MOTT MACDONALD

Shelburne Energy Farm Environmental Impact Assessment Report

Chapter 5 Description of Development

April 2026

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5.1 Introduction

The Proposed Project comprises a photovoltaic (PV) solar energy farm which is spilt into three distinct solar array areas - A, B and C, and a co-located Battery Energy Storage System (BESS), collectively referred to as Shelburne Energy Farm, and together occupying a total area of approximately 121.5 hectares. A grid connection is required to connect Shelburne Energy Farm to the national electricity grid, with a co-located 220kV substation compound within the energy farm, measuring approximately 0.72 hectares, with an associated underground cable connection which will connect to an existing overhead transmission circuit.

This chapter contains information on the site, design, size and other relevant features in accordance with the requirements of the EIA Directive. It describes the main components of the Proposed Project, including details of construction activities, the operational phase and decommissioning. This chapter provides the basis for the assessments in the subsequent chapters of this EIAR.

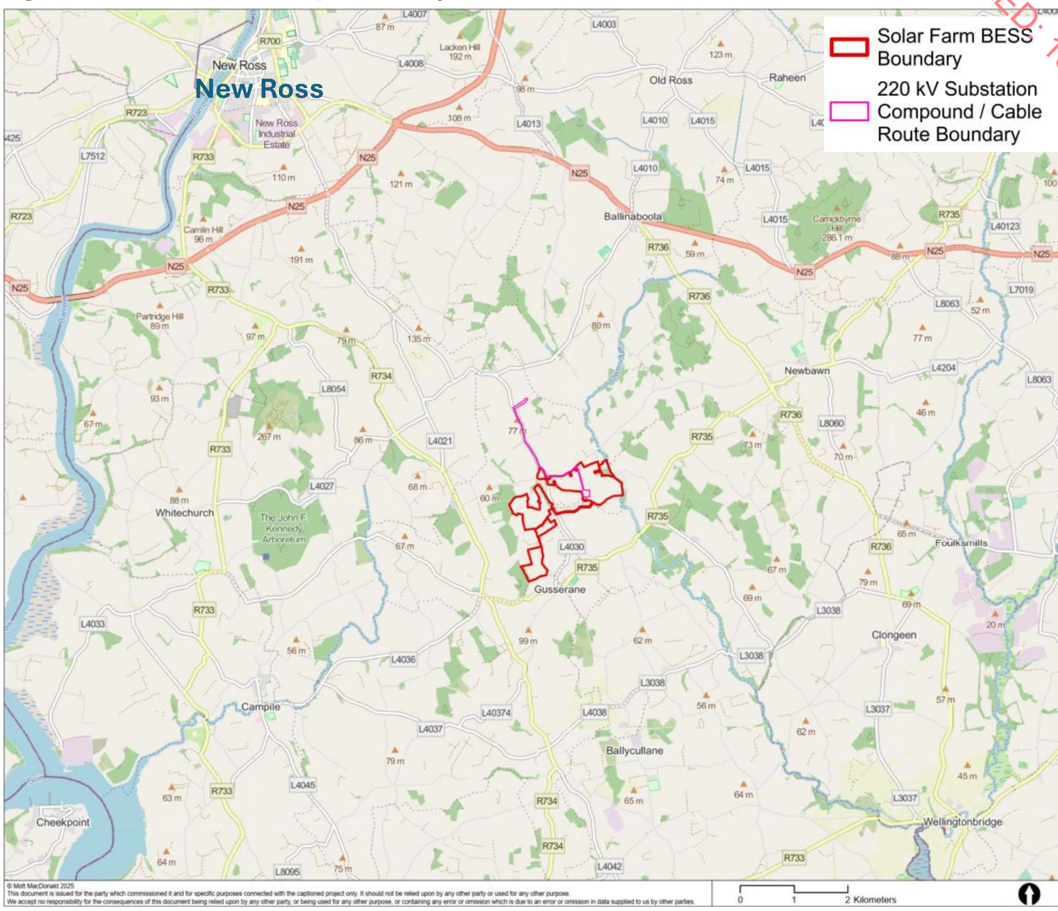
5.2 Location of the Proposed Project

The Proposed Project is located in the townlands of Ballygarvan, Cloonagh and Nash, Gusserane, County Wexford, as illustrated in Figure 5.1. The local area in which the Proposed Project will be situated is characterised as predominantly rural agricultural lands with low density residential properties occurring throughout the locality.

The closest settlements include the town of New Ross located approximately 6.5km northwest, and the villages of Ballynaboola approximately 4.5km to the north, Newbawn 3.4km to the northeast and Ballycullane 3.5km to the south.

The Proposed Project is predominantly within agricultural lands with field boundaries delineated by mature hedgerows, with some limited areas of semi-natural woodland in the east of the project site. The solar energy farm is divided into three distinct array areas, occurring on either side of the local public road - L4030, while the L40232 bounds solar array Area A to the north. The Owenduff River (EPA code: 13O01) bounds areas of the Project site to the east of solar array Area A, while the Tellarought river (EPA code: 13T14) is crossed by the inter-array cables connecting solar array Area B and C to solar array Area A and onwards to the proposed 220kV substation.

Figure 5.1: Location of Proposed Project



Source: Mott MacDonald Ireland Limited

5.3 Project Description

The layout of the Proposed Project is illustrated in Figure 5.2. A summary of the Proposed Project is outlined below and described in further detail throughout this chapter.

A **solar energy farm** consisting of

- Photovoltaic (PV) panels on ground mounted frames, fixed in place using earth screws or driven mini-piles, with a maximum height of 4m above ground level, and a minimum ground clearance of 1.0m above ground level, across three separate land parcels referred to as Array Areas A, B and C providing 92.68 MWp (peak electricity generation under optimal conditions)
- Inverter units incorporated into the PV support structures;
- 17 no. transformer centres each measuring approximately 6.1m L x 2.5m W x 3.1m H;
- Underground electrical cable ducting between solar array areas A, B and C, connecting to the future proposed 220kV substation, including underground connections across local roads and 2no. wooden overhead electric poles, one placed on either side of the Tellarought River to facilitate its crossing;
- 4no. meteorological stations.

A Battery Energy Storage System (BESS) providing 54.8MWac of electricity storage for a two-hour duration, secured with 2.6m high palisade fencing and gates, and containing:

- 79no. of containerised battery storage modules (measuring approximately 6.82m length, 2.44m wide and 2.89m high);
- 19no. of containerised transformer and Power Conditioning Units (measuring approximately 6.82m length, 2.44m wide and 2.89m high) and ancillary equipment;
- 8.5m high acoustic barrier for noise attenuation around the BESS compound;
- Well and pump house to supply 2no. fire fighting tanks for Battery Energy Storage System compound and

All associated development including widening of existing field entrance from local road L - 8059-1 to serve the solar array and BESS in Area A and vegetation clearance at all other existing site entrances to provide sight lines, temporary construction compounds (one in each solar array area), 2m high perimeter fencing fitted with mammal passes and security gates, pole mounted CCTV system, lighting, site drainage, fire water tanks, use of existing field entrances for access for construction and operation, internal access tracks, recontouring of land and landscaping, and all other works required to facilitate the proposed development.

The proposed 220kV substation compound and grid connection will be the subject of a separate planning application to An Coimisiún Pleanála under section 182A of the Planning and Development Act 2000 as amended. This associated development will consist of:

- A substation compound measuring an area of approximately 1.0 hectare which will accommodate the following:
  - 1no. Air Insulated Switchgear (AIS) securely fenced compound, which includes 1no.control building (9m L x 7.5m W x 4m H), 1no. transformers, cable sealing ends and associated AIS equipment;
  - 1no. Gas Insulated Switchgear (GIS) securely fenced compound, which includes a 220kV GIS building (49m L x 18.5m W x 17m H) housing GIS equipment;
- A grid cable connection from the GIS building to the existing 220kV overhead line circuit to Great Island, comprising 2no. 220kV underground cable circuits measuring approximately 2.9km in length;
- 2no. Line Cable Interface Masts (LCIMs) and stringing of new conductor to connect to an existing 220kV overhead line circuit to Great Island; and,
- All associated development including lighting, substation compound site drainage, effluent holding tank, well water supply for substation, internal access circulation area, lightning rods, lighting, dismantling and removal of 1no. existing 220kV overhead line tower and all other works required to facilitate the proposed development.

Figure 5.2: Proposed Project Layout

Source: Mott MacDonald Ireland Limited

5.4 Solar PV Infrastructure Description

5.4.1 Solar Arrays

The individual solar panels measure 1.3m wide by 2.58m long, and will be positioned in rows of three (overall length of PV rows varies based on their location) which will be erected on pre-erected galvanised steel mounting frames set at a height of 1m above ground level at the lowest point increasing to a maximum height above ground level of 4m, and tilted at 20 degrees to the horizontal. The solar panels will be positioned with appropriate gaps between modules implemented as to minimise the number of tables required and to reduce inter-row shading.

It is proposed that the solar panels will be fixed in place using earth screw/ pile driven steel framing. A cross section of a three-row solar panel is provided in the accompanying Planning Drawing Ref: 229101268-MMD-00-XX-DR-E-0301.

5.4.2 Inverter Units and Transformers Centres

The inverter unit collects direct current (DC) and converts it into grid-compliant alternating current (AC), which is then fed to the transformer centres via underground electrical cabling (refer to Section 5.4.3). These inverter units are positioned on the support structures under the end of each row of solar panels. It is proposed to construct string inverters across the solar farm which will be mounted on brackets within the profile of the PV panel mounting structure. The dimensions for the proposed inverter units are approximately 1.15m L x 0.87m W x 0.36m H.

The transformers centres are integral to the solar farm, collecting the AC electricity from the inverters and increasing the voltage to 33kV before transferring this current to the proposed 220 kV substation. The units enclose the transformer, medium voltage switchboard and low voltage switchboard. The transformers are equipped with a weather station, ventilation vent and security light. The transformer units (including associated ancillary equipment) will be constructed as modular containerised units to facilitate efficient transport and installation. It is proposed to construct 17no. transformer and MV switchgear units across the solar farm, which will be modular containerised units to be placed on plinths suitably bunded. The dimensions for the proposed units are approximately 6.1m L x 2.4m W x 3m H.

A total of 17no. of transformers centres are proposed across the entire solar farm. The number of transformers in each solar array area is directly related to the AC electricity generated within each array area as such the number of transformers per solar array area is as follows;

- Area A: 9no.
- Area B: 5no.
- Area C: 3no.

The proposed transformers will be oil-filled transformers, which are the most commonly occurring type used in outdoor high voltage installations. Each transformer will include built-in leak containment to prevent leaks and protect the environment.

5.4.3 Array Cabling

An estimated total linear length of 9,700m of low voltage (LV) underground electrical cable trenching is required to connect the solar panels to the invertors, and from the invertors to the transformer centres. These cables will operate at a voltage below 1kV.

The medium voltage (MV) underground array cables from the transformer centres to the proposed substation will operate at 33kV and be directly buried except where crossing roads or other services in which case the cable will be installed in ducts covered in concrete. An estimated total of 5,400m linear metres of MV cable trench is required.

There are two parcels of land which comprise part of the overall Array Area A, but which are divided from the main Array Area A by public roads, namely the north-westerly parcel, referred to as parcel 1 in planning drawing titled Overall Site Location Map (drawing number 229101268-MMD-00-XX-DR-E-0100) is separated by the L4030. Parcel 10, to the northeast, is separated from the main Array Area A by the L80591. These two parcels will be connected to the main Array Area A by LV cables installed within the public road. These connections are shown on the site location maps (drawing number 229101268-MMD-00-XX-DR-E-0101 and drawing number 229101268-MMD-00-XX-DR-E-0203).

The 33kV cabling for Array Area B and C will be required to be constructed within the public road, L-81411-1 and L4030, on its route to the proposed 220kV substation compound, the final section of the route will be off-road as it traverses through agricultural fields. The proposed MV cable routes are shown on the site layout drawings (drawing numbers 229101268-MMD-00-XX-DR-E-0204, and drawing numbers 229101268-MMD-00-XX-DR-E-0208 through to 229101268-MMD-00-XX-DR-E-0210). A crossing of the Tellarought River, via an overhead section of cabling which will be strung between two wooden polesets on either side of the river (which can be seen in Planning Drawing 229101268-MMD-00-XX-DR-E-0205), when it reaches Array Area A the MV cabling will be once again undergrounded and will connect to the AIS compound.

