ECOLOGICAL IMPACT ASSESSMENT OF A PROPOSED SUBSTATION AND GRID CONNECTION

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Prepared for:

HW Planning Ltd.

On behalf of Ballyloo Solar Farm Limited.

Prepared by:

Ecology Ireland Wildlife Consultants Ltd.

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Executive Summary

Ecology Ireland Wildlife Consultants Ltd. were commissioned by HW Planning Ltd., on behalf of Ballyloo Solar Farm Limited to undertake an appraisal of the potential ecological impacts of a proposed HV substation and connection to the electricity transmission grid.

The proposed substation will be either an Air Insulated Switchgear (AIS) or Gas Insulated Switchgear (GIS) tail fed substation on lands adjacent to the Ballyloo Solar Farm with the associated grid connection comprising underground cabling which will connect into the existing 220/110kV Kellis substation.

The underground cable grid connection is located primarily in the public road network. However, after c. 8.3km there are two options proposed for its final entry into the existing 220/110kV Kellis substation. Option A is to leave the L30535 local road and enter onto private lands where it will cross agricultural farmland into the existing 220/110kV Kellis substation. The length of this section of the underground grid connection cable within the application boundary is c. 0.6km. Option B is to be situated within the L30535 local road which provides road access into the existing 220/110kV Kellis substation. The length of this section of the underground grid connection cable within the application boundary is c. 0.35km. It should be noted that the options described above apply to both the 110kV and 220kV underground grid connection cables.

The operational lifetime of the solar farms is assumed to be 40 years. However, following the decommissioning of the solar farm, it is envisaged that the substation (and underground cable grid connection) will remain in situ as a valuable functioning and operational part of the electricity transmission network managed by the Transmission Systems Operator, EirGrid.

The development of a HV substation and grid connection options to Kellis substation were previously assessed as part of the ecological impact assessment and Natura Impact Statement that accompanied the planning application for the permitted Ballyloo Solar Farm (Ecology Ireland 2024).

The proposed substation site is located in agricultural land (Arable crops (BC1)) of relatively low ecological value. The substation will connect to the Kellis 220/110kV substation by an undergrounded 110kV or 220kV underground cable. The grid options cross one named EPA watercourse, the Kilmeany stream, a tributary of the Burren River itself a tributary of the River Barrow. The watercourse will be crossed by means of Horizontal Directional Drilling (HDD). The underground cable route is largely contained with the public road which is of negligible ecological value.

1 Introduction

Ecology Ireland Wildlife Consultants Ltd. were commissioned by HW Planning Ltd., on behalf of Ballyloo Solar Farm Limited to undertake an appraisal of the potential ecological impacts of proposed HV substation and grid connection options to the electricity transmission network.

The proposed substation will be either an Air Insulated Switchgear (AIS) or Gas Insulated Switchgear (GIS) tail fed substation at Ballyloo Solar Farm, Co. Carlow with the associated grid connection comprising underground cabling which will connect into the existing 220/110kV Kellis substation. Further information on the design options proposed for both the substation and grid connection is provided in Section 1.1.1 and Section 2.1.1.

The main objectives of this study were to:

- undertake a desktop review of available ecological data of the study area (*i.e.* substation site, grid connection and surrounding area), including a review of designated nature conservation sites within the wider hinterland of the development site and the completion of a Natura Impact Statement in support of the Appropriate Assessment (AA) process (attached at Appendix 1 of this Assessment);
- complete a baseline ecological field assessment of the study area in order to describe existing flora and fauna;
- evaluate the ecological significance of the study area;
- assess potential impacts on existing ecology that could arise from the proposed development;
- consider mitigation measures to reduce potential negative effect(s) on the existing ecology arising from the proposed development where relevant.

Ecology Ireland previously carried out the ecological assessments for a number of other permitted solar farm developments in the surrounding area including Ballyloo Solar Farm (24/60043; PL01.322347), Garreenleen Solar Farm (22/163) and Clonmacshane Solar Farm (20/143; ABP 307891-20).

1.1 Brief Description of the Site & Project

1.1.1 Application Context

The purpose of the proposed development is to transport the electricity generated at the Ballyloo, Park and Ballybannon Solar Farms to the national electricity grid via the existing 220/110kV Kellis substation. The planning status of those solar farms is set out below:

- An application for the Ballyloo Solar Farm was made to Carlow County Council on the 28th February 2024 (Council Reference: 24/60043). The Council issued a Notification of Decision to Refuse Permission on the 25th March 2025 and a First Party Appeal was submitted by to An Coimisiún Pleanála on the 22nd April 2024. Permission was granted by An Coimisiún Pleanála on the 5th September.

