2025

Drumdowney Substation & Grid Connection - Construction Methodology

DRUMDOWNEY SOLAR FARM LIMITED

DECEMBER 2025

Local Authority: Kilkenny County Council

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Revision	Date	Author	Checked	Notes
01	12/12/2025	RH	ND/MMC	Issue for Planning

1 Introduction

1.1 Overview

The purpose of this document is to set out the construction techniques and methodologies which will be implemented during the construction of the electrical substation and grid connection proposed as part of the Drumdowney Solar Farm in County Kilkenny.

The substation will be a 110kV GIS electricity substation with 33kV customer compound. The substation will consist of the EirGrid and Independent Power Producers (IPP) control room buildings, a transformer, security fencing, security lighting, drainage infrastructure, temporary construction compound and high voltage electrical equipment. The substation will include a 'loop-in / loop-out' underground 110kV cable grid connection which will connect into the existing 110kV Great Island - Waterford overhead transmission line via 2 no. new Interface Towers.

This document is intended as an aid to understand the construction methods and timelines of the project and should be read in conjunction with all other specialist reports pertaining to the project. This document will be updated prior to the commencement of any construction activities by the electrical infrastructure construction contractor. The final Construction Method Statement will be agreed with the Planning Authority in advance of commencement of construction.

1.2 Planning Context

The proposed substation, interface towers and grid connection is subject to a Strategic Infrastructure Development (SID) application to An Coimisiún Pleanála in accordance with section 182A of the Planning and Development Act 2000.

Drumdowney Solar Farm is subject to a planning application to Kilkenny County Council (Register Reference: 2560391). The proposed solar farm will consist of ground mounted panels on frames, inverter/transformer stations and all ancillary development works including underground 33kV interconnector cabling. The planning application had yet to be determined at the time of this SID application to An Coimisiún Pleanála.

1.3 Structure of Report

The structure of the remainder of this report is as follows:

- Section 2: provides a description of the proposed electrical infrastructure works;
- Section 3: provides information on the preliminary site investigations to be undertaken;
- Section 4: provides details of the substation construction methodology;

- Section 5: provides details of the grid connection construction methodology;
- Section 6: provides details on the Emergency Response Plan;
- Section 7: provides information on relevant best practice design and construction mitigation; and
- Section 8: provides a summary of the report.

2 Description of Proposed Electrical Infrastructure

2.1 Substation

As described previously, the substation is subject to a SID application to An Coimisiún Pleanála. The substation is based on EirGrid design specifications. The substation compound consists of a two storey GIS substation building, IPP Control Room building, High Voltage (HV) electrical equipment and associated infrastructure including palisade fences and concrete post and rail fences. The installation of HV electrical equipment will include a transformer with associated equipment along with:

- Lightning Masts (LM);
- Back-Up Diesel Generator;
- Fire/Blast Wall;
- 110kV underground cable which will connect into the existing 110kV Great Island to Waterford overhead line via 2 no. new Interface Towers.

The substation compound has a total area of 5,335m^2. Earthworks will be undertaken so the compound is level and the buildings will have a finished floor level of 91.65m. Figure 1 shows the layout of the substation and all associated works.