5.4.4 Access Tracks

The Proposed Project includes the construction of internal access tracks (total length measures approximately 2860m) to facilitate the movement of construction, operational, and maintenance vehicles throughout the solar farm. These tracks will be constructed using a compacted gravel surface, with a width of 3.8m, and will be adjusted to suit site-specific conditions and tie-in levels with the existing ground.

One internal access track provides shared access for the solar farm, the BESS compound and proposed substation compound, this track is 6m wide and has been developed to EirGrid Technical Standards for Customer Connections (this track runs from Site Access 4 as illustrated in Planning Drawing 229101268-MMD-00-XX-DR-E-0101 to the proposed substation compound).

5.4.5 Surface Water Drainage

The Proposed Project comprises three distinct solar array areas - A, B and C. All the elements of the drainage design have been developed in accordance with CIRIA Sustainable Drainage Systems (SuDS) Manual 2015. To ensure effective surface water management along the proposed access tracks within the solar farm, the project includes the construction of two dedicated drainage systems, namely the access tracks drainage and the perimeter drainage system. A Site Access Drainage Plan has been developed and is contained in Appendix 5.4 within Volume 3 of this EIAR.

Surface water drainage is required along the proposed access tracks to ensure effective control of runoff rates from these areas. Due to the reduced permeability of the compacted gravel surface compared to natural ground conditions, a mitigation strategy has been developed. This includes the installation of filter drains positioned alongside the access tracks, designed to collect and convey surface runoff to soakaways, facilitating gradual infiltration into the subsoil. The proposed system helps prevent washouts, minimise erosion, and mitigates long-term deterioration of the track infrastructure. The performance of infiltration-based systems is influenced by the geotechnical characteristics of the underlying soil.

The proposed perimeter drainage system is designed to manage flows from the identified grassed areas allocated for solar panels, which naturally slope towards the adjacent access tracks. The design varies across Array Areas A to C and comprises a combination of solutions that facilitate both infiltration and conveyance of surface water flows. In Lot A and Lot C, the system facilitates the discharge of surface water into downstream receiving waterbodies.

The solar farm is primarily situated on agricultural land with filed parcels defined by mature hedgerows that are to be retained and, if required, bolstered. The parcels generally slope towards the vegetated strips, which based on site topography, function as natural conveyance features that discharge surface water into more pronounced downstream waterbodies. The hedgerows are anticipated to provide a high degree of natural infiltration.

The layout of solar panels has been designed to provide optimal separation distances between the solar panel array rows to avoid blanket coverage of the site and to allow for vegetation growth between them. The panels are designed with moderate slopes, and the installation frames are elevated at a height of 1.0 metre above ground level. This configuration offers dual benefits: it reduces the potential for elevated rainwater runoff rates and provides space for vegetation growth and maintenance beneath the panels.

As part of the overall drainage strategy, gravel-filled filter drains are proposed between the rows of solar panels. These are intended to intercept and manage surface water runoff, promote infiltration and to mitigate the risk of erosion and waterlogging.

The operation and maintenance of the solar farm will include regular monitoring of the vegetation beneath the panels. Where soil compaction is observed during operation of the site, the ground will be reinstated.

The topographical characteristics relative to respective solar energy farm Array Areas A to C are outlined below.

Array Area A

The overall landscape of Array Area A is relatively uniform, with gradients ranging between 1:20 and 1:30. These consistent slopes allow natural surface water conveyance across the site. Based on the topographical survey and site walkover a drainage ditch is noted to run parallel along the hedgerow conveying flows downstream and discharging to a more pronounced drainage ditch at the southeast of the site. This ultimately connects to the Owenduff River.

This area of the solar farm is characterised by moderate sloping topography with two primary drainage directions. The western portion of the site slopes predominantly from north to south, directing surface water towards existing matured hedgerow strip. The eastern portion slopes towards the southeast and east, discharging naturally towards the adjacent Owenduff River. This watercourse, along with its associated floodplain, defines the eastern boundary of the development area.

It was noted during the site walkover that there is an absence of formal land drainage along the hedgerow strip at the south, although it is evident that the surface runoff follows the existing topography of the land. The design includes a range of mitigation measures aimed at maintaining pre-development hydrological conditions to effectively manage surface water across the solar farm. These are included in the first part of this section.

To ensure effective surface water management along the proposed access tracks within the solar farm, the project includes the construction of two dedicated drainage systems, namely the access tracks drainage and the perimeter drainage system.

The main access track is proposed to connect the proposed substation compound and BESS compound to the local public road L-40232, which defines the northern boundary of Array Area A. In addition, a network of secondary access tracks is proposed to provide operational access throughout the solar farm.

The proposed perimeter drainage system is designed to intercept, infiltrate and convey surface water flows from the identified grassed areas, which naturally slope towards the adjacent access tracks. The system comprises French drains, filter drains and carrier drains. The flows follow the existing topography of the land and discharge through a headwall into the nearest existing drainage ditch located at the southeast. The system includes a flow control chamber to ensure that discharged does not exceed greenfield runoff rates, therefore protecting the capacity of the downstream network.

The proposed surface water drainage layout is shown on Drawing No. 229101268-MMD-00-XX-DR-C-0101 to 0105.

Array Area B

Area B generally features gently sloping topography, with the gradients falling towards existing waterbodies. The Owenduff River, its floodplain and associated streams bound the Proposed Project to the north, northeast and the northwest. The natural ground slope directs surface water toward existing hedgerows, which serve as informal vegetated conveyance features and ultimately discharge into the downstream watercourses.

The majority of the site has a relatively uniform landscape, with average ground gradients of 1:50. The narrow section at the northeastern area is an exception and the slopes are steeper here with average slope of 1:20. The surface runoff discharges naturally to the adjacent river.

This area of the solar farm is situated on agricultural land bordered by mature hedgerows that aid natural infiltration and convey surface water downslope into larger waterbodies. The design includes a range of mitigation measures aimed at maintaining pre-development hydrological conditions to effectively manage surface water across the solar farm. These are included in the first part of this section.

To ensure effective surface water management along the proposed access tracks within the solar farm, the project includes the construction of a dedicated access tracks drainage system. This includes the installation of filter drains positioned alongside the access tracks, designed to collect and convey surface runoff to soakaways, facilitating gradual infiltration into the subsoil. The main access track is proposed to connect to the local public road located to the south of the site. As outlined in the design principles, a perimeter drainage system and access track drainage have been integrated into the overall drainage strategy to ensure effective surface water management.

The proposed surface water drainage layout is shown on Drawing No. 229101268-MMD-00-XX-DR-C-0106 to 0108.

Array Area C

Area C is characterised by gently sloping topography with the primary gradient falling westward. This directs surface water toward existing hedgerows, which serve as informal vegetated conveyance features and ultimately discharge into the adjacent stream. This stream defines the western boundary of the development area. The overall landscape is relatively uniform, with gradients ranging between 1:30 and 1:40. These consistent slopes allow natural surface water conveyance across the site.

This area of solar farm is situated on agricultural land bordered by mature hedgerows that aid natural infiltration and convey surface water downslope into larger waterbodies. The design includes a range of mitigation measures aimed at maintaining pre-development hydrological conditions to effectively manage surface water across the solar farm. These are included in the first part of this section.

To ensure effective surface water management along the proposed access tracks within the solar farm, the project includes the construction of a dedicated access tracks drainage system. This includes the installation of filter drains positioned alongside the access tracks, designed to collect and convey surface runoff to soakaways, facilitating gradual infiltration into the subsoil. The main access track is proposed to run centrally through the site, connecting to the local public road that runs parallel to the eastern boundary of Area C.

The proposed surface water drainage layout is shown on Drawing No. 229101268-MMD-00-XX-DR-C-0109 and 0110.

5.4.6 Water and Waste Water

There is no requirement for water or wastewater drainage infrastructure as neither are required for the operation of the solar energy farm.

5.4.7 Security Infrastructure

The perimeter of the overall project site will be required to be secured from unauthorised access to ensure protection of the solar equipment. The proposed perimeter fencing is typical deer fencing, structured of galvanised wire steel mesh fencing, measuring 2m high with 15cm wide apertures. The security fencing will have mammal access points to ensure species such as foxes, badgers, rabbits, hares etc. have unfettered movement throughout the solar farm. Fencing will also have the added benefit of ensuring sheep, which will be used to graze throughout the solar farm, will be contained within the solar farm site. Each site entrance will have a 2.0m high double leaf high chain link gate (moss green colour, RAL 6005) installed.

A closed-circuit television camera (CCTV) system will be provided from various locations in each array area and will be erected on dedicated pole mounted stands at a height of 4.0m above ground level as detailed within planning drawing 229101268-MMD-00-XX-DR-E-0305. The CCTV be angled to record within the array areas only and will not capture any adjacent residential properties or roads. The CCTV system will be monitored remotely on a continual basis using infrared lighting as the solar facility will be unlit at night-time.

There is no lighting infrastructure required or proposed for the operational phase of the solar farm.

5.4.8 Landscaping

As an outcome of the landscape and visual impact assessment, mitigation in the form of additional hedgerow planting was proposed. This will bolster existing hedgerows within and on the boundaries of the Project site to provided further screening. The proposed landscaping is illustrated in the accompanying landscape drawing (refer to drawing 25WX01-DR-0101 to 0103 in Appendix 5.3, Volume 3 of this EIAR).

5.4.9 Land Use/Grazing Arrangements

At present the Project site comprises improved and wet agricultural grassland and is used for tillage production and animal grazing. It is proposed that all solar farm array areas (A, B and C) will continue to retain agricultural practices through the application of sheep grazing. Sheep grazing is a common agricultural practice at established solar energy farm locations for the maintenance of grassed areas. Sheep grazing has a mutual benefit of retaining agricultural practices and is a sustainable farming practice ensuring vegetation growth does not interfere with solar panels, while also improving biodiversity through the creation of conditions for the (re)establishment of native wildflower/meadow species.

5.4.10 Biodiversity Enhancement Measures

The biodiversity enhancements are based on the preservation of existing local habitats which support flora and fauna of local, regional or national importance. In this regard, areas of recovering remanent fen/ wet woodland habitats have been left undeveloped. Any retained habitats are best managed via low maintenance methods, i.e. reduced grazing or self-regeneration, while no pesticides or herbicide usage will be employed within the Project site.

As discussed in Section 5.4.9 above, sheep grazing will be used to provide a natural form of grass management throughout the solar farm, this has biodiversity benefits to maintain meadow areas and prevent scrub encroachment.

The predominate enhancements are focused on bolstering existing hedgerows throughout the Project site, where current agricultural practices have resulted in rigorous management of hedgerows. Hedgerows will be bolstered with the planting of native hedgerow species, such as hawthorn, sloe, hazel, holly, spindle and guelder rose. Where trees will be planted within hedgerows these species include a mix of oak, crab apple, wild cherry, scots pine.

A 2.31 hectare field at the northeast corner of the site has been identified for specific biodiversity enhancement. This field comprises a river floodplain with remnant fen and wet woodland habitat. The planting of alder and oak has been identified as appropriate within areas of the Project site (refer to drawing 25WX01-DR-0120 in Appendix 5.3, Volume 3 of this EIAR).

The proposed biodiversity enhancement measures are listed below.

- 2.01 hectares of existing wet grassland and scrub mix to be conserved and managed to protect existing habitats.

- 2.64 hectares of existing marsh and scrub mix to be conserved and managed to protect existing habitats.
- 5.33 hectares of existing marsh, wet grassland, and scrub mix to be conserved and managed to protect existing habitats.
- Retention of 0.73 hectares including an existing building and bat roost to be left undisturbed.
- Retention of 1.45 hectares of mixed woodland.
- 3.66 hectares of former agricultural pasture and tillage land is to be planted with native woodland; Alder and Oak on lower lying ground adjacent streams and flood prone areas and Hazel and Oak woodland on drier ground.
- Additional mitigation planting adjoining dwellings will consist of dense native woodland and shrub planting and provides a cumulative area of 1.03 hectares.
- Replanting of degraded hedgerows over and a cumulative area of 1.35 hectares.

