CLIENT: LUMCLOON ENERGY LIMITED

PROJECT NAME: LEL CASTLELOST

PROJECT DETAILS: PROPOSED DEVELOPMENT OF THE LEL FLEXGEN CASTLELOST, LEL ESS CASTLELOST, & LEL GIS CASTLELOST PROJECTS AT KILTOTAN & COLLINSTOWN AND OLDTOWN, ROCHFORTBRIDGE, COUNTY WESTMEATH

DOCUMENT: ENVIRONMENTAL IMPACT ASSESSMENT REPORT (EIAR) (VOLUME 1) NON-TECHNICAL SUMMARY (NTS)

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1 INTRODUCTION

1.1 OVERVIEW

Lumcloon Energy Limited (LEL) propose to develop a reserve gas-fired generator (referred to as the *LEL Flexgen Castlelost*) and Energy Storage System (ESS) project (referred to as the *LEL ESS Castlelost*) and Gas Insulated Switchgear (GIS) electricity substation (*referred to as LEL GIS Castlelost*) on lands with an area of 21.3ha /52.6 acres in the townlands of Kiltotan & Collinstown and Oldtown, Rochfortbridge, Co. Westmeath.

Each of the three projects are subject to separate planning applications, i.e., the LEL Flexgen Castlelost Project, the LEL ESS Castlelost Project and the LEL GIS Castlelost Electrical Substation. Whilst EIAR is mandatory only in the case of the LEL Flexgen Castlelost Project, given the scale nature and the proximity of the projects to each other, a single Environmental Impact Assessment Report (EIAR) has been prepared for all projects. The potential environmental impacts from each project are assessed individually and cumulatively (with each other and with any other identified projects) within this EIAR. The planning and development regulatory framework is presented in Section 1.5 below.

1.2 SUMMARY OF PROPOSED PROJECTS

The three projects include different technologies which were selected to provide a comprehensive range of electricity capacity and ancillary services to the grid and assist with the transition to a low carbon economy.

The LEL Flexgen Castlelost Project is a reserve generator and will provide back-up electricity to the national grid. The plant will comprise five (5no.) open cycle gas turbine (OCGT) electrical generating units, totalling approximately 275MWe (megawatts electrical), ancillary plant, buildings and infrastructure. The LEL Flexgen Castlelost project is designed to operate intermittently and provide generating capacity during periods of high demand or when renewable energy cannot meet demand. OCGT units are advantageous due to their operational flexibility and can be turned on quickly to match system demand.

The LEL ESS Castlelost Project will comprise an open area battery storage system compound, synchronous condenser compound, IPP (customer) building and all ancillary electrical equipment and development works. The LEL ESS Castlelost Project will store surplus renewable energy generated during periods of low demand and release this to the grid with demand is greater, i.e., it will provide load shifting and ancillary services to the electricity grid.

The LEL Flexgen Castlelost and LEL ESS Castlelost projects will connect to a proposed 220kV Gas Insulated Switchgear (GIS) electrical substation, which will be developed on lands adjoining the projects.

The LEL GIS Castlelost project consists of a substation building with a maximum height of 17 metres (m). The GIS substation will connect via two 220kV underground cables to the existing Shannonbridge-Maynooth 220kV overhead line, which passes through the project study area on an east-west orientation.

An underground gas pipeline will be constructed to deliver natural gas to the LEL Flexgen Castlelost Project from the existing natural gas gas pipeline located c.5km north of the development lands. Gas Networks Ireland (GNI), as the designated competent authority, will separately manage the process of delivering the underground natural gas pipeline to the proposed site.

The LEL Flexgen Castlelost Project will ensure power supply continuity and assist with transition towards 70% renewable sources by 2030[1]. Owing to the primary fuel type and the projected low number of running hours, the carbon footprint of the reserve gas-fired generator is minimal when compared with existing diesel-fired back up (reserve) generators and the recently retired peat-fired power stations in the country. The proposed LEL Flexgen Castlelost Project is designed to operate during high demand periods only.

The LEL ESS Castlelost Project will provide a full range of carbon free system services and it will replace the functions of a conventional power plant including black start services. The LEL ESS Castlelost Project will trade electricity at times of high demand aiming to shift and smoothen the demand curve by charging at night and discharging during peak hours (daytime) and during the occurrence of power system event such as a frequency and voltage deviations, faults in the lines, tripping generators, insufficient renewables supply, etc.

1.3 APPLICANT COMPANY

Lumcloon Energy Limited (LEL) was established in November 2008 as a project development company focused on flexible power and energy assets. The company is based in Tullamore, Co. Offaly. Since its inception, LEL focused on the development of flexible generation and grid connected energy storage systems to address the changing

[1] Legal obligation as part of Ireland's National Energy and Climate Plan (NECP) 2021-2030, which is Ireland's contribution to the European Union's Clean Energy Package

needs of evolving power system which are transitioning from fossil-based generation to renewable and low carbon /low emission generation.

1.4 NEED FOR THE DEVELOPMENT

The need for the projects (LEL Flexgen Castlelost, LEL ESS Castlelost and LEL GIS Castlelost) is driven by (a) decarbonisation plans[2] (70% by 2030 and towards zero by 2050), (b) the change to new sources of electricity production and further penetration of renewable energy sources which creates stability, reliability and predictability issues, (c) security of supply issues associated with existing inflexible and inefficient conventional generation, and (d) identified grid reinforcement needs to cater for future economic growth and demand. The projects will support the transition to higher levels of renewables and assist in the provision of a cleaner, more efficient, reliable, economic and secure electricity supply for consumers on the Island.

The three standalone projects are designed and configured to provide economic, reliable, and low emissions power to the electricity grid.

The LEL Flexgen Castlelost Project (gas-fired reserve generator) will replace existing older diesel fired generators and peat-fired /coal-fired stations by providing additional low emissions capacity to the electricity system.

The LEL ESS Castlelost Project will provide a wide range of carbon-free system services and is designed to support further integration of variable non-dispatchable renewable generators to the grid.

The LEL GIS Castlelost Project will be developed to meet the identified transmission network reinforcement requirements in the Midlands of Ireland as outlined in the recently published *"Shaping our Electricity Future"*[3] report by Eirgrid and SONI. The report details innovative approaches to developing the grid in order to meet ambitious 2030 renewable energy targets. The report describes a "*Generation-Led approach*" which seeks to influence the location of new generators to sites on the transmission system where there is capacity available to accommodate them. Construction of the proposed GIS electrical substation within the development lands at Castlelost accords with findings in the report and electricity infrastructure policy objectives as prescribed in the Westmeath CDP 2021-2027

[2] 70% RES-E target has become a legal obligation as part of Ireland's National Energy and Climate Plan (NECP) 2021-2030, which is Ireland's contribution to the European Union's Clean Energy Package. The Climate Action and Low Carbon Development (Amendment) Act 2021 commits Ireland to 2030 and 2050

[3] Shaping Our Electricity Future (2021); details innovative approaches to developing the grid in order to meet ambitious 2030 renewable energy targets

and simplifies connection of the LEL Flexgen Castlelost and LEL ESS Castlelost projects to the electricity transmission system.

1.5 PLANNING & DEVELOPMENT REGULATORY FRAMEWORK

Each of the three projects are subject to separate planning applications, i.e., the LEL Flexgen Castlelost Project, the LEL ESS Castlelost Project and the LEL GIS Castlelost Project.

The LEL GIS Castlelost Project falls within the remit of Section 182 of the Planning and Development Act 2000, as amended. Accordingly, LEL submitted a Section 182E pre-application consultation request to An Bord Pleanála (ABP) in respect of the LEL GIS Castlelost Project to obtain notice from ABP on whether or not the proposed development is regarded as strategic infrastructure development (refer to ABP acknowledgement letter provided in Appendix 1.2).

The LEL Flexgen Castlelost and the LEL ESS Castlelost Projects are not within the classes of development prescribed under the Seventh Schedule to the Planning and Development Act 2000, as amended. They also fall below the thresholds at paragraph (1) of that Schedule. The LEL Flexgen Castlelost Project and the LEL ESS Castlelost Project are therefore not considered to be *"strategic infrastructure"* as defined in the Planning and Development Act 2000, as amended.

Consequently, planning consents are being sought for the LEL Flexgen Castlelost Project and the LEL ESS Castlelost Project under Section 34 of the Planning and Development Act 2000, as amended. The LEL Flexgen Castlelost Project and the LEL ESS Castlelost Project are standalone projects and can be constructed, commissioned, and operated in isolation. Therefore, separate planning consents are being sought from Westmeath County Council for these projects. Engineering drawings for the purposes of the planning application are listed in the drawing register provided in Section 2.1 below and Table 1.2 of this EIAR.

A proposed site layout drawing (Halston Ref. 0347-PL-002) showing all three projects within the overall development at Kiltotan & Collinstown and Oldtown, Rochfortbridge, Co. Westmeath is presented in Figure 2 attached. The planning drawings prepared for each of the three planning applications include *"proposed site layout"* drawings showing each of the projects within the proposed development lands. This information was used to inform the EIA process.

In addition, the proposed underground natural gas pipeline, which will serve the LEL Flexgen Castlelost Project is assessed with this EIAR. The underground pipeline will be constructed from the existing natural gas pipeline, which is located approximately 5km

north of the development lands. Gas Networks Ireland (GNI), as the designated competent authority, will separately manage the process of delivering the underground gas transmission pipeline to the proposed AGI. The work by GNI includes selection of the preferred route. As this work is ongoing, three indicative routes were selected and assessed from the existing gas pipeline to the development lands at Kiltotan & Collinstown and Oldtown as part of the EIA work.

1.6 EIA AND EIAR

The obligations under Irish law EIA and EIAR are derived from obligations incurred as a result of membership of the European Community. Under Irish legislation, the type of development for which an EIAR is required is prescribed by *Part X* of the 2000 Planning and Development Act, as amended and Part 10 of, and Schedule 5 (*'Development for the Purposes of Part 10'*), Schedule 6 (*'Information to be contained in an EIS'*), and Schedule 7 (*'Criteria for determining Whether a Development would or would not be likely to have Significant Effects on the Environment'*) to the Planning and Development Regulations 2001, as amended.

Section 172(1) of the Planning and Development Act 2000, as amended, states that an Environmental Impact Assessment (EIA) shall be carried out in respect of certain applications for consent for proposed development. Specifically, EIA shall be carried out where:

- the proposed development would be of a class specified in Part 1 of Schedule 5 of the Planning and Development Regulations 2001 (as amended), and such development would equal or exceed, as the case may be, any relevant quantity, area or other limit specified in that Part or no quantity, area or other limit is specified in that Part in respect of the development concerned.
- the proposed development would be of a class specified in Part 2 of Schedule 5 of the Planning and Development Regulations 2001 (as amended), and such development would equal or exceed, as the case may be, any relevant quantity, area or other limit specified in that Part or no quantity, area or other limit is specified in that Part in respect of the development concerned.
- the proposed development would be of a class specified in Part 2 of Schedule 5 of the Planning and Development Regulations 2001 (as amended), but does not equal or exceed, as the case may be, the relevant quantity, area or other limit specified in that Part and that the proposed development is likely to have a significant effect on the environment. This is referred to as *"sub threshold development".*

The main objective of an EIA, as set out in Article 3(1) of the 2014 EIA Directive, is to identify, describe and assess the direct and indirect significant impacts of a project on population and human health, biodiversity, land, soils, water, air & climate (including noise), material assets, cultural heritage and the landscape and the interaction between the aforementioned factors. The EIA Report reports on the findings of the EIA process and informs the Planning Authority, statutory consultees, other interested parties and the public in general about the likely effects of the project on the environment.

