whereby the Proposed Development is operating on liquid-fuel in the event of a gas supply shortage.

The assessment identified that the operation of the Proposed Development will have the largest impact (*i.e.* increase in pollutant concentrations) on the limited number of residential dwellings close to the Site, but that impact will reduce with increasing distance from the Site. For the normal operational scenario,

impacts at the closest sensitive residential dwellings to the Site are such that pollutant concentrations remain well below the Air Quality Standards and Environmental Assessment Levels, nor will the Proposed Development increase pollutant concentrations to the extent that pollutant emissions from further development of the area will put standards and levels at risk. The overall impact significance of the operation of the Proposed Development is considered to be **Slight**, continuous, likely to occur and long-term, for the duration of the Proposed Development's operation.

Decommissioning Phase

In the event of decommissioning, measures will be undertaken by the Applicant to ensure that there will be **Not Significant, Negative** environmental effects.

Mitigation Measures

The Proposed Development includes a number of embedded mitigation measures that will likely reduce the impact of emissions on nearby air quality sensitive receptors. Some of these measures are designed with the specific purpose of controlling emissions to air, and others are included primarily for other purposes, but have an additional benefit of reducing air quality impacts. These measures are summarised below.

- Emission release heights for the largest and most frequent sources of emissions to air have been designed to encourage good dispersion, through height above ground level and height above nearby buildings and structures.
- The layout of the site maximises distance between the main continuous sources of emissions to air and the nearest air quality sensitive receptors.
- Whilst the air quality assessment has assumed continuous operation of the Power Plant throughout the year, in reality the Power Plant will only operate for the energy demand required at any given time. The actual operation of the plant will be determined by many factors such as power demand itself from the grid which varies hour by hour, the amount of renewable generation on the system, its bid price into the market compared to other generators, and the rules of the grid to ensure priority is given to renewable generation. The grid also needs to remain stable and secure with increased high levels of renewable generation.
- The majority of plant and all continuous and frequently operational plant will be fuelled by natural gas. Liquid fuel will only be used for testing and in the event of a national gas supply emergency.
- Start-up and emergency plant will only operate with use of low and ultra-low sulphur liquid fuel.

Summary of Impact

In summary, the construction, operation and decommissioning of the Proposed Development does not contravene local or national planning policy.

Pollutant concentrations will not increase to the extent that the Air Quality Standards or Environmental Assessment Levels are reached or at risk of exceedance.

Therefore, the effect of the Proposed Development is considered **Not Significant** overall and is compliant with local and national planning policy.

9. Airborne Noise and Groundborne Vibration

Introduction

This chapter describes the potential impact on residential receptors associated with the noise and vibration produced from the Proposed Development.

The potential noise and vibration sources during the construction phase comprise mobile machinery / plant and construction processes, such as earthworks, which can give rise to elevated sound and vibration levels.

The potential noise during the operational phase comprise plant and equipment associated with the operation of the Proposed Development (e.g. the Power Plant and the Above Ground Installation).

Noise and vibration impacts affecting ecological receptors is summarised in **Chapter 07** (Biodiversity).

Existing Environment

The existing acoustic environment in and around the Site was quantified via baseline surveys. It was identified that existing sound levels are variable, but at times very low due to the absence of sound generated by human activity. Sound sources identified included birdsong, farm animals and weather induced sound (e.g. the wind 'rustling' vegetation). Some intermittent road traffic sound was present, mainly from the L1010 road.

Impact Assessment

The potential for the Proposed Development to give rise to airborne noise and groundborne vibration impacts has been considered as follows:

- Noise and vibration impacts arising during the construction phase, including:
 - Potential noise impacts arising from construction site activities located within the construction site, covering all construction activities proposed (e.g. blasting is required to excavate rock which cannot be removed by equipment mounted on tracked excavators).
 - Potential noise impacts arising from changes in traffic flows on existing roads.
- Noise and vibration impacts arising during the operational phase, including:
 - Operation of plant and equipment.
 - Increase in traffic flows associated with employees, deliveries etc.

To determine the impact of the Proposed Development on existing receptors in the area, a 3D sound model was constructed using CadnaA 2023 acoustic modelling software. This model was used to determine potential exceedances of the nominated criteria and investigate the mitigation measures required to reduce emissions to compliant levels.

During the construction phase, a **Negative, Not Significant, Short-Term** effect is expected as a result of construction phase sound levels and vibration levels generated by onsite activities.

During the construction phase, it is expected that blasting would be required to excavate rock which cannot be removed by other equipment. This will give rise to a **Negative, Significant, Momentary** effect.

During the construction phase a **Negative, Significant, Short-Term** effect is expected as a result of construction traffic.

During the operational phase, noise from Site operations will give rise to a **Negative, Significant, Long-Term** effect.

During the operational phase, noise from operational traffic on the existing road network will give rise to **Negative, Not Significant, Long-Term** effect.

Mitigation Measures

Mitigation requirements for potential impacts identified as follows:

- Careful programming of site works.
- Construction phase: the impact of blasting induced noise, vibration and overpressure will be mitigated via process management, community liaison and through the limiting of blasting charge quantities. To determine the maximum permissible blast charge, a number of trial blasts will be carried out such that a site-specific scaled distance graph can be developed. Using this graph, limits required to achieve the relevant criteria can be determined.
- Operational phase noise impacts will be mitigated via the inclusion of mitigation measures such as attenuators, silencers, careful plant item selection and, acoustic barriers and enclosures. A 2 dB exceedance of the nominated criteria is predicted at one receptor location (R1), however it is concluded this is **Not Significant** due to the contextual factors discussed in the noise and vibration chapter.
- A commitment has been made to ensure the final design of the development complies with the relevant operational phase noise limits. This will be confirmed via an appropriate noise monitoring regime.

Summary of Impact

Residual impacts are those arising from changes in traffic flows on existing roads during the construction phase. However, as discussed in this chapter, the spatial extent of this impact is small, being restricted to one road link; the L1010 road between the Site entrance and Tarbert.

No impacts are predicted during the operational phase.

Furthermore, although the change in noise from this road is sufficient to constitute an impact, absolute levels are not high therefore the impact may be less than indicated by the numerical assessment presented in **Chapter 07** (Biodiversity) of this report.