Tree planting will be conducted by hand under the supervision of an ecologist to ensure that tree planting is located outside remanent fen/ wet woodland, which will be retained. This will enhance biodiversity within the floodplain of the Owenduff River which forms a boundary of the Project site.

The perimeter fencing for the Proposed Project will have mammal gates installed at regular intervals (small mammal gates at every panel (between posts) and large mammal passes every tenth panel) to allow the mammal access points to ensure species such as foxes, badgers, rabbits, hares etc. have unfettered movement throughout the solar farm.

5.5 Battery Energy Storage System Description

5.5.1 BESS Units

The purpose of the BESS units is to store surplus energy generated during low demand periods and release this when demand is greater. Additionally, the stored energy is used to provide fast acting DS3 system[1] services which contribute to the stability of the system as the penetration of renewable generation on the system increases.

The BESS units are modular and will be arrayed within the site along with associated transformers and inverters. An example of a typical BESS unit is shown in Figure 5.3. The BESS unit incorporates a concrete base, battery modules, associated plant and equipment including transformers and inverters.

A BESS operates in either a charging mode or a discharging mode. During discharging mode power from the batteries is converted from direct current to alternating current by an inverter. Power from all the batteries is stepped up through a transformer to a 33 kV busbar which then connects to a main transformer and from there an underground cable connects the facility to the grid. During charging mode, the process is reversed and electricity is fed into the batteries and the energy is stored. For this development, energy for charging of the batteries will only be sourced from the co-located solar development.

The design adopted allows for minimising on-site construction as each modular component is manufactured off-site and transported to site for final assembly. Each BESS unit will be transported to site already built, the site works will include installation, connection via cables and commissioning. Inverters and transformers will also be transported to site as compete functional units ready for installation and connection on site.

[1] DS3 is about operating the power system securely, while meeting renewable targets.

5.5.2 Site Layout and Processes

The precise BESS arrangement, consisting of the containerised battery storage modules, the transformer and Power Conversion Systems (PCSs), to be used at the site will be finalised prior to construction and will be dependent on commercial and technical considerations at the time of procurement. Dimensions of containerised modules produced by different manufacturers vary; however, designs have been over specified, and therefore, the total structure height and boundaries will not exceed that indicated in the accompanying planning drawings.

These containers will house the batteries, fire suppression equipment and associated electrical components. The cable routing between containers would be above ground.

Each battery module will be monitored and controlled through a Battery Power Facility Management System. The site will be monitored and controlled remotely and will be visited regularly for routine maintenance and security checks.

An example of a typical containerised battery storage module and associated transformer and PCU is provided in Figure 5.3 and Figure 5.4.

Figure 5.3: Image of a typical container housing the battery storage modules

Source: Mott MacDonald

Figure 5.4: Image of a typical container housing the PCU

Source: Power Electronics

A certain number of the BESS containers may include 3m lightning finials, if required, as per the site lightning risk assessment. For the purpose of the planning application and associated drawings, it has been assumed that lightning finials will be provided on each BESS container. Details have been provided for standard approach for a BESS container in planning application drawing 229101268-MMD-00-XX-DR-E-0308.

A 8.5m high acoustic barrier surrounding the BESS compound is proposed to mitigate noise impacts to local residents.

The proposed BESS layout is shown in Figure 5.5. For more details on the proposed location and layout of the BESS units, refer to planning application drawings 229101268-MMD-00-XX-DR-E-0200, 229101268-MMD-00-XX-DR-E-0203, 0205 and 0206.

Figure 5.5: BESS Layout

Source: Mott MacDonald

5.5.3 Internal circulation tracks

Internal access is required throughout the BESS compound to allow safe vehicular access and movements to areas of the array for maintenance purposes throughout its operational lifespan. The access tracks will be 4.5m wide and will be excavated to a depth of 450mm. This will then be replaced with an aggregate base layer of soil that will be topped with a surface layer of gravel. The main access road leading to the proposed substation compound and BESS compound will be topped with asphalt.

The BESS compound will include for two access points (one to the west and one to the east) to ensure redundancy in the event of an obstruction and emergency [fire] services to attend in the event of a fire.

5.5.4 Water Supply

An on-site fire water supply will be provided due to distance from any Uisce Éireann water supply infrastructure. The water supply will be capable of supplying a minimum of 1900 litres /

minute for at least two hours in accordance with National Fire Chiefs Council publication 'Grid Scale Battery Energy Storage System Planning – Guidance for FRS'[2]. Firefighting water is to be supplied from a bored well (the location of which will be subject to site investigation results) that will be located a minimum of 50m from any watercourse and 30m from the GIS building's foul holding tank. Two fire water supply tanks are proposed, each measuring a height of 4.2m and with a tank diameter of 6.1m, each providing a volume of 124m^3. The tanks will be equipped with level monitoring and overflow protection. A dedicated pump house will be constructed to accommodate a fire pump capable of maintaining the required pressure and flow during emergency conditions, with backup power provision for grid outages.

There is no requirement for a potable water supply for the operation of the BESS.

Refer to Section 5.5.6 below for details of the proposed firefighting water discharge containment.

5.5.5 Wastewater Drainage

No permanent welfare facilities are proposed for the BESS plant. As a result, there is no requirement for wastewater treatment or drainage infrastructure to be installed to facilitate the operation of the BESS plant.

5.5.6 Surface Water Drainage

To comply with established best practice, a surface water drainage system incorporating Sustainable Drainage System (SuDS) features will be constructed to manage the quantity and quality of runoff during rainfall events. The proposed drainage strategy will comply with the recommendations as outlined in the Wexford County Development Plan 2022-2028 (Volume 2, Chapter 9) that include reference to the CIRIA SuDS Manual 2015.

Surface runoff from the narrow area along the north boundary of the BESS compound will naturally flow in a northwestern direction towards the proposed solar energy farm (Array Area A) access track drainage, following the geomorphology of the site.

The surface water runoff generated by the BESS facility will be collected via a gravity drainage system and managed using a dry detention basin. The proposed future substation will also be connected to main gravity drainage system serving the BESS compound. The basin will be unlined allowing for infiltration and it will be sized to ensure no flooding of the proposed site occurs for the critical storm with a 1 in 100-year return period, including a 30% allowance for climate change. The operational efficiency of infiltration systems is dependent on the geotechnical properties of underlying soil at the proposed location and should be confirmed through ground investigation. The dry detention basin will include a sediment forebay at the inlet of the basin that will provide sediment treatment by allowing particulates to settle out and preventing their resuspension within the main detention area. Furthermore, a permanently wet volume will be provided to enhance the treatment of surface water runoff by encouraging the adhesion of entrained contaminants to vegetation planted within the pond. The outfall from the basin will be discharged via a headwall into the existing drainage ditch located to the southeast. The headwall is positioned approximately 5 metres from the perimeter fencing of the BESS compound. Based on site walkover, the ditch maintains hydrological connectivity with the Owenduff River, which flows in a south-westerly direction, running parallel to the site's boundary. The discharge to a watercourse is to be restricted in accordance with sustainable drainage principles and limited to the greenfield runoff rate.

[2] https://nfcc.org.uk/wp-content/uploads/2023/10/Grid-Scale-Battery-Energy-Storage-System-planning-Guidance-for-FRS.pdf

In case of a fire event, surface water from the hardstanding BESS area will be automatically redirected to a firewater storage tank via an automated penstock. The tank will be sized to accommodate flows during a critical storm event with a 1 in 10-year return period, including a 30% allowance for climate change.

A perimeter drainage system, comprising a filter drains and soakaways system, will be installed to collect and infiltrate surface water runoff from the access track located in the western section of the Project Site, as well as from the adjacent unpaved area between the BESS compound and the substation compound. In the southwestern area, the surfacing surrounding the fire tank will be served by the filter drains running parallel to the acoustic wall that connect to main gravity drainage system of the BESS compound.

The proposed surface water drainage system will incorporate the following features to reduce the risk of pollution and improve the quality of surface water which will be discharged from the site:

- Silt trap chamber and oil/fuel interceptor located upstream of the dry detention basin to help remove pollutants which may have become entrained in runoff from any hardstanding areas that may be at risk of contamination from oil or fuel spills associated with vehicles;
- Flow control chamber downstream of the dry detention basin regulates the flow at the discharge point from the basin;
- Forebay within the dry detention basin to promote treatment and settlement; and,
- Emergency shut-off valve chambers located upstream of the dry detention basin to prevent discharge from the drainage network in an emergency event and during periodic maintenance.

The proposed surface water drainage layout is shown on Drawing No. 229101268-MMD-00-XX-DR-C-0100. The proposed firewater storage tank plan and sections are included on Drawing No. 229101268-MMD-00-XX-DR-C-0017 and the proposed pumphouse plan and sections are on Drawing No. 229101268-MMD-00-XX-DR-C-0018.

5.5.7 Lighting

Internal site lighting is proposed within the centre of the BESS compound, there will be no perimeter lighting. A total of 14 no. double head lamp post positions are indicated on the proposed site layout plans. Lighting will be sensor activated. The lamp posts will be inward facing and approximately 6.0m in height, the details of which are shown in the planning application drawing 229101268-MMD-00-XX-DR-C-0100.

5.5.8 Acoustic barrier

An acoustic barrier is required around the BESS compound and a further section will extend internally. The acoustic barrier will measure a height of 8.5m and will have full absorptive noise capacity to ensure there is no exceedance of background noise levels at the closest residential receptors.

5.5.9 Embedded Fire Protection

There are a number of levels of fire protection built into the BESS units. The BESS plants are comprised of several individual battery container units called ‘cubes’, each cube has racks, each rack contains a number of battery modules and each module is comprised of a number of battery cells.

At a module and cell level, the battery temperature and voltage are constantly monitored. If these parameters are measured outside the safe operating range, the module is automatically disconnected from the system in order to prevent any further issues.

Should the module level protections fail to prevent a fire each cube contains gas, temperature and smoke detection sensors. If smoke or oxidation gases are detected within the cube, all cubes linked in the same string are disconnected from the system and a solid aerosol fire suppressant is automatically released within the cube.

As a final layer of protection, the battery modules are designed to so that in the event the first two layers of fire protection do not prevent a fire igniting, any fire will remain contained within that module and will not spread to other modules within the container and thereby will not spread to adjacent containers.

In line with best practice guidance, a water-based fire suppression system is proposed to provide defensive cooling. This involves the strategic application of water to adjacent units and surrounding infrastructure to prevent fire spread and reduce thermal escalation. Direct application of water onto burning battery modules is to be avoided due to electrical hazards. Firewater containment measures are incorporated into the site design to manage runoff and prevent contamination.

Refer to Section 5.5.4 above for details of the fire water supply.

5.5.10 Security Infrastructure

The BESS compound will be required to be secured from unauthorised access to ensure protection of the BESS units. The proposed fencing comprises 2.6m high steel palisade fencing (moss green colour, RAL 6005).

The closed circuit television cameras (CCTV) system will be provided around the perimeter of the solar farm from various locations in each array area and will be erected on dedicated pole mounted stands at a height of 3.5m above ground level as detailed within planning drawing titled Ancillary Details (Drawing number 229101268-MMD-00-XX-DR-E-0305). The CCTV cameras will be angled to record within the array areas only and will not capture any adjacent residential properties. The CCTV system will be monitored remotely on a continual basis using infrared lighting as the facility will be unlit at night-time.

5.6 Grid Connection Description

Shelburne Energy Farm as an electricity generation and storage project, requires a connection to the national grid to enable the export of the electricity generated or stored. The connection to the national grid will comprise a 220kV Gas Insulated Switchgear substation compound with two transformers, one for the BESS storing electricity generated by the solar energy farm and a second for the BESS storing electricity from the national grid.

5.6.1 220kV Substation Compound

The substation compound will house two separately fenced compounds, to the west the GIS compound (EirGrid operated compound) and to the east the AIS compound (customer operated compound). Both compounds have been designed to EirGrid technical specifications and are further detailed herein.