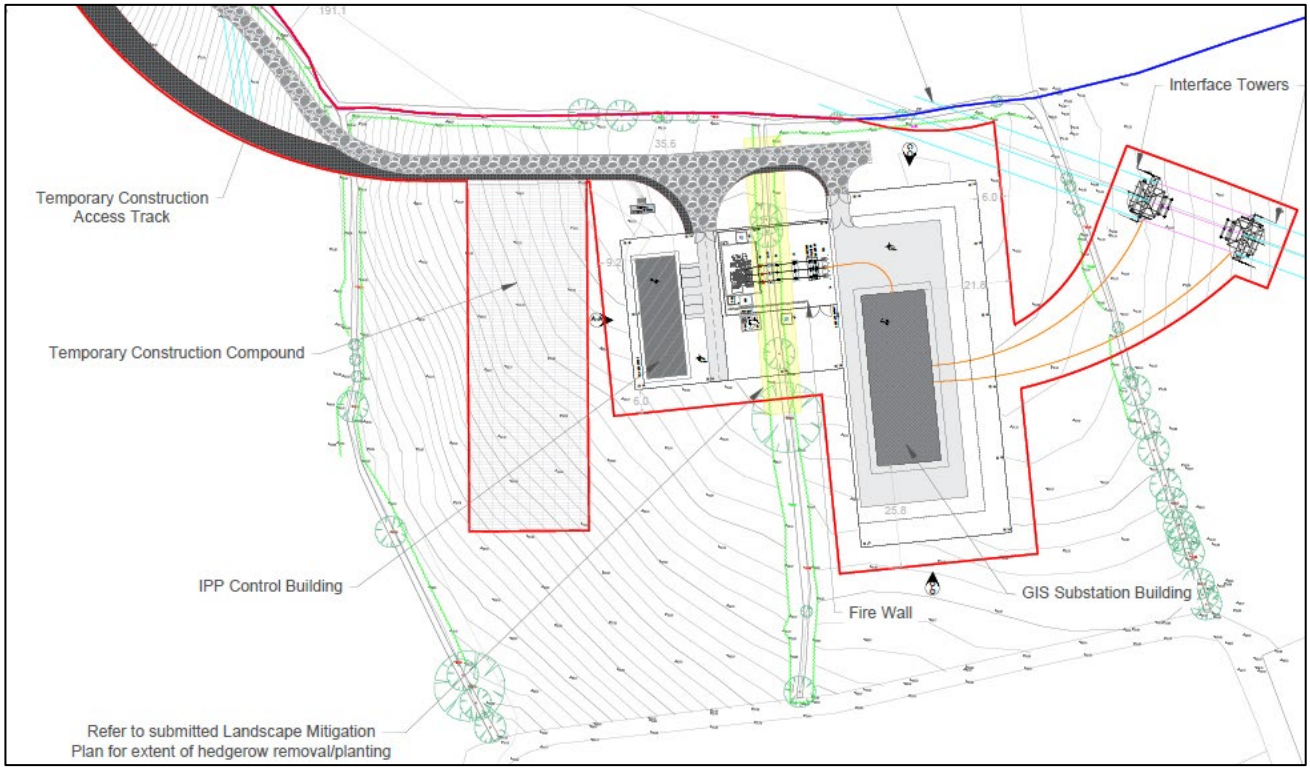

Figure 1: Proposed 110kV GIS Substation

2.2 Grid Connection

The substation will connect into the national grid via a 'loop-in / loop-out' underground 110kV cables grid connection which will connect into the existing 110kV Great Island to Waterford overhead line. Two new interface towers are required to achieve this. The interface towers are approximately 15 metres apart, therefore the similar length of the existing 110kV Great Island to Waterford overhead line will need to be decommissioned. The proposed substation will connect into each interface tower via an underground 110kV cable. This cable is comprised of 3 no. power ducts, 2 no. telecom ducts and 1 no. earth continuity duct. The cables to each interface tower are 68 and 83 metres in length.

2.3 33kV UGC Interconnectors

A description is provided below on the 33kV underground interconnector cables which are required to transport the electricity generated at each land parcel which comprise the Drumdowney Solar Farm to the proposed substation. These cables form part of the planning application for the proposed Drumdowney Solar Farm which is currently pending determination from An Coimisiún Pleanála and is provided for information purposes only.

The Interconnectors link electricity from each of the inverter/transformer stations to the substation. The locations of the inverter/transformer stations are detailed on the planning application site layout drawings submitted to Kilkenny County Council. The inverter/transformer stations convert the direct current (DC) electricity which is generated by the solar panels to alternating current (AC) which is used in the electrical grid, and outputs at a voltage of 33kV which is appropriate for carrying the produced electricity across the site. The Interconnectors will also connect into Ring Main Units (RMU) which are located next to selected inverter/transformer stations. An RMU is a type of medium voltage (MV) switchgear which will allow for greater circuit control. The 33kV UGC Interconnectors will be located within the solar farm access tracks, within private land lands and within the public road network.

An image of the Drumdowney Solar Farm and the 33kV Interconnector routes can be seen below.

