2 DESCRIPTION OF THE PROPOSED DEVELOPMENT

2.1 INTRODUCTION

This chapter of the Environmental Impact Assessment Report (EIAR) presents information on the elements that constitute the proposed development and details the characteristics and operations involved in the project. The purpose is to provide an appropriate level of detail to provide the basis for Environmental Impact Assessment (EIA). The description includes all phases of the development including the construction and operation of the substation and grid connection.

The chapter describes the site location, the main components of the proposed development and details the activities and operations required to construct and operate the proposed project and to connect it to the national grid. Details of the design of the proposed development are also provided in this Chapter, supported by excerpts from engineering drawings prepared by MWP accompanying the planning application. It should be noted that these drawings having been reduced in scale within the EIAR for more convenient examination. The larger drawings to a correct scale are cross-referenced and may be inspected in the planning file.

2.2 PROJECT SUMMARY

The proposed development is the Kilcumber Bridge 110kV substation. Cloncant Renewable Energy Ltd., a subsidiary of Statkraft Ireland Ltd. are applying for planning permission and will build out the proposed Kilcumber Bridge 110kV substation project. Once the development is completed the ownership of the facility will transfer to Eirgrid who will operate and maintain the development as part of the national electricity grid.

The proposal is to construct a 110kV substation to facilitate the connection of permitted renewable energy projects in the local area to the transmission network. The overall compound would have an area of approx. 19,809m2. The development consists of a 12,875m2 compound with all the components of a substation with an additional 7,524m2 area for future expansion of the substation electrical capacity (See below **Figure 2-1 Proposed Site Layout** (full size in **Vol 3 Appendix 6 Drawings**)**)**. The buildings and other externally mounted electrical plant will be enclosed in a fenced compound. These compounds will include an Air Insulated Switchgear (AIS) station and Control Building. It will also include underground ducting and cabling.

The components of the proposed Kilcumber Bridge 110kV Air Insulated Switchgear (AIS) Loop Substation are listed below:

- control building,
- over and underground ducting/ cables,
- electrical pylons,
- fencing,
- electrical equipment including busbars, disconnects, breakers, sealing ends, lightning and lighting masts.

The 110kV grid connection route assessed for the EIAR is an overhead line (OHL). A 400m OHL going south east from the substation and connecting into the adjacent existing Cushaling – Mount Lucas 110kV OHL. The OHL would consist of a combination of steel lattice pylons and wooden pylons with a height of 12m.

Activities associated with these construction phase elements are described within this chapter and have been considered throughout the assessment process.