10. Landscape and Visual

Introduction

This chapter presents the objective of the Landscape and Visual Impact Assessment (LIVA) process is to identify and evaluate the likely significant effects on the landscape (including seascape) character and the visual amenity arising from all elements the Proposed Development.

Landscape effects are the result of physical changes to the fabric of the landscape. Visual effects concern changes in views.

The landscape and visual impact assessment is accompanied by mapping indicating landscape and visual designations as well as 15 Photomontages taken at representative viewpoints, refer to Volume 4 of the EIAR.

Existing Environment

Overview of the Landscape and Seascape Context

The Site of the Proposed Development is located in north County Kerry along the south shore of the Shannon Estuary, approximately 4.5 km to the west of Tarbert and 3.5 km to the east of the village of Ballylongford. The Site occupies part of two townlands, Kilcolgan Lower and Ralappane. The Rusal Aughinish (formerly Aughinish Alumina) plant at Foynes is located approximately 26 km to the east in County Limerick and outside of the study area.

The Site is currently in pasture with some tillage, comprising primarily improved grassland with some wet grassland adjacent to the Shannon Estuary shore. Its boundary to the shore is formed by low sandy cliffs. The topography of the land within the Site is generally undulating and rising up from the Shannon Estuary shoreline. Some of the fields are waterlogged in wet weather and there are pockets of marshy ground. There are currently several old disused farm buildings and structures on the Site.

The broad waters of the Shannon Estuary are the defining landscape feature, while the prominent built power station developments at Moneypoint and Tarbert Island, together with wind turbines and large electricity pylons going off into the distance, draw the immediate focus. The location of the Site on the edge of the southern shore results in it being particularly visible in scenic views from the northern shore of the estuary; from the waters of the estuary and Scattery Island and Hog Island; and from sections of the south shore extending west to beyond Ballylongford Bay and Carrig Island.

While portions of the Site are openly visible from areas and properties immediately south and south-east, e.g. Ralappane House, the Site is not particularly visible within the wider landscape. The undulating nature of the landscape east of the Site provides middle-ground screening while even low roadside and field vegetation provides effective foreground and middle-ground screening of views from within the flatter landscape west of the Site.

Study Area

Based on a desktop analysis and subsequent fieldwork, it was determined that the majority of likely significant landscape and visual effects will arise within a 7 km study area radius from the Site boundary. It is acknowledged that the Proposed Development may be visible from locations beyond the study area

of 7 km radius and as such it is important to note that the study area defines the area within which potential effects could be significant, rather than defining the extent of visibility.

Impact Assessment

Construction Phase

Landscape and visual effects and their significance at construction stage will be Temporary to Short-Term Adverse and will result in:

- Likely effects to landscape character or visual amenity within the locality or the wider study area as a result of the visibility of construction activities such as, scaffolding, cranes, the movement of construction vehicles along local roads, and other tall equipment such as machinery onsite.
- Effects of temporary – short-term Site infrastructure such as site traffic and construction compounds.
- Likely physical effects arising from construction of the development will be confined to the Site.

Landscape and Seascape Effects (Operational Phase)

The main landscape and seascape effects of the Proposed Development will be associated with the introduction of large industrial buildings, leading to a long-term change in character at the Site and an intensification of the industrial character along the shores of the Shannon Estuary. It is anticipated that the Proposed Development will alter the landscape character within approximately 1 km radius and up to 2 km radius from the Site boundary in elevated locations within County Kerry. Change to the landscape character will be noticeable beyond 1 km and up to approximately 6 km along the coastline of County Clare and in elevated areas near the coast.

In the context of the wider study area, the Proposed Development will be seen in conjunction with other existing large-scale industrial developments along the Shannon Estuary, which define already the overall character of estuary and its shorelines within the study area. The Proposed Development will therefore not be seen as uncharacteristic and can integrate into the wider landscape and seascape character.

Visual Effects (Operational Phase)

The main visual effects will relate to the introduction of a new large industrial facility onshore. The main visual receptor groups are residents, vehicle travellers including ferry passengers, workers and visitors / tourists. Residents will have the highest sensitivity to change than road users or ferry passengers. Vehicle travellers and workers will focus mainly on traffic or their commercial tasks and not primarily on available views. Ship passengers will see the Proposed Development in conjunction with the prominent existing Tarbert Power Station and Moneypoint Power Station structures.

The Proposed Development will introduce another prominent industrial facility in available views within the County Kerry section of the study area. It will often be seen in conjunction with the existing Tarbert Power Station, and Moneypoint Power Station with associated wind farm.

The majority of open views of the Proposed Development will be experienced from the County Clare side of the Shannon Estuary, where middle to long distance open views of the proposal will be possible. This includes most coastal roads within the study area as well as elevated sections of the N67 and adjoining local roads. Visibility is generally considered middle to long distance in nature (beyond 1 km)

due to the width of the estuary. Despite the distance, the Proposed Development will become a discernible new focus point in views from the shoreline. However, views across the Shannon Estuary will be depended on weather conditions and the level of haziness.

The Proposed Development will be a new component on often panoramic views across the estuary into County Kerry. It will be seen in conjunction with existing wind turbines including Leanamore Wind Farm and Tullahennel Wind Farm in County Kerry and Money Point Power Station and its chimney stacks in Co. Clare. Similar as for views in County Kerry, existing views contain already large scale industrial or light industrial developments, and the Proposed Development will therefore not be totally out of character. It will nevertheless industrialise additional areas further west along the shoreline, which are currently rural and natural in appearance.

Cumulative Effects (Operational Phase)

Cumulative effects describe landscape and visual effects of the Proposed Development in conjunction with other (3rd party) similar developments, which are in still the planning process.

It is anticipated that cumulative effects from future developments on the landscape, seascape and visual resource depend on the extend of additions to overground buildings. Combined visibility (between the Proposed Development and a proposed 3rd party development) will generally increase the industrialisation along the Shannon Estuary. Changes to Tarbert and Moneypoint Power Stations will be visible and intensify the industrial character of these sites. However, they will not change the overall landscape and seascape character further. Combined views will be limited to elevated locations within Counties Kerry and Limerick due to intervening vegetation and topography. Main receptors of these effects will be local residents, vehicles drivers and users of the Kilimer / Tarbert ferry. View across the Shannon Estuary from County Clare will, depending on good weather conditions, result in a clear increase in industrial facilities along the shoreline in generally wide panoramic views. Changes to views can be prominent despite the long distance between the viewer and the proposed developments due to the introduction of industrial facilities along a currently rural shoreline.