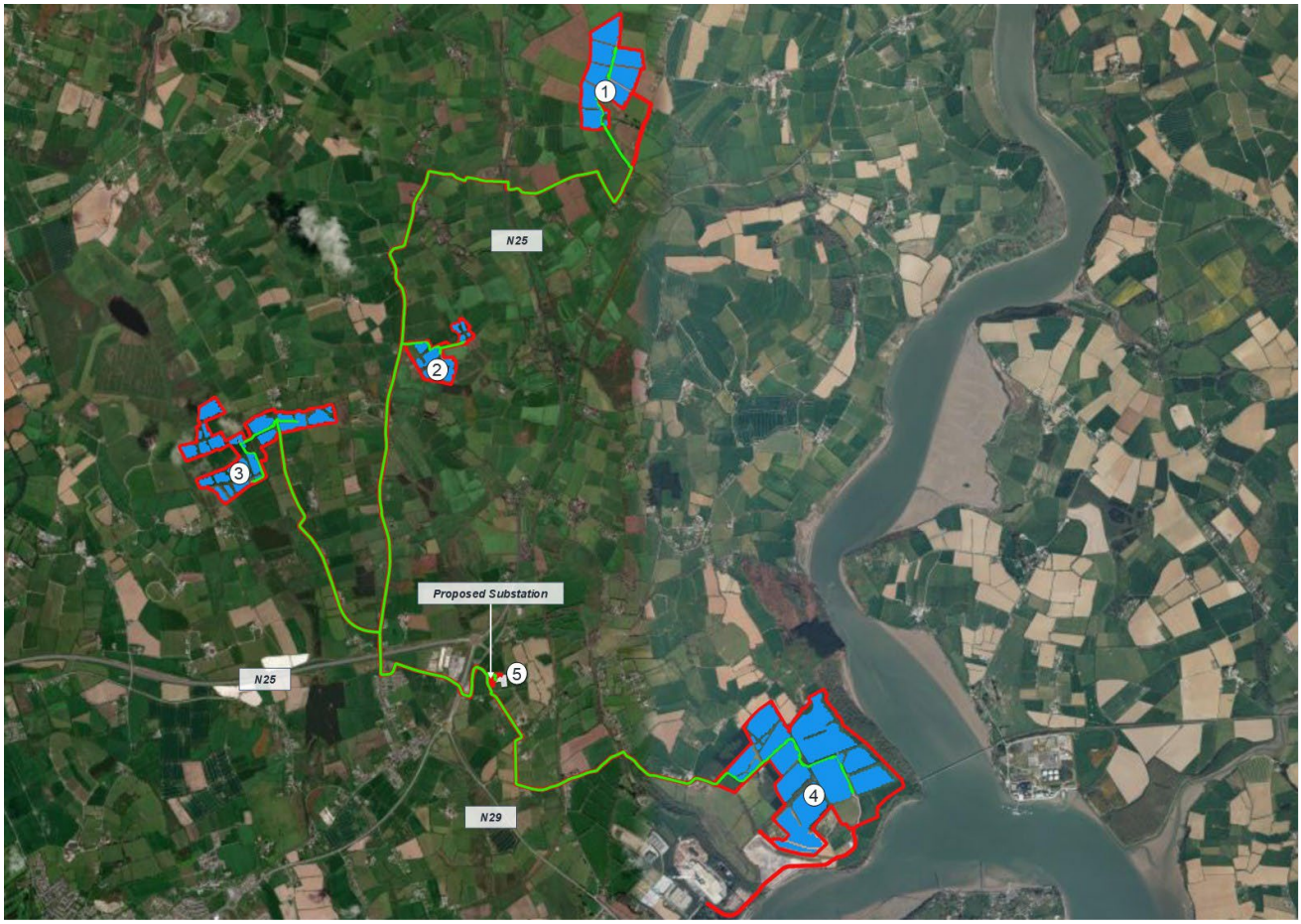

Figure 2: Drumdowney Solar Farm Layout and Interconnectors (in green)

3 Site Investigations

3.1 Substation & Grid Connection

Site Investigations will be required for the detailed design of foundations and compound build-ups prior to construction and to inform project costs prior to detailed design.

The site investigation works will be scoped and specified by a geotechnical engineer during detailed design but will generally include the following:

- Boreholes: will be carried out at the location of GIS and IPP Buildings to determine the depth of bedrock.
- Trial holes: will be carried out in order to obtain information on the ground conditions and measure the thermal resistivity of the soil.
- Dynamic probes: will be carried out to determine soil strength/density characteristics.
- Dynamic Cone Penetrometers and Pavement Cores: will be carried out for pavement design.

It is anticipated that these site investigation works will take approximately 2-3 weeks to complete.

4 Substation Construction Methodology

4.1 Substation Compound

The proposed substation compound area is approximately 5,335m^2 including the surrounding fence. The substation area will be secured by a 2.6m high palisade fence. The construction sequence will be as follows;

- Any mitigation measures or conditions of the planning permission will be implemented.
- An Assigned Certifier will be appointed in accordance with Building Control Regulations.
- The AF2 Commencement Notice will be submitted upon completion of a comprehensive Preliminary Safety and Health Plan (PSHP) by the PSDP. This Health and Safety Plan will be built up from the Preliminary Plan;
- A temporary construction compound with appropriate mobile sanitary facilities will be set up to facilitate the construction process. The location of this temporary construction compound is shown in on the site location drawings submitted with this planning application. Sanitary facilities will be pumped to a holding tank which will be monitored and disposed off-site by a suitably licensed waste contractor;
- The extents of substation compound and drainage will be marked out by a qualified engineer.
- Earthworks will be undertaken in order to create a level compound level across the entire substation footprint. The cut material is unlikely to be suitable for reuse as fill under EirGrid standards and therefore it will be transported off site to a suitably licensed facility.
- A drainage system will be excavated and installed around the compound area.
- Topsoil and subsoil will be removed from the footprint of the compound using an excavator.
- A layer of geotextile material will be laid over the footprint of the compound.
- Using an excavator, a base layer of Clause 804 material will be laid followed by a 6F2 capping layer which will provide the finished surface.
- Each layer will be compacted using a vibrating roller.
- Earthing cable will be laid underground around the substation for connection to the various electrical components during the electrical fit out phase.
- The construction of the substation compound comprising of two-storey GIS substation building, IPP Control building and all associated outdoor electrical equipment, including 1 no. transformer, associated internal access track, 2.6m high station perimeter fencing and concrete post and rail property boundary fence will be built.
- The construction of the IPP control building will begin by setting out the foundations. The building foundations will consist of reinforced concrete rafts or footings. Pre-formed works will be constructed to the specifications of the detailed design. The concrete will be mixed off site

and transported in on cement trucks where the foundations will be poured in-situ in the preformed works.

- Adequate lighting will be installed around the compound on the lighting columns.
- Lightning protection masts will be installed to protect the station from direct lightning strike.
- An underground cable chamber will be installed outside the IPP compound entrance to act as the common interface point for the 33kV interconnector cables coming from the solar farm inverter/transformer stations going into the substation. The solar farm contractor will be typically responsible for routing all the interconnector cables into this chamber and then the separate substation contractor will manage the short connection of the 33kV cables from this chamber into the switchgear housed in the IPP control building.

Following the completion of construction works, the electrical infrastructure can be installed. The following electrical installation works will take place.

- Delivery and installation of transformer. The delivery of the transformer will be managed in accordance with regulations governing the movement of abnormal loads. In advance of undertaking abnormal load deliveries necessary permitting, approvals and infrastructure accommodation works will be agreed with An Garda Síochána and implemented accordingly. Delivery vehicles will only follow agreed routes and where possible will be delivered overnight to minimise potential for delay and obstruction to general traffic.
- Delivery and installation of all other HV equipment.
- Wiring and cabling of HV/LV equipment, protection and control cabinets.
- Commissioning of all newly installed equipment.

The following equipment is required for the construction of the substation compound:

- Tracked Excavators;
- 360˚ tracked excavators (13 ton normally, 22 ton for rock breaker);
- Tracked dumpers / tractors and trailers;
- Vibrating rollers;
- Power Tools;
- Scaffolding;
- Crane;
- Hoist; and
- Generator.