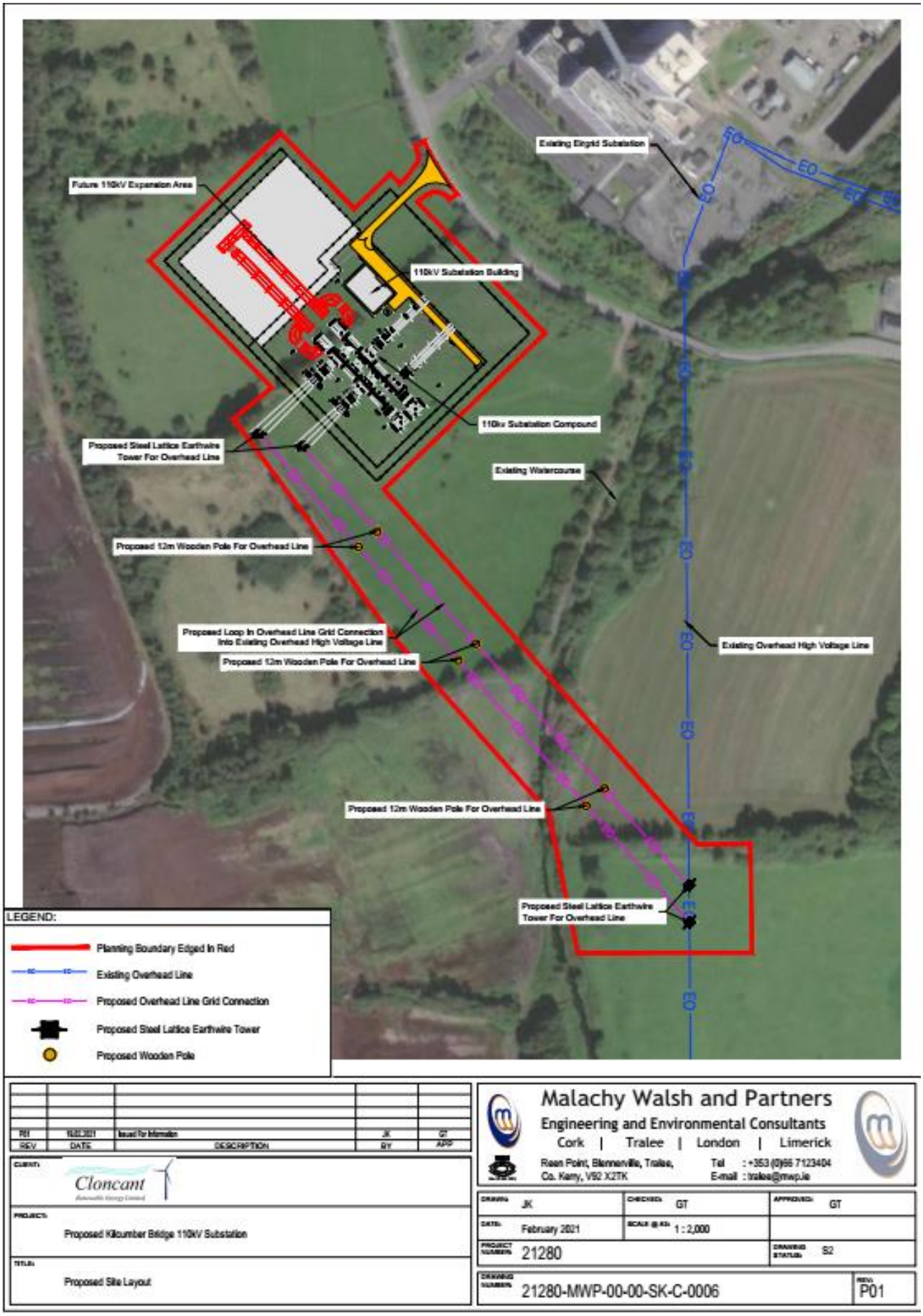

Figure 2-1 Proposed Site Layout (full size in **Vol 3 Appendix 6 Drawings**).

2.3 SITE DESCRIPTION

2.3.1 Site Location

The proposed development site is in the townlands of Ballykilleen, Cloncreen and Ballinowlart North, Co. Offaly. See **Figure 2.2** below for the location. Grid Ref. (ITM) Easting = 660810, Northing = 726820. The proposed development is opposite the Edenderry power station and approximately 6km south of Edenderry on the R401.

2.3.2 Environmental Setting

The site is currently an agricultural field and is in a rural location. It is accessed via the R401 which is adjacent to the site. To the northeast of the site there is the R401 and the Edenderry power station, which is 80m to the north east of the site. The land to the south, west and north of the site is made up of agricultural fields and cutaway peatland. The topography of the site is relatively flat and is at an elevation of approximately 67 metres above Ordnance Datum (mOD).

The Figile River is approximately 70 meters to the east of the substation. The grid connection route cross over agricultural fields as well as the River Figile. The site generally drains towards the River Figile, which is within the Barrow River Basin District (RBD). The field boundaries consist of hedgerows with land drains which directs drainage towards the River Figile.

The total site area is approximately 5.3 hectares, of which approximately half makes up the substation compound and half makes up the grid connection route. Existing land-use at the site is agriculture.

The closest residential property is approximately 200m to the east of the substation on the R401. There is a further cluster of residential dwellings approximately 220m to the east of the southernmost pylon.

Ecological surveys of the site indicate that habitats within the footprint of the proposed substation site comprise of improved agricultural grassland.

The aquifer underlying the site is classified as Locally Important with bedrock which is moderately productive in local zones. Groundwater vulnerability ranges from Low in the west of the site to High in the east of the site. The site is located within the Cushina and Rhode Groundwater Body. However, this is a surface water dominated environment and most of the environmental risk associated with the substation will be associated with surface water, therefore the focus will be on surface water protection. There are no karst features mapped in the area and none would be expected in this type of bedrock geology.