Whilst EIAR is mandatory only in the case of the LEL Flexgen Castlelost Project, following consultation with Westmeath County Council and given the scale nature and the proximity of the projects to each other, a single Environmental Impact Assessment Report has been prepared for the three projects. The potential environmental impacts and effects from each project are assessed individually and cumulatively (with each other) within the EIAR. This EIAR has been prepared in accordance with the following:

- EU Directive /337/EEC; 2011/92/EU and 2014/52/EU,
- Planning and Development Act 2000 (As amended),
- Planning and Development Regulations 2001 (as amended),
- European Commission (EC) (2017), *"Environmental Impact Assessment of Projects - Guidance on the preparation of the Environmental Impact Assessment Report"* (Directive 2011/92/EU as amended by 2014/52/EU),
- Environmental Protection Agency (2017), *"DRAFT Guidelines on the information to be contained in Environmental Impact Assessment Reports",*
- Environmental Protection Agency (2003), *"Advice notes on current Practice (in the preparation of Environmental Impact Statements)"*,
- Environmental Protection Agency (2002), *"Guidelines on the information to be contained in Environmental Impact Statements".*

In accordance with the requirements of the EIA Directive electronic notification was provided to the Department of Housing, Local Government and Heritage about the applications for inclusion on the EIA portal.

2 DESCRIPTION OF THE PROPOSED DEVELOPMENT

2.1 INTRODUCTION

Lumcloon Energy Limited (LEL) propose to develop a backup generator (referred to as the *LEL Flexgen Castlelost Project*) and an Energy Storage System (ESS) Plant (referred to as the *LEL ESS Castlelost Project*) on lands at Kiltotan & Collinstown and Oldtown, Rochfortbridge, Co. Westmeath. The LEL Flexgen Castlelost and LEL ESS Castlelost projects will connect to a proposed 220kV Gas Insulated Switchgear (GIS) electrical substation (hereafter referred to as the *LEL GIS Castlelost Project*), which will be located adjacent to the *LEL Flexgen Castlelost and* LEL ESS Castlelost Projects.

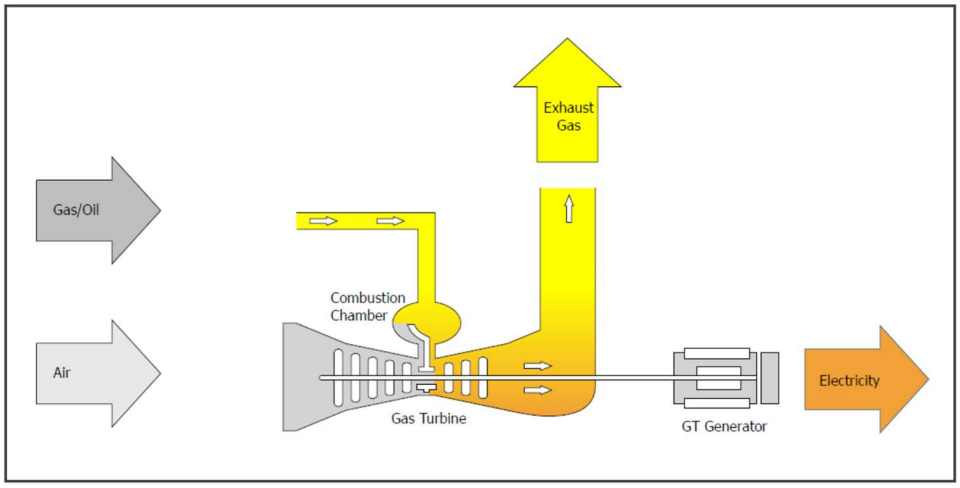
The three projects will be located on a 54-acre site at Kiltotan and Collinstown, Oldtown, Co. Westmeath. A map showing the location of the development lands on which the projects are proposed is presented below and Figure 1 attached.

The proposed development lands are located approximately 2km southwest of Rochfortbridge and 3.5km northeast of Tyrrellspass. The lands within the development boundary gently rise from the lowest point of 93.5m OD in the southeast close to the boundary with the M6 motorway to 107.1m OD in the west of the site and 105m OD and 107m OD at the position where the lands border the R446.

A summary description of the three projects is as follows:

LEL Flexgen Castlelost**:** Proposed gas-fired reserve generator of 275MW electrical capacity. The project will combust natural gas supplied from the Gas Networks Ireland (GNI) transmission system. The proposal includes the installation of five (5no.) dry low emission (DLE) gas-fired turbines, associated stack(s), raw water/fire water tank, fire water retention basin, back-up fuel tank, emergency generator, gas receiving station (AGI), low, medium and high voltage transformers, customer control room, and all ancillary electrical plant and delivery systems. GNI will separately manage the process of delivering a natural gas pipeline from the existing transmission system to the project lands.

Combustion turbines in open cycle (or simple cycle) configuration utilise a single thermodynamic cycle called the Brayton cycle. In the Brayton cycle, the working fluid (e.g., air) is compressed, heated, expanded through a turbine to turn the shaft (rotor) and then be discharged. The shaft drives the generator to produce electricity and the compressor to provide a continuous source of compressed air to the combustor. The combustion turbine exhaust gas, at slightly above atmospheric pressure, flows through an emissions control system before discharging into the atmosphere.



OCGT units are advantageous due to their operational flexibility and can be turned on quickly to provide peak load and accordingly are considered and recognised as the preferred solution for system reserve generators. The LEL Flexgen Castlelost reserve generator is designed to get to full load in less than 10 minutes.

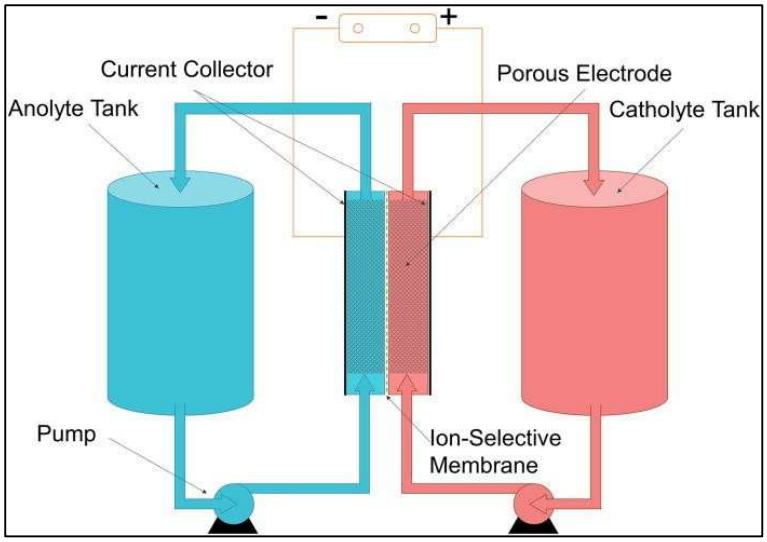
LEL GIS Castlelost Project: Proposed 220kV Gas Insulated Switchgear (GIS) Electrical Substation. The project will involve installation of two (2 no.) 220 kV underground circuits forming a connection to the existing Shannonbridge-Maynooth 220 kV overhead line (located within the development boundary) and two (2no.) 220 kV underground circuits and associated low voltage and communication underground cabling connecting the proposed substation with electricity transformers on the adjacent LEL Flexgen Castlelost

and LEL ESS Castlelost Projects, and all associated and ancillary site development works. The GIS substation itself includes a two storey, 17m high building (housing electrical switchgear, a battery room, a workshop room, and WC), transformer bay(s), access roadway and all ancillary site development works. Development of the LEL GIS Castlelost electrical substation conforms with the identified need[4] for reinforcement of the 220kV transmission infrastructure in the Midlands.

LEL ESS Castlelost Project**:** Proposed Energy Storage System (ESS) using vanadium flow battery (VFB) technology and synchronous condenser. The battery energy storage system (BESS) will comprise a cluster of battery modules positioned within a dedicated BESS outdoor compound. Each module will consist of (i) a battery container (6.1m long container) housing pumps and heat exchangers positioned on top of two (ii) tank (electrolyte) enclosures (12.2m long containers). An associated battery management system (BMS) and medium voltage power station (MVPS) enclosure will also form part of the battery module. The BMS will monitor and control electrolyte circulation and the MVPS is provided to condition the power generated. The synchronous condenser comprises a rotating generator positioned within a building. The generator is connected to the transmission system via a step-up transformer. When the generator has reached an operating speed that is synchronous to the system frequency, it is synchronised with the transmission network and acts as a motor providing reactive and short circuit power to the electricity network. A customer (IPP) building will also be installed within the ESS compound, and it will house electrical switchgear, store, control room, welfare facilities and administration facilities.

Vanadium Redox Flow Batteries (VRFB) are a form of electrochemical storage which release energy through a reaction between two chemical compounds dissolved in electrolytes. Unlike conventional batteries, VRFB batteries store the electrolytes in separate tanks which flow into a cell and the ion-exchange occurs through a membrane. The energy capacity of the battery is a function of the volume of electrolyte, therefore, by changing the size of the tanks the energy capacity of the system can be increased or decreased. The proposal includes for the placement of 264 modules each holding 136 tonnes of vanadium electrolyte solution. The electrolyte solution is not a surface water pollutant. Each tank module has secondary containment and is fitted with leak detection equipment in three position which provides information to the battery management system. The leak detection alarm system notifies the operator automatically ceases pumping of liquid electrolyte in the module.

[4] Refer to Eirgrid Report "Shaping our Electricity Future".



The power rating of the system depends on the number of modules and corresponding power converters. As the power and energy capacity of a VRFB are decoupled, there is an advantage over lithium ion (Li-ion) systems regarding the flexibility of the power to energy ratio. This flexibility allows for a modular design which can be scaled and adapted as required for a range of operating requirements. Additionally, VRFB have advantages over Li-ion particularly with regard to energy capacity degradation and lifetime. Flow batteries are typically based on two aqueous electrolytes serving as either the anolyte or catholyte, with different charges that are pumped from separate storage tanks across a membrane in a fuel cell.

Synchronous condensers are synchronous electrical machines attached to the electricity grid. The machine will be brought up to speed with an electrical motor attached or via a frequency convertor. When the machine is synchronised with the electricity grid it will act as a motor, turned by the energy taken from the grid. Because of the nature of the synchronous machine, reactive power can be consumed and generated by controlling the excitation of the rotor. The synchronous condenser compound includes a hall which will contain the condenser unit.