4.2 Access Track

Construction access to the substation will be provided by private lands, with an entrance from the public road L34142. A traffic management plan will be implemented for the delivery of the transformer. This access track will be permanent and will also be used for operational access.

4.3 Drainage

4.3.1 Surface Water

Surface water drainage proposals for the proposed substation compound have been designed to mimic the natural drainage patterns of the site and thereby be in accordance with the Best Management Practices (BMPs) of Sustainable Drainage Systems (SuDS).

This is achieved when the following parameters are considered:

- The compound construction is formed with permeable stone thus mimicking a soakaway scenario. ESB compound stone is single sized for the first 150mm for safety purposes. It then changes to a graded 6F2 material.
- The main areas to be drained includes the roofs and the compound road. These equate to approximately 2,359m². The compound road will be drained via series of road gullies.
- Assuming even the most basic of infiltration rates down through the permeable compound stone, the existing greenfield situation is easily maintained.

The surface water generated in the hardstanding areas and in the bunded areas within the substation compound will discharge to soakaway via Class 1 Full Retention Oil Separators. The electrical transformer in the substation is oil filled equipment and, as such, is protected with impermeable bunds. Surface water generated in this bund will be pumped out by an oil sensitive pump ensuring that only non-contaminated water enters the site drainage network.

4.3.2 Foul Water

There are no existing foul sewer water drains on or near the proposed substation site.

The foul drainage proposal must cater for the wastewater generated in the welfare facilities of the proposed substation. These welfare facilities include a toilet and wash hand basin in the IPP control building. The station will be unmanned in normal operation so demand for facilities which generate foul flows will be low.

Onsite treatment and disposal of foul waste was considered by using a suitable septic tank and intermittent filter system and polishing unit or packaged wastewater treatment system and polishing unit. This option would be subject to the results of the site characteristic testing as part of detailed pre-

construction site investigations. However, the low volumes of foul waste that will be generated and consequently the low biological loading may impact on the successful continual operation of a treatment system reliant on bacterial action. For this reason, the alternative of a foul holding tank to be emptied periodically is proposed. Foul holding tanks are normally used in EirGrid and ESB substations.

The foul holding tanks will have a capacity of $5m^3$ which is a multiple of the foul water generated over three months of normal operation of the station. The foul holding tank will also be inspected by a suitably qualified and indemnified person at these intervals and records of inspections will be held on site for inspection by the local authority. A freeboard of 300mm will be provided for and the foul holding tank will be fitted with a high-level alarm. This alarm will be connected to a manned control station via the substation's Supervisory Control and Data Acquisition (SCADA) telecom relay system. This will allow for non-scheduled maintenance and emptying of the tank between the regular three monthly intervals in the unlikely event that this is required. The foul holding tank will also be vented to the atmosphere to avoid the buildup of noxious and dangerous gases.

The proposed station will be unmanned and as such will generate small quantities of foul waste. There will be visits to the station for scheduled and unscheduled inspections, maintenance and repairs as necessary. It is anticipated that this will result in a contribution of 60 litres of foul waste per week. In the unlikely event that such a high visitation rate would be extrapolated throughout the year, this would result in 6,323 litres per annum. While such a consistently high visitation is improbable, there is the possibility of increased numbers of staff being present on site for short durations during the commissioning of electrical elements of the station from time to time. It is envisaged that these extraordinary occurrences would balance out with the ordinary operation of the unmanned station to produce foul flows no greater than the 6,323 litres per annum as a "worst-case" scenario.

It is common for much lower usage of the facilities on unmanned stations and therefore a much lower foul loading. A common problem on such unmanned stations is odours in the toilet areas due to the drying out of the water trap in the WC through evaporation resulting from the lack of use. For this reason, it is proposed to use self-flushing toilets in the station, which would flush automatically twice a week. The station will include two 6 litre flush WCs so a minimum weekly foul flow of 24 litres can be expected. The self-flushing WCs will therefore contribute 1,248 litres per annum.

Combining the automatic flush and maximum user demand figures would result in a maximum annual generation of 7,571 litres ($7.5m^3$) of foul sewer water waste. The $5m^3$ tank proposed will be emptied approximately every three months. As outlined, the capacity provided is well in excess of what is required.

4.4 Water Supply

It is proposed to provide the required potable water demand of the station with a bored well on site. The potable water demand within the site will be low as the proposed station is to be unmanned. To avoid issues like stagnation in the water supply line and problems resulting from this, there will be a continual water demand of 24 litres per week from automatically flushing WCs within the station.

The water demand within the proposed development will be low and will be similar to the figures for foul sewer water generation as set out above in this report.

5 Grid Connection Construction Methodology

5.1 110kV Underground Grid Connection Cables

A 'loop-in / loop-out' underground 110kV cable grid connection will be constructed which will connect the substation into the existing 110kV Great Island - Waterford overhead line via 2 no. new Interface Towers.

The 110kV cable grid connection will consist of two underground cables which will run from each of the Interface Towers into the EirGrid Compound of the substation. The cables will be approximately 68m and 83m in length and will be situated in private lands within the confines of the substation site. A typical trench for a 110kV cable is 825mm wide and 1315mm, consisting of 3 no. 160mm HDPE ducts in trefoil formation. See Figure 3 below for details of the single circuit 110kV underground cable trench.