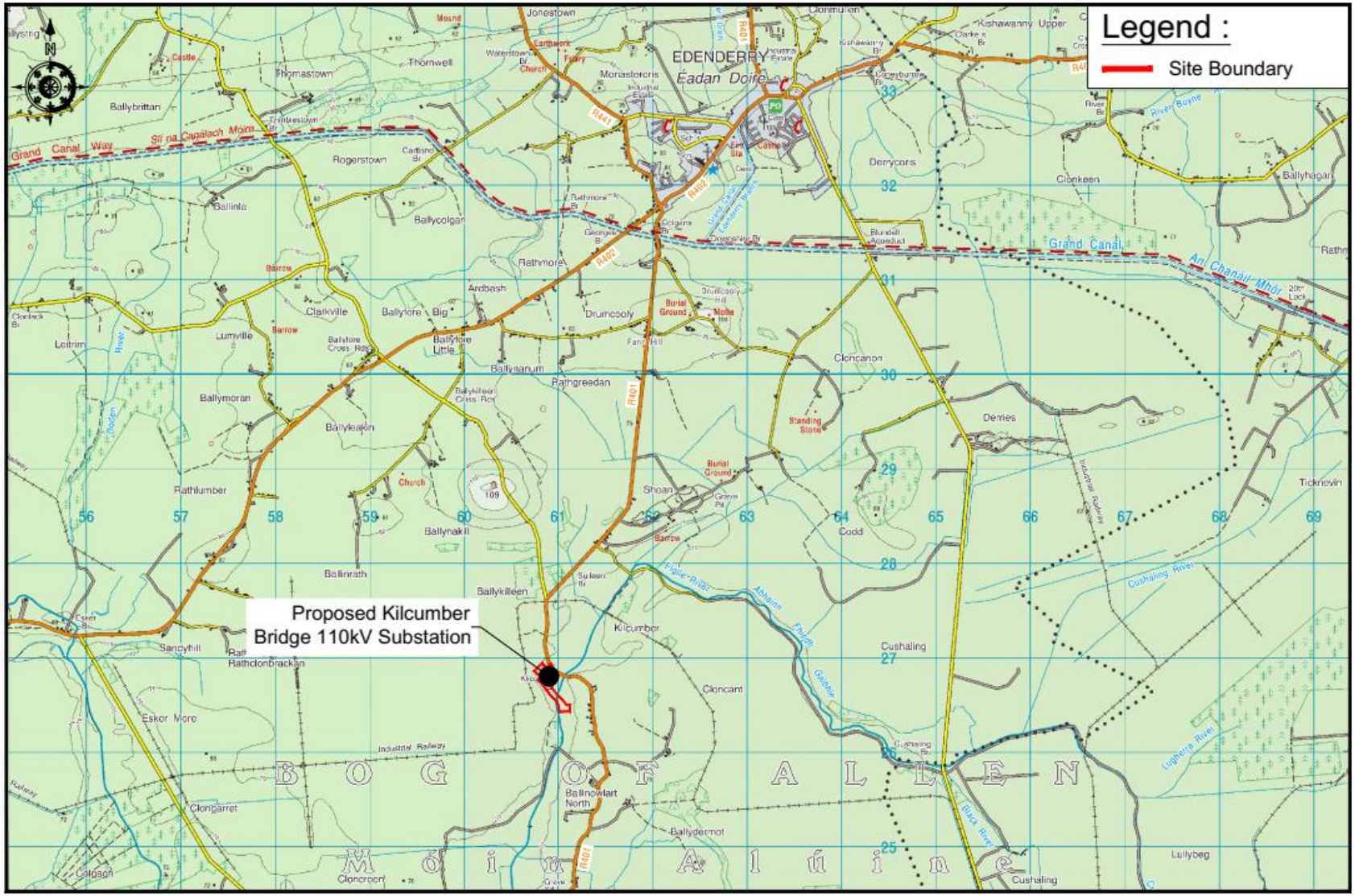

Figure 2-2: Site Location

2.4 DESCRIPTION OF THE PROJECT

This section provides details of the layout and main components of the proposed development (see above **Figure 2-1 Proposed Site Layout**). It also provides additional information on the project engineering considerations in the design.

The substation building contains connection points and associated equipment, incoming and outgoing circuit breakers, earth fault, over-current and other protection devices, metering equipment and other items of switchgear required for importing power from renewable energy projects across to the Kilcumber Bridge 110kV substation and exporting from here to the national electrical grid.

The substation consists of a 12,875m2 compound with all the components of a substation with an additional 7,524m2 area for future expansion of the substation electrical capacity. The compound comprises a substation control building, electrical gear and hardstand areas. The maximum height of the associated infrastructure in the substation compound will be 19m (light pole), most of the infrastructure will be 8-14m in height. The control building will cover an area of approximately 450m^2 and is made up of a relay room, battery room, generator room, workshop, messroom and a toilet. The external doors will be flat steel with a three-point locking system and wind restraints. The floors will consist of a concrete slab with ducts to house electrical cabling. The control building will have a dark coloured, pitched tile roof and a plastered external finish. The substation will be painted to an agreed colour to minimise visual impact. The discharge from the toilet will go to a holding tank where the effluent will be temporarily stored and removed at regular intervals. Parking and a hardstand area are located outside of the control building on the eastern side. The compound will be surrounded by a 2.6m galvanised steel high palisade fence.