This schedule of engineering drawings prepared in support of each of the three projects and on which this EIAR is based is presented below.

LEL Flexgen Castlelost Project	
Drawing Ref.	**Title**
0347-PL-1000	Site Locations
0347-PL-1001	Existing Site Layout
0347-PL-1002A	Proposed Site Layout 1 of 3
0347-PL-1002B	Proposed Site Layout 2 of 3
0347-PL-1002C	Proposed Site Layout 3 of 3
0347-PL-1003	Site Entrance Junction & Sight Lines
0347-PL-1004A	Surface Water Drainage Layout
0347-PL-1004B	Surface Water Drainage Layout
0347-PL-1005	Foul Water Drainage Layout
0347-PL-1006	Watermain Layout
0347-PL-1007	Drainage Details
0347-PL-1010	OCGT Layout Section & Elevations
0347-PL-1011	OCGT Compound Elevations
0347-PL-1020	Maintenance Building - Plan & Section
0347-PL-1021	Maintenance Building - Elevations
0347-PL-1022	IPP Building - Plan, Elevations & Section
0347-PL-1030	Fuel Tank & Bund Details
0347-PL-1040	Black Start Generator, Air Compressor & Fire Pump Skid Building Details
0347-PL-1041	Step Up Transformers and Raw Water Tank Details
0347-PL-1042	Ammonia Tank & Purified Water Tank
0347-PL-1043	Fuel Pump and Water Treatment Module Details
0347-PL-1050	AGI Instrument, Regulator, Boiler House and Analyser Kiosk Details
0347-PL-1051	AGI Compound Layout & Elevations
0347-PL-1060	Main Transformer Compound Details
0347-PL-1070	Fencing and Lighting Details

LEL GIS Castlelost Project	
Drawing Ref.	**Title**
0347-PL-2001	Site Location Map
0347-PL-2002	Existing Site Layout
0347-PL-2003A	Proposed Site Layout (1 of 3)
0347-PL-2003B	Proposed Site Layout (2 of 3)
0347-PL-2003C	Proposed Site Layout (3 of 3)
0347-PL-2004A	Surface Water Drainage Layout (1 of 2)
0347-PL-2004B	Surface Water Drainage Layout (2 of 2)
0347-PL-2005	Foul Water Drainage Layout
0347-PL-2006	Watermain Layout
0347-PL-2007	Drainage Details
0347-PL-2008	Site Entrance Junction & Sight Lines

0347-PL-2020	GIS Building Floor Plans & Section
0347-PL-2021	GIS Building Elevations
0347-PL-2022	GIS Compound Layout & Elevations
0347-PL-2030	Proposed Western Interface Mini Tower Compound Details
0347-PL-2031	Proposed Eastern Interface Mini Tower Compound Layout
0347-PL-2032	Proposed Eastern Interface Mini Tower Compound Elevations
0347-PL-2033	Proposed Western Interface Mini Tower Compound Layout
0347-PL-2034	Proposed Eastern Interface Mini Tower Compound Elevations
0347-PL-2040	Fencing and Lighting Details
LEL ESS Castlelost Project	
Drawing Ref.	**Title**
0347-PL-3001	Site Location
0347-PL-3002	Existing Site Layout
0347-PL-3003A	Proposed Site Layout 1 of 3
0347-PL-3003B	Proposed Site Layout 2 of 3
0347-PL-3003C	Proposed Site Layout 3 of 3
0347-PL-3004A	Surface Water Drainage Layout 1 of 2
0347-PL-3004B	Surface Water Drainage Layout 2 of 2
0347-PL-3005	Foul Water Drainage Layout
0347-PL-3006	Watermain Layout
0347-PL-3007	Drainage Details
0347-PL-3008	Site entrance Junction & Sight Lines
0347-PL-3300	SynCon Compound Layout
0347-PL-3301	SynCon Compound Elevations
0347-PL-3302	SynCon Building Layout, Elevations & Section
0347-PL-3303	SynCon Control Modules Layout, Elevations & Section
0347-PL-3400	Battery Compound Layout
0347-PL-3401	Battery & PCS Details
0347-PL-3402	Battery Compound Elevations
0347-PL-3500	IPP Building Layout, Elevations & Section
0347-PL-3600	Fence and Light details

2.2 CONSTRUCTION STAGE

Subject to obtaining planning permission, it is envisaged that the LEL GIS Castlelost Project and the LEL Flexgen Castlelost Project will be constructed over an 18–25-month period commencing October 2022. Commencement of construction of the LEL ESS Castlelost Project would commence in March 2023 and would occur over an estimated 23-month period. Therefore, development of the three projects at the site is likely to occur over an estimated 28-month period.

Employment levels across the projects will vary depending on the construction programme and the extent of activities occurring on the site. It is expected that during peak activities, there will be up to 150 construction workers at the site for the LEL Flexgen Castlelost Project, 100 construction workers for the LEL ESS Castlelost project and 50 construction workers for the LEL GIS Castlelost Project.

2.3 OPERATIONAL STAGE

The LEL Flexgen Castlelost Project will operate as a reserve gas-fired generator. This means that the plant will only run during periods of high demand or system instability. The plant will be operated remotely. However weekly engineering and maintenance inspection visits to the plant will be carried out. When called upon, it is expected that the plant will respond and reach full load within 10 minutes and generate electricity for export to the grid. The LEL Flexgen Castlelost Project will require an industrial emissions licence from the EPA (i.e., it falls under a class of activity ("*Combustion of fuels in installations with a total rated thermal input of 50 MW or more*") as outlined in the first schedule of the EPA Act 1992, as amended.

The LEL ESS Castlelost Project will operate unmanned and controlled remotely. The storage systems will respond to system demand and provide up to 8 hours of electricity daily along with a wide range of system services. The LEL ESS Castlelost Project is not a class of activity under the First Schedule of the EPA Act 1992, as amended.

The LEL GIS Castlelost Project will operate as an unmanned electricity substation and be under the control and ownership of Eirgrid (TSO) and ESB Networks (TAO) respectively. The substation will become a new node on the 220kV Shannonbridge-Maynooth transmission line and is equally distant to the existing node to the west (Shannonbridge) and east (Maynooth).

2.4 CONSIDERATION OF ALTERNATIVES

2.4.1 DO NOTHING SCENARIO

Recently, the CRU and Eirgrid have issued warnings to Government about the risk of blackouts. Ongoing system analysis shows that the all-Ireland capacity margin is insufficient, particularly when renewable generation is at a low output and support is not available. This has been exacerbated in recent times due to the closure of the peat-fired power stations and increases in system demand.

The proposed energy projects at Castlelost provide a mix of technology solutions designed to provide a wide range of grid support services and to assist with the transition to a low carbon economy. In the absence of the proposed LEL Flexgen Castlelost and LEL ESS Castlelost Projects, integration of renewable energy generators will be constrained and decarbonisation of the generation portfolio will be inhibited, thereby impeding Ireland's commitment to meet its EU and national emissions targets.

2.4.2 ALTERNATIVE TECHNOLOGIES

A mix of technologies were chosen for the LEL Castlelost projects to provide a comprehensive range of grid products and to assist with the transition to a low carbon economy.

Open cycle gas turbine (OCGT) technology, also referred to as simple cycle gas turbine technology, was chosen for the LEL Flexgen Castlelost Project to address the current emergent needs for support generation capacity reflected by the T-3 Capacity Auction, and the closure of peat and coal plants in Ireland. The chosen technology type will be capable of providing predicable dispatchable power and a range of "on-state" and "off-state" electricity system services.

As part of the assessment of the electricity substation option (LEL GIS Castlelost Project) a gas insulated switchgear (GIS) substation and an air insulated switchgear (AIS) substation were considered. In general GIS substations are positioned indoor and AIS substations are installed outdoors. The main advantage of the GIS substation is that the phase to phase spacing is reduced significantly resulting in a substation with a much smaller compound footprint and visual impact than its AIS counterpart.

The technologies chosen for the LEL ESS Castlelost Project were a vanadium redox flow battery (VRFB) storage system and a synchronous condenser. The VRFB is capable of

providing a wide range of system services[5] which support the integration and further growth of nonsynchronous renewable generation. The synchronous condenser provides reactive power consumption and generation resulting in voltage control, short circuit power capacity and inertia response.

2.4.3 ALTERNATIVE LOCATIONS

During the concept development phase of the projects, a site selection and options appraisal study was undertaken. The study was informed by high-level criteria and potential project type related constraints. During the project concept phase, six sites across the county were examined and evaluated to establish suitability.

The preferred site, located in the townlands of Kiltotan and Collinstown and Oldtown, was selected for locating the development proposals for a number of reasons including proximity to the electricity and gas networks, suitable road network for access, distance to sensitive receptors and the availability of lands. In terms of the consideration of alternative locations for the LEL GIS Castlelost Project, as part of the site selection and options appraisal study, the project proposers identified the opportunity of providing symbiotic benefit to both the transmission system in this area of the country and to the LEL Flexgen and LEL ESS projects at the proposed development lands at Kiltotan and Collinstown and Oldtown, Rochfortbridge, Co. Westmeath.

2.4.4 ALTERNATIVE LAYOUTS

Once the preferred site was selected, the design team focused on suitably positioning a proposal within the site that is sympathetic and one which integrates into the landscape and surrounding environment. The final design has sought, as far as practicable, to minimise visual intrusion and accordingly the proposed finished compound levels were determined following careful consideration of cut and fill requirements and existing local topographical conditions. Project compound finished levels were set to reduce the overall height of the development within its setting whilst carefully considering other potential knock-on effects. The design uses the naturally more elevated lands to the north for positioning of lower low-rise components (LEL ESS Castlelost Project). A planted berm is also provided in the northern and north-eastern areas of the development lands to minimise potential visual and noise impacts on receivers. The administration (LEL Flexgen Castlelost Project) and GIS substation (LEL GIS Castlelost Project) buildings are placed to provide some degree of visual screening of proposed structures from the M6 motorway.

[5] SIR, FFR, POR, SOR, TOR1, TOR2, SSRP, RRS, RRD, RM1, RM3, and RM8

2.5 CONTROL OF MAJOR ACCIDENT HAZARDS (COMAH)

The Chemicals Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015 (S.I. No. 209 of 2015) (the "COMAH Regulations") implement the Seveso III Directive (2012/18/EU) and aim to prevent and mitigate the effects of major accidents involving dangerous substances which can cause serious harm to people and/or the environment, with the overall objective of providing a high level of protection in a consistent and effective manner. An Environmental Risk Assessment (ERA) of the development proposals was carried out by DNV Services UK Limited. The ERA determined that development of the LEL Flexgen Castlelost Project qualifies as a "lower tier" site under the COMAH Regulations 2015 as it holds quantities of dangerous substances (diesel /gas oil as a secondary fuel) above threshold quantities specified in Schedule 1 of the COMAH Regulations 2015. The LEL GIS Castlelost and LEL ESS Castlelost Projects do not fall under the provisions of the COMAH Regulations 2015.