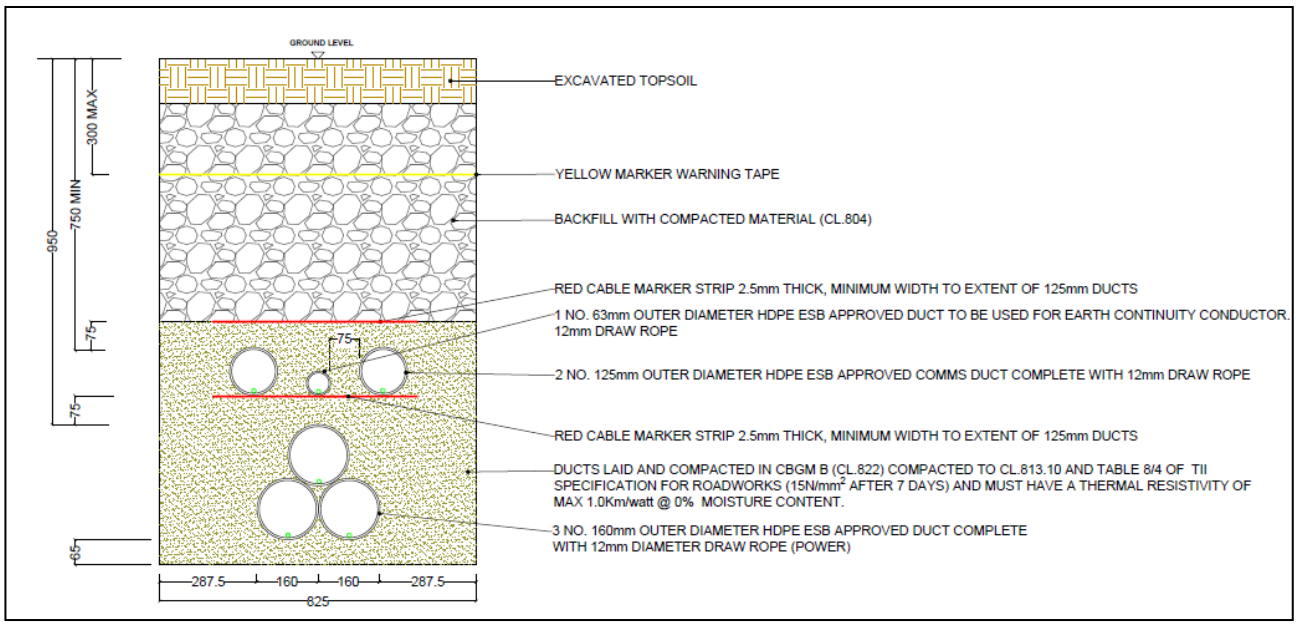

Figure 3: Typical 110kV Underground Cable

The bullet points below outline the construction methodologies to be used during trenching works for the underground cable grid connection.

- Prior to construction the Contractor and the appointed Site Manager will prepare a detailed Method Statement for each section of the cabling based on the detailed design of same. The Method Statements will take into account any mitigation measures where required, or any planning conditions set out by An Coimisiún Pleanála;
- None of the works proposed will require a road opening licence from Kilkenny County Council. No cabling works associated with the 110kV underground cable are proposed in public roads;
- A detailed traffic management plan will be prepared by the appointed contractor and agreed with Kilkenny County Council at construction stage, outlining how traffic will be managed during the course of the construction works where construction traffic will use the public road network to access the development site;
- All existing underground services shall be identified on site prior to the commencement of construction works. Exact locations will be determined via slit trenches as referenced in Section 3;
- Excavated material will be temporarily stockpiled onsite for re-use during reinstatement. Stockpiles will be restricted to less than 2m in height. Stockpiles will be in suitably safe locations and all stockpiling locations will be subject to approval by the Site Manager;
- Excavated material shall be employed to backfill the trench where appropriate and any surplus material will be transported off site and disposed of at a fully authorised soil recovery site;
- Any earthen (sod) banks to be excavated will be carefully opened with the surface sods being stored separately and maintained for use during reinstatement;
- Where required, grass will be reinstated by either seeding or by replacing with grass turves.
- The trench will be excavated in 100m sections;
- The trench will be laid with a bedding layer for the ducts. This layer will be compacted in accordance with the design specifications.
- The ducts will be lowered into the trench and laid in a trefoil formation. Spacers will be used where appropriate to ensure the ducts are centred within the trench section.
- The ducts will then be carefully covered with the bedding layer and compacted to the required standards, as per the detailed design. The layer with be levelled to the appropriate height. Care will be taken to not damage or displace the ducts.
- A backfill will be placed on top the of the bedding layer and compacted as per the detailed design specifications.

- At the required level a yellow warning tape will be laid in accordance with the ESB Code 2955092.
- The ducts will then be cleaned and tested by pulling through a brush and mandrel. Following this a 12mm draw rope will be installed in each duct. The ducts will then be sealed using end seals, each fitted with rope attachment eyes to allow for cable installation.
- All the above works should be witnessed by ESBN Clerk of Works as required.
- Cable lubricant will be applied to jacket (outer sheath) of the cables. This reduces friction between the cable and the rollers and also prevents the cable from snagging.
- The specialised winch will monitor the tension on the cables being pulled, ensuring the cables do not exceed their tensile limit.
- Works will only be conducted in normal working hours of Monday to Friday 08:00 to 18:00 and Saturday 08:00 to 13:00, with no works on Sundays or Bank Holidays except in exceptional circumstances or in the event of an emergency;

The following equipment is required for trench construction, noting that this is required on private lands only and not on the public road network:

- 2-3 General Operatives;
- 1 Excavator Operator;
- 1 no. tracked excavator (only rubber tracked machines will be allowed on public roads); and
- 1 no. dumper or tractor and trailer.
- The following materials are required for trench construction:
- 110mm diameter HDPE ducting;
- Sand for pipe bedding;
- Ready-mix Concrete where necessary; and
- Trench backfilling material to relevant specifications.