The entrance road from the R401 to the proposed substation compound is approximately 60m long and 4.5m in width.

Grid connection route

AN overhead line (OHL) grid connection route is assessed as part of this EIAR. The route is a 400m OHL that exits the compound on the western side and heads south over the River Figile to connect into the adjacent existing Cushaling – Mount Lucas 110kV OHL. The OHL would consist of two pairs of 12m steel lattice pylons at each end (4 in total) with three pairs of 12m wooden poles (6 in total) supporting the line in between.

The compound is set back from the R401 in order to allow room for the permitted Cushaling Wind Farm substation and battery energy storage system (BESS). The entrance road into the Kilcumber Bridge 110kV substation is proposed to be used by both the Kilcumber Bridge 110kV Substation and the Cushaling Wind Farm compound. The Kilcumber Bridge 110kV substation will have its own entrance gate at the end of the shared entrance road.

2.4.1 Design of proposed substation

The proposed site layout is based on a generic AIS 110kV substation issued by Eirgrid (refer to **Figure 2-1**). The main components of the project are described above in **Section 2.2.**

The proposed Kilcumber Bridge 110kV substation will not be linked to the water mains or the wastewater system. The design of the compound includes a rainwater harvesting system for non-potable water use in the bathroom facilities with a water cooler system supplying the potable water in the canteen facilities. The wastewater will be held onsite in wastewater tanks to be pumped out periodically.

2.4.2 Drainage

During the construction phase of the project, there is potential for sedimented surface water run-off from the construction works areas to contaminate downstream watercourses. Fundamental to any construction project, is the need to keep clean water (i.e. runoff from adjacent ground upslope of the permitted development footprint) clean and manage all other run-off and water from construction in an appropriate manner.

A site-specific drainage system has been designed taking account of the following:

- Knowledge of the ground and hydrological conditions at the site;
- Technical guidance and best management practice manuals.

The system is designed to ensure that the proposal will largely mimic the existing drainage regime across the site, will not deteriorate water quality and will safeguard catchment water quality status from sediment run-off.

It is comprised of the following key element:

- The land drains situated within the substation field and situated down gradient of the works will be installed with a silt trap fence in combination with a straw dam. Any rainwater runoff from the construction site will enter these drains and any potential suspended solids within the water will be retained in the field drains.
- Once construction finishes the risk of suspended solids in the runoff will dissipate. The silt traps will remain in place during the operational phase for the life of the trap.

During the operational phase of the project, the stormwater drainage system will direct storm water from the impermeable areas (road and control building) within the compound through a fuel interceptor and discharge into a soakpit. Rainwater falling on the hardcore rock areas of the compound will filter through the rock into the soils below.

2.4.3 Excavated and Imported Materials

The development will require the following ground excavation and movement:

- Excavation of approximately 1,800m^3 of topsoil for substation and entrance road

Construction materials will include stone and quarry-run material for various uses at the site. **Table 2-1** below shows the calculated quantities of materials to be imported to site and excavated on site during the course of construction.

Table 2-1: Material Volumes

Item	Unit	Quantity
Length of new entrance roads	m	60
Excavation of topsoil for substation	m^3	1,800
Excavation of subsoils for pylon foundation	m^3	16
Volume of subsoil to be excavated	**m^3**	**16**
Volume of topsoil to be excavated	**m^3**	**1,800**
Total volume of excavated material	**m^3**	**1,816**
Volume of subsoil/topsoil from excavations to be re-used	**m^3**	**1,816**
Imported stone for entrance road	m^3	320
Imported stone for substation compound	m^3	28,160
Total volume of imported stone required	**m^3**	**28,480**
Concrete for substation foundation	m^3	25
Concrete for overhead grid connection Pylon bases	m^3	16

2.5 CONSTRUCTION PHASE

2.5.1 Construction timeframe

Depending on the grid application process, the project build is expected to start in 2022 or 2023. The substation will be constructed first, followed by the grid connection over a period of 12 months. There will be an additional allowance of about two months for commissioning and handover to Eirgrid. The total timeframe for the proposed project is 14 months from start of construction to hand over to Eirgrid.

2.5.2 Construction description

Construction compound

The construction compound will be situated in the future expansion area of the proposed Kilcumber Bridge 110kV substation, within the red line of the proposed site layout. This compound will act as the construction compound for both the substation and the grid connection.