Mitigation Measures

The Proposed Development has been designed, as far as practicable, to avoid negative effects on the landscape and views. Modifications made to the design of the Proposed Development to avoid and reduce negative effects include mainly limiting the extent of land-take, siting of components, and, where possible, minimise impacts on established vegetation and features that contribute to landscape character and visual amenity. The main landscape and visual mitigation measures proposed include the following:

Facade Colour Scheme

Landscape mitigation can provide screening of the lower parts of the development and the area around the site entrance but not for the upper sections of the built structures. The main landscape and visual mitigation measures for the Proposed Development are therefore inherent in the design of its architecture and its colour scheme.

With the primary objective to minimise the visual impact of the built structures and to allow the buildings to be as unobtrusive as feasible against their backdrop, the proposed colour scheme was drawn from

colours found the surrounding local landscape. The building colours consist generally of a mix between the following six main colours, which range all within a muted mid-dark grey and green spectrum.

The colours pick up existing colours of the landscape along the County Kerry shore and its hinterland against which the Proposed Development will be seen in the majority of views. The proposed colour scheme will help to take the attention away from individual buildings and roofscapes and help blending-in the proposed built structures better with the landscape in available views. It will make it one of several other existing industrial facilities along the Shannon Estuary rather than pinpointing it with bright colours, which would otherwise emphasise further the existence of the proposed industrial structures in available views. The colours will also work with varying weather and visibility conditions, where their muted colours can quickly blend in.

Construction Phase – Mitigation

Main visual mitigation measures at construction include the following:

- Existing tree protection measures during construction shall be carried out in accordance with BS 5837:2012.
- Minimise external lighting related to construction works.
- Regular cleaning of public roads to remove any track out and to reduce temporary to short-term effects on visual amenity.
- Lighting will be kept to essential locations only, with the position and direction of lighting being designed to minimise intrusion and disturbance to adjacent areas.
- Lighting will be minimised in terms of number of lights and the power of the lights (lux level).
- Directional lighting, facing and located away from any surrounding vegetation.

Operational Phase – Mitigation

Landscape mitigation measures have been developed in order to screen the lower sections of the proposed range of buildings and the proposed access road to help the integration into the landscape. Landscape mitigation will be implemented in the first planting season after construction works are complete. The intended screening to be achieved by planting proposals will establish over time as the vegetation grows and matures. The objectives of the landscape design are to:

- Screen the Site from the public road and adjacent property.
- Preserve the existing landscape as far as feasible.
- Maximise pervious surfacing.
- Provide natural habitat for animals to aim for 'no net loss of habitat'.

Summary of Impact

In summary, it is expected that the cumulative effects from future developments on the landscape, seascape and visual resource depend on the extent of changes or additions to overground structures. Combined views of the generally increase or intensify the industrialisation along the Shannon Estuary. Changes to Tarbert and Moneypoint Power Stations will be visible and intensify the industrial character of these sites. However, they will not significantly change the overall landscape and seascape character.

View across the Shannon Estuary from County Clare will, depending on clear weather conditions' result in a clear increase in industrial facilities along the shoreline in generally wide panoramic views.

11. Traffic and Transport

Introduction

This chapter describes the likely significant effects of the Proposed Development on traffic and transport. This chapter describes the transportation impacts of the Proposed Development during the construction and operation phases in accordance with the requirements of the Environmental Protection Agency (EPA) ‘*Guidelines on the information to be contained in Environmental Impact Assessment Reports*’ (2022).

To assist in determining the impact that the Proposed Development has on the surrounding road network reference has been made to Transport Infrastructure Ireland standard ‘*PE-PDV-02045, Traffic and Transport Assessment Guidelines*’ (2014).

This chapter also sets out measures to mitigate any significant effects.

Existing Environment

The L1010 road is a single lane carriageway, from which access to the Proposed Development will be provided. The L1010 road connects with the R551 / N67 in Tarbert Town and the R551 / R552 in Ballylongford Village.

A 4.36 km long section of the L1010 road, from Tarbert Town to the Site access, will be improved by Kerry County Council, which involves widening the road to eight metres. It is expected that these improvements would be complete prior to the start of construction of the Proposed Development.

The Site is not well served by public transport with the nearest bus stop in Tarbert Town, approximately 4.6 km to the east of the Site. There are also no footways or cycle paths along the L1010 road close to the Site. There is a ferry crossing from Tarbert to Killimer in County Clare located at the Tarbert Ferry Terminal, north of Tarbert Town and approximately 6.8 km east of the Site. This ferry crossing takes approximately 20 minutes and runs every hour from 07:00 to 19:00 during the winter and 07:00 to 21:00 during the summer.

Impact Assessment

The Proposed Development has been assessed in terms of the following scenarios:

- **Do Nothing Scenario** – assessment of the environment where the Proposed Development is not built.
- **Construction phase** – the impact of the Proposed Development during construction.
- **Operational phase** – the impact of the Proposed Development during operation.

Models of the study junctions were undertaken to assess the capacity and identify the impact of the Proposed Development. This indicated that the Proposed Development results in a **Slight** impact in terms of the operating capacity of the junctions, however all of the junctions will continue to operate well within capacity with the addition of construction traffic from the Proposed Development.

During the operational phase, the operational traffic on the road network will potentially lead to an increase in queuing at the junctions, however the effect will be **Imperceptible** and **Long-Term** in nature.

Overall, from the analysis undertaken suggests that the junctions will remain within capacity for the duration of the operational phase. As a result, no mitigation would be required at any of the junctions.

Mitigation Measures

No mitigation is deemed to be required. Upon completion of construction the road junctions would return to normal levels, with the addition of the operational phase traffic.

There are not considered to be any significant effects on pedestrians, cyclists or public transport as a result of the Proposed Development.