- An application for the Park Solar Farm was made to Carlow County Council on the 19th July 2024 (Council Reference: 24/60205). The Council issued a Notification of Decision to Grant Permission on the 24th April 2025.

- An application for the Ballybannon Solar Farm was made to Carlow County Council on the 22nd May 2025 (Council Reference: 25/60137). Planning permission was granted by Carlow County Council on 31st October 2025.

Early in the project development phase, it was identified that the proposed substation and grid connection may constitute 'strategic infrastructure development' having regard to the provisions of the Planning and Development (Strategic Infrastructure) Act 2006 and established case precedent on such matters. The Act provides that applications for permission/approval for specified private and public strategic infrastructure developments be made directly to An Coimisiún Pleanála. The applicant entered into pre-application consultations with An Coimisiún Pleanála on the 10th February 2025, with a meeting held on 31st March 2025. An Coimisiún confirmed their opinion that the proposed development meets the definition of 'strategic infrastructure development' as defined in the legislation by means of a formal notice dated 14th July 2025. The subject application is made pursuant to this determination.

In addition to the above pre-application consultation, the applicant also requested a meeting under section 182F of the Planning and Development Act 2000, as amended, to determine An Coimisiún Pleanála's opinion as to flexibility with regard to the proposed development. The applicant proposed design flexibility for the following development:

1. The substation will be either 110kV or 220kV voltage. The 110kV substation will use Air Insulated Switchgear (AIS) switchgear, whilst the 220kV substation might use AIS or Gas Insulated Switchgear (GIS) depending on the requirements of EirGrid.
2. The underground cable grid connection from the proposed substation to the existing 110/220kV Kellis substation will be at either 110kV or 220kV voltage.
3. The underground cable grid connection is located primarily in the public road network. However, there are two options proposed for its final entry into the existing 220/110kV Kellis substation.
    - Option A is to leave the L30535 local road and enter onto private lands where it will cross agricultural farmland into the existing 220/110kV Kellis substation.
    - Option B is to be situated within the L30535 local road which provides road access into the existing 220/110kV Kellis substation.
    - *It should be noted that the options described above apply to both the 110kV and 220kV underground grid connection cables.*

An Coimisiún confirmed that the above referred design flexibility can be facilitated by means of a formal notice dated 14th July 2025. The location of the application site and the local watercourses is shown in Figure 1-1. It should be noted that the red line development application boundary is identical for the substation options and the grid connection options. For clarity, it should be noted that this EcIA considers all options as described above.