Substation

The construction consists of the stripping of the topsoil across the compound followed by the placement of approximately 1-1.6m (depending on existing topography) of hardcore rock up to the compound level of the substation. The new level of the compound has been driven by the calculated flood heights in the Flood Risk Assessment (FRA), see **Appendix 3**. There is a need to raise any underground ducting in the compound above any calculated flood level. The area of the substation compound will be finished with the permeable hardcore rock. The site entrance and internal roads will be finished in tarmac. The control building, compound infrastructure and perimeter fence will be built on the hardcore rock layer.

Grid construction

Pre-construction surveys will be undertaken immediately prior to the construction phase, including ground investigations to allow detailed design of the OHL route. Access to the grid connection construction areas will primarily be via the compound area with limited temporary access from existing field entrances and routes used by the landowner. The detailed design of any temporary access routes will be based on the condition of the land at the time of construction and will be agreed with the landowner prior to the commencement of works. The existing Mount Lucas - Cushaling overhead line will be isolated to allow for construction of the proposed grid connection.

Overhead (OHL) route

The OHL route consists of two lines going in and out of the substation. The OHL infrastructure includes four 12m steel lattice pylons and six 12m wooden pole structures (see **Figure 2-3**). The 12m steel lattice pylons will be constructed on four concrete foundation footings of approximately one cubic meter each (four cubic meters of concrete per steel lattice pylon). The steel lattice frames will be constructed on site. The wooden pole infrastructure will consist of holes cored into the ground. The poles will then be concreted into the prepared holes.