The following measures will be adopted during construction phase of the Proposed Development to minimise the impacts on the road network:

- Logistic manager put in place.
- Traffic control will be in place for all vehicles entering and exiting the site, restricting road traffic from entering the site and introducing a one-way system, to reduce the need for vehicles to reverse.
- Parking will be allowed only in designated parking areas.
- Segregated pedestrian walkways will be introduced and restrict public pedestrian access.
- Traffic on the Site will remain on hardcore areas wherever possible. Where this is unavoidable, traffic exiting the Site would go through a wheel wash.
- All plant and equipment will be fitted with flashing amber warning lamps and hazard lights and will be required to have reversing alarms for operations within the work site.
- Speed limit of 15 km/h will be put in place on the construction site.
- All workers will be required to wear high visibility reflective protective clothing.
- Site foreman and supervisors will be in two-way communication with each other and the traffic controllers for the duration of the work shift.
- The construction Health and Safety Plan will set out how health and safety is to be managed during the construction phase.
- Site equipment within the work area that may have an impact on any emergency services requiring access to an incident will be cleared from the area as quickly as necessary.
- Heavy Goods Vehicles 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.
- No HGV traffic will be allowed pass the existing school on the Coast Road at Tarbert for 20 minutes before and 10 minutes after the opening and closing times of the school. The elimination of passing HGV traffic during these time periods will ensure the continued safe delivery and collection of children at the school.

No mitigation measures would be required for the operational phase of the Proposed Development. Despite this, a Mobility Management Plan will be prepared for the staff of the Proposed Development to help encourage sustainable modes of transport over single private vehicle trips.

Summary of Impact

The residual impact of the Proposed Development on traffic and transportation is considered to be **Slight** at the construction phase and **Imperceptible** during the operation phase. Cumulative impacts arising from related projects such as Tarbert Power Station and the L1010 Road Works are considered to be minimal and **Insignificant**.

12. Cultural Heritage

Introduction

This chapter describes the potential impacts and residual effects upon the identified archaeological and architectural heritage resources resulting from the Proposed Development.

Existing Environment

Detailed archaeological surveys were undertaken to inform the Environmental Impact Statement (EIS), relating to a previous planning application for a larger development (in 2007), including a walkover survey, intertidal survey, marine geophysical survey, terrestrial geophysical and aerial photography.

Measures to mitigate impact to Cultural Heritage assets noted on these surveys recommended in the EIS were subsequently placed as Condition 32 of Planning Permission (08.PA0002 which has since expired) and followed up with archaeological testing and recording in 2008. On the basis of this previous work, the following Cultural Heritage is noted within the Proposed Development.

There is one recorded archaeological site partially located within the boundaries of the Site. This is a ringfort (KE003-004) which is located on the east boundary which was noted as CHS10 in the previous EIS. The Cultural Heritage sites identified during the EIS within the Proposed Development comprise six assets – CHS4 Farm Complex, CHS5 Possible Archaeological Feature, CHS6 well, CHS7 gun emplacement, CHS14 Mass Rock and CHS15 a two-bay ruined structure.

The archaeological testing in 2008 revealed 31 No. Areas of Archaeological Potential within the footprint of the current Site. These represent a wide range of archaeological site types from the prehistoric period onwards including burnt mounds, enclosures, hearths and post-medieval settlement activity.

One further heritage asset has been recorded within the immediate area since the archaeological testing and recording in 2008. This is a Protected Structure - lookout Post / Searchlight Emplacement (RPS-KY-087) which is located adjacent to the north-east boundary of the Site. This asset is associated with the Fort Shannon Coast Defence Artillery installation constructed in 1941.

Impact Assessment

Construction Phase

The Cultural Heritage assets and 31 Areas of Archaeological Potential are located within the footprint of the Site and will be impacted by groundworks associated with the construction of the Proposed Development.

There will be residual impacts on two assets of **Slight** effect, residual impacts on 26 No. assets of **Moderate** effect and residual impacts on two assets of **No Effect**.

The ringfort (KE003-004) / CHS10 will remain in situ within the boundaries of the Proposed Development with a buffer zone created around it. This recommendation was included as Condition 32 (f) of Planning Permission (08.PA0002) and a fence-line was proposed to demarcate the appropriate buffer zone. This fence-line will also be included in the current scheme as embedded mitigation.

A seabed impact exclusion zone of 50 m should be maintained around the marine anomaly A8 to ensure that it is not accidentally impacted. This mitigation will be included at the construction phase of the Proposed Development.

The Lookout Post / Searchlight Emplacement (RPS-KY-087) is located immediately adjacent to the Proposed Development construction works. Embedded mitigation in design comprising a buffer zone established around the asset to prevent incursion during construction will be undertaken.

A photographic survey and written description of CHS6 Well should be carried out in advance of groundworks within the vicinity of this asset. It is also recommended that the dismantling of the well be carried out in an orderly fashion under the supervision of a suitably qualified archaeologist.

CHS4 Farm Complex, CHS7 Gun Emplacement and CHS15 two-bay ruined structure were recorded as part of the upstanding building survey in 2008 to fulfil a condition on planning approval (Condition 32 (d) of Planning Permission 08.PA0002). No further mitigation is required in relation to these assets which will be demolished during the construction phase.

CHS14 Mass Rock was made known to the 2007 EIS by local knowledge. This asset was not observed during fieldwork associated with the EIS including the intertidal survey nor was it observed during a survey of the foreshore area associated with this EIAR in February 2024. This asset no longer exists and there will be no impact to it.

Operational Phase

All physical impacts to known and unknown heritage assets will occur during the construction phase and there is no requirement for mitigation measures during the operational phase.

Mitigation Measures

It is anticipated that the archaeological mitigation programme will commence prior to the start of the main construction works pre enabling works.

During phase 1, the following specific mitigation measures are proposed for the archaeological sites located within the Site:

- Areas of excavation around the known archaeological sites and areas will include a 5m buffer zone as a minimum between the edge of the site and any archaeological features. Should previously unknown archaeological features be identified then the excavation area will be expanded to ensure the 5m buffer zone is maintained.
- It is noted that the archaeological deposits within Area 6 Post-Medieval Habitation site and Area 11 Enclosure are particularly close to the surface and are vulnerable to disturbance. A topographic survey will be carried out in advance of archaeological excavations to record potentially significant anomalies in the ground surface which could otherwise be damaged by plant moving over the area.
- The removal of topsoil in parts of Areas 6 Post-Medieval Habitation site and Area 11 Enclosure will be performed by mini-digger to reduce the potential of damage caused by plant tracking over the shallow archaeological features.
- A photographic survey and written description of CH6 Well will be carried out in advance of groundworks within the vicinity of this asset, the dismantling of the well will be carried out in an orderly fashion under the supervision of a suitably qualified archaeologist.