2.6 APPROPRIATE ASSESSMENT

Stage 1 AA screening of the projects was completed. A single AA Stage 1 Screening Report has been completed for the three projects and is provided under separate cover in support of each planning application.

3 PLANNING AND POLICY

The developments were assessed in the context of the following:

- National Policy; including the National Development Plan 2018-2027 and Energy, and Climate Change Policy.
- Regional Policy; Regional Spatial and Economic Strategy (RSES) Eastern & Midland Regional Assembly (EMRA) 2019
- County and Local Policy; Westmeath County Development Plan 2021-2027

There is significant policy support for low carbon energy production and sustainable improvement and expansion of the electricity transmission system to provide for future economic growth at national, regional and county level. The proposed projects conform with policy objectives and support and promote sustainable improvements and the transition to a net zero and climate neutral economy. Given the location of the development in respect of the electricity and gas transmission systems, siting of the projects conforms with the principles of proper planning and sustainable development and is compatible with the overarching framework of plans and policies.

A review of other projects /developments in the general area of the site was undertaken as part of cumulative assessment using the Westmeath County Council Planning Search Portal. The vast majority of recent (last 10 years) valid planning permission consents in the immediate vicinity of the site (1 km radius) relate to once off residential development and agricultural buildings. The projects are mainly positioned along public roads (R446 and L51251) in the vicinity of the site and are deemed to be not significant in terms of cumulative impacts with the proposed projects.

4 POPULATION AND HUMAN HEALTH

4.1 INTRODUCTION

This Chapter presents an assessment of impacts on Population and Human Health. While there are a range of issues which may impact on human beings many of these have been considered within other disciplines within this EIAR, including Planning Policy (Chapter 3), Water Environment (Chapter 7), Air Quality (Chapter 8), Noise and Vibration (Chapter 10), Landscape and Visual (Chapter 11), and Traffic and Transport (Chapter 12). This Chapter is therefore focused on potential impacts which have not been assessed elsewhere within the EIAR. Therefore, the Chapter focuses on Population and Settlement Patterns, Landuse Change, Land Severance and Health and Safety.

4.2 DESCRIPTION OF THE RECEIVING ENVIRONMENT

The subject site is located in the townlands of Kiltotan and Collinstown and Oldtown, and the electoral division (ED) of Castlelost. The townland of Kiltotan and Collinstown lies south and southeast of the old mail coach road from Tyrrellspass to Dublin (out of use by 1837) and borders part of the County of Offaly. The number of persons enumerated in the townland of Kiltotan and Collinstown was 19 and 29 persons were enumerated in the townland of Oldtown in 2016. Other than the two townlands of Kiltotan and Collinstown and Oldtown, there are six other townlands within the ED of Castlelost. According to the CSO 2016 census, the total population of the Castlelost ED is 1,692 (838 males and 854 females). Of the 617 total permanent dwelling recorded, 576 were recorded as being occupied permanent dwellings. The ED of Castlelost has an area of 17.01km^2. The largest settlement in the ED is Rochfortbridge.

The proposed development lands are not zoned. The development lands are currently in agricultural use (grazing and tillage) and are owned privately (with the exception of the "farmers lane" which runs parallel to the M6 motorway). Notably the Shannonbridge – Maynooth 220kV overhead line transects the lands, running in a west, southwest /east northeast direction across the lands. The existence of this (and the natural gas transmission line to the north) was an important criterion in the selection of the proposed development lands.

4.3 CONSTRUCTION AND OPERATION STAGE EFFECTS

The overall impact is considered to be imperceptible and not significant in terms of population and human health. With the recommended traffic and transport mitigation measures in place, no significant adverse roads and traffic related environmental impacts

are anticipated during the construction, operational or decommissioning phases of the proposed development.

In terms of land-use change and severance the effect of the impact associated with development of the projects in isolation or in combination is considered as slight, neutral and long-term.

A Stage 1 Road Safety Audit has been carried out in accordance with TII's publication *'GE-STY-01024 – Road Safety Audit'* and is included under the Traffic and Transport Appendix. All issues raised in the Road Safety Audit have been addressed so the proposed development will be satisfactory in terms of traffic operations and safety.

In terms of COMAH, the ERA prepared by DNV concluded that the level of mitigated risk posed by the LEL Flexgen Castlelost Project and the LEL ESS Castlelost Project is acceptable and is therefore the potential effect is considered imperceptible.

4.4 MITIGATION

Post mitigation impacts to population and human health during the construction (and decommissioning stages) of each project in isolation and in combination are predicted as short-term, direct and indirect slight effects.

Given that the receivers sensitivity is considered low, the potential effects associated with operation of the LEL Flexgen Castlelost Project, the LEL GIS Castlelost Project and the LEL ESS Castlelost Project is considered imperceptible. The potential effects associated with operation of the three projects in combination is considered imperceptible.

Based on the assessment, the proposed development of the three proposed projects (in isolation or in combination) on the development lands at Kiltotan and Collinstown and Oldtown will give not rise to any significant population and human health effects.

5 BIODIVERSITY

5.1 INTRODUCTION

This chapter provides an assessment of the impacts of the proposed development on the ecological environment, i.e., biodiversity, flora and fauna.

5.2 DESCRIPTION OF THE RECEIVING ENVIRONMENT

The development lands on which the proposed projects will be located comprises a mosaic of open farmland fields (GA1) which are either heavily grazed or under Arable Crops (BC1). The fields are bordered by low gappy sections of hedgerows with occasional semi-mature or mature trees. The main habitats recorded with the development lands are presented below.

Habitat	Habitat Category	Habitat Type
(F) Freshwater	(FW) Watercourses	(FW4) Drainage ditches
(G) Grassland	(GA) Improved grassland	(GA1) Improved agricultural grassland
(W) Woodland and Scrub	(WS) Scrub and transitional woodland	(WS1) Scrub
	(WL) Linear woodland	(WL1) Hedgerows
(B) Cultivated and Built land	(BC) Cultivated land	(BC1) Arable crops
(B) Cultivated and Built land	(BL) Built land	(BL3) Buildings and artificial surfaces

There is no potential for connectivity to any European sites (Natura 2000). Given the above analysis, it is considered that there will be no potential for significant effects on any European sites considered and therefore potential effects on European sites can be excluded at the screening stage.

The open field habitats are considered of low biodiversity value at a local level as are the internal hedgerows. There are no rare or protected habitats recorded in the study areas inside the licenced areas. Overall, the proposed development area is of Low Local Ecological Value.

5.2.1 CONSTRUCITON AND OPERATION STAGE EFFECTS (PROJECTS IN ISOLATION AND IN COMBINATION)

The open field habitats are considered of low biodiversity value at a local level as are the internal hedgerows. There are no rare or protected habitats recorded in the study areas inside the licenced areas. Overall, the proposed development area is of Low Local

Ecological Value. Potential direct effects on breeding birds can be avoided by appropriate timing. The potential direct effects on biodiversity will be imperceptible and neutral.

The potential indirect effects on habitats will be imperceptible and neutral. There will be earth movement during site preparation, however, there will be no discharge of silt laden or contaminated surface water to the Mongagh River. The possibility of contaminated surface water reaching the Rover Boyne is extremely low given the downstream distance of over 20 river km. Guidance on lighting has been based on the Bats & Lighting document; (BCI , 20 the Bats and artificial lighting in the UK Guidance Note 08/18 (BC T, 2018) and Guidelines for consideration of bats in lighting projects. EUROBATS Publication Series No. 8 (Voigt, 2018). Lighting can alter the behaviour of bats and the insects they prey on.

There are no predicted in-combination or cumulative effects given that it is predicted that the Proposed Development will have no effect on any European site.

5.2.2 MITIGATION (PROJECTS IN ISOLATION AND IN COMBINATION)

Potential impacts on birds will be avoided by cutting of vegetation outside the bird nesting season March 1st to August 31st. If this cannot be enforced, then the site will be surveyed for the presence of nesting birds and/or nests prior to cutting and if none are recorded the vegetation may be removed within 48 hours.

In order to minimise the extent of light spill onto perimeter habitats, all lights that are pole mounted will be directional and/or cowled to ensure that light is directed downward and inwards. Lights will be programmed or otherwise to be off unless required.

In summary, it is concluded that there will be no significant effects on designated sites in the potential Zone of Influence of the proposed development lands and there will be no significant effects on low value local biodiversity.

6 SOILS AND GEOLOGY

6.1 INTRODUCTION

This Chapter focuses on the soils and geology environment and discusses the potential impacts associated with the development proposals during the construction and operational phases.

6.2 DESCRIPTION OF THE RECEIVING ENVIRONMENT

The current land use is described as agricultural pastures. The Geological Survey of Ireland's *'The Quaternary geology of Ireland – Sediments Map'* is a representation of the superficial geology of Ireland at a scale of 1 to 50,000. The map shows the sediments mapped within 1 metre of the surface which were laid down during the Quaternary period as well as bedrock at or close to the surface, water bodies and made ground. The mapped sediments underlying the site are describe as *"Cut over raised peat"* and *"Till derived from limestones".* The soils within the development lands are classed as fine loamy drift with limestones (Eton association) of moderate drainage with cutover peat near the southern boundary. Subsoils are classed as limestone tills (Carboniferous) and peat.

The bedrock geology underlying the site is mapped on the GSI 1:100,000 bedrock formations map. This data shows that the bedrock geology underlying the development lands is mapped as Waulsortian Limestones. Waulsortian limestones are described as Massive unbedded lime-mudstone and are dominantly pale-grey, crudely bedded or massive limestone. No bedrock outcrops are identified by the GSI. It is envisaged that bedrock is close to the surface in the extreme southwestern area of the site.

As part of site assessment works a number of trial pits were excavated across the development lands to depths of c.2.7m below ground level (bgl). No bedrock was encountered in any of the trial pits excavated. No groundwater was observed within the trial pits. The soils were described as silty clay containing an abundance of cobbles and boulders and no evidence of mottling. There are no karst features within or near (within 5km) the site. There are no sites of geological interest within or close to the development boundary.

6.3 CONSTRUCTION STAGE EFFECTS (PROJECTS IN ISOLATION AND IN COMBINATION)

Receptor (soils and bedrock) was considered as Low. The impact of potential environment effects during construction of the projects in isolation and in combination were determined as being short term, minor to moderate (pre mitigation).

6.4 OPERATIONAL STAGE EFFECTS

The impact of potential environment effects during operation of the projects in isolation and in combination (pre-mitigation) were determined as being moderate for the LEL Flexgen Castlelost Project, minor/moderate for the LEL ESS Castlelost Project and minor for the LEL GIS Castlelost Project.

6.5 MITIGATION

Post recommended mitigation, the potential effects are during construction and operation of the projects in isolation and in combination are considered short-term negligible and long-term negligible respectively. The proposed developments will not have any significant residual effects on soils and geology post implementation of mitigation.

7 WATER ENVIRONMENT

7.1 INTRODUCTION

This Chapter assesses the potential impacts and related effects arising from the construction and long-term operation of LEL Flexgen Castlelost, LEL ESS Castlelost and LEL GIS Castlelost Projects at Kiltotan and Collinstown and Oldtown, Castlelost, Co. Westmeath.