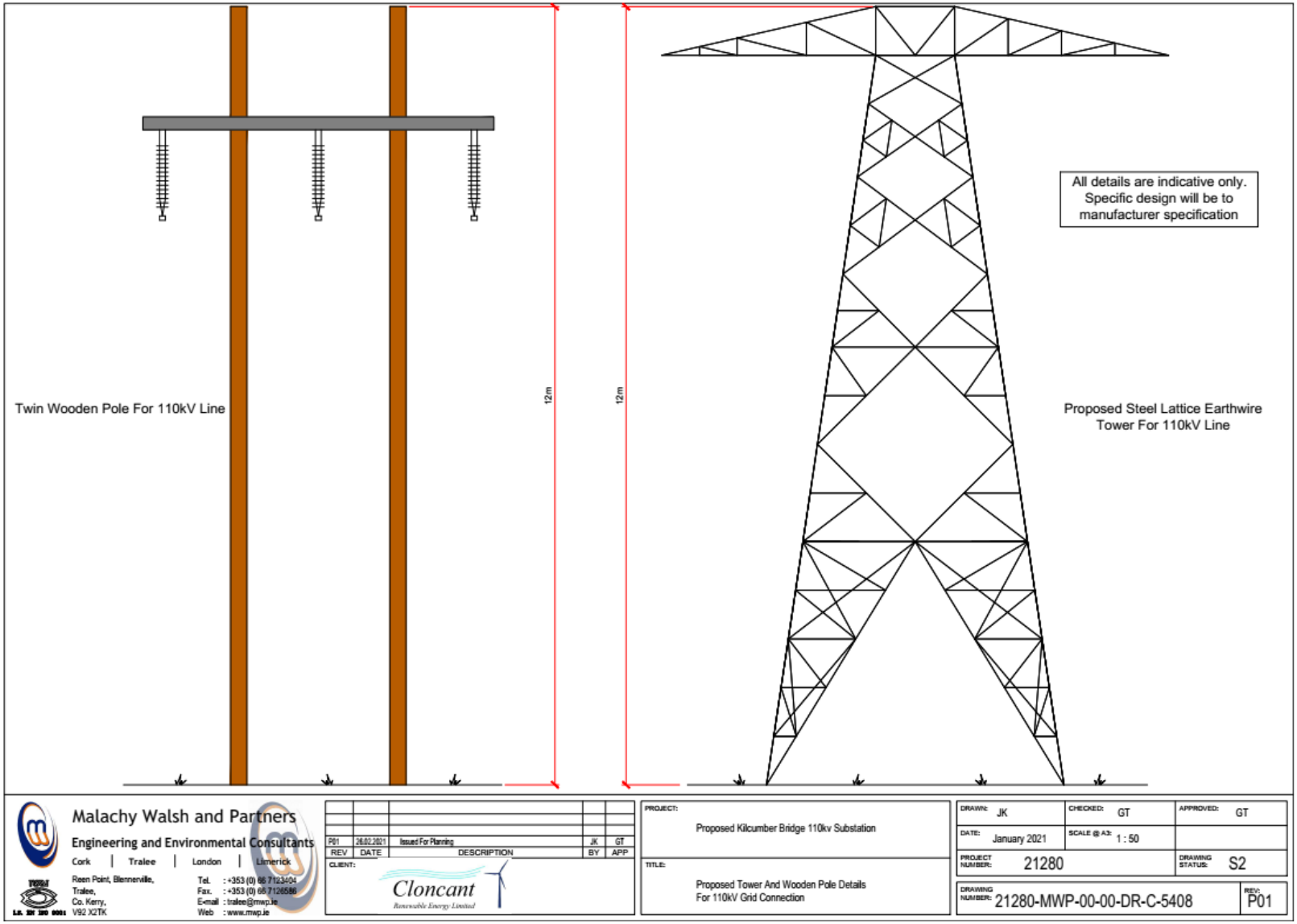

Figure 2-3 Proposed grid route Infrastructure

2.5.3 Construction Hours and Personnel

Construction activities would generally take place between the hours of 8:00 a.m. and 6:00 p.m., Monday to Friday, and between the hours of 8:00 a.m. and 1:00 p.m. on Saturday, which equates to a 55 hour week of operation. A detailed Traffic Management Plan will be developed at the construction stage (or commenced during planning compliance stage) to ensure controls are in place with all suppliers coming to the project site.

It is estimated that approximately 30 - 35 personnel are required for the construction of the proposed substation.

2.5.4 Communication with the Local Community

A Community Liaison Officer (CLO), typically the Site Foreman or a Site Engineer for a project of this size, will be employed to liaise between the public and the contractor to communicate and, where required, coordinate activities.

2.5.5 Construction and Environmental Management Plan

A Construction and Environmental Management Plan (CEMP) has been prepared for the project and is included as **Appendix 4**. The CEMP will be prepared to collate and manage the proposed and agreed mitigation measures, monitoring and follow-up arrangements and management of impacts. A CEMP provides a commitment to mitigation and follow-up monitoring; and reduces the risk of pollution and improves the sustainable management of resources. The environmental commitments of the proposed development will be managed through the CEMP and will be secured in contract documentation and arrangements for construction and later development stages, so that it can be ensured they are implemented and adhered to. The CEMP will mainly address the construction phase however, it can also be continued through to the commissioning and operation stages. An Environmental Manager with appropriate experience will be appointed for the duration of the construction phase to ensure that the CEMP is comprehensive and effectively implemented. It should also be noted that a CEMP is a live document which will be continually improved upon over the lifetime of the project, taking account of any conditions of planning imposed, while holding the provisions as set out in the CEMP submitted for planning as a minimum.

2.5.5.1 Waste Management

From a waste management perspective, the project can be divided into two phases:

- Construction; and
- Operation/Maintenance.

Construction phase waste may consist of hardcore, concrete, spare steel reinforcement, shuttering timber, food waste from the canteen and unused oil, diesel and building materials. This waste will be collected at the end of the construction phase and taken off site to be reused, recycled and disposed of in accordance with best practice procedures at an approved facility. The holding tank for the temporary enclosed toilets will be emptied on a regular basis by an appropriate permitted/licensed and approved contractor. Plastic waste will be taken for recycling by an approved contractor and disposed or recycled at an approved facility. Excavated materials from all construction activities will be subsequently reused on site for backfill, re-grading or re-vegetation. No waste soil, subsoil or bedrock will require disposal outside the boundary of the proposed development site.

Wastes arising during the operation phase of the project include but are not limited to lubricating oils, cooling oils, unused paint and packaging from spare parts. The containment and disposal of such oils will be carried out in a safe manner by an approved contractor. Such operations will be carried out in accordance with the Waste Management (Hazardous Waste) Regulations, 1998. The remaining wastes will all be removed from site and reused, recycled or disposed of in an authorised facility in accordance with best practice.

2.5.6 Water Requirement and Supply

Potable water will be required for the construction employees (30 to 35 personnel). The average requirement is estimated at approximately 50 litres per person per day which equates to 1,500 to 1,750 litres per day during peak construction. It is proposed to import water by tanker to the site during the construction phase.

2.5.7 Fuel Storage and Management

All plant will be refuelled on site e.g. excavators, dumpers etc, while rigid and articulated vehicles will be fuelled off site as would all site vehicles (jeeps, cars and vans). At construction stage, a fuel management plan will be developed specific to the site and the particular plant and equipment required for construction. The plan outlined will have regard to the following elements:

- Mobile bowsers, tanks and drums should be stored in a secure, impermeable storage area, away from drains and open water;
- Fuel containers should be stored within a secondary containment system e.g. bund for static tanks or a drip tray for mobile stores;
- Ancillary equipment such as hoses, pipes must be contained within the bund;
- Taps, nozzles or valves should be fitted with a lock system;
- Fuel and oil stores, including tanks and drums, should be regularly inspected for leaks and signs of damage;
- Only designated trained operators should be authorised to refuel plant on site;
- Procedures and contingency plans should be set up to deal with an emergency accidents or spills; and
- An emergency spill kit with oil boom and absorbers is to be kept on site in the event of an accidental spill.