Phase 2 will take place during later enabling works and in advance of and concurrent with construction) – the GWB will be undertaken in all other areas where it is required, in particular in areas which have

not been subject to previous archaeological testing. The construction of the stormwater Outfall Pipe and other works on the foreshore will also be archaeologically monitored under licence by a suitably qualified and experienced maritime archaeologist.

Phase 3 – a post-excavation assessment will be undertaken in accordance with DCHG / NMS advice, followed by an appropriate scheme of detailed analysis and reporting. Phase 3 will commence as soon as practicable following completion of the main investigative works.

Summary of Impact

The Proposed Development will impact upon known and unknown archaeological and architectural assets. Mitigation has been proposed to reduce this impact which will ensure any archaeological and architectural assets are identified and recorded to best practice thereby enriching the known heritage of County Kerry.

13. Population and Human Health

Introduction

This chapter describes the potential effects of the Proposed Development on population and human health. It defines the existing environment in relation to population and human health; and presents the findings of the impact assessment including suggested mitigation measures and a summary of impact.

Existing Environment

The Proposed Development will be located along the Shannon Estuary in County Kerry. The nearest residential properties to the Proposed Development are part of small settlements along the L1010 road. The area is predominantly rural and the primary land use in the study area is agricultural. There are two settlements offering community resources near to the Site: Tarbert and Ballylongford.

The town of Tarbert is located approximately 4.5 km east of the Site on County Kerry's border with County Limerick. The town has a population of approximately 500 people. Tarbert comprises a high street with a number of facilities for the local community, including a post office, a church (St Mary's Roman Catholic Church), a community centre and three schools: a pre-school (Wishing Tree Pre-School), a primary school (Tarbert National School) and a secondary school (Tarbert Comprehensive School).

The village of Ballylongford is located approximately 3.5 km to the south-west of the Site. The village is situated at the top of a creek of Ballylongford Bay on the tidal estuary of the River Shannon. The village has a population of approximately 400 people, and sees a large influx of tourists which visit the range of historical sites in the local area.

Impact Assessment

Construction Phase

Construction of the Proposed Development will lead to a **Slight Positive** impact on the local employment workforce due to the number of construction workers required. It will also lead to an **Imperceptible Negative** impact on severance between the local population and the services which they frequently use due to construction traffic travelling to and from the Site.

The Proposed Development will also lead to the following impacts on human health during the construction phase:

- A **Negative** human health impact due to the presence of construction traffic leading to nuisance and noise level increases at residential properties on the L1010 road and Church Street in Tarbert.
- A **Positive** human health impact due to the workforce required to construct the Proposed Development leading to increased accessibility to employment opportunities and training for the employment workforce in the local and wider community.

Operational Phase

During the operational phase of the Proposed Development will lead to a **Slight Positive** impact on the local employment workforce due to the number of workers required.

The Proposed Development will also lead to the following impacts on human health during the operation phase:

- A **Negative** human health impact due to the impact of the Proposed Development on greenhouse gas emissions and climate change.
- A **Positive** human health impact due to workforce required to operate the Proposed Development leading to increased accessibility to employment opportunities and training for the employment workforce in the local and wider community.

No significant cumulative effects have been identified.

Mitigation Measures

There are no specific mitigation measures for Population and Human Health. However, this chapter should be read in conjunction with the mitigation measures in **Chapter 10** (Landscape and Visual), **Chapter 09** (Airborne Noise and Groundborne Vibration) and **Chapter 15** (Climate)

Summary of Impact

During the construction and operational phases, the overall impact on Population and Human Health will be **Low**.

14. Major Accidents and Disasters

Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) assesses the potential Major Accidents and Disasters scenarios which are pertinent to the Proposed Development, taking into consideration the materials, operations and location of the Proposed Development and associated facilities.

Major Accidents and Disasters are incidents which can result in immediate or delayed significant harm to human health and / or the environment and require the use of resources beyond those of the proposed developer or its contractors to manage, such as the emergency services.

Disasters are typically naturally occurring events, such as earthquakes, landslides and flooding, and can also include manmade or external hazards such as acts of terrorism.

The assessment of Major Accidents and Disasters considers the full lifecycle of the Proposed Development, from construction, through operation, maintenance, and the eventual decommissioning and demolition of the facilities.

Existing Environment

The Proposed Development is located on a site adjacent to the Shannon Estuary, between Tarbert and Ballylongford in Co. Kerry.

The Site is zoned as industrial by Kerry Co. Co. (Kerry CDP 2022-2028) and supports the progress of strategic energy projects along with the expansion of the gas network (Objective KCDP12-3).

There are a small number of residential properties located within 500 m of the Site and additional residential properties located along the L1010 road. The nearest COMAH Establishments to the Site are as follows:

- The decommissioned SSE Tarbert HFO Power Station which is approximately 5 km east of the Site.
- The National Oil Reserves Agency facility, known as the Mainland Tank Farm, which is also approximately 5 km east of the Site. SSE Tarbert HFO Power Station and the NORA facility are both Upper Tier COMAH installations and adjacent to one another.
- Moneypoint Power Generating Station, which is an Upper Tier COMAH installation, located on the northern shore of the Shannon Estuary, approximately 3 km to the north of the Site.

There is no local Fire station within the environs of the Proposed Development.

There are a number of designated environmental sites in the area of the Proposed Development, including the Lower River Shannon Special Area of Conservation (SAC), which is adjacent to the Site, along the northern / north-western boundary and also along part of the eastern boundary. The Proposed Development is not located within a groundwater drinking water source protection area.

Impact Assessment

Substances are generally classified in accordance with the Classification, Labelling and Packaging Regulations (EC, 2008). This is a system of identifying the hazardous properties of materials, for example those which are flammable, toxic and harmful to the environment. The assessment considers the potential interactions of substances present on the Proposed Development, which could potentially create harmful materials or the release of energy.