5.6.1.1 GIS Compound

The GIS compound which will be securely fencing with palisade fencing, with an independent and separate gated compound entrance. The 220kV GIS Building housing all associated GIS equipment will be the solitary above ground structure within the GIS compound. The 220kV GIS building will comprise a two-storey over partial basement structure. It will house the new gas insulated switchgear, comprising Sulphur Hexafluoride (SF6) insulated circuit breakers, disconnectors and other high voltage equipment. Auxiliary services equipment, such as control and telecoms equipment, low voltage switchgear, an emergency diesel generator, and batteries. Welfare facilities (i.e. toilets, sinks, messroom, workshop.) will also be located within the GIS substation building in line with EirGrid Functional Specifications. The underground cables will connect with the substation via the partial basement, which will be designed to prevent any water ingress.

A below ground earth grid will be installed in a grid arrangement approximately 600-750 mm below the finished surface. The earth grid will consist of bare stranded copper conductor with an outside diameter of approximately 95mm2. The purpose of the earth grid is to ensure personnel and public safety during electrical faults that may occur on the transmission grid.

Fencing around the entire EirGrid substation compound, with the exception of the site entrances/gates, will comprise 2.6m high galvanised steel palisade security fencing, with black powder coat.

The building will comprise a typical industrial form, with a structural steel frame clad with profiled metallic sheet wall and roof cladding. Internal walling of masonry will be adopted, except where specific load carrying requirements necessitate the use of reinforced concrete walls.

Industrial claddings will be factory finished according to EirGrid specification. The roof will be shallow pitched and constructed of profiled metal decking on purlins spanning between rafters. The buildings will have access gantries and walkways for access to equipment. These will be constructed of stainless/galvanised steel open grating type flooring supported on steel beams and columns.

External doors and escape doors will generally comprise metal flush doors and mild steel frames. Fire doors will comply with BS 476-22:1987 - Fire tests on building materials and structures.

The ultimate choice of finish and colour of the metal cladding coating will be made considering the specified service life, resistance to degradation under long term exposure to climatic conditions and will comply with the requirements of the statutory approval, if granted. A typical 220kV GIS Substation Building is shown in Figure 5.6.

Figure 5.6: Typical 220kV GIS Substation Building

Directional light fittings have been incorporated within the plan in order to minimise light pollution in the surrounding area. External light fittings will be mounted to the cladding of the GIS building facing downwards to minimise impacts to areas outside the substation compound. A total of 20no. external lights will be mounted to the GIS building, six lights will be positioned on each long edge of the building, and two lights on each short edge.

5.6.1.2 AIS Compound

The AIS Compound contains two individually fenced compounds, the southern compound will contain the AIS structures and equipment which related to the transfer of electricity from the solar farm and BESS. The northern compound will be left unoccupied (i.e. no AIS equipment/control building will be installed) and may be utilised in the future should any future expansion of the facility be developed, subject to all necessary development consents and assessments. The dimensions of the AIS structures are detailed in Table 5.1.

The AIS compound will contain a single control building which will contain a switchgear room that houses the 33kV switchgear and a transformer. The security and control room will house the cabinets used for SCADA, telecommunications, security and fire, CCTV and LV distribution. A storage room will also be provided within the control building. A total of four lighting poles will be provided in the AIS compound.

Table 5.1: Approximate Dimensions of AIS structures

Structure	Number of Structures	Length (m)	Width (m)	Height (m)
Transformers	1	10.8	6.9	5.72
Lightning monopoles	2	n/a	n/a	18.5
Cable Sealing Ends (with associated steelwork)	3	n/a	n/a	4.1
Voltage Transformers	3	n/a	n/a	4.1
Current transformers	3	n/a	n/a	4.1
Disconnectors	3	2.8	n/a	4.1
Post insulators	6	n/a	n/a	4.1
Control Building	1	9	7.5	4
Lightning Rods (mounted to the roof of the control building)	4	n/a	n/a	2
Palisade Fence	1	n/a	n/a	2.6

5.6.1.3 Surface Water Drainage

The proposed substation compound will include a range of hardstanding surfaces, comprising building roofs, vehicle access tracks, parking areas and compacted granular zones within the compound. These surfaces will generate stormwater runoff, which will be intercepted and managed through a gravity-fed drainage system designed to collect and convey flows efficiently across the site. The drainage will consist of a combination of filter drains used to capture and promote infiltration of surface water from permeable areas and carrier pipes that will convey collected runoff. The proposed substation drainage system is designed to discharge into the main BESS drainage network. This integrated approach ensures that surface water flows generated within the substation compound are effectively managed within the overall site-wide drainage strategy. The BESS drainage system has been sized to accommodate the additional runoff from the substation, as detailed in Section 5.5.6. This allows for consolidated flow conveyance, attenuation, and controlled discharge in accordance with sustainable drainage principles and regulatory requirements.

Additionally, measures to protect water quality will have to be a considered within the design of the substation compound drainage. In accordance with standards practice, drainage from oil filled bunds will require an oil-sensitive bund pump. As a backup measure to ensure no oil can escape it is proposed that all storm water generated on the site will gravity flow to the outfall via a full retention petrol / oil interceptor.

A perimeter drainage comprising a French drain will be constructed parallel to the western and southern site boundary to intercept and infiltrate surface water runoff to prevent surface water from descending from the adjacent areas towards the site. The proposed surface water drainage layout is shown on Drawing No. 229101268-MMD-00-XX-DR-C-0100.

5.6.2 Water and Wastewater

A new potable water connection is required for welfare facilities within the proposed GIS substation. Due to the distance from existing potable water infrastructure the proposed water supply will be taken from the bored well that is designed to supply also the firefighting water for the BESS compound. This is included in Section 5.5.4.

This borehole will be constructed with regard to the Environmental Protection Agency Drinking Water Advice Note No.14, Borehole Construction and Wellhead Protection (Version 1, 2013)37. The volumes required from the well during the operational phase will be limited, as staff visiting for operational and maintenance purposes are likely to not exceed five persons twice per month.

The only sources of wastewater on site will be the basic welfare facilities located in the GIS building. There is an absence of existing wastewater infrastructure in the locality of the substation. Therefore, an underground foul holding tank is proposed to collect wastewater. This is a standard solution that require regular scheduled emptying. Appropriate separation distance to be provided to comply with the EPA's Code of Practice for Domestic Waste Water Treatment Systems (Population Equivalent ≤ 10) (2021).

5.6.3 220kV Cable Connection

The proposed underground cable development will comprise two 220kV electricity cables and fibre optic cables to facilitate the connection of electricity generated at the solar and battery plant to the national grid.

The grid connection is proposed via two 220kV underground cables (UGC) approximately 2850m in length, the initial section will extend from the GIS building and along access tracks within the Project site until it reaches the L40232, turning westwards until it reaches the junction with the L4030 where it will continue northwards before once again travelling off-road, as it passes through agricultural land to connect to the existing Great Island-Lodgewood 220kV overhead transmission circuit. Each 220kV circuit will have a total of four joint bays and accompanying each joint bay will be a communication chamber and a link box.

The underground section of the cable will have a trefoil formation. The assessment included in this EIAR is based on a trefoil formation which has a standard width.

The final section of each 220kV cable will be above ground, as each cable will connect to a proposed Line Cable Interface Mast, which allows each circuit to connect to the existing Great Island-Lodgewood 220kV overhead transmission circuit providing a "looped-in connection".

5.7 Construction Phase Activities

5.7.1 Solar Farm

5.7.1.1 Site Preparation

Vegetation removal will be required, and any removal of hedgerow, trees or scrub will take place outside of the bird nesting season (01 March - 31 August). There is no requirement for site levelling to be undertaken for the proposed solar farm with the exception of minor re-structuring to provide a flat platform for the containerised transformer systems.

5.7.1.2 Solar PV Civil Works

Access Tracks

The construction methodology will include the following materials and steps:

- Topsoil stripping along the route of the proposed track, with the excavated soil stored on-site for later reinstatement or landscaping.
- Installation of a permeable geotextile membrane (e.g., Terram 1000 or equivalent) to allow water infiltration while preventing the upward migration of fines from the subgrade.
- In areas with weaker subsoil, a soil-reinforcing geogrid (e.g., Tensar TX160 or similar) or high-strength geotextile will be installed to enhance load-bearing capacity and reduce the required thickness of aggregate layers.
- Placement of a minimum 200 mm thick Clause 804 sub-base (a well-graded granular material composed of crushed rock, gravel, or recycled concrete), compacted in layers to provide structural support and durability.
- Application of a surface layer of crushed stone (typically 6F2 or similar), compacted in layers to form a durable, low-dust running surface suitable for regular vehicle use.
- The access tracks are designed to be semi-permeable and semi-permanent, supporting sustainable drainage and minimising surface runoff. Surface water drainage will be installed alongside the tracks to manage surface water and prevent erosion. Tracks are typically aligned along field boundaries or existing farm routes to minimise land take and ecological disturbance.

To further reduce environmental impact:

- Access to the majority of most solar panels will not require access tracks and will use tractors or 4 wheel drive vehicles as the vast majority of the site is well drained with low risk of soil rutting etc.
- Tracks are allowed to grass over post-construction to blend with the surrounding landscape and reduce visual impact.
- No concrete is used in the track construction unless required for specific load-bearing areas such as crane pads or substation access points.
- Construction is staged to minimise soil disturbance and protect biodiversity, particularly during sensitive ecological periods.

At the end of the solar farm’s operational life, the access tracks will be decommissioned, with all materials removed and the land restored to its original agricultural condition, including the reinstatement of topsoil and reseeding where appropriate.

Drainage Pipework

The construction methodology will include the following materials and steps:

- No drainage works are proposed in the vicinity of wet grassland and marsh habitats which are generally down slope of proposed works areas
- Ensure safe excavation practices, including shoring or benching as required. Where dewatering is required, water will be treated and appropriately attenuated, before being discharged to vegetation or surface water drainage feature
- Conduct geotechnical surveys to assess soil type, soil permeability, bearing capacity, groundwater levels and contamination risk through site investigation.
- Surface water carrier pipes. Excavate pipe trenches to the specified depth, ensuring a minimum cover. Ensure trench base is flat and follows the designed slope. Fill the trench with bedding material below, around and above the pipe. Pipes shall be laid at specified design grade using approved methods. Ensure proper joint assembly. Backfill trenches in layers using suitable materials.
- Install inspection chambers at appropriate intervals for maintenance access. Regular inspection and maintenance are essential to prevent clogging and ensure long-term performance.
- Assess ground conditions to determine the feasibility of implementing an infiltration system

French drains and filter drains

- Excavate the trenches to the specified depth, ensure trench base is flat and follows the designed slope.
- Use a geotextile membrane to separate the trench from surrounding soil and prevent migration of fines. For non-infiltrating designs, use an impermeable liner to contain flow and direct it to downstream SuDS components.
- Install a perforated carrier pipe at the base of the filter drain trench.
- Backfill the trench/ French drain with clean, angular stone (Clause 505 Type B coarse and light weight aggregate to Table 5/5 MCDRW Series 500). Fill to within 150 mm of the surface.
- Top with crushed stone or gravel to match levels of adjacent surfacing.

Soakaway

- Excavate to the required dimensions based on design calculations. Provide a level bedding layer of compacted granular material.
- Wrap the stone fill in a geotextile membrane to prevent soil ingress while allowing water to pass through.
- Fill the soakaway pit with clean, angular stone (Clause 505 Type B) to the specified depth. Ensure uniform distribution and compaction of the stone to prevent settlement.
- Connect the inlet pipe to the soakaway, ensuring it discharges above the stone layer.
- Install a perforated vertical observation tube for monitoring water levels.
- Maintain a minimum cover depth for the soakaways. Backfill the top layer with permeable material or topsoil, depending on surface finish requirements.

Restore the surface above the soakaway.