7.2 DESCRIPTION OF THE RECEIVING ENVIRONMENT

Lands in the general area of the site are predominantly agricultural pastures with some arable lands. The M6 motorway defines the southern boundary of the proposed development lands and the R446 (N6) provides the proposed main access point to the site. The topography in the general area of the site gently slopes from the agricultural pastures to the north towards peatlands, beyond the M6 to the south /southeast. The highest feature in the general area of the site is Croghan Hill, which is located approximately 6.3km southeast of the site. In terms of the proposed development lands, topography is best described as gradually sloping from higher ground in the west and north to lower ground in the southeast. The lands within the development boundary gently rise from the lowest point of 93.5m OD in the southeast, close to the boundary with the M6 motorway, to 107.1m OD in the west of the site and 105m OD and 107m OD (at the proposed main entrance to the development lands from the R446). There are No Natura 2000 sites (European Sites) are within or immediately close to the development lands.

The bedrock geology underlying the site is mapped on the GSI 1:100,000 bedrock formations map. This data shows that the bedrock geology underlying the development lands is mapped as Waulsortian Limestones. Waulsortian limestones are described as Massive unbedded lime-mudstone and are dominantly pale-grey, crudely bedded or massive limestone. No bedrock outcrops are identified by the GSI. It is envisaged that bedrock is close to the surface in the extreme southwestern area of the site.

As part of site assessment works a number of trial pits were excavated across the development lands to depths of c.2.7m below ground level (bgl). No bedrock was encountered in any of the trial pits excavated. No groundwater was observed within the trial pits. The soils were described as silty clay containing an abundance of cobbles and boulders and no evidence of mottling. There are no karst features within or near (within 5km) the site.

The development lands are located in the Athboy groundwater body (WFD site code IE_EA_G-001). According to the EPA, the GWB is classed as having "good" status (2013-2018). The aquifer beneath the proposed development lands is classed as a *"locally important aquifer – bedrock which is moderately productive only in local zones"*. Groundwater vulnerability across the vast majority of the development lands is classed as *'Moderate'* vulnerability. An area of high vulnerability is shown to be present in the southwestern corner of the site and in the immediate area of the proposed site entrance at the R446.

it is assumed that groundwater flow direction will coincide with topography and be to the east/southeast towards the Mongagh and Castlejordan Rivers. The proposed development lands are located within the Boyne WFD Catchment, the Yellow[Castlejordan]_SC_010 subcatchment and the Castlejordan_020 River Sub Basin. There are five identified wells at and in the vicinity of the development lands. In terms of the site applications boundaries associated with each of the three projects, there are no groundwater wells impacted by the siting of infrastructure associated with the three projects.

The development lands are located within the hydrological catchment of the Mongagh River. The proposed development lands are located approximately 500m to the north of the water course. The Mongagh River flows east into the River Boyne which is located over 20 river km to the northeast of the proposed development lands. There are no significant hydrological features identified within or near the site. However, some surface water drains (drainage ditches) were identified within the site boundary. The drainage ditches originate within the site boundary and run in a southerly direction before flowing in culvert under a gravel surfaced access road (farmers lane) and then into a TII drain that runs along the crest of the motorway cutting in an easterly direction within an oversized grassy channel. The TII drain meets a headwall and culvert that goes under the M6 in a southerly direction. Waters from the drain discharge to the Mongagh River to the south. On the various dates when site walkover visits were undertaken during the months of June to August 2021, the drainage ditches within the boundary of the development lands were found to be dry and overgrown with vegetation.

7.3 CONSTRUCTION STAGE EFFECTS (PROJECTS IN ISOLATION AND IN COMBINATION)

Receptor (surface water and groundwaters) was considered as Low. The impact of potential environment effects during construction of the projects in isolation and in combination were determined as being short term, minor to moderate (pre mitigation).

7.4 OPERATIONAL STAGE EFFECTS (PROJECTS IN ISOLATION AND IN COMBINATION)

The impact of potential environment effects during operation of the projects in isolation and in combination (pre mitigation) were determined as being moderate for the LEL Flexgen Castlelost Project, minor/moderate for the LEL ESS Castlelost Project and minor/moderate for the LEL GIS Castlelost Project.

7.5 MITIGATION

Post recommended mitigation, the potential effects are during construction and operation of the projects in isolation and in combination are considered short term negligible and long-term negligible respectively. The proposed developments will not have any significant residual effects on the water environment post implementation of mitigation.

8 AIR QUALITY AND CLIMATE

Planning Permission is being sought for three standalone projects, namely the LEL Flexgen Castlelost Project, LEL GIS Castlelost Project and the LEL ESS Castlelost Project. The potential air quality and climate impacts on the surrounding environment that requires consideration for a proposed development includes two the short-term construction phase and the long-term operational phase.

8.1 CONSTRUCTION STAGE EFFECTS

The impact assessment that was completed shows that the most significant potential impacts are those associated with excavation work which is very dependent on weather conditions. Damp weather and low wind speeds will reduce the level of impact experienced at the receptor locations. There will be a *temporary, slight* impact on the closest receptors during the excavation works and a *short-term, not significant* impact on the closest receptors during the construction works. Construction traffic impacts will be *not significant* and experienced in the *short-term*. In the absence of mitigation measures, the overall impact of dust arising during the construction phase is considered to be *short-term* in duration and its significance will vary from *not significant* to *slight*.

Potential emissions from construction traffic using the local road network have been assessed to contribute an imperceptible change to the existing air quality concentration and no material change in air quality relative to the existing situation is predicted.

8.2 OPERATIONAL STAGE EFFECTS

The only predicted air quality impacts associated with operation of the development are emissions to atmosphere from the combustion of natural gas in the gas turbines. A comprehensive assessment was undertaken which demonstrated that, with the chosen stack height of 30m, the predicted ambient air concentrations will be very significantly lower than the relevant air quality standards and therefore there will be no adverse impact on air quality, human health or on ecosystems as a result of the proposed development. The operational phase activities will have a *not significant impact* on local air quality and will be *long-term* in duration.

8.3 CLIMATE IMPACT

Construction phase climate impacts are assessed by using a qualitative approach that considers the nature, scale and duration of the construction programme for the proposed development. The assessment concluded for all elements of the proposed development

that the climate impacts are short term and imperceptible in either a regional or national context.

As an electricity provider, the proposed scheme is part of the Emission Trading Scheme therefore greenhouse gas emissions from the proposed facility are exempt from consideration in terms of the targeted reduction in emissions from the non-ETS sector. Consequently, the proposed facility will not affect Ireland's obligations to meet the EU Effort Sharing Decision in relation to reduction of greenhouse gas emissions. This situation will continue until at least 2030. Obligations if any beyond that date are unknown at this time.

8.4 CUMULATIVE IMPACT ASSESSMENT

The cumulative impacts of this proposed development have been considered in conjunction with known other developments and existing activities in the immediate area. The air quality impacts associated with the proposed developments will be well within the relevant Air Quality Standards. The impacts are deemed to be *not significant* and *long-term*.

8.5 MITIGATION MEASURES

A Dust Management Plan will be formulated for the construction phase of the project, as construction activities are likely to generate some dust emissions. The principal objective of the Plan is to ensure that dust emissions do not cause significant nuisance at receptors in the vicinity of the site. The design of the construction programme and the location and layout of the construction compound and the storage of materials will be carefully planned to ensure that air quality impacts are minimised.

8.6 RESIDUAL IMPACTS

Due to the size and nature of the development and the nature and volume of the potential emissions, the construction phase activities will have a *not significant* impact on climate and will be *short-term* in duration while the operational phase activities will have an imperceptible impact on climate and a *not significant* impact on air quality and will be *long-term* in duration.

9 MATERIAL ASSETS

9.1 INTRODUCTION

This Chapter evaluates the impacts, if any, which the development will have on material assets. Material assets of *natural origin* and the existing quality of natural resources such as air, water, soils, landscape, lands and soil, etc., are discussed in depth in earlier Chapters of the EIAR along with those of human origin such as traffic and transport infrastructure, land and soils, archaeological /architectural heritage and flood protection.

Material assets of natural and human origin which are included in this assessment are the following

- Ownership and access
- Land Use
- Services
- Demolition works

9.2 DESCRIPTION OF THE RECEIVING ENVIRONMENT

The proposed development lands on which the proposed projects will be located are c.21.3 hectares and are greenfield site. The site is currently used for agricultural purposes; currently in agricultural use (mainly grazing of cattle and horses with some fields within the development area being used for tillage).

The southern boundary of the site is defined by the existence of the M6 which connects Dublin and Galway. The development lands are currently accessed via the R446 and the L51251. The 220kV Shannonbridge-Maynooth overhead transmission line transects the southern area of the development lands. Development of the proposed projects will not involve the installation of new infrastructure for the extraction of natural resources.

There are no readily available municipally owned infrastructure serving the proposed development lands – water supply pipe or sewer network. The existing on farm residence and farm activity is served by a groundwater well on site. Similarly foul wastewater from the existing residence is management and treatment by an on-site wastewater treatment system.

The existing groundwater well will be used to serve the water requirements of the development proposals which are very low. The existing residence on the farm will be served by a second existing well within the landowner's boundary. Foul wastewater which will be generated from the projects will be managed and treated using an onsite

proprietary package wastewater treatment plant (domestic wastewater treatment system with a population equivalent ≤ 10). Due to the nature, type of projects and future occupancy levels during operation, the volume of foul wastewater which will be generated is low.

In accordance with best practice, stormwater arising from development of impermeable surfaces (e.g., roof of buildings, roadways) stormwater will be collected and infiltrated to ground. Stormwater generated from oil risk areas (e.g., certain impermeable areas within the LEL Flexgen Castlelost Project such as the secondary fuel storage bund) will pass through a Class 1 bypass petrol interceptor and grit trap prior to discharge to ground.

Minimal process wastewater will be generated during the operational phases of any of the projects. Any process wastewater (e.g., that from the demineralisation plant in the LEL Flexgen Project) will be collected and disposed of at a suitably waste authorised facility.

The development proposals will involve demolition and removal of a farm shed, farm workshop, feed silo and a silage clamp. The onsite farm outbuilding, farm sheds, feed silo and silage clamp will be demolished and removed from site in accordance with best practice. Works will involve careful decommission and removal of all farm structures at the site. Anticipated wastes which will be generated include soils, bricks and blocks; concrete and reinforced concrete; timber; metal sheeting and steel. Materials arising from this process will be recycled /disposed of at authorised waste management facilities.

9.3 CONSTRUCTION AND OPERATION STAGE EFFECTS

Development of the projects will result in change of use of lands from agricultural to industrial use. Soils excavated as part of development works will be used within the overall development boundary to create landscaped berms in the northern and north-western areas of the site. The planted berm will be constructed to enhance the terrestrial ecosystem.