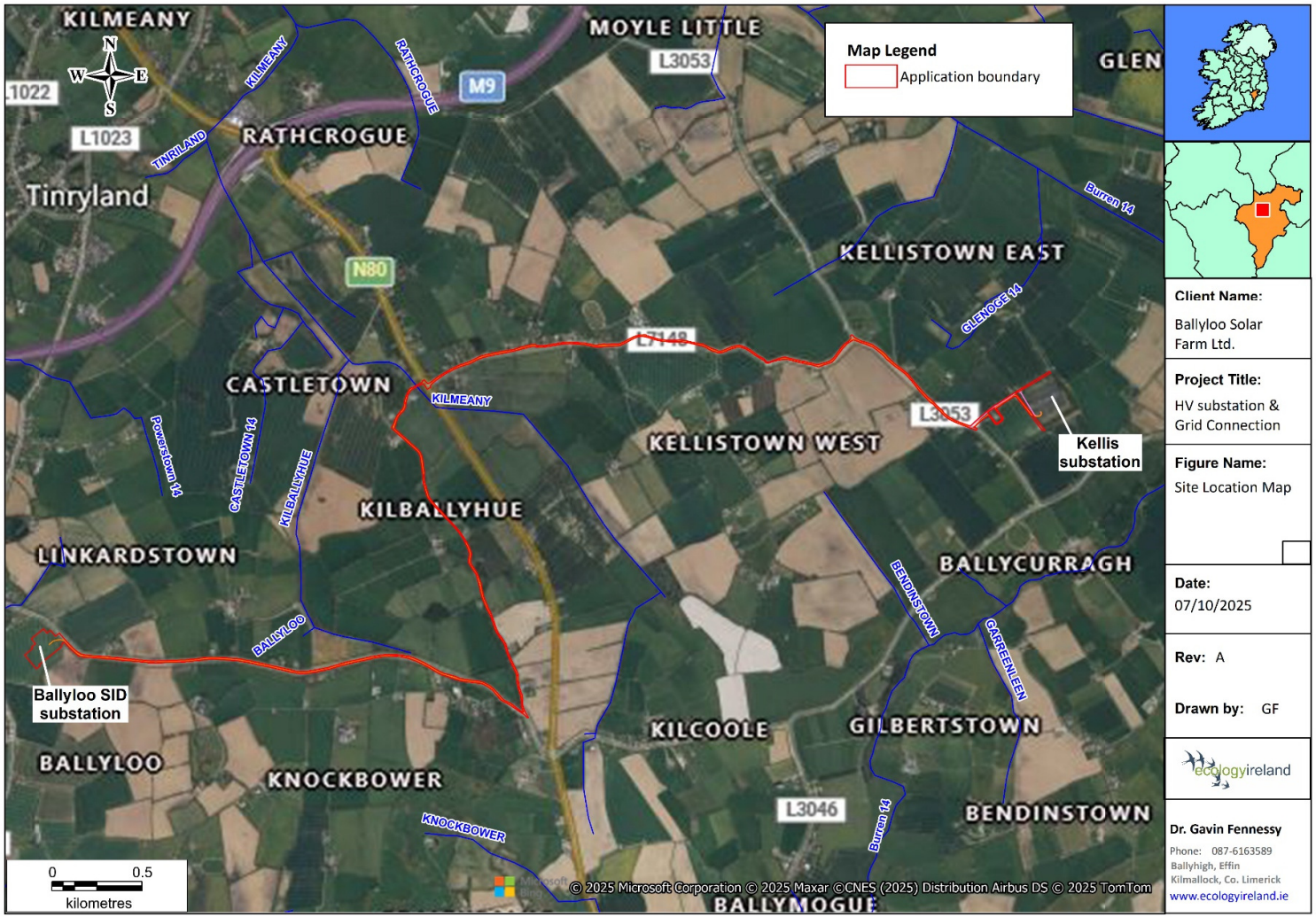

Figure 1-1 Proposed HV substation and grid connection route to Kellis substation.

2 Proposed Development

2.1.1 General

It is proposed that electricity produced from the Ballyloo, Park and Ballybannon Solar Farms will be transported into the proposed substation. The proposed substation will be either an Air Insulated Switchgear (AIS) or Gas Insulated Switchgear (GIS) tail fed substation with the associated grid connection comprising underground cabling which will connect into the existing 220/110kV Kellis substation.

The applicant proposes design flexibility for the following development, as follows:

The proposed development comprises of:

1. A 220kV Air Insulated Switchgear (AIS) or Gas Insulated Switchgear (GIS) electricity substation or a 110kV AIS electricity substation, including two control buildings, associated electrical structures and apparatus, lightning protection, telecom pole, perimeter security fencing, security lighting, water and drainage infrastructure, temporary construction compound to connect to and serve solar farms;
2. Associated grid connection between the proposed substation and the existing 110/220kV Kellis substation comprising 220kV or 110kV underground electricity cables (reflecting final substation option) of c. 8.9 km or c. 8.65 km in length to be provided in an excavated trench including associated fibre cable and ducting, and all associated site development and reinstatement works. Two options are proposed after the first c.8.3 km of underground grid connection and for the final c.0.35 – 0.6 km of the underground cable grid connection route comprising (i) cabling in the L30535 public road, or (ii) cabling in private agricultural land;
3. Temporary construction and permanent operational access to the substation from the L3050, vehicular entrance and access track from this public road;
4. All ancillary site development, excavation, construction, landscaping and reinstatement works;
5. The development subject to this application forms part of grid connection and access arrangements which will facilitate the connection of the permitted Ballyloo Solar Farm (Carlow County Council Reference 24/60043 / An Coimisiún Pleanála Reference ABP-322347-25), permitted Park Solar Farm (Carlow County Council Reference 24/60205), and proposed Ballybannon Solar Farm (Carlow County Council Reference 25/60137) to the national electricity grid via the existing 110/220kV Kellis substation. A Natura Impact Statement (NIS) has been prepared in respect of the proposed development. The NIS includes consideration of the permitted Ballyloo, Park and proposed Ballybannon Solar Farms which are located in County Carlow.

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 the substation 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 for all substation options.

Site investigations for the underground grid connection will be determined following detailed design, however it is anticipated that a single closure Stop/Go system can be implemented for the slit trenches on all the roads in each of the three options. It is anticipated that these preliminary site works associated with the grid connection cable will take approximately 2-3 weeks to complete. Where temporary road closures are necessary, a suitable diversion will be implemented using appropriate signage, following consultation and agreement with Carlow County Council.