- Headwall and dispersion outlet installation. Evaluate existing waterbody/ditch location, direction of flow and soil conditions in advance of works. Use shoring or trench boxes if required to prevent collapse and protect the ditch. Ensure the base is level and compacted to prevent settlement. Place a layer of compacted granular material or lean concrete to form a stable base. Install any required anti-scour measures to protect the ditch banks. Position the headwall to required depth and dimensions, ensuring a level base and to provide alignment with the existing ditch to guide interrupted water flow. Backfill around the headwall with suitable material, compacted in layers. Restore the ditch profile and surrounding area.

- It is required that all grassed areas will be reinstated by either seeding or by replacing with grass turves.

To further reduce environmental impact:

- Weather conditions are to be considered when planning construction activities to minimise risk of run off from site.
- The contractor will carry out visual examinations of local watercourses during the construction phase. In the unlikely event of water quality concerns, the Environmental Manager will be consulted.
- Materials storage and storage tanks etc, shall not be located near any surface water features and will be located beyond the 50m exclusion zone.
- Appropriate containment facilities will be provided to ensure that any spills from vehicles are contained and removed off site. Use spill kits and follow pollution prevention protocols.
- Welfare facilities will be provided within the designated construction compound for duration of works. All generated effluent will be contained in a sealed holding tank, which will be emptied and disposed of off-site by a licenced contractor. Water will be supplied to the site via tanker as required. No impacts on existing site conditions are anticipated.
- Temporary works will be designed to avoid increasing flood risk from overland flow by limiting excavation lengths and providing suitable drainage provision.
- Silt control measures, including silt traps and fences, will be implemented to prevent construction site-generated sediment from entering surface drainage and nearby waterbodies.

Solar panel installation

- The metal support structure which the PV panels will be bear the PV panels will be secured in-situ with piles will be driven into the ground and no additional foundation will be required. However, this aspect should be confirmed once the geotechnical studies are completed, and the structure is selected.
- The installation of the piles is carried out using specialised machinery that will drive them into the ground. The length of embedding (depth into the ground) may vary depending on the ground characteristics.
- PV modules are often attached to mounting rails using module clamps or directly bolted. The mounting rails provide a stable base, while the clamps or the bolts secure the modules in place.
- String inverters can be mounted on piles driven into the ground or integrated into the PV panel support structures. For this project, it is proposed that they be located along the roads.

LV/MV cabling

Civil works for trenching within the solar plant will be required to accommodate all necessary cabling and ducting between the string inverters, transformer containers, and associated electrical infrastructure.

- Trenches will typically range in depth and width according to cable specification and installation standards and will be excavated to ensure sufficient separation between circuits as required by design codes and cable section calculations.
- All trenches will be lined with sand bedding, with marker tape installed above the cables prior to backfilling.
- Backfilling materials will be free of rocks, roots, vegetation or any element that could damage the cables or create cavities after compaction or during project lifetime.
- The alignment of the trenches will be coordinated with the overall site layout to minimise crossings and maintain clear access routes for installation and operational activities.

- Upon completion of cable installation, trenches will be reinstated to match the finished surface levels.

38kV poleset

- Transport 2 no. wooden poles, crossarm, insulators, and fittings to the area immediately adjacent to the intended location. The wooden poles are between 16m - 23m in length and weigh ca. 2.0 - 2.5 tonnes.
- Excavate for each pole using a tracked excavator. The topsoil layer will be excavated first and placed at a location adjacent to the construction area. The soil below will be stockpiled separately.
- Line up the 2 no. poles with the excavated holes. Attach the new crossarm to 1 no. pole. The machine operator will then drive forward pushing each pole up until the pole is in an almost vertical position. The pole will be supported at all times while the excavation is backfilled to a minimum depth by using a smaller tracked excavator.
- Insert each new wooden pole in the ground at a depth of 2.3m bgl.
- After erection of the poleset, excavate a further 0.8m bgl in between the poles. This is a small linear excavation necessary to install wooden sleepers. These sleepers add additional stability to the new poleset and are attached to the poleset using a U-bolt.
- Attach the crossarm to the second pole.
- Backfill the soil arisings (spoil) with the turf layer placed on top.

Transformer centres

The modular containerised transformer centres will be placed on suitably bunded concrete plinths. Soil will be excavated and stored on-site for later reinstatement or landscaping, following which, the bund will be poured.

5.7.2 Battery Energy Storage System

5.7.2.1 BESS Civil Works

The BESS site will be required to be levelled. The existing site slopes southwards from a high level of +43.4 OD to a low point of +34.7m OD to the southeast of the site. It is proposed that the development site is set at a gradual slope of 1:150 from +39.495m OD to +36.800m OD. The proposed site will follow the natural slope southwards to facilitate the drainage design intent to follow the natural drainage south-westwards. A cut & fill analysis estimates a cut quantity of 23,540m^3 (accounting for a bulk factor of 1.15) and a fill quantity of 17,810m^3. As much of the cut quantity as practicable will be used for fill,. The need for a level platform for the BESS is the trigger for the need for an EIAR in conjunction with the levelling required for the substation.

A minimum 300mm concrete platform will be constructed under each of the BESS and PCS containers, and this will support the BESS containers and equipment. An access track is proposed to the east and west of the BESS compound to access track which will have an asphalt finish, while the areas between containers will be hardstanding concrete.

An absorptive acoustic barrier will be installed at the BESS location to reduce noise impacts to local receptors. The barrier will be formed by a set of 4m wide panels each with its own foundation and support designed for the appropriate design loads. Foundation construction will commence after the completion of BESS site clearance and grading. The foundation installation will involve excavation, form work, steel reinforcement, and concrete placement. Foundations will be designed in accordance with the appropriate design loads and specifications. After curing of the concrete, Steel columns will be fixed to the anchor bolts via baseplates, spaced at 4100 mm centres. The steelwork erection will follow a sequence agreed with the contractor to ensure temporary stability of all members during installation. All baseplates will be grouted using a high-strength, non-shrink grout to ensure proper load transfer and long-term durability. Temporary bracing or propping may be used during this phase to maintain alignment and safety.

Once the steel frame is securely in place, acoustic panels will be fixed to the structure using specified fasteners. Care will be taken to ensure accurate alignment and effective sealing to meet acoustic performance requirements. Upon completion of panel installation, a thorough inspection of all components will be conducted to verify compliance with design specifications and quality standards.

Civil works for trenching within the BESS compound will be required to accommodate all necessary cabling and ducting between the DC containers, PCSs, and associated electrical infrastructure. Trenches will typically range in depth and width according to cable specification and installation standards and will be excavated to ensure sufficient separation between circuits as required by design codes and cable section calculations. All trenches will be lined with sand bedding, with marker tape installed above the cables prior to backfilling. Backfilling materials will be free of rocks, roots, vegetation or any element that could damage the cables or create cavities after compaction or during project lifetime. The alignment of the trenches will be coordinated with the overall site layout to minimise crossings and maintain clear access routes for installation and operational activities. Upon completion of cable installation, trenches will be reinstated to match the finished surface levels.

The BESS units will be delivered to site, pre-integrated with internal components such as battery racks, HVAC systems, fire suppression, and Battery Management Systems (BMS). Using cranes or other lifting equipment, the BESS units are carefully placed onto their designated foundations and anchored securely. Mechanical connections, such as HVAC ducting and fire system interfaces, is also done afterwards.

5.7.2.2 Drainage

The construction methodology will include the following materials and steps:

Drainage pipework

- Ensure safe excavation practices, including shoring or benching as required. Where dewatering is required, water will be treated and appropriately attenuated, before being discharged to vegetation or surface water drainage feature
- Conduct geotechnical surveys to assess soil type, soil permeability, bearing capacity, groundwater levels and contamination risk through site investigation.
- Surface water carrier pipes. Excavate pipe trenches to the specified depth, ensuring a minimum cover. Ensure trench base is flat and follows the designed slope. Fill the trench with bedding material below, around and above the pipe. Pipes shall be laid at specified design grade using approved methods. Ensure proper joint assembly. Backfill trenches in layers using suitable materials.
- Install inspection chambers at appropriate intervals for maintenance access. Regular inspection and maintenance is essential to prevent clogging and ensure long-term performance.
- Assess ground conditions to determine the feasibility of implementing an infiltration system
- French drains and filter drains. Excavate the trenches to the specified depth, ensure trench base is flat and follows the designed slope. Use a geotextile membrane to separate the trench from surrounding soil and prevent migration of fines. For non-infiltrating designs, use an impermeable liner to contain flow and direct it to downstream SuDS components. Install a perforated carrier pipe at the base of the filter drain trench. Backfill the trench/ French drain with clean, angular stone (Clause 505 Type B coarse and light weight aggregate to Table 5/5 MCDRW Series 500). Fill to within 150 mm of the surface. Top with crushed stone or gravel to match levels of adjacent surfacing.

Soakaway

- Excavate to the required dimensions based on design calculations.
- Provide a level bedding layer of compacted granular material.
- Wrap the stone fill in a geotextile membrane to prevent soil ingress while allowing water to pass through.
- Fill the soakaway pit with clean, angular stone (Clause 505 Type B) to the specified depth.
- Ensure uniform distribution and compaction of the stone to prevent settlement. Connect the inlet pipe to the soakaway, ensuring it discharges above the stone layer.
- Install a perforated vertical observation tube for monitoring water levels. Maintain a minimum cover depth for the soakaways.
- Backfill the top layer with permeable material or topsoil, depending on surface finish requirements.
- Restore the surface above the soakaway.

Attenuation basin

- Clear vegetation, debris, and obstructions from the site. Set out pond boundaries and access routes in accordance with approved drawings.
- Excavate to the required depth and shape. Dewater the excavation if groundwater is encountered.
- Grade and compact the base to design levels. Use a geotextile permeable membrane to separate the base from surrounding soil and prevent migration of fines.
- Construct headwall inlet and outlet structures and forebay berm to manage flows.
- Install flow control chamber at the outlet to regulate discharge rates.
- Fit overflow to manage exceedance flows safely.
- Plant native vegetation to enhance biodiversity and aid water quality.
- Install fencing and access paths if required.
- Inspect inlet/outlet structures and liner integrity. Confirm pond capacity and flow control performance.

Headwall installation

- Evaluate existing waterbody/ditch location and direction of flow, soil conditions, and environmental constraints in advance of works.
- Use shoring or trench boxes if required to prevent collapse and protect the ditch. Ensure the base is level and compacted to prevent settlement.
- Place a layer of compacted granular material or lean concrete to form a stable base. Install any required anti-scour measures to protect the ditch banks.
- Position the headwall to required depth and dimensions, ensuring a level base and to provide alignment with the existing ditch to guide interrupted water flow.
- Backfill around the headwall with suitable material, compacted in layers.
- Restore the ditch profile and surrounding area.
- Access ground conditions to determine measures for the underground structures including oil / fuel interceptor, fire water storage tank, foul water holding tank to withstand earth pressure, hydrostatic pressure, and uplift forces.

Underground structures including oil / fuel interceptor, fire water storage tank, foul water holding tank

- Excavate to the required depth, allowing for base slab thickness and working space. Ensure safe excavation practices, including shoring or benching as required. Dewater the excavation if groundwater is present. Install anti-floatation measures in high groundwater areas. Install formwork and reinforcement of the underground tank as per structural design. Install inlet/outlet pipework, access covers, and ventilation systems. Fit internal components such as baffles or pump chambers if specified. Perform water tightness testing to confirm integrity. Inspect structural elements, pipe connections, and access fittings. Backfill around the tank with suitable material in compacted layers. Restore surface finishes and ensure proper drainage away from the tank.

Firefighting water supply tanks

- Conduct a site survey to confirm location, access, and ground stability. Clear vegetation and debris, and level the area.
- Construct a reinforced concrete or compacted gravel base, ensuring it is level and sized to support the tank footprint.
- Install foundation, anchor bolts or base plates as per tank design. Assemble the tank according to manufacturer specifications. Install inlet, outlet, overflow, and drain connections as per design.
- Fit access ladders, inspection hatches and safety railings if required.
- Conduct hydrostatic testing to confirm structural integrity.
- Inspect all fittings and connections for proper function.

Water supply system

- Conduct hydrogeological surveys to support selection of appropriate bored well location. The well to be installed with third party contractor. Use submersible or jet pumps to be installed depending on the well depth and yield. Conduct test pumping to evaluate performance.