2.5.8 Health and Safety

The project will ensure that all relevant Health and Safety appointments will be made to ensure the highest possible safety standards are achieved. A Project Supervisor Design Stage (PSDP) has already been appointed in Malachy Walsh and Partners, as planning and design consultant for the project. This may change to an assigned Project Manager during the project construction. A Project Supervisor Construction Stage (PSCS) will be appointed well in advance of any construction works commencing onsite. The PSCS will typically be the Civil Contractor during civil construction works with the role passing to the Turbine Supply contractor when turbine deliveries commence. These appointments and the meetings that are required to go with them, are essential to not only to ensure that all safety issues and interfaces are discussed and addressed but also issues of concern to local residents such as traffic management etc. as may be highlighted to the project via the Community Liaison Officer. The project will assess the competencies and project relevant experiences of the PSDP, PSCS, designers

and contractors as part of the appointment processes ensuring that same are to the required standards.

2.6 OPERATIONAL PHASE

Eirgrid will own, maintain and operate the substation as part of the national electricity grid.

2.7 DECOMMISSIONING

No decommissioning is addressed in the EIAR as the substation will become a permanent 110kV substation node on the national electricity grid.

2.8 CUMULATIVE IMPACTS

The potential for cumulative or in-combination effects is considered throughout this EIAR where relevant. A cumulative impact arises from incremental changes caused by other past, present or reasonably foreseeable future actions together with the proposed development.

The proposal is situated in a highly modified, intensively managed, agricultural landscape. There are also a number of commercial forestry plantations in the wider landscape. The main activities with which the proposed development could interact synergistically are considered to be agriculture, roadwork, and wind farms. The potential for cumulative impacts is included in the relevant chapters.

The following existing and permitted developments were assessed in cumulative impact as part of this EIAR:

- The permitted Cushaling Wind Farm has a substation compound adjoining the Kilcumber Bridge 110kV substation. The Cushaling Wind Farm compound consists of an independent power producer (IPP) substation and a battery energy storage system (BESS). The IPP substation is planned to connect into the Kilcumber Bridge 110kV substation. The permitted Cushaling Wind Farm comprises of 9 wind turbines approximately 1.2km north east of the site.

- The Edenderry Power Plant is situated across the road (R401) from the proposed Kilcumber Bridge 110kV substation.

- Construction has started on the Cloncreen Wind Farm (21 turbines) that is situated approximately 1km to the west of the proposed substation.

- Agriculture and peat cutting are important industries around the proposed substation. The impact on these is also assessed.

- The Proposed Irish Water Eastern and Midlands Regional Water Supply Project

2.9 PROJECT NEED AND ALTERNATIVES

The EIA Directive(2014/52/EU) states that the developer shall include:
"a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment"

The specific characteristics of this project include provision of a 110kV substation adjacent to the existing Cushaling 110kV substation.

2.9.1 Project need

The existing Cushaling 110kV substation located adjacent to the Edenderry Power Station is at capacity. Permitted and future energy projects in the area require a new 110kV substation to connect to the national grid.

2.9.2 Alternative substation location

The Kilcumber Bridge 110kV substation was planned in conjunction with the permitted Cushaling Wind Farm. Eirgrid were consulted in relation to the grid connection route and location of the Kilcumber Bridge 110kV substation. The proposed location of the 110kV substation and the wind farm substation / grid connection was advised from the following alternatives. (refer to **Figure 2--4**).

Option A was an on-site wind farm substation with an underground connection running west and southward along the R401 to the power station. Option B was an off-site wind farm substation on Bord na Mona property, which could either be an underground or overground connection across intervening lands to the Cushaling 110kV substation. Option C was an off-site wind farm substation with an underground cable connection across the R401 directly into the Cushaling 110kV substation.

Option C was adjudged to be the most suitable option to connection to the national grid network. The route is the closest, most direct and the most economically feasible route to the national grid network.