Where a major fire and / or explosion could cause harm both on and offsite, this would be considered as a Major Accident Hazard. This aligns with the criteria for the notifiable incident referred to in the COMAH Regulations, which is a fire involving a dangerous substance that may result in suspension of normal work in the establishment for more than 24 hours.

If a release of a dangerous substance resulted in significant damage to the environment or property, this would be considered a Major Accident Hazard. The Power Plant will contain process equipment such as natural gas compressors, turbine generators and electrical transformers, containing flammable and combustible substances. Consequently, a fire has also been identified in this assessment as the most significant potential major accident in this area of the Proposed Development.

The vulnerability of the Proposed Development to natural disasters such as flooding, earthquakes and the impact of climate change is substantially dependant on location. For example, highly unlikely events such as seismic events at the location of the Proposed Development have the potential to cause significant damage to assets and infrastructure such as the natural gas pipeline. These events can result in a loss of containment of natural gas leading to fires and / or explosions.

Identification of potential Major Accident Hazard / Major Accident to the Environment scenarios in this assessment has been based on the application of an industry standard risk assessment methodology, which considers the substances that could be present on the Proposed Development and their properties, including potential health, safety and environmental hazards.

A Quantitative Risk Assessment (QRA) has been carried out to support the COMAH reporting to the HSA for these potential Major Accident Hazard / Major Accident to the Environment scenarios and it has provided a detailed analysis of these hazards, including calculations of individual and societal risk.

Mitigation Measures

The following measures which will be implemented to prevent major accidents and disasters at the Proposed Development.

- The design, construction, and operation of the Proposed Development will be in accordance with international, national and established industry codes, standards and practice, such as the specification of pipework materials, design of structures etc.
- A detailed chemical inventory and risk assessments for all materials handled on-site will be produced in accordance with the requirements of the Chemical Agents legislation.
- All fuels and chemicals stored on-site will be subject to the Safety, Health and Welfare at Work (Chemical Agents) Regulations, as amended by *S.I. No. 231/2021* as well as compliance with the requirements of Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).

- The Proposed Development will comply with the requirements of all relevant health, safety and environmental legislation including COMAH, which requires operators to take all measures necessary to prevent major accidents and to ensure risks are minimised to 'As Low as Reasonably Practicable' (ALARP).

A Site Emergency Response Plan (ERP) will be developed in relation to the Proposed Development in accordance with legislative requirements including COMAH and the IE licence, which will include a fire strategy and appropriate training procedures.

Summary of Impact

Operators of power generation and natural gas industries incorporate the highest standards of safety and environmental protection measures throughout the design, construction and operation of their facilities.

Safety and environmental protection measures are incorporated at all stages in the lifecycle of the Proposed Development. From the extensive number of engineering codes and standards which are used in the design of facilities, from the construction of infrastructure to the specification of pipework and instruments to monitor and control the process. Detailed safety and environmental risk assessments will be carried out during design and on a regular basis during the operating phase of the Proposed Development to identify and analyse hazards.

A number of fire prevention and protection measures are included in the design of the Proposed Development.

Overall, the construction, operation and decommissioning phases of the Proposed Development is considered **Not Significant** for Major Accidents and Disasters.

15. Climate

Introduction

The climate change assessment has two separate considerations which are:

- **Lifecycle Greenhouse Gas (GHG) Impact Assessment:** estimates the greenhouse gas emissions to be produced during the construction, operation and decommissioning of the Proposed Development and examines the affect this could have on the Irish Carbon Budget.
- **Climate Change Resilience Assessment:** assesses vulnerability of the Proposed Development to climate change such as extreme weather events and sea level rise.

Existing Environment

The Study Area for the lifecycle GHG impact assessment covers all direct GHG emissions arising from activities undertaken within the Site and indirect emissions from activities outside the Site. The Study Area for the Climate Change Resilience Assessment is the Site.

The current baseline for the lifecycle GHG impact assessment is based on a 'Do Nothing' scenario where the Proposed Development is not constructed or operated. The baseline typically consists of the GHG emissions from the existing carbon stock within the soil and vegetation with the Site. As current land use within the Site will have minor levels of associated GHG emissions which are not considered material in the context of the Proposed Development, a net GHG emissions baseline of zero has been assumed.

The baseline for the Climate Change Resilience Assessment is based on historic climate data from Met Éireann recorded by the closest meteorological station to the Proposed Development. Met Éireann climate projections indicate an increase in 1-1.6°C in mean annual temperatures by 2060, with the most pronounced warming occurring in the east of the country. Frost days are anticipated to decrease by 50-62%. Summer rainfall is expected to decrease by up to 20%, with the frequency of heavy precipitation events during winter and autumn expected to increase by 20%.

Impact Assessment

Lifecycle GHG Impact Assessment

The lifecycle GHG impact assessment involves the calculation of GHG emissions (as tonnes of carbon dioxide equivalent (tCO₂e)) associated with the construction, operation and decommissioning of the Proposed Development, then comparison against the baseline.

The total construction-related GHG emissions from the Proposed Development are calculated to be approximately 109,996 tCO₂e, predominately consisting of embodied carbon within the construction materials (83%). Additional project activities that will contribute to emissions during the construction phase include:

- Plant emissions and enabling works (8%).
- Transportation of materials (1%).
- Electricity Purchase (<1%).
- Land use change (1%).

- Construction worker commuting (6%).
- Construction waste (1%).

The lifetime operational GHG emissions from the Proposed Development within the Site are calculated to be approximately 22,225,151 tCO₂e with 93% of operational emissions associated with fuel consumption of the CCGT. The GHG emissions associated with purchased goods and services, well-to-tank emissions from the upstream natural gas supply chain, waste, and employee commuting were also considered.

Climate Change Resilience Assessment

During the construction phase, receptors such as the construction work force, construction plant, vehicles, materials, and the construction programme may be vulnerable to a range of climate risks. These could include:

- Inaccessible construction sites or health and safety risks to the workforce due to severe weather events (flooding, snow and ice, storms).
- Unsuitable conditions (due to very hot weather or very wet weather, for example) for certain construction activities.
- Damage to construction materials, plant, and equipment, including damage to temporary buildings / facilities as a result of stormy weather.