Watermain pipe

- Excavate pipe trenches to the specified depth, ensuring a minimum cover. Ensure trench base is flat and follows the designed slope.
- Fill the trench with bedding material below, around and above the pipe. Pipes shall be laid at specified design grade using approved methods.
- Ensure proper joint assembly. Install thrust blocks or mechanical joint restraints at bends, joints and valves. Install service connections, scour and air release valves as per design.
- Backfill trenches in layers using suitable materials.

Pump house

- Excavate for foundations, sump pits, and pipelines as per design drawings.
- Construct the foundation using reinforced concrete, ensuring proper waterproofing. Build the superstructure with associated utilities.
- Install pumps, base frames, and connect raising mains and discharge pipelines as per design specifications.
- Complete electrical works including control panels, cable laying, earthing, and safety systems.
- Conduct thorough testing and commissioning of mechanical and electrical systems.

To further reduce environmental impact:

- Weather conditions are to be considered when planning construction activities to minimise risk of run off from site.
- The contractor will carry out visual examinations of local watercourses during the construction phase. In the unlikely event of water quality concerns, the Environmental Manager will be consulted.
- Materials storage and storage tanks etc, shall not be located near any surface water features and will be located beyond the 50m exclusion zone.

- Appropriate containment facilities will be provided to ensure that any spills from vehicles are contained and removed off site. Use spill kits and follow pollution prevention protocols.
- Concrete or concrete contaminated water run-off will not be allowed to enter any watercourses, drainage channels and other surface water features.
- Welfare facilities will be provided within the designated construction compound for duration of works. All generated effluent will be contained in a sealed holding tank, which will be emptied and disposed of off-site by a licenced contractor. Water will be supplied to the site via tanker as required. No impacts on existing site conditions are anticipated.
- Temporary works will be designed to avoid increasing flood risk from overland flow by limiting excavation lengths and providing suitable drainage provision.
- Silt control measures, including silt traps and fences, will be implemented to prevent construction site-generated sediment from entering surface drainage and nearby waterbodies.

5.7.2.3 BESS electrical works

Following the placement of the BESS units on their foundations, electrical installation begins. Internally, battery strings are connected and routed to the PCS, which converts DC power from the batteries to AC for grid export. AC cabling is then installed to connect PCS units to medium-voltage transformers and onward to the MV switchgears in the substation throughout the MV circuits. Control and communication cabling is laid to integrate the BMS, PCS, and SCADA systems. Auxiliary systems such as lighting, security, and emergency shutdown circuits are wired and tested. All electrical works are carried out in accordance with local electrical codes and standards.

5.7.2.4 BESS Commissioning

Prior to shipment and installation, Factory Acceptance Tests (FAT) are conducted at manufacturer's facility, verifying that the system meets all technical specifications, safety standards, and performance requirements outlined during the design phase. FAT typically includes visual inspections, functional tests of components like battery modules, power conversion systems (PCS), and battery management systems (BMS), as well as validation of thermal management and fire safety systems. Once equipment is fully installed on site the commissioning phase begins with pre-functional checks, including visual inspections, insulation resistance testing, and validation of protection settings. Once systems are energized, functional testing is conducted on the BMS, PCS, HVAC, fire suppression, and SCADA interfaces. Site Acceptance Tests (SAT) include verifying system performance under various operating conditions such as charge/discharge cycles, grid response tests (e.g., frequency regulation, reactive power support), and fault simulations. Communication protocols are tested to ensure reliable data exchange between site equipment and remote monitoring centres. Final SAT documentation is compiled, including test reports, calibration certificates, and compliance records. Upon successful completion, the system is handed over to operations.

5.7.3 Substation Compound

General construction phase activities associated with the substation are set out below.

5.7.3.1 Civil works

- Demarcation of construction works areas, clearance, and site levelling to prepare the works area. As the substation is to be located on an area set aside within the Shelburne Energy Farm project area, the site levelling works will be completed as part of the site groundworks.

- Topsoil will be stripped using excavators. The topsoil will be stockpiled within the demarcated boundary. The grounds will be built up to a finished ground level of 37.3 to 39.4 metres above ordnance datum.
- Stone for compound surfacing will be graded into place using excavator.

The main civil works for constructing the new GIS building will include:

- Foundations works
- Structural steelwork erection
- Cladding and building finishing works
- Permanent water supply and drainage works
- Miscellaneous civil works: paving, landscaping, permanent fencing and completion of works.

5.7.3.2 Foundation Works

Foundation construction will commence after the completion of Shelburne Energy Farm site clearance and grading. The foundation installation will involve excavation, form work, steel reinforcement, and concrete placement. Foundations will be designed in accordance with the appropriate and relevant EirGrid Technical Specifications. Excavated material will either be reused on-site or disposed of off-site in accordance with applicable requirements under the Waste Management Act 1996, as amended and associated regulations.

When the foundations have been set, the copper earth mat will be installed into the soil in and around the foundation and will cover the entire substation compound. The earth mat installation and permitted operating limits will be designed in accordance with the appropriate and relevant EirGrid Technical Specifications.

5.7.3.3 Structural Steelwork Erection

Following the installation of the foundation and earth mat, construction activities will shift to the erection of structural steelwork. The GIS Building will be a steel portal two storey building over partial basement constructed in accordance with EirGrid technical specification. The ground floor level will include service rooms, loading bay, generator room, relay room, battery room and access to the cable basement area. The first-floor area of the building will be constructed to accommodate the 220kV switchgear assembly and a storeroom.

5.7.3.4 Cladding and Building Finishing Works

Cladding and building finishing works and the installation of building services, e.g. drainage, internal circulation road, will be undertaken once the structural frame and steel support structures are completed.

A fire detection and alarm system will be specified during the detail design of the substation in compliance with EirGrid requirements. A Fire Safety certificate application to Wexford County Council will be made in advance of construction in accordance with the standard approach for the construction of substations**.**

5.7.3.5 Miscellaneous Civil Works: Permanent Fencing and Completion of Works

Fencing around the entire substation compound, except for the site entrances, will comprise a 2.6m high palisade security fencing. The installation of this fencing will comprise root mounted posts (posts driven into ground). There will be negligible ground borne vibration due to relatively small diameter of these posts. This would negate the requirement for pad footings below each post.

Electrical Installation of GIS plant will be delivered to the substation compound and unloaded within the GIS building loading bay. The gantry crane located within the hoisting area will lift the GIS plant to the first storey of the building and position it appropriately within the GIS Equipment Room. The plant will then be bolted together in place. Following the installation of plant within the GIS building, wiring and cabling of GIS plant and associated protection and control cabinets will be undertaken to the specifications and standards set out by the manufacturer.

5.7.3.6 Drainage

The construction methodology will include the following materials and steps:

- Ensure safe excavation practices, including shoring or benching as required. Where dewatering is required, water will be treated and appropriately attenuated, before being discharged to vegetation or surface water drainage feature
- Conduct geotechnical surveys to assess soil type, soil permeability, bearing capacity, groundwater levels and contamination risk through site investigation.
- Surface water carrier pipes. Excavate pipe trenches to the specified depth, ensuring a minimum cover. Ensure trench base is flat and follows the designed slope. Fill the trench with bedding material below, around and above the pipe. Pipes shall be laid at specified design grade using approved methods. Ensure proper joint assembly. Backfill trenches in layers using suitable materials.
- Install inspection chambers at appropriate intervals for maintenance access. Regular inspection and maintenance is essential to prevent clogging and ensure long-term performance.
- Access ground conditions to determine the feasibility of implementing an infiltration system
- French drains. Excavate the trenches to the specified depth, ensure trench base is flat and follows the designed slope. Use a geotextile membrane to separate the trench from surrounding soil and prevent migration of fines. For non-infiltrating designs, use an impermeable liner to contain flow and direct it to downstream SuDS components. Install a perforated carrier pipe at the base of the filter drain trench. Backfill the trench/ French drain with clean, angular stone (Clause 505 Type B coarse and light weight aggregate to Table 5/5 MCDRW Series 500). Fill to within 150 mm of the surface. Top with crushed stone or gravel to match levels of adjacent surfacing.
- Access ground conditions to determine measures for the underground structures including oil / fuel interceptor, foul water holding tank to withstand earth pressure, hydrostatic pressure, and uplift forces. Excavate to the required depth, allowing for base slab thickness and working space. Ensure safe excavation practices, including shoring or benching as required. Dewater the excavation if groundwater is present. Install anti-floatation measures in high groundwater areas. Install formwork and reinforcement of the underground tank as per structural design. Install inlet/outlet pipework, access covers, and ventilation systems. Fit internal components such as baffles or pump chambers if specified. Perform water tightness testing to confirm integrity. Inspect structural elements, pipe connections, and access fittings. Backfill around the tank with suitable material in compacted layers. Restore surface finishes and ensure proper drainage away from the tank.
- Watermain pipe. Excavate pipe trenches to the specified depth, ensuring a minimum cover. Ensure trench base is flat and follows the designed slope. Fill the trench with bedding material below, around and above the pipe. Pipes shall be laid at specified design grade using approved methods. Ensure proper joint assembly. Install thrust blocks or mechanical joint restraints at bends, joints and valves. Install service connections, scour and air release valves as per design. Backfill trenches in layers using suitable materials.

To further reduce environmental impact:

- Weather conditions are to be considered when planning construction activities to minimise risk of run off from site.
- Appropriate containment facilities will be provided to ensure that any spills from vehicles are contained and removed off site. Use spill kits and follow pollution prevention protocols.
- Concrete or concrete contaminated water run-off will not be allowed to enter any watercourses, drainage channels and other surface water features.
- Welfare facilities will be provided within the designated construction compound for duration of works. All generated effluent will be contained in a sealed holding tank, which will be emptied and disposed of off-site by a licenced contractor. Water will be supplied to the site via tanker as required. No impacts on existing site conditions are anticipated.

5.7.4 220kV Cable Connection

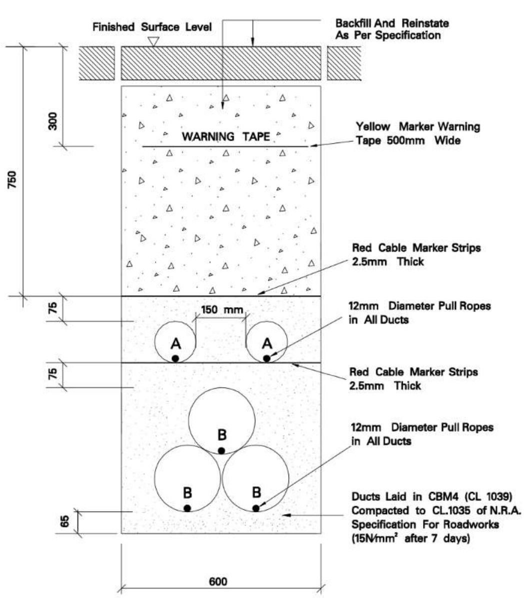
This section describes the proposed construction phase activities associated with the installation of the two proposed underground cables.

Subject to any grant of planning approval of the Grid Connection by An Coimisiún Pleanála there will be a process of pre-construction detailed design and micro-siting of the grid infrastructure. This will occur within the parameters and assessments of the approved development; any micro-siting which extends outside such parameters, for example outside the red line application area, will be subject to post-consent modification in accordance with the provisions of statutory legislation, as required. Throughout the design and assessment process, all reasonable and practically achievable measures have been taken to minimise and avoid impacts.

5.7.4.1 Trenching and Ducting

The standard trench dimensions for a single 220kV cable circuit in trefoil formation installed within an existing road is a width of 0.6m and a minimum depth of 1.45m. These cable trenches are to be installed on sections of the L40232 and L4030 on both sides of the road. Refer to Figure 5.7.

Figure 5.7: Standard Trefoil Arrangement Cross Section



Source: EirGrid PE424-D7001-019-001-000

The standard trench dimensions for a single 220kV cable circuit in trefoil formation installed on agricultural land is a width of 0.7m and a minimum depth of 1.75m, as per EirGrid technical requirement drawings (not publicly available XDC-CBL-STND-F-016). These cable trenches are to be installed on the final section between the L4030 and the LCIM's.