There are no direct or indirect negative effects on material assets. The LEL Flexgen Castlelost and LEL ESS Castlelost Projects will positively benefit the electricity transmission system by providing a low carbon and carbon free secure and resilient supply of energy which is critical to a well-functioning economy. The Projects will also support and promote sustainable improvement and expansion of the electricity transmission (LEL GIS Castlelost Project) network and gas transmission network (LEL Flexgen Castlelost Project).

In terms of potential environmental effect once operational, the impact on the environment from projects in isolation and in combination will be long-term, neutral and imperceptible.

10 NOISE AND VIBRATION

10.1 INTRODUCTION

An assessment of the impact on the ambient sound environment and related effects on receptors, (namely human beings), potentially arising, as a result of each of the proposed projects individually and cumulatively has been prepared. Potential for vibration impacts on nearby dwellings and occupants during site development and construction has also been conducted.

10.2 DESCRIPTION OF THE RECEIVING ENVIRONMENT

The site of the proposed developments and immediate surrounding area can be described as rural and generally quiet except in close proximity to significant road transportation sources such as the M6. The monitoring undertaken indicates that some NSRs, in proximity to the main proposed development site and the proposed pipeline, are in areas classed as low background noise areas under NG4. Ambient and background noise levels at two long term monitoring points on the site boundary close to existing NSRs are summarised below:

Period	$L_{Aeq,15min}$ range dB	$L_{A90,15min}$ range dB
Daytime (07.00 -19.00hrs)	44 - 52	39 - 45
Evening (19.00 – 23.00hrs)	42 - 49	34 - 38
Night-time (23.00 – 07.00hrs)	39 - 46	28 - 32

10.3 CONSTRUCTION STAGE EFFECTS

In the short term, site development and construction works can potentially give rise to temporary elevated noise levels at NSRs through the use of mobile and non-mobile heavy machinery and equipment. An assessment of the site development and construction phase noise impact has been conducted in accordance with BS5228:1:2009+A1:2014 for each proposed development and cumulatively for all three. Overall, it is considered that the earthworks associated with the proposed berm, (assessed as part of the LEL Flexgen Castlelost Project), and the construction of the access route will result in the highest predicted temporary noise levels at the nearest NSRs.

Temporary to short term noise levels associated with LEL GIS Castlelost and LEL GIS Castlelost Projects are expected to be less due to increased intervening distance and/or smaller built footprint.

The potential for cumulative impacts has been considered as the programme of works for each project may overlap. The noise levels as a result of the construction of the berm as part of the LEL Flexgen Castlelost Project and levelling of the site for LEL GIS Castlelost Projects has been estimated as 1 decibel higher than construction of the berm *alone*. Therefore, overall, the cumulative impact during the site development and construction is not expected to be significantly different from that the value predicted for the LEL Flexgen Castlelost Project.

It is unlikely that the proposed works will cause vibration impact due to intervening distance. No piling is proposed.

10.4 OPERATIONAL STAGE EFFECTS

Specific noise levels have been predicted for each individual project and cumulatively at the nearest NSRs as summarised below.

Project	Predicted Noise Level Range $L_{Aeq,t}$ dB
LEL Flexgen Castlelost	40 – 49
LEL ESS Castlelost	20 - 32
LEL GIS Castlelost	12 - 23
Cumulative	40 - 49

The above predictions are based on all sources operating continuously. The following limits typically apply for areas of low background noise and all other areas.

Scenario	Daytime Noise Criterion, dB $L_{Ar,T}$ (07.00 -19.00 hrs)	Evening time Noise Criterion, dB $L_{Ar,T}$ (19.00 – 23.00 hrs)	Night-time Noise Criterion, dB $L_{Aeq,T}$ 23.00 -07.00hrs)
Areas of Low Background Noise	45	40	35
All other Areas	55	50	45

The LEL ESS Castlelost and GIS Castlelost project will comply with the lower limits for areas of low background noise which applies to NSRs to the northeast. No significant effects are expected taking account of existing background levels.

It is anticipated that the LEL Flexgen Castlelost project will only be operational approximately 250 hours per year and will not be operated at night-time (as this is not a period of high system demand). In reality, all 5 OCGT units are unlikely to be operational simultaneously. Therefore, on this basis, it is considered that the limits for 'all other areas' can be applied to this project without causing significant adverse impact.

10.5 MITIGATION

The following mitigation measures are included:

- The standard threshold or limit values for short term site development and construction related noise as set out below shall be complied with:
  - 65 dB $L_{Aeq,1hr,}$ Mon-Fri (07.00 – 19.00hrs) and Saturday (07.00 -13.00 hrs) at existing NSRs.
  - Sunday, public holidays, evening (19.00-23.00hrs) and night-time (23.00 - 07.00 hrs) works are not proposed.
- A Site Representative shall be appointed for matters related to noise and vibration.
- Any complaints received shall be thoroughly investigated.
- A written complaints log shall be maintained by the Site Manager. This shall, at a minimum, record complainant's details (where agreed) the date and time of the complaint, details of the complaint including where the effect was observed, corrective and preventative actions taken and any close-out communications. This will ensure that the concerns of local residents who may be affected by site activities are considered during the management of activities at the site.
- Noise monitoring with capability for real-time review both on-site and remotely shall be conducted at nearby NSRs throughout site development and construction.
- In the event of exceedance of the limits specified above at NSRs, works shall be ceased and measures implemented immediately to ensure that the limits are complied with.
- The operation of certain pieces of equipment, where substitution etc cannot be carried out shall be managed through monitoring and timing of use to ensure that the threshold values/criteria specified are complied with.
- During the construction phase all equipment shall be required to comply with noise limits set out in EC Directive 2000/14/EC and the 2005/88/EC amendment on the approximation of the laws of the Member States relating to the noise emission in the environment by equipment for use outdoors. The directive covers equipment such as compressors, welding generators, excavators, dozers, loaders and dump trucks.
- Temporary acoustic screening/hoarding shall be erected along the boundary of NSRs with the construction access route. As a general rule of thumb, it is recommended that temporary screening break the "line of sight" from the sources to the windows. The hoarding surface density shall be a minimum 10kg/m^2.

In the long term and during operation, limits as specified earlier and standard conditions on tonality and impulsive noise will be complied with.

10.6 RESIDUAL IMPACTS

Elevated noise is expected to occur at times at existing NSRs during the implementation of the proposed works, however this will be controlled to comply with standard criteria for development works therefore *no significant* effect is expected. In the long term, no significant adverse effects are expected due to the inherent low source noise levels associated with the LEL ESS Castlelost and LEL GIS Castlelost projects. With regards to the LEL Flexgen Castlelost project, the infrequent use and the plant operating as a reserve generating unit will ensure that *no significant* adverse effects will occur.

11 LANDSCAPE AND VISUAL

11.1 INTRODUCTION

This chapter comprises a Landscape and Visual Impact Assessment. It considers the existing landscape setting of the proposed development site and assesses likely landscape and visual impacts of the proposed development on the receiving environment in the context of proposed mitigation measures to reduce any likely adverse potential visual impacts on the receiving environment.

11.2 DESCRIPTION OF THE RECEIVING ENVIRONMENT

Though potentially visible from reasonable distances, it is anticipated that the proposed development is not likely to give rise to significant landscape or visual impacts beyond approximately 2km. In the interests of a comprehensive appraisal, a 3km radius study area is used in this instance. Furthermore, out of an abundance of caution, the important feature of Croghaun Hill in County Offaly, which is over 5km away, has also been specifically included within the study without extending the entire, predominantly flat, study area to such distances.

The landform of the study area is characterised by flat to low rolling terrain which is typical of the midlands of Ireland. The site ascends gently to the north from the M6 Motorway, which is in cut or close to grade as it passes south of the site. There is a low hill in the northwest of the study area at Garrane as well as a subtle ridge to the east of the site. The landscape of the southern study area is flat with the exception of Croghan Hill which is outside of the principal study area but one of the few prominent hills within this part of the midlands.

The predominant land use within the study area is that of agricultural farmland which comprises of medium to large sized geometric fields that are often bound by dense mature tree lined hedgerows. Another notable land cover within the study area is large cutaway peat bogs, the nearest and largest of which are situated in the southern half of the study area within County Offaly. Several conifer forest plantations are also dotted throughout the study area and are often found on the periphery of the large-scale peatbogs. A number of large overhead transmission lines also traverse the site and study area and are evidence of the power generation heritage (peat fired power stations) of this area.

The most notable centre of population in relation to the proposed development is the settlement of Rochfortbridge near the north-eastern periphery of the study area. The similar sized settlement of Tyrrellspass is just beyond the western border of the study area

and there is a small hilltop settlement at Garrane approximately 2.2km to the northwest of the site. There is also a dispersed linear group of houses to the south of the M6 motorway at Rahincuill lining a local road. Otherwise, the study area is relatively sparsely settled with occasional farmsteads and rural dwellings.

The most notable transport route in relation to the proposed development is the M6 motorway corridor which is situated almost immediately adjacent to the south of the site and dissects the study area east to west. The R446 runs parallel to the M6 about 700m to the north of the site as it passes between Rochfortbridge and Tyrrellspass. The R400 links between the M6 motorway and Rochfortbridge at the eastern periphery of the study area. The nearest road to the site is quiet local road that runs between the R400 and the M6 motorway but passes over rather than connecting to the latter.

Only those parts of the receiving environment that potentially afford views of the proposed development are of concern to this section of the assessment. A computer-generated Zone of Theoretical Visibility (ZTV) map has been prepared to illustrate where the proposed development is potentially visible from. The ZTV map is based solely on terrain data (i.e. bare ground visibility), and ignores features such as trees, hedges or buildings, which may screen views. Given the complex vegetation patterns within this landscape, the main value of this form of ZTV mapping is to determine those parts of the landscape from which the proposed development will definitely not be visible, due to terrain screening, within the 3km study area. As can be seen from the Digital Surface Model based ZTV map:

- The existing vegetation in the vicinity of the site has a substantial screening effect, reducing the potential to see the proposed development beyond 1-2 fields from the site(c. 500m);
- Where residual visibility remains beyond 500m from the site it tends to be in a shard pattern which indicates intermittent visibility through and between hedgerows and treelines rather than comprehensive visibility above them.
- Relatively open visibility still occurs from the M6 motorway, but very restricted visibility is afforded to the R446, which is the more sensitive of these routes as it is a designated scenic route and lined by residential houses.
- Visibility from the direction of Rochfortbridge (NE) appears to be precluded by intervening vegetation.

11.3 CONSTRUCTION AND OPERATION STAGE EFFECTS

In terms of physical landscape impacts, the proposed development is considered to have substantial and permanent effects on the landcover and to a lesser degree the landform

of the site. Construction stage landscape effects will relate to the clutter and movement of construction machinery on-site, HGVs travelling to and from the site and the temporary storage of excavated / construction materials. Thereafter, operational stage landscape effects will relate to change in the prevailing landscape character of the site and its surrounds. This change relates to the introduction of a diverse range of new, substantial scale industrial features into what is currently a predominantly agricultural setting, albeit strongly influenced by the motorway corridor and high voltage overhead lines.