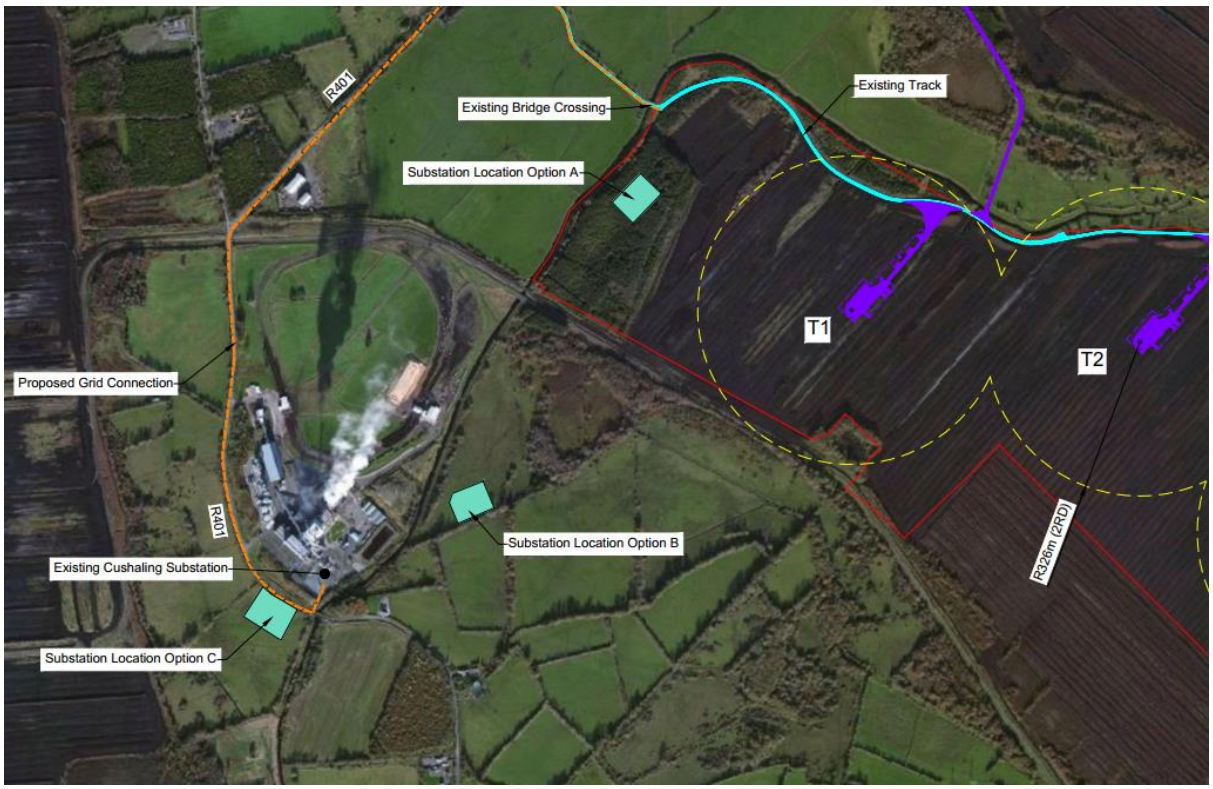

Figure 2-4: Kilcumber Bridge 110kV Substation and Cushaling Wind Farm Grid Connection Options

2.9.3 Alternative grid connection route

The original route option for the 110kV grid connection route was an underground line going into the existing Cushaling 110kV substation (see **figure 2-4**). This was changed to the proposed grid connection route due to two reasons;

- Ease of access for the connection into the existing and adjacent Mount Lucas – Cushaling 110kV overhead line.
- An agreement with the proposed grid connection route landowner.

This route was changed a third time to the final version of the proposed grid connection route due to the presence of a badger sett in the area. A slight revision of the direction of the route into what is presented within this EIAR ensured protection to the badgers.

2.9.4 Underground cable or overhead line grid connection alternative

Both an overhead line and an underground cable were considered as options for the new grid connection route (see above section 2.9.3). This was reduced to the overhead line only, mainly due to an Eirgrid specification for a permanent road on the underground cable route and the intrusive nature of the cable trenching work. It was considered during initial environmental impact assessment that an overhead line would have potentially less impact on the surrounding lands and waters then an underground cable and road. Also, the visual and landscape impact of the overhead line was assessed as not significant due to the existing overhead lines already in the area.

2.10 NOTE ON RISKS OF MAJOR ACCIDENTS AND DISASTERS

Overall, it is not expected that the Project will result in significant effects resulting in the risk of major accidents and disasters, nor is the project considered vulnerable to risks of major accidents and disasters. Threats to the environment are inherently assessed within environmental impact assessment. The project will be constructed and operated in line with EirGrid specifications.

REFERENCES

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National Roads Authority *Design Manual for Roads and Bridges:* Section TD 41-42/09.