Following excavation of the trench and bedding material, Cement Bound Granular Material (CBGM) will be laid, the ducts put in place, protection strips laid on top and the trench will be backfilled.

The duct installation will progress sequentially starting at one joint bay and moving towards the next joint bay along the route. The construction area will move in tandem with the progress of the duct installation, with only the relevant portion of the section cordoned off while under construction.

If there are excavations required where there are existing utilities, hand digging and the use of smaller excavators may also be required.

For cross-country sections, a temporary working strip of approximately 37m in width is proposed. The working strip is required for the following reasons:

- To facilitate the storage of topsoil which must be removed from:
  - The footprint of the temporary construction access track (typically up to 5m in width).
  - The footprint of the cable trench.
  - A buffer strip between the temporary access track and the trench (for safety).
  - Subsoil storage area.
  - Materials storage areas.
- To facilitate the laying of the temporary construction access track alongside the cable trench to allow for the movement of construction equipment and materials along the section of the route on the farmland.
- To facilitate the excavation of the cable trench and the installation of the cable ducting.
- To facilitate the storage of distinct layers of subsoils excavated from the cable trench in segregated piles for later reinstatement to the original soil profile.

Approximately 30-50 m of trenching and ducting is completed in a day, dependent on conditions and location.

5.7.4.2 Cable Installation and Jointing

The cables will be brought to site on cable drums which will then be placed into position. Once the drum is set up, a winch system at the remote joint bay location(s), including pulling cable, will be attached to the nose of the cable and rollers will be used to guide the cable end towards the duct. The cables will then be pulled into the duct with lubrication being applied to the cable and duct throughout the process in order to control pulling tensions.

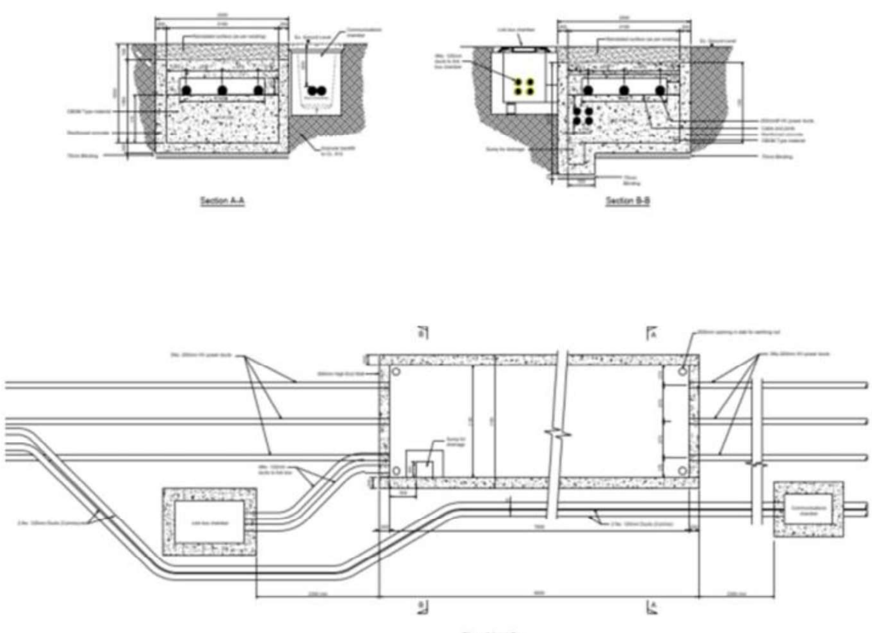
A bend radius of typically 20m or greater is used to navigate changes in direction for the cable route. The bend radius can be reduced to 6m to navigate very tight corners however as this introduces increased pulling tensions when installing the cable, it is used sparingly and only where required.

As detailed previously, joint bays will be required to be installed along the cable route to join consecutive lengths of cable and to facilitate cable pulling.

The width of the joint bays and the nature of the road network in the area means that partial road closures and diversions may be required in some areas along the route during cable installation. However, all reasonable and practically achievable measures, such as moving of equipment and placing temporary covers over the joint bays to allow essential access for vehicles, will be implemented to facilitate local access requirements for emergency services, residential and commercial purposes. Chapter 14 Roads and Traffic details proposed traffic management measures. Specific traffic management requirements and localised arrangements will be developed by the appointed contractor(s) and will be agreed in advance of implementation with the appropriate local authority.

Joint bays generally consist of precast concrete walls and base located below ground with typical approximate dimensions of 8m length x 2.5m width x 2.3m depth for 220kV joint bays. The length of the joint bays may be longer subject to the requirements of the cable manufacturer. Sand or lean mix concrete will be used as required as a blinding layer to the underside of the chamber. The ducts will be installed to each end of the chamber, then proven, cleaned and sealed. Figure 5.8 illustrates an indicative joint bay; Figure 5.9 illustrates a pre-cast joint bay and Figure 5.10 illustrates the cable pulling set up.

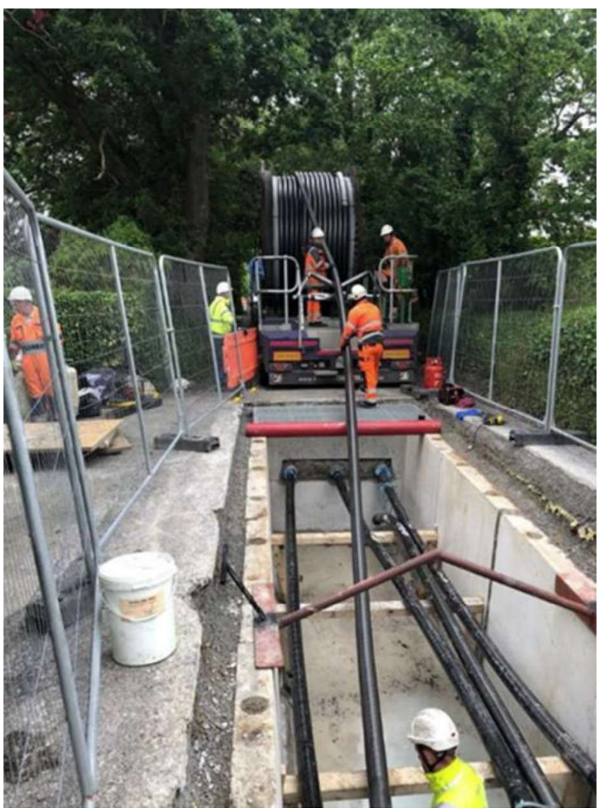
Figure 5.8: Indicative Joint Bay



Source: Mott MacDonald

Figure 5.9: Pre-cast Joint Bay prior to Cable Installation

Figure 5.10:Typical Set-Up of HV Cable Pulling Procedure



5.7.4.3 High Voltage transmission crossings

Crossing underneath overhead power lines will require mitigation during the construction phase ensuring that a suitable distance from the cabling is maintained by construction equipment and staff, and staff welfare and safety is maintained**.**

5.7.4.4 Connection to Great Island - Lodgewood 220kV circuit

The two underground cables will connect to the national transmission network via two separate LCIM connections. En example of an LCIM is shown in Figure 5.11.

Figure 5.11: Line Cable Interface Mast (LCIM)

Both underground cables will be jointed to a conductor on a newly constructed LCIM from which they will connect to the Great Island and Lodgewood substations via an existing overhead line.

From the Great Island and Lodgewood substations there will be connection to the wider existing grid network.

The installation of the underground cable is expected to take approximately 14-16 months.

5.7.4.5 Dismantling of existing 220kV tower

A single existing 220kV steel tower carrying the conductor for the Great Island **–** Lodgewood transmission circuit in the townland of Nash, will be required to be dismantled as part of the Proposed Project. The following details the construction methodology for its removal.

- Set up of temporary working area with fencing installed around the tower location.
- Removal of overhead line conductors **–** This involves releasing the line tension and winching of conductors onto drums.
- Removal of hardware and insulators **–** Using Mobile Elevating Work Platforms the fittings and hardware such as spacers, dampers and insulators will be removed from the towers.
- The towers will be dismantled and lowered in sections using a suitably sized crane and removed from site to an approved recycling facility.

- Using an excavator and a rock breaker if required, the tower will be dismantled to shear block level, the concrete base will be left in-situ.
- Material from the dismantled overhead line infrastructure will be removed from the site for recycling to a licensed recycling facility.

5.7.5 Construction Schedule

Construction of the Proposed Project is expected to take ca. 21-23 months, and is anticipated to commence in 2027, subject to grant of planning permission. An indicative schedule for each element is set out in Table 5.2.

Table 5.2: Project Construction Schedule

Construction Activity	Approximate Duration (weeks or months as appropriate)
GIS Substation Compound	
Site Preparation	3-4 months
Civil Works	5 months
Electrical works	4-5 months
Energisation	2 months
Total	14-16 months
220kV Cable Connection	
Pre-construction	2 months
Civil Works	5-6 months
Electrical works	5-6 months
Commissioning	1 month
Joint Bay re-instatement	1 month
Total	14-16 months
Solar PV farm	
Civil works	6 months
Mechanical works	6 months
Electrical works	6 months
Commissioning	3 months
Total	12-18 months
BESS	
Site Clearance and enabling works	2-3 months
Civil works	3-4 months
Electrical Installation	3 months
BESS container installation	2 months
Commissioning and testing	2 months
Total	12-14 months
Overall Construction Phase Timeframe	21-23 months

Table 5.3: Construction Timeline

Construction Programme	Year 1				Year 2			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Substation compound								
220kV Cable connection								
Solar farm								
BESS								

5.7.6 Construction Personnel

The total number of construction staff on-site will vary during the construction phase of the works but are expected to reach a peak of 150 persons. In any event the average daily number is expected to be less than 100. It has been assumed that construction personnel will travel to site using private passenger vehicles (in some cases accommodating more than one occupant).

5.7.7 Hours of Work

Construction activities will be undertaken during 07:00 – 19:00 Monday to Friday and 08:00 – 14:00 on Saturday, subject to agreement with Wexford County Council and An Coimisiún Pleanála respectively.

No construction works will take place outside these hours, unless such work:

- is required under exceptional circumstances; or
- is carried out with the prior written approval of the planning authority.

5.7.8 Construction Access

All construction traffic will arrive via the regional roads R735 and R754 and the local tertiary roads to the north (L4030 and L4023), east (L4030 and L4023) and south (L-8141-1 and L-8141-2).

The main construction access for the Proposed Project to the main temporary construction compound is via site access number 3 providing access to Array Area A via the L40232. Construction site access will not be undertaken to the east of site access no.3 to ensure that construction traffic does not utilise the L-80591-1. In order to access field 9 located in the north eastern corner of the Project site a temporary construction access will be provided in parcel 8 to provide direct access to site.

The local tertiary road network will then be used to access Array Area B and C.

5.7.9 Construction Traffic

It is conservatively assumed that the average vehicle occupancy for construction personnel travelling to/from the study area (i.e. to/from a home location) will be 1.25 persons. A vehicle occupancy rate of 1.25 is assumed and in the robust-case scenario this would equate to a peak daily number of 120 vehicles (240 two-way movements per day) for the construction phase. It is anticipated that the peak daily number of HGVs required to facilitate construction activity will be 26 vehicles (52 two-way movements, as a worst-case scenario).

It is understood that there will be a requirement for the movement of abnormal loads (for the proposed GIS/AIS substation equipment) during the construction phase of Proposed Project. The assessment of abnormal loads is presented in Chapter 14 Roads, Traffic and Transportation.

5.7.10 Temporary Construction Compounds/Laydown Areas

A temporary construction compound is proposed in each Array Area – A, B and C. The main temporary construction compound and laydown area will be located in Array Area A, and will include the construction staff parking area. This temporary construction compound will be utilised during all stages of the construction programme for the Proposed Project.

The location of the temporary compound/laydown areas is indicated on the site layout drawings contained in Appendix 5.2, Volume 3 of this EIAR.

The appointed contractor(s) will be responsible for organising site compounds in consultation with the Environmental Manager or Environmental Clerk of Works (EnCoW).