5.2 Interface Towers

The Interface towers will be 16 meters in height and approximately 5.75 metres in width. The construction of the Interface Towers will be as follows;

- Site levelling and clearance works;
- The foundation of the interface tower will be set out;
- The ground will be excavated to the foundation footprint;
- If required, any water will be drained from the excavated area;

- Concrete will be poured in the excavated area to create the foundation for the interface tower. If concrete cannot be poured directly into the excavation, the concrete will either be pumped or transported via dumpers;
- The foundations will be backfilled with the excavated material and compacted;
- The existing OHL will be de-energised by Systems Operator so the body of the towers can be constructed;
- The conductor will be moved off centre using stay wire that is anchored to the ground;
- The body of the tower will be erected via crane using guide ropes;
- The sections of the tower body will be bolted and fixed into position;
- The conductor will be centred over the newly built towers and attached onto each tower. The section of conductor in between the two towers will be removed along with the existing 110kV portal wood pole set which is located between the two proposed interface towers
- Down dropper conductors (For Electrical Connections, Insulators, Surge arrestors) and shackles will be installed;
- All associated accessories required for transition from line to cable will be installed on the interface towers;
- The circuit will be tested and the line will be re-energised.

A typical design for the proposed interface tower is shown in Figure 4.

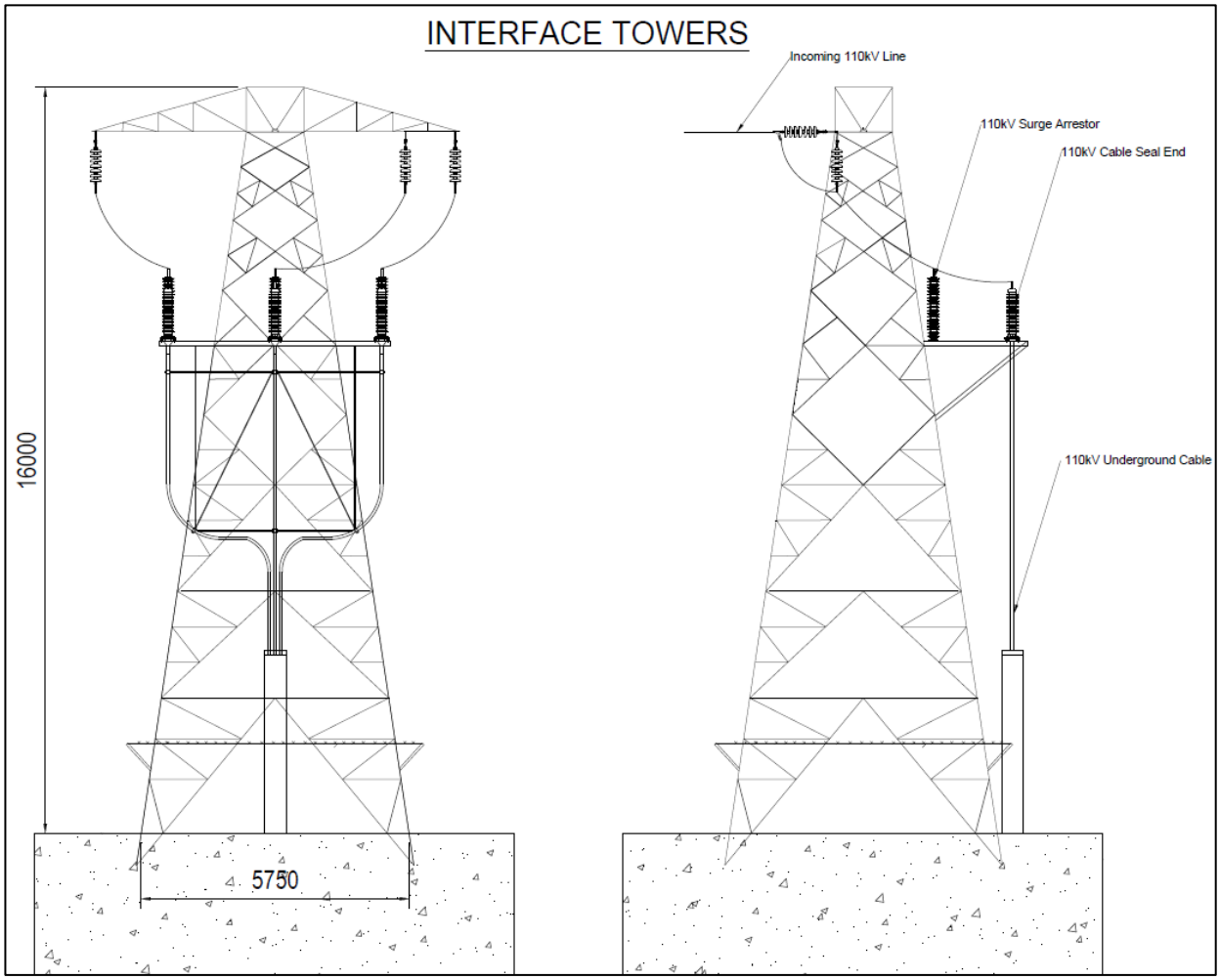

Figure 4: Typical Interface Tower

The expected duration of the above works is approximately 4 weeks. The erection of the Interface Towers is expected to take 5 days per tower. De-energisation of the existing OHL will be coordinated with the System Operator pending detailed design.