During the operational phase, potential climate impacts include:

- Overheating of electrical equipment and heat damage, deformation, cracking and thermal expansion of building surfaces and pavements due to extreme heat events.
- Impact on the thermal comfort of building users resulting from increased summer temperatures.
- Reduced efficiency of power plant operations due to increased temperatures.
- Deterioration of structures or foundations due to increased soil moisture resulting from increased winter rainfall.
- Coastal flooding due to sea level rise.

Mitigation Measures

For the purposes of the climate change assessment, key mitigation measure considered embedded in the design included:

- The burial of electrical connections underground to protect from extreme heat events.
- Drainage systems built in accordance with Sustainable Drainage Systems (SuDs) and designed with a 20% allowance for increased precipitation due to climate change.
- Use of attenuation ponds to hold peak discharges from storm events.
- Power Plant designed to operate over a large range of ambient temperatures.
- Power Plant utilises air cooled heat exchangers instead of cooling water to reduce water demand.

To mitigate the GHG impact of the Proposed Development, the following are examples of some of the key mitigation measures that have been implemented into the design:

- Power Plant to operate exclusively in combined cycle mode.
- Minimise the cut and fill during construction.
- Black-start diesel generator only to be used during start-up.
- Site layout designed to be compact and efficient.
- Reduced water consumption through the implementation of a closed loop air cooled steam condenser.

Summary of Impact

The GHG assessment for the Proposed Development has considered the Proposed Development to have a **Major Adverse** residual effect and is therefore considered **Significant**.

However, the Proposed Development must be considered in relation to the Irish Government's low-carbon energy strategy. The Proposed Development will assist in displacing higher carbon intensity, fossil-fuelled power plants. The Proposed Development will result in significant reductions in carbon emissions for the Irish energy sector and aid in the transition to a renewable-based energy network.

The Climate Change Resilience Assessment has been qualitative and provides commentary on how the Proposed Development will be resilient to climate change within the context of current and predicted future climate conditions. **No Significant** climate change impacts were identified for the Proposed Development.

16. Waste Management

Introduction

This chapter presents the assessment of the effects of the Proposed Development with respect to waste management. All management of waste will be in accordance with the relevant regulations. Waste will be transported by licensed waste carriers to waste management sites which hold the necessary regulatory authorisation and / or permits for those wastes consigned to them.

Existing Environment

The current state of the environment comprises baseline information on waste arisings and waste management in Ireland. The existing environmental information was sourced from the most recent data collated and published by the Environmental Protection Agency.

Impact Assessment

All management of waste will be in accordance with the relevant regulations. Waste will be transported by licensed waste carriers to waste management sites which hold the necessary regulatory authorisation and / or permits for those wastes consigned to them.

Construction Phase

Construction waste arisings (from demolition, excavation and construction waste) is considered to cause a **Slight / Not Significant** effect when compared to national construction and demolition waste arisings. All effects are also deemed to be **Temporary** due to the length of the construction programme.

Construction waste includes the waste arising from the construction of building and enclosures (such as bricks, concrete, metals, packaging etc.), road and parking areas (including materials such as aggregate and asphalt) and additional concrete from the containment walls of other structures including a utility sleeper, a retaining wall and a fuel oil storage and pumping facility.

All excavated material will be reused onsite, and no import of soil is required so a balanced cut and fill is proposed. Therefore, the impact is considered to be **No Change / Imperceptible**.

Small quantities of municipal waste and hazardous waste are expected to be generated when compared to national waste arisings, therefore a **Not Significant** impact is expected.

All hazardous waste will be managed as set out in the Resource Waste Management Plan (RWMP) which will be implemented by the EPC Contractor and that Contractor will update the RWMP, where necessary, to comply with planning conditions and in agreement with Kerry County Council.

It is concluded that **No Significant** effects are expected during construction.

Operational Phase

Waste arising during the operational phase of the Proposed Development is not expected to generate any other waste than general, commercial, industrial waste and small quantities of municipal. All operational wastes are expected to be **Not Significant** in the context of national waste arisings and significantly less than those arising from the construction of the Proposed Development

Mitigation Measures

The construction of the Proposed Development will be subject to measures and procedures defined within a CEMP. The CEMP will include the implementation of industry standard practice and control measures for environmental impacts arising during construction, such as the control of dust and the approach to materials and waste management on-site.

A RWMP has been prepared for the Proposed Development and sets out measures relating to waste management that will be implemented during construction of the Proposed Development. Contractors will implement RWMP in accordance with the Environmental Protection Agency 2021 publication '*Best Practice Guidelines on the Preparation of Resource and Waste Management Plans for Construction and Demolition Projects*'.

Summary of Impact

The implementation of the mitigation and monitoring measures will ensure that high rates of reuse, recovery and recycling are achieved at the Site of the Proposed Development.

Therefore, the residual effect significance on national waste plans and policies, and national capacity as a result of the waste generated from the Proposed Development is considered to remain **Not Significant**.

17. Material Assets

Introduction

This chapter presents an assessment of the potential impacts of the Proposed Development on Material Assets. This chapter defines the study area; the methodology used for developing the baseline and impact assessment; provides a description of the baseline environment; and presents the findings of the impact assessment.

This chapter presents an assessment of the potential impacts of the Proposed Development on land use and built services (utilities).

Other resources, such as land, soil, water, air, traffic, human health and amenity resources are discussed in the other chapters of the EIAR, and as such are not considered in this chapter, namely: **Chapter 05** (Land, Soils and Geology), **Chapter 06** (Water), **Chapter 08** (Air Quality), **Chapter 11** (Traffic and Transport), **Chapter 13** (Population and Human Health) and **Chapter 16** (Waste Management).

Existing Environment

The Site is located on the southern shore of the Shannon Estuary and predominantly comprises grassland, with minimal infrastructure in place.

A number of minor drainage channels are present on the Site, with longer drainage features crossing the proposed access road. A small stream runs in a north-westerly direction through the Site and discharges into the Shannon Estuary. The lands of the Site are under Applicant Ownership and currently leased and in agricultural use, mainly in pasture with some tillage. The lands are accessed by the L1010 road.

There are a number of disused and unoccupied buildings within the Site including a derelict set of buildings which now appear to be used as agricultural outbuildings.