The operational lifetime of the solar farms is assumed to be 40 years. However, following the decommissioning of the solar farm, it is envisaged that the substation (and underground cable grid connection) will remain in situ as a valuable functioning and operational part of the electricity transmission network managed by the Transmission Systems Operator, EirGrid. It should be noted that the red line development application boundary is identical for the substation options and the grid connection options. For clarity, it should be noted that this EcIA considers all options as described above.

2.1.2 Substation

110kV AIS Substation

The substation will be based on EirGrid design specifications. The 110kV AIS substation will consist of both EirGrid and Independent Power Producer (IPP) including IPP Control Room buildings, 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 (TRAFO) with associated equipment along with:

- Cable Sealing End (CSE);
- Surge Arrestor (SA);
- Earth Disconnect (DT);
- Current /Voltage Transformer (CT/VT);
- House Transformer (HT);
- Circuit Breaker (CB);
- Lightning Mast (LM);
- Diesel Generator;
- Security Fencing and Cameras;
- Drainage, access etc.

Earthworks will be undertaken so the compound is level, with a finish compound level of 100.72m. The 110kV AIS substation layout is indicated in Figure 2.1.

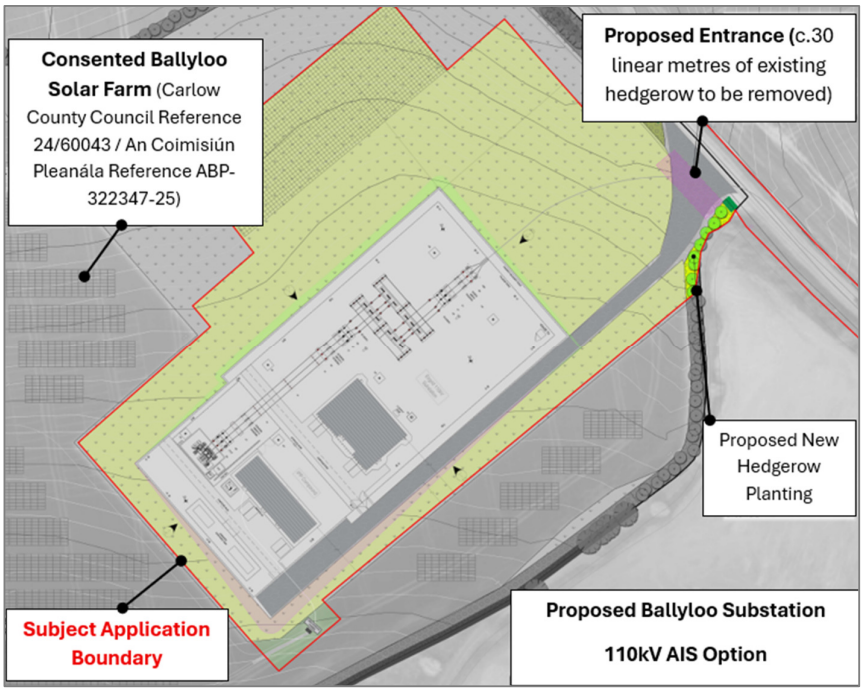

Figure 2.1 Proposed 110kV AIS Substation Option

220kV AIS Substation

The 220kV AIS substation will comprise the same infrastructure and equipment as the 110kV AIS substation option. The key difference is that the clearance distances required between individual components becomes greater at 220kV and therefore it has a larger footprint. The 220kV AIS substation layout is indicated in Figure 2.2.