6 Emergency Response Plan

All site personnel will be inducted in the provisions of the Emergency Response Plan. The following outlines some of the information, on the types of emergencies, which must be communicated to site staff (list not exhaustive)

- Release of hazardous substance – Fuel or oil spill;
- Concrete spill or release of concrete;
- Flood event – extreme rainfall event;
- Environmental buffers and exclusion zones breach;
- Housekeeping of materials and waste storage areas breach; and
- Stop Works order due to environmental issue or concern.

The Emergency Response Plan will be completed by the appointed Contractor before the project begins.

7 Best Practice Design and Construction Mitigation

Prior to commencement of construction works the contractor will draw up a final Method Statement including a Construction Environmental Management Plan which will be based on established best practice measures. These documents will be adhered to by the contractors and will be overseen by the project representative/foreman.

The following documents will contribute to the preparation of the Method Statement and CEMP:

- Inland Fisheries Ireland (2016) *Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters*. Inland Fisheries Ireland*, Dublin,*
- *National Roads Authority (2008) Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes*. National Roads Authority, Dublin.
- E. Murnane, A. Heap and A. Swain. (2006) *Control of water pollution from linear construction projects.* Technical guidance (C648). CIRIA.
- E. Murnane et al., (2006) *Control of water pollution from linear construction projects*. Site guide (C649). CIRIA.
- Murphy, D. (2004) Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites. Eastern Regional Fisheries Board, Dublin.
- H. Masters-Williams et al (2001) *Control of water pollution from construction sites. Guidance for consultants and contractors* (C532).
- Enterprise Ireland (unknown). *Best Practice Guide (BPGCS005) Oil storage guidelines.*
- Law, C. and D'Aleo, S. (2016) *Environmental good practice on site pocketbook*. (C762) 4th edition. CIRIA.
- CIRIA *Environmental Good Practice on Site (fourth edition) (C741) 2015*.

The final Construction Method Statement and CEMP will comply with any planning condition specified by An Coimisiún Pleanála. The environmental measures to be included in the final CEMP will include the measures as set out in the following sections:

7.1 General

The environmental control measures for the solar farm include the following:

- Materials, plant and equipment shall be stored in the proposed site compounds.

- All hazardous liquid materials shall be stored in a bunded area and spill containment measures will be in place.
- Re-fuelling of machinery, plant or equipment will be carried out in the site compounds.
- Fuel pipes on plant, outlets at fuel tanks etc. will be regularly checked and maintained to ensure that no drips or leaks to ground occur. The following precautions will also be installed on fuel delivery pipes:
- Any flexible pipe, tap or valve must be fitted with a lock where it leaves the container and be locked when not in use.
- Flexible delivery pipes must be fitted with manually operated pumps or a valve at the delivery end that closes automatically when not in use.
- Warning notices including “No smoking” and “Close valves when not in use” shall also be displayed.
- Any pouring of concrete will only be carried out in dry weather. Washout of concrete trucks shall be strictly confined to designated and controlled impermeable wash-out areas remote from watercourses, drainage channels and other surface water features.
- Spill kits will be available within each plant/vehicle on site and located close to identified pollution sources or sensitive receptors (fuel storage areas, etc.).
- Interceptor drip trays will be positioned under any stationary mobile plant to prevent oil contamination of the ground surface or water. Plant and site vehicles are to be well maintained and any vehicles leaking fluids must be repaired or removed from site immediately. Any servicing operations shall take place over drip trays.
- Areas used to store fuel and oil on the site will be appropriately lined and bunded to prevent the downward percolation of contaminants to natural soils and groundwater.
- Fuel for construction vehicles will be stored on an impervious base within a bund able to contain at least 110% of the volume stored. Rainwater will not be allowed to accumulate within the bund and in any way compromise the required 110% volume capacity. No tanks or containers may be perforated or dismantled on site. A competent operator shall empty all contents and residues for safe disposal elsewhere.
- Suitable wheel wash facilities, complete with C/W silt traps will be put in place to ensure vehicles entering/existing the site do not carry/transport debris.
- If very wet ground must be accessed during the construction process bog mats will be used to enable access to these areas by machinery.
- Daily environmental toolbox talks / briefing sessions will be conducted for all persons working to outline the relevant environmental control measures and to identify any environment risk areas/works.

7.2 Water Quality

- A buffer of 5-10 m from the closest drain or watercourse will be established and clearly marked out prior to the commencement of construction activities where possible. The buffer will be maintained with the exception of localised areas where fencing, access, crossing or cable trenching is required.
- Silt fencing will be installed within the works area for the proposed interconnector cables. The silt fence will provide protection from sediment and potential site water runoff.
- The silt fencing will be checked twice daily during construction and once per day thereafter to ensure that it is working satisfactorily until such time as the re-instated ground/material has been fully established.
- If dewatering is required as part of the proposed works e.g., in trenches for underground cabling or in wet areas, water must be treated prior to discharge. The Contractor shall employ best practice settling systems to ensure maximum removal of suspended solids prior to discharge of any surface water or groundwater from excavations to receiving waterbodies. This may include treatment via settlement tanks. There will be no direct pumping of water from the works to any watercourses or drains at any time.
- An emergency-operating plan will be established to deal with incidents or accidents during construction that may give rise to pollution within any nearby watercourses or drains. This will include means of containment in the event of accidental spillage of hydrocarbons or other pollutants (spill kits etc.).
- The contractor will ensure that good housekeeping is always maintained and that all site personnel are made aware of the importance of the nearby estuary/aquatic environments and the requirement to avoid pollution of all types.