In summary, the landscape impact of the proposed development is considered to result in an overall significance of Moderate in the immediate vicinity (<500m) of the proposed development, with the rest of the 3km radius study area likely to experience Slight and Imperceptible landscape impacts as the development becomes a proportionally smaller component of the wider landscape fabric.

In terms of visual impacts, the proposed development was assessed across 10 representative viewpoints from a wide range of locations within the study area. Of the 10 viewpoints assessed, the highest impacts occurred in close proximity to the east and southeast of the site (VP1, VP2, VP3 and VP10). These ranged between Moderate at VP2 and Moderate-slight at VP1, VP3 and VP10. At all other viewpoints, the significance of impact was either Slight-imperceptible or Imperceptible.

VP1 and VP2 represent views from the nearest local road to the east of the site and the partial views of the proposed development are dominated by the Project 2 GIS substation building riding above intervening vegetation at a modest distance. Whilst VP3 has a clearer elevated view across the site and the various components of the development and VP10 has the closest view, the sensitivity of these receptor locations is reduced (Low) by the motorway corridor. This serves to balance the significance of impact at *'Moderate-slight'*.

Based on the landscape and visual impact judgements provided throughout this LVIA, the proposed developments are not considered to give rise to any significant residual impacts. Instead, the proposed developments are generally well screened or otherwise well assimilated within the prevailing landscape pattern.

12 TRAFFIC AND TRANSPORT

12.1 INTRODUCTION

The traffic and transport impacts of the three projects (LEL Flexgen Castlelost, LEL GIS Castlelost and LEL ESS Castlelost) in isolation and in combination have been assessed.

The assessment has followed current legislations and guidance including: the TTA guidelines produced by Transport Infrastructure Ireland (TII); and, the Environmental Protection Agency (EPA) Guidelines on the information to be contained in Environmental Impact Assessment Reports, and involved a range of desktop study and field work, including: traffic data collection; and, traffic modelling.

12.2 DESCRIPTION OF THE RECEIVING ENVIRONMENT

The proposed projects will be accessed from the R446 Regional Road approximately 3.1km to the east of the N52/R446 junction (located to the east of Tyrrellspass), and immediately to the east of the R446/L5125 junction. Limited access is also provided to the development lands from the L51251 for emergency or infrequent site attendance (e.g., by ESBN in their role as TAO of the LEL GIS Castlelost Project).

12.3 CONSTRUCTION STAGE EFFECTS

The traffic modelling output for construction phase of all three projects, in isolation and combination, showed that the site access junction will operate with a large amount of spare capacity and that the development did not result in a material impact on the operation of the R446 at this location. No significant visual defects within the immediate vicinity of the proposed site access junction were observed during a site visit on 9th September 2021. The level of traffic anticipated to be generated by all three projects in isolation and combination would not be anticipated to impact significantly on the road structure of the R446.

The Road Safety Authority collision mapping 'Collstats' shows no reported collisions resulting in injury having occurred on the relevant section of the R446, nor the L51251, between the opening of the relevant section of the M6 motorway in 2006. Based on the number of trips generated by the three projects in isolation and combination, and the typical length of such trips, no measurable road safety impact is predicted to result.

Whilst some traffic noise is anticipated in the immediate vicinity of the site, for example associated with AM peak hour arrivals and PM peak hour departures of construction operatives for the three projects in isolation and combination, the level of trip generation

means that this increase in noise is unlikely to be significant based on normal significance criteria for traffic noise.

Due to the relatively low traffic volumes generated by the three projects in isolation and combination during the construction phase, and the dispersed nature of access over the road network, no measurable impact is anticipated in relation to atmospheric pollutants from traffic related to the project.

12.4 OPERATIONAL STAGE EFFECTS

As there will be minimal traffic movements associated with operational phases of the projects (in isolation or in combination), 20 operatives involved in the operation of the LEL Flexgen Castlelost project and 5 operatives involved in the operation of the LEL ESS project, assuming that the access road and access junction are maintained, there will be no measurable traffic related environmental impacts during the operational phase of the projects.

As the proposed project site access and project access junction are common to the three projects in isolation and combination, the mitigation measures proposed are also consistent between the individual projects. Specifically, a wheel wash facility in reasonable proximity to the project access junction and implementation of the recommendations contained with the Stage 1 Road Safety Audit.

12.5 SUMMARY OF SIGNIFICANT EFFECTS

Based on the assessment and implementation of the recommended mitigation measures, no significant environmental effects are predicted as a result of the traffic and transport associated with the LEL Flexgen Castlelost, LEL GIS Castlelost and LEL ESS Castlelost Projects (in isolation or combination).

13 ARCHAEOLOGY AND CULTURAL HERITAGE

This Chapter presents a cultural heritage impact assessment of the development proposals (for clarity the LEL Flexgen Castlelost, LEL ESS Castlelost and LEL GIS Castlelost Projects) on lands at Kiltotan, Collinstown and Oldtown, Co. Westmeath.

13.1 DESCRIPTION OF THE RECEIVING ENVIRONMENT

The site is on a slight sloping south facing pasture. The proposed development lands are located on a roughly rectilinear east west aligned series of plots of improved pastureland at the foot a gentle south facing slope. The most westerly plot was under crop at the time of the inspection. To the south it is bordered by timber fencing and a farm access road. South of the access road is the recently constructed M6 road.

Some of the informed presented in this Chapter of the EIAR derives from the original EIS report related to the recently constructed M6 (Riada Consult 2003) as well as related excavation reports. The subject site is in a rich multi-period archaeological landscape and recent excavations along the route of new M6 road have added significantly to the known cultural heritage resource of the surrounding area. The landscape in the area is typified by regular enclosed fields, bordered by densely overgrown banks with mature hedgerows of ash, elder and hawthorn with areas of raised bogland.

The wider area is associated with ancient routeways of unknown date; a large togher discovered by R.A.S. Macalister in the townland of Baltigeer *ca.* 10km to the east in the 1930s may possibly have linked up with the Slighe Dala or Slí Asail, two ancient routeways which led to Tara and Connacht. One of the five great ancient roads of Ireland, the Slí Mór, is also thought to have passed through the area.

Although not formally recognised in Irish legislation, impacts on World Heritage Sites will nonetheless be a material consideration for developments in their wider vicinity. There are no World Heritage Sites within the vicinity.

There is one potential World Heritage Site which was on the Tentative List for UNESCO World Heritage Sites in 2010 located roughly 18km to the northwest of the subject site – *'The Hill of Uisneach'* which is part of the Royal Site of Ireland group of monuments which are described in early medieval and medieval texts as the principal ancient sites of royal inauguration in Ireland.

Archaeological monuments listed in the ASD that are in the vicinity of the proposed development are presented below. Distances indicated are from the point data, made available in the ASD, to the site boundary.

SMR No	Class	Townland	ITM Ref.(E)	ITM Ref. (N)	Distance
WM033-061----	Ringfort - rath	KILTOTAN and COLLINSTOWN	644652	739037	c. 160m
WM033-062----	Ringfort - rath	OLDTOWN	644939	739529	c. 167m
WM033-066----	Ringfort - rath	KILTOTAN and COLLINSTOWN	644273	738758	c. 360m
WM033-068----	Ringfort - unclassified	FARTHINGSTOWN	645459	739265	c.260m

There are no ACA's adjacent to the site boundary, or within adjacent townlands. The nearest ACA is Derrygreenagh Park ACA in Rochfortbridge located roughly 2km northeast of the subject site.

13.2 CONSTRUCTION AND OPERATION STAGE EFFECTS

The potential effects for the projects in isolation and in combination is presented. There are no known archaeological sites within the proposed development lands and therefore there are no potential impacts on the known cultural heritage resource. Archaeological testing in the vicinity as part of the M6 road project has identified several archaeological sites in the immediate vicinity of the subject site. The area is archaeologically sensitive due to the proximity to known cultural heritage sites. There is a moderate to high potential for the presence of previously unknown subsurface archaeological sites or features to be present.

Internally there are no Protected Structures or NIAH site or previously unrecorded vernacular features within the site boundary or adjacent to the subject site. There are no architectural sites that are likely to be affected by the proposed development.

There are no recorded archaeological sites/features listed as being located within the boundary of the subject site. There are several ringforts in the vicinity of the subject site. The impact on the setting of these sites which are in private lands and inaccessible to the public is not considered significant.

13.3 MITIGATION

Given that the results of archaeological testing in the vicinity as part of the M6 road project identified several archaeological sites in the immediate vicinity of the subject site, and the presence of known archaeological sites in the vicinity, the area is considered archaeologically sensitive There is a moderate to high potential for the presence of previously unknown subsurface archaeological sites or features to be present.

It is recommended that a programme of archaeological testing be carried out at the subject site by a suitably qualified archaeologist under licence to the National Monuments Service of the DHLGH in advance of construction works.

There will be an impact on the setting of the nearby ringforts. This impact was not deemed to be significance.

In summary there will be no direct impact on known cultural heritage sites or features. There is a moderate to high potential for direct impacts on previously unknown cultural heritage sites or features.

14 INTERACTIONS

This Chapter of the EIAR describes the main interactions between potential impacts identified as part of the Environmental Impact Assessments for each of the proposed developments at Kiltotan & Collinstown and Oldtown, Rochfortbridge, Co. Westmeath.

The proposed development of the individual and collective development has the potential to impact on various environmental aspects, and there are interactions and inter-relationships between these aspects, as presented below. This EIAR has considered these interactions and inter-relationships throughout the design process through appropriate siting of development components, functional design in accordance with the relevant standards /codes and guidelines and incorporation of mitigation measures as recommended by the EIA team of specialists.