There is currently no electricity network infrastructure within the boundary of the Site. There is a high voltage (HV) electricity grid in close proximity to the Site. A 220 kV and 110 kV electrical transmission is available from the nearby Kilpaddoge 220 kV substation approximately 3 km east of the Site.

There is no existing natural gas transmission network within the footprint of the Site. A GNI owned and operated gas transmission pipeline is located approximately 26 km east of the Site.

An existing overhead telecom line (EIR phone line) runs along the L1010 road. There are no broadband connections within the footprint of the Site.

Currently there is a group water scheme, supplied from Ballylongford, that extends to a distance of about 150 m beyond the entrance to the Site. There are no existing stormwater or foul water drainage systems within the footprint of the Site, or along the L1010 road, adjacent to the Site.

Impact Assessment

Construction Phase

The construction programme is anticipated to take 32 months, subject to seasonal and other planning constraints.

Demolition of an existing abandoned farmhouse and other structure within the Site of the Proposed Development is required to facilitate the development. The Proposed Development will be located on agricultural grassland. The construction phase of the Proposed Development will have a **Negative** impact on land use, as the land use changes from agricultural use over the course of the construction phase to an industrial power use.

During the construction phase, electricity will be required by the Contractor, and this will be provided to the construction compound via a series of portable site diesel generators.

During the construction phase there will be no requirement for natural gas at the construction compound for the construction works.

During the construction phase, underground gas pipework connections, electric cabling, telecommunications supplies, stormwater drainage networks and water supply connections will be laid within the Site. There is the potential to impact on local network supplies, causing a potential **Temporary, Slight and Negative** effect.

Operational Phase

During the operational phase the land use will be permanently changed from an agricultural land use to industrial / power infrastructure on a much large scale.

During the operational phase, the new electrical infrastructure of the Power Plant will have a **Long-Term, Positive and Very Significant** effect on the existing electricity supply network during operations as the Proposed Development will deliver the urgently needed electricity generation requirements to meet capacity needs.

During the operational phase the Power Plant will operate off natural gas as the primary fuel (delivered to Site via the consented 26 km Natural Gas Pipeline. The new gas infrastructure will have a high sensitivity as this infrastructure will tie into the existing national network for a gas supply. The magnitude of impact will be **Very Significant** as there will be a major change in utilities required during operational phase of the Power Plant.

The Proposed Development will require a connection to a broadband network.

During the operational phase the Proposed Development will require water supply. The Applicant has made a connection request to Uisce Éireann which will require connection to a mains water system. It is anticipated that this will be provided along the L1010 road from Ballylongford to the Site.

During the operational phase, stormwater (surface water) will be generated from all surfaces within the Site which are exposed to rainwater, including areas where water is used to wash down.

During the operational phase, all foul water will be pumped or fall by gravity to a wastewater treatment plant. The treated effluent from the wastewater treatment plant will be discharged to the Shannon Estuary via the same discharge point as the surface water, in accordance with the Industrial Emissions licence for the Site.

Mitigation Measures

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

- A CEMP has been prepared and is presented within **Appendix A2.3**, Volume 4. This will be finalised by the Contractor prior to the start of construction.
- Control of runoff from construction activities will be managed under the CEMP.
- As with any excavations there is a potential to disrupt local underground services. A confirmatory survey of all existing services will be carried out prior to construction and identify the precise locations of any services.
- The 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.
- All potential temporary connections will be agreed in advance with the relevant service provider.

Prior to the operational phase of the Proposed Development, utilities infrastructure connections will be tested regularly by a suitably qualified person using an appropriate methodology, approved by the relevant service provider, and under the supervision of the local authority.

Emissions during the operational phase will be regulated and monitored under the Industrial Emissions licence.

Summary of Impact

With the implementation of best practice mitigation measures the Proposed Development could still require a temporary suspension of services to facilitate the connection works to the utilities network during the construction phase. However, the residual effect on the existing utilities network will likely be **Imperceptible** during the construction phase.

During operations, the Proposed Development will operate off natural gas as the primary fuel and will use approximately 25.5 GWh/d² of natural gas when operating at full capacity.

The residual effect on the existing electricity transmission network will be **Positive** and **Very Significant**, as the Proposed Development will export up to 600 MW of power to the electricity transmission system.

2 Gigawatt hour per day

18. Interactions

This chapter evaluates the potential interaction of effects described within the EIAR, which the Proposed Development may have on the receiving environment and sensitive receptors.

The interaction of effects within the Proposed Development in respect of each of the environmental factors, listed in Article 3(1) of the EIA Directive, have been identified and addressed in detail in the respective chapters in this EIAR. This chapter, however, presents a summary of each assessment of the interaction (interrelationship) of impacts from the Proposed Development between the various environmental factors.

Interactions of effects identified from the Proposed Development are identified between the following environmental aspects:

- Land, Soils and Geology.
- Water.
- Biodiversity (Marine and Terrestrial).
- Air Quality.
- Airborne Noise and Groundborne Vibration.
- Landscape and Visual.
- Traffic and Transport.
- Cultural Heritage.
- Population and Human Health.
- Major Accidents and Disasters.
- Climate.
- Waste Management.
- Material Assets.

All potential effects arising from the interactions were identified early in the design process and in preparation of the EIAR and were therefore addressed in the design of the Proposed Development, in addition to the impact assessment studies. As a result, any potential effects were either avoided through design measures or have been addressed through specific mitigation and monitoring measures reported within respective chapters of this EIAR.

No additional mitigation or monitoring measures are proposed in this chapter.

19. Summary of Mitigation

Embedded mitigation measures have been incorporated into the design of the Proposed Development throughout the design process. The environmental impact assessment of the Proposed Development, as described in **Chapter 01** (Introduction), facilitated the identification of additional mitigation and monitoring measures to prevent or reduce any likely significant impacts identified in relation to the Proposed Development.

This chapter of the EIAR (in Volume 2) summarises the impacts assessed, and the mitigation and monitoring measures identified within **Chapters 05 to 17** of the EIAR. The embedded environmental controls and all mitigation and monitoring measures detailed herein are included in the Construction Environmental Management Plan (CEMP), included as **Appendix A2.3** in Volume 4.

20. References

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