In areas where the potential temporary construction compounds are not currently hardstanding, the ground will be stripped and levelled and replaced with hardstanding. The ground will be reinstated to its original condition following the proposed works.

The Contractor's Environmental Manager will be responsible for the management of the site compounds in accordance with the CEMP. The contractor's compounds will be used for storage of construction materials, as well as construction equipment and machinery.

The contractor will ensure that the proposed compound is secured, either with existing hedgerows/treelines, or new palisade fencing.

5.7.11 Construction Environmental Management Plan (CEMP)

A CEMP has been prepared and submitted as part of this planning application, contained in Appendix 5.1, Volume 3 of this EIAR. The CEMP will be implemented during the construction phase in consultation with Wexford County Council. The CEMP will remain a 'live' document which will be reviewed regularly and revised as necessary in consultation and agreement with the local authority to ensure that the measures implemented are effective.

The CEMP will be a key contract document, which will ensure that all mitigation measures, which are considered necessary to protect the environment are implemented. The primary objective of the CEMP is to safeguard the environment, site personnel and nearby sensitive receptors from site activity which may cause harm or nuisance. As such, the CEMP sets out a project framework to ensure that key mitigation measures and conditions set out as part of the planning consent process are translated into measurable actions and are appropriately implemented during the construction phase of the Proposed Project. As part of this framework, transparent and effective monitoring of the receiving environment during construction will be used to inform and manage on-going activities on site and to demonstrate effectiveness of the measures outlined therein.

5.7.11.1 Resource and Waste Management Plan (RWMP)

Prior to commencement of the development, the appointed Contractor will implement the construction phase Resource and Waste Management Plan (RWMP) (included as Appendix A to the CEMP) which will ensure that optimum levels of waste prevention, reduction, reuse, recycling, and recovery are achieved throughout the duration of the Proposed Project. As with the CEMP, the RWMP will remain a 'live' document and will be reviewed regularly and revised as necessary in consultation and agreement with Wexford County Council to ensure that the measures implemented are effective.

The plan has been prepared in accordance with waste management guidance and principles as outlined in *Best practice guidelines for the preparation of resource & waste management plans for construction & demolition projects* (EPA, 2021) and *Design Out Waste: A design team guide to waste reduction in construction and demolition projects* (EPA, 2015). All operations at the site will be managed and programmed in such a manner as to prevent/minimise waste production and maximise upper tier waste management (i.e. reuse, recycle, and recovery) in line with the Waste Hierarchy where technically and economically feasible.

The requirement to develop, maintain and operate the construction phase RWMP will form part of the contract documents for the Proposed Project and will be updated by the appointed Contractor in advance of the commencement of construction activities on site. Waste sent off site for recovery or disposal will only be conveyed by an authorised waste contractor and transported from the Proposed Project site to an authorised site of recovery/disposal in a manner which will not adversely affect the environment. All employees will be required to comply with the obligations under this RWMP.

5.7.11.2 Traffic Management Plan (TMP)

The appointed Contractor will implement and develop the Traffic Management Plan (TMP) during construction phase, in ongoing consultation with Wexford County Council. A TMP is included as Appendix B to the Construction Environmental Management Plan (CEMP) submitted as part of the planning application. The TMP will remain a 'live' document and will be reviewed regularly and revised as necessary in consultation and agreement with Wexford County Council to ensure that the measures implemented are effective.

The implementation of the TMP will mitigate potential construction traffic impacts on the public road network. All construction activities, including construction traffic, will be managed through the CEMP.

5.7.12 Environmental Supervision and Monitoring

An Environmental Manager will be employed by the Contractor to oversee implementation of mitigation. The Environmental Manager will be a suitably qualified, competent and experienced professional to perform the necessary tasks, review environmental procedures and consult with the members of the construction team and stakeholders as required. This will include monitoring and auditing the works and contractor programmes and works method statements, to ensure mitigation is correctly implemented. For further detail on the role and responsibilities of the Environmental Manager, refer to the CEMP (submitted as part of this planning application).

An Ecological Clerk of Works (ECoW) will be employed by the Contractor to oversee implementation of mitigation measures. This will include monitoring and auditing the works and contractor programmes and works method statements, to ensure mitigation is correctly implemented.

The ECoW will be a full member of a relevant environmental institute, such as the Chartered Institute of Ecology and Environmental Management (CIEEM) and have demonstrable experience in ecological supervision.

The Contractor's ECoW will also ensure any disturbance licenses, if required are arranged based on relevant details outlined in the EIAR. The Contractor's ECoW will advise on mitigation measures implementation including the scheduling of works and will be included in regular liaison meetings between project teams to ensure that plans are co-ordinated, and effects are minimised. For further detail on the role and responsibilities of the ECoW, refer to the CEMP.

All monitoring reports will be provided to the Employer's Representative team, and to the local authorities or other parties where required by condition.

An independent ECoW will be employed on behalf of the Employer's Representative team, who will review and comment on the pre-construction survey reports, mitigation proposals, monitoring and compliance reports generated by the Contractor's ECoW.

An Environmental Clerk of Works (EnCoW) will be employed by the Contractor to oversee implementation of mitigation. This will include monitoring and auditing the works and contractor programmes and works method statements, to ensure mitigation is correctly implemented.

The Contractor's Environmental Clerk of Works (EnCoW) will have suitable environmental qualifications and the necessary experience and knowledge appropriate to the role. The EnCoW will be delegated sufficient powers under the construction contract so that she / he will be permitted to instruct the Contractor to stop works and apply emergency response mitigation should an environmental incident occur.

The EnCoW will also manage consultation with environmental bodies including the NPWS and IFI. The EnCoW will be responsible for carrying out regular monitoring of the Contractors CEMP and will report monitoring findings in writing to ESB on a regular basis (at least weekly, but immediately in the case of incidents or accidents).

An independent EnCoW will be retained on behalf of the Employers Representative team, who will review and comment on the pre-construction survey reports, mitigation proposals, monitoring and compliance reports generated by the Contractor's EnCoW. The independent EnCoW will have the necessary experience and knowledge appropriate to the role and will be a member of a relevant professional body, such as the Institute of Sustainability and Environmental Professionals (ISEP) (formerly known as IEMA).

In addition to the above, the CEMP includes an Emergency Incident Response Plan. In the unlikely event of an incident, the Emergency Incident Response Plan will ensure that any incident is dealt will effectively, and that the response is timely and appropriate. This plan will be further developed by the appointed Contractor, in line with the mitigation measures detailed in the CEMP, to describe the procedures, lines of authority and processes that will be followed to ensure that all incident response efforts are prompt, efficient and appropriate to the particular incident. Inland Fisheries Ireland and the EPA will be notified in the event of an incident or accident.

5.8 Operation and Maintenance

5.8.1 Solar Farm

During operations, the proposed solar farm will be monitored and operated remotely by a management team and will be visited regularly by security and/or maintenance personnel.

Maintenance activities associated with the solar farm will comprise the following:

- Supplementary grass cutting (only in identified areas where sheep grazing has not ensured that vegetation growth has been maintained)
- Preventative inspections and maintenance inspections (i.e identification of damage, where identified further visits will be undertaken, cleaning of panels as when required)
- Electricity meter readings
- Maintenance of drains, attenuation pond and security fencing

- Maintenance of access tracks, including grading, weed control, and surface repairs to maintain safe vehicle access
- Maintenance of hedgerows (where there is an obstruction of solar panels)

There is no waste generation or wastewater (foul) generation during the operational phase, as such there is no waste/wastewater collection required for the solar farm.

This will typically result on average of two visits every six months.

5.8.2 Battery Energy Storage System

During operations, maintenance of BESS follows a similar approach, but oriented to the particularities of BESS equipment, comprising mainly the following activities;

- Preventative inspections and maintenance checks (e.g. visual inspection of battery containers, PCS units, HVAC systems, and fire suppression equipment; follow-up visits for cleaning filters or replacing worn components as needed). Particularly, regular checks for corrosion, structural damage, door seals, and ventilation grilles to ensure weatherproofing and thermal performance.
- Energy meter readings and system performance logging (including verification of state-of-charge, round-trip efficiency, capacity and degradation, and inverter output)
- Clearing of vegetation or debris near air intakes, exhausts, and cooling units (to maintain thermal performance and prevent overheating risks)
- Grounding and earthing system verification: Periodic testing of grounding connections for all containers to maintain electrical safety and reduce fault risks.
- Maintenance of drains, attenuation pond and security fencing
- Maintenance of access tracks, including grading, weed control, and surface repairs to maintain safe vehicle access

5.8.3 Grid Connection

The GIS substation compound is expected to be operated remotely by EirGrid and maintained by ESB. Welfare facilities will be provided in the GIS substation for ESB personnel attending the site. Monthly attendance by a team of ESB technicians is anticipated. The GIS substation will require the maintenance of the foul holding tank.

The AIS substation compound will also be operated remotely and will require infrequent visits, which will be conducted on average once every six months.

There is no required maintenance activities related to the 220kV cable connection.

5.9 Decommissioning

Subject to the granting of statutory approval, the Shelburne Energy Farm and grid connections will form part of the national electrical grid infrastructure. The design life of the PV Solar Farm and BESS is 30 years and 20 years respectively, where the planning permission for the operational life span of the Proposed Project overall is 40 years. The Shelburne Energy Farm is to be decommissioned in line with the Decommissioning and Land Restoration Plan, contained in Appendix 3.1, Volume 3 of this EIAR.

It is expected that the 220kV Grid Connection will remain a permanent part of the national electricity transmission network and will be refurbished and / or redeveloped as required rather than be decommissioned.

5.9.1 Solar Farm

The decommissioning of the solar array areas involves ceasing all electrical output. All electrical works will be disconnected before the removal of any site equipment.

The site decommissioning and restoration plan, in Appendix 3.1, will be executed in line with the environmental conditions of the Planning Permission.

Given the nature of the solar farm development and the small amount of infrastructure required, it is considered highly unlikely that any adverse effects would occur as a result of decommissioning works.

Following the decommissioning of the site the agricultural land will be restored to its original state. Should the access tracks be removed, the affected areas will be regraded, covered with topsoil, and seeded with an appropriate grass mixture.

5.9.2 Battery Energy Storage System

The decommissioning of the BESS site involves the safe cessation of all electrical output and the isolation of both AC and DC systems. All electrical works, including disconnection of grid interfaces, battery modules, and power conversion systems, will be completed prior to the removal of any equipment. A comprehensive lockout-tagout (LOTO) procedure will be followed to ensure safety during dismantling.

The site decommissioning and restoration plan in Appendix 3.1, Volume 3 of this EIAR will be carried out in accordance with the environmental conditions set out in the Planning Permission and relevant regulations in place at the time. Given the modular and containerised nature of BESS infrastructure, and the controlled handling of hazardous components such as lithium-ion batteries and fire suppression systems, no environmental impacts are expected to result from decommissioning activities.

Following the removal of all containers, cabling, and ancillary infrastructure, the site will be restored to its original condition. Where access tracks are removed, the affected areas will be regraded, covered with topsoil, and seeded with an appropriate grass mixture.

All battery modules will be transported to licensed recycling or treatment facilities, with documentation retained to demonstrate compliance with end-of-life obligations.

5.9.3 Grid Connection

The design life of the GIS substation is approximately 40 years. It is expected that the substation site will remain a permanent part of the national electricity transmission network and will be refurbished and / or redeveloped as required rather than be decommissioned.

The AIS substation is expected to have a design life of 40 years. Where decommissioning takes place, all above-ground components associated with the substation will be disassembled and removed from the site and effects are likely to be similar or of a lesser magnitude than the construction effects.

5.10 Health and Safety Considerations

5.10.1 Project Supervisor for Design Phase

A Project Supervisor for the Design Phase (PSDP) will be appointed. The PSDP ensures co-ordination of the work of designers throughout the Proposed Project. This is to ensure effectiveness in addressing and co-ordinating safety and health matters from the very early stages of the Proposed Project.

5.10.2 Project Supervisor for the Construction Stage

A Project Supervisor for the Construction Stage (PSCS) will be appointed. The PSCS will be responsible for developing the construction stage Safety and Health Plan, co-ordinating the work of Contractors and providing PSDP with information required in the Safety File.

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