7.3 Soils

- Excavated material will be temporarily stockpiled onsite for re-use during reinstatement. Stockpiles will be restricted to less than 2m in height.
- No stockpiles associated with the excavation works associated with the proposed grid connection will be located within 10m of drains.
- Imported materials and any site won materials will be tested prior to use to determine its geotechnical and geo-environmental properties to assess their suitability for use
- Any earthen (sod) banks to be excavated will be carefully opened with the surface sods being stored separately and maintained for use during reinstatement.

7.4 Ecology

- No removal of habitats or movement of construction machinery will occur outside of the development works area/footprint during the construction phase, where the works area/footprint will be clearly marked for associated site staff.
- The following best practice measures form part of the construction methodology and will help to contain and/or prevent the introduction of invasive species on the site as follows:
- When deemed necessary, all plant and equipment employed on the proposed works (e.g., diggers, tracked machines, footwear etc.) will be thoroughly cleaned down using a power washer unit, and washed into a dedicated and contained area prior to arrival on site and on leaving site to prevent the spread of invasive aquatic / riparian species. A sign off sheet will be maintained by the contractor to confirm cleaning.
- Material gathered in the dedicated and contained clean down area will need to be appropriately treated as contaminated material on site.
- For any material entering the site, the supplier must provide an assurance that it is free of invasive species.
- Ensure all site users are aware of invasive species management plan and treatment methodologies. This can be achieved through “toolbox talks” before works begin on the site.
- Adequate site hygiene signage should be erected in relation to the management of non-native invasive material.
- All excavations/trenches should be covered at night, or a suitable means of escape provided for nocturnal mammals.

7.5 Noise

All plant will be required to conform to the British Standards (BS) 5228 Code of practice for noise and vibration control on construction and open site. BS5228 provides a comprehensive guidance on construction noise including details of typical noise levels associated with various items of plant or activities, prediction methods and measures and procedures and is an accepted standard for construction practise in Ireland given the absence of statutory Irish guidelines.

7.6 Air Quality

The main activities that may give rise to dust emissions during construction include the following:

- Excavation and removal of earthworks.
- Materials handling and storage.
- Movement of vehicles (particularly HGV's) and mobile plant.
- Suspended solids in surface water runoff.

7.7 Waste Management

All waste arising during the construction phase will be managed and disposed of in a way that ensures the provisions of the Waste Management Act 1996 and associated amendments, and regulations of the Waste Management Plan are followed.

8 Summary

The construction of the proposed substation and grid connection to serve the proposed Drumdowney Solar farm can be summarised as follows:

- Construction of the substation will consist primarily of an electrical compound to house a transformer, high voltage equipment and separate EirGrid and IPP control buildings.
- All substation construction activities will take place within the extents of the proposed site boundary.
- Earthworks will be required to create a level compound area for the substation, with export of cut material and import of fill material required by truck from/to the site.
- The duration of the construction works will be confirmed and agreed with the Local Authority prior to construction. The construction programme for the entire Drumdowney Solar Farm (including the substation and grid connection) is estimated to be a total of 24 months. Further detail on this programme is provided in Appendix A.
- Prior to commencement of development, a detailed Construction Environment Management Plan (CEMP) shall be submitted to, and agreed in writing with, the planning authorities, following consultation with relevant statutory agencies.
- All planning conditions will be complied with in full and contractor(s) will be supervised and managed closely to ensure full compliance.

Appendix A

Solar Farm and Electrical Infrastructure Programme and Construction Vehicles

	Estimated Construction Programme & Vehicle Numbers																							
		Construction Programme (Months)																						
	Week	1	2	3	4	5	6	7	0	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Substation Construction	Enabling Works	250	250	250																					
	Civil Works				20	20	20	20	20	20	20														
	Electrical Works											20	20	15	10	5									
Grid Connection Construction	Civil and Electrical Works													137	138	138	138								
Substation Electrical Commissioning	Pre-commissioning																								
	ESB Commissioning																								
Solar Farm Construction	Solar Farm Site Set Up & Installation							323	440	235	287	99	99	99	202	112	112	301	301	298	22	22	4	96	71
Solar Farm Electrical Commissioning	Electrical Commissioning																					100	100	80	
	Close Out																							80	80
	Estimated Vehicles Per Month	250	250	250	20	20	20	342.9	459.6	255.4	307.4	119.2	119.2	251.2	349.6	255.5	250.5	300.6	300.6	298	22.05	122.1	104.2	256.1	151
	Estimated Vehicles Per Week	62.5	62.5	62.5	5	5	5	85.72	114.9	63.84	76.84	29.81	29.81	62.81	87.4	63.86	62.61	75.15	75.15	74.49	5.513	30.51	26.05	64.02	37.7
	Estimated Vehicles Per Day (5.5 days)	11	11	11	1	1	1	16	21	12	14	5	5	11	16	12	11	14	14	14	1	6	5	12	7
	Peak Daily Vehicles	21																							
	Peak Hourly Vehicles	2.625																							
	Average Daily Vehicles	10																							
	Average Hourly Vehicles	1																							