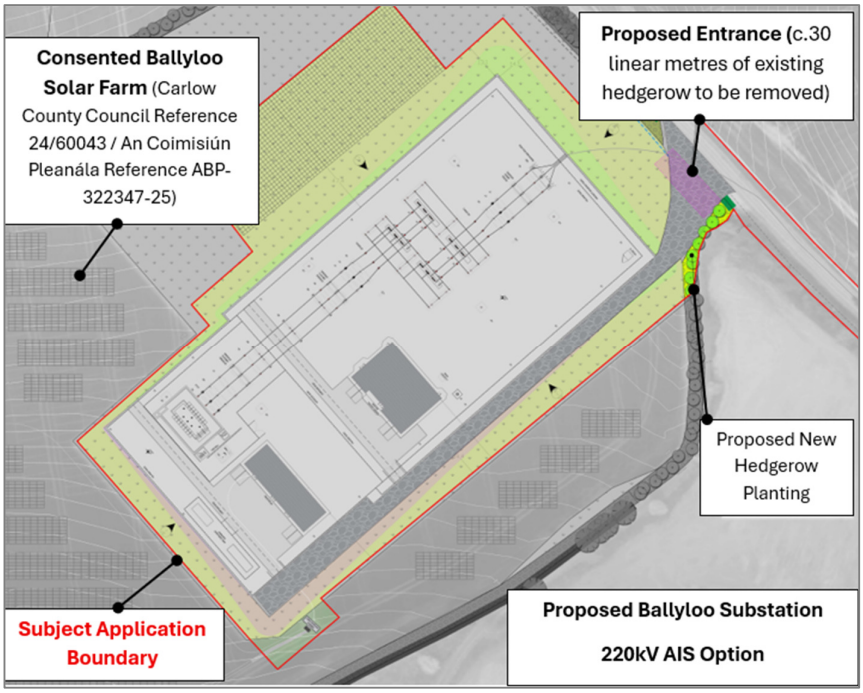

Figure 2.2 Proposed 220kV AIS Substation Option

220kV GIS Substation

The substation will be based on EirGrid design specifications. The substation compound will consist 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;
- Harmonic filters if required by EirGrid;
- Capacitor Bank if required by EirGrid;
- Fire/Blast Wall;
- Telecoms Pole.

The 220kV GIS substation layout is indicated in Figure 2.3.

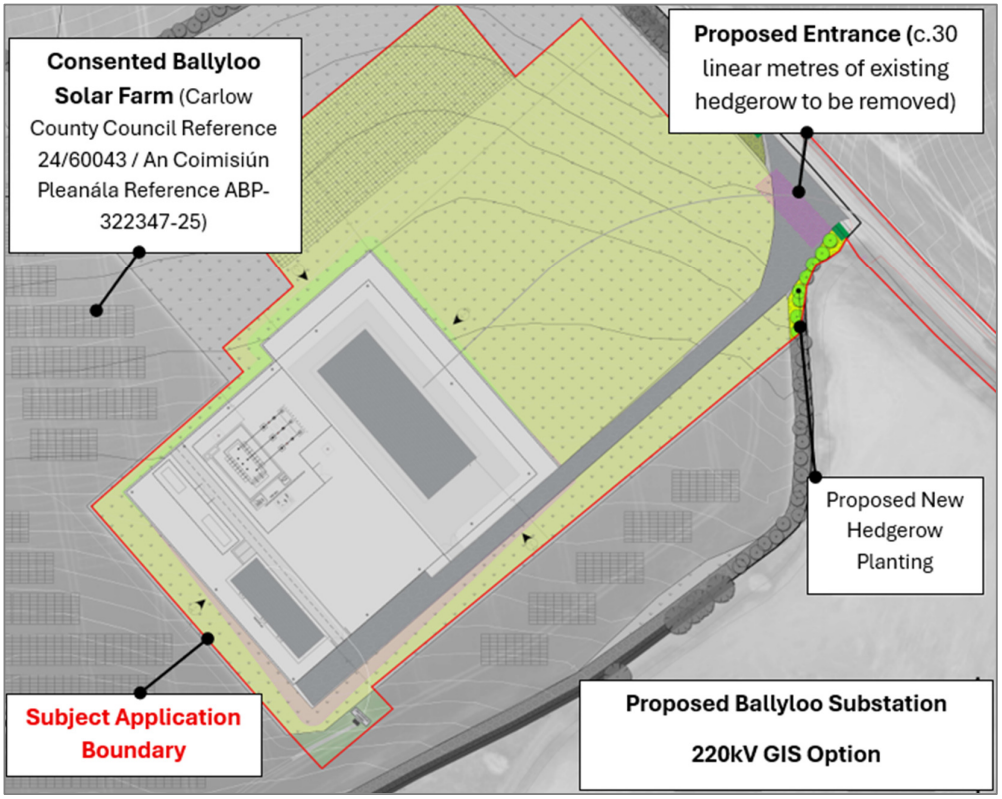

Figure 2.3 Proposed 220kV GIS Substation Option

2.1.3 Substation Access

It should be noted that the red line development application boundary is identical for all substation options. Construction access to the substation will be provided by private lands, with a new entrance from the public road L3050. c. 30 linear metres of existing hedgerow will be removed to facilitate the entrance. The entrance will be suitably splayed and has been subject to sight line and autotrack analysis, with the latter

including modelling of abnormal load delivery for the transformer. The entrance will include a linear drain to ensure there is no potential for runoff to the public road.

A compacted access track will extend from the entrance to the substation compound. The track will include a geotextile base and filter membrane and 200mm of Clause