	Population & Human Health	Air, Odour & Climate	Noise & Vibration	Landscape	Biodiversity	Waters	Land and Soils	Material Assets	Traffic & Transport	Archaeology & Cultural Heritage
Population & Human Health		C/D, O	C/D, O	C/D, O			C/D		C/D,	
Air, Odour & Climate	C/D, O				C/D, O		C/D		C/D	
Noise & Vibration	C/D, O				C/D				C/D	
Landscape	C/D, O									
Biodiversity		C/D, O	C/D			C/D, O	C/D			
Waters					C/D, O		C/D, O			
Land and Soils	C/D	C/D			C/D	C/D				
Material Assets										
Traffic & Transport	C/D	C/D	C/D							
Archaeology & Cultural Heritage										

Interaction of Environmental Factors	Description
Air Quality, Population, Human Health and Biodiversity	There is potential for impact to human beings living in the area of the proposed development during the construction, operation and decommissioning phases of the development. These have been outlined and assessed in Section 8 (Air Quality and Climate) of the EIAR. The impact of construction activities on air quality during the construction phase of all projects is short term in duration and its significance will vary from not significant to slight. The air quality impact at the nearest residential receivers is associated with each of the projects (and in combination) is predicted to be below the relevant air quality standard limit values and is therefore determined to be negligible. Similarly, the impact on identified protected ecological site and biodiversity is not significant.
Noise, Human Beings and Biodiversity	The impact of noise on the human beings living in the area of the proposed development has been addressed during the construction, operational and decommissioning phases of the proposed development. Appropriate mitigation measures have been recommended to ensure the construction phase target noise limits are not exceeded. These will be further prescribed in a construction management plan subject to planning. The predicted noise levels at the nearest neighbouring residential properties due to the operation of the proposed projects during daytime and night-time is negligible. Given the proximity of the development lands and projects to designated ecological sites, noise impacts on the local ecological receivers is not considered significant.
Landscape and Visual, Biodiversity, Population and Human Health	The landscape and visual impacts have potential interactions with impacts resulting from other environmental statement topics. The interactions of these impacts are usually highly complex in practice and this section serves to act as a brief overview to these issues. In addition, the proposed development will create varying impacts during the construction phase and the operation phase. No designated scenic views will be affected by the proposed development. The proposed mitigation planting (including a new berm) will increase the variety of native tree and shrub species on site and this will have a positive impact of providing increasing screening and increased ecological benefit. The management of the site vegetation will also result in a positive impact to the appearance and condition of site vegetation. Based on the landscape and visual impact judgements provided throughout this LVIA, the proposed development is not considered to give rise to any significant residual impacts. Instead, the proposed development is generally well screened or otherwise well assimilated within the prevailing landscape pattern. This is examined in detail in Chapter 11 of the EIAR with the assessment determining that the landscape and visual effects of the projects are not considered significant.
Soils & Geology and Water Environment	There is an interaction between soils & geology and the water environment. The disturbance of soil during construction has the potential to impact on water quality. Construction activities which disturb or expose the soil have the potential to elevate suspended solids in runoff from the site which could impact on local drains. Mitigation measures during the construction process will prevent

Interaction of Environmental Factors	Description
	sediment run-off and construction discharges. A CEMP shall be developed and implemented for the construction phase of all projects. This document will provide a framework under which construction activities which have potential for environmental impact (e.g., generation of dust, ecological impacts, surface water discharge, etc) will be managed. Mitigation measures as outlined in the EIAR shall be included within this plan. There will be no direct discharges to soils or surface water bodies during the operational phase of the developments (in isolation or in combination). Bunds have been designed in accordance with best practice to contain and spillages chemicals stored on the sites. Stormwater generated on the site will be managed in accordance with sustainable best practice proposals as presented in the drainage report for each project. Overall, the impact is not considered significant.
Traffic & Transport, population and human health, noise & vibration, and biodiversity	There will be potential interactions with increased traffic movements as a result of the construction and to a lesser extent the operation of the proposed projects with potential effects on population and human health, air quality, noise and vibration and biodiversity. This is dealt within each Chapter of the EIAR The impact of construction stage traffic on air quality, human health, noise & vibration and biodiversity is short term to not significant (depending on activities) and long term imperceptible during operation.

ATTACHMENTS

FIGURE 1

SITE LOCATION MAP

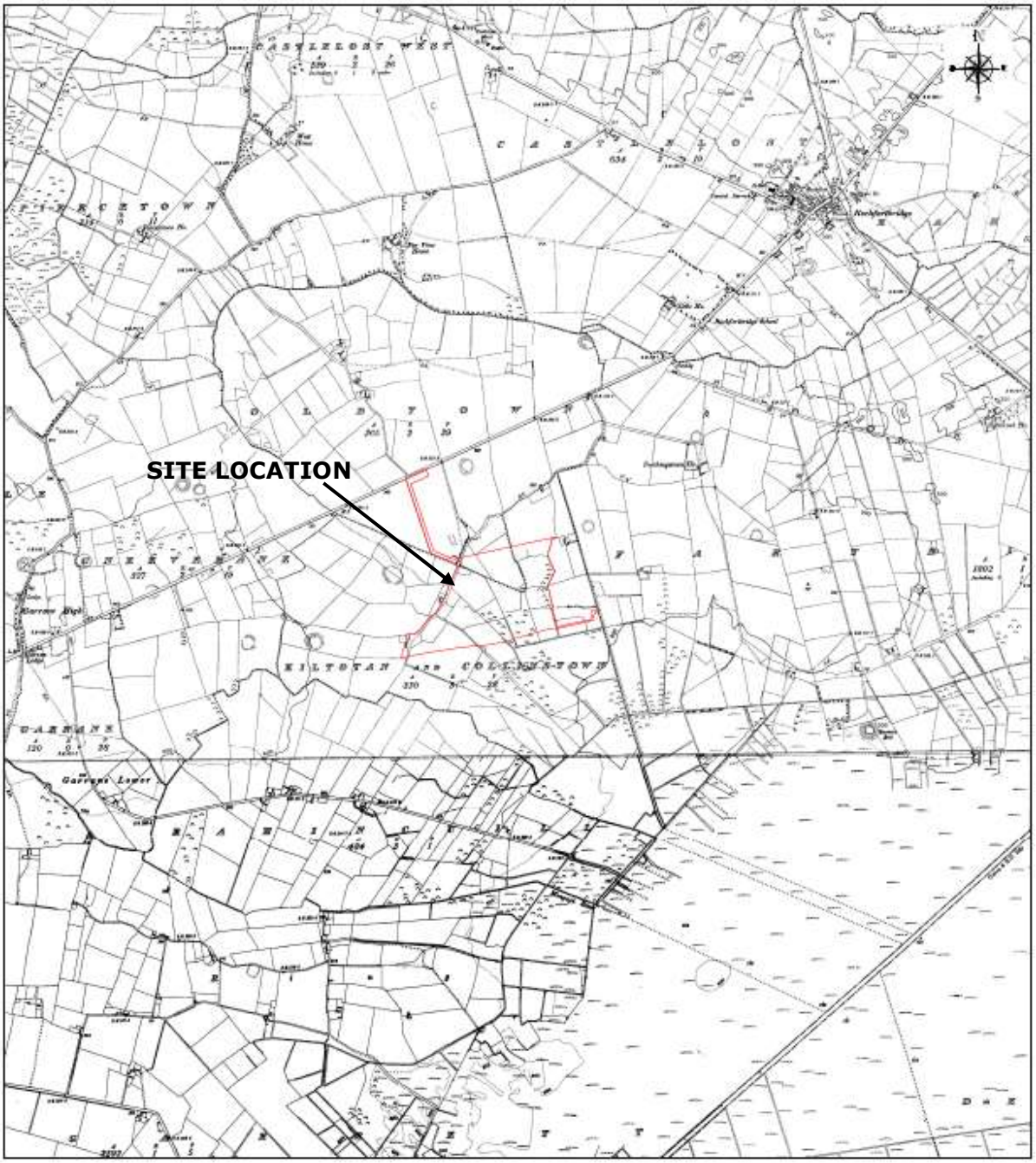
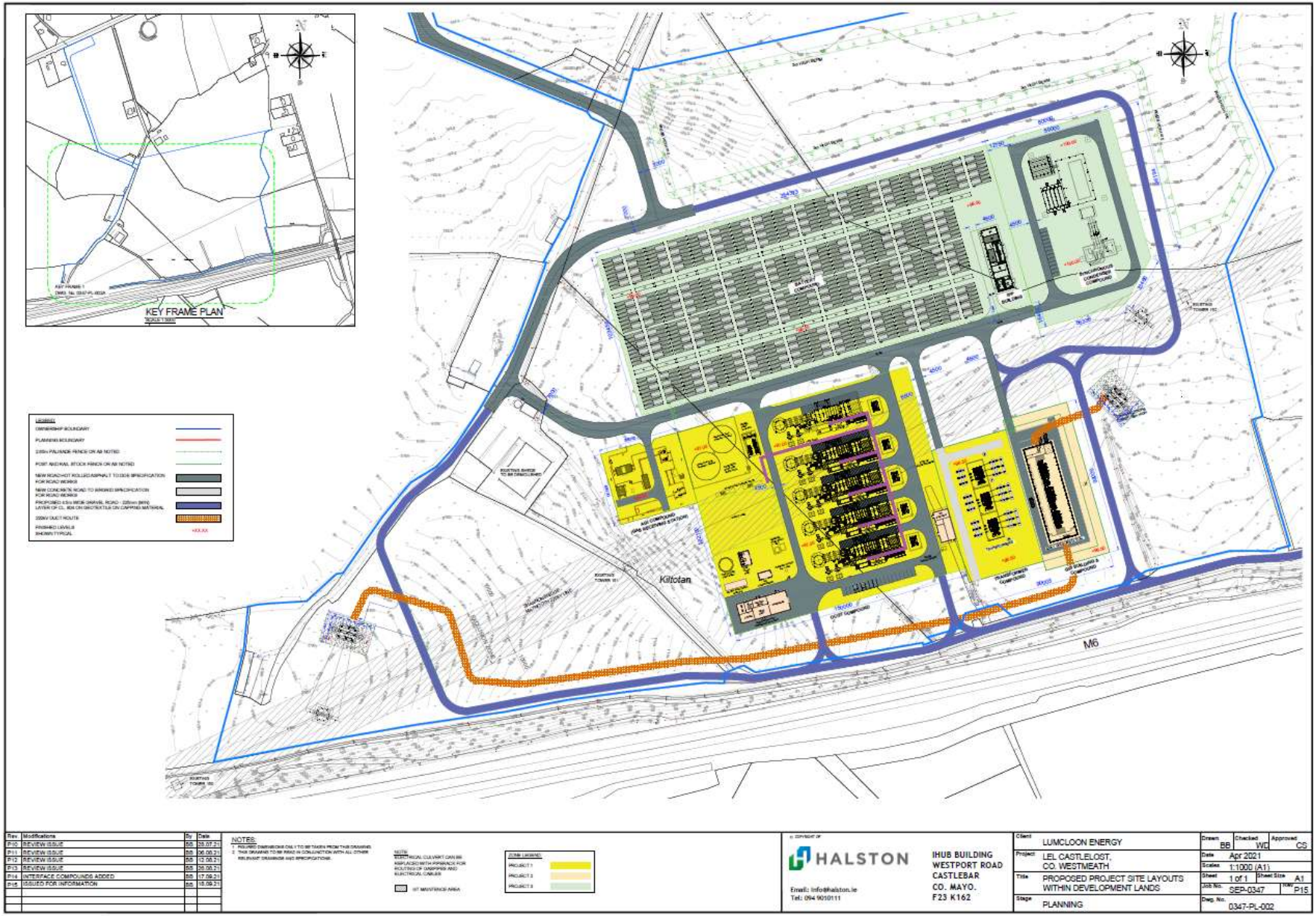

SITE LOCATION

FIGURE 2

PROPOSED PROJECT LAYOUTS WITHIN DEVELOPMENT LANDS


KEY FRAME PLAN
Kiltotan
M6
HALSTON
IHUB BUILDING
WESTPORT ROAD
CASTLEBAR
CO. MAYO.
F23 K162
LUMCLOON ENERGY
LEL CASTLELOST,
CO. WESTMEATH
PROPOSED PROJECT SITE LAYOUTS
WITHIN DEVELOPMENT LANDS
PLANNING
1:1000 (A1)
0347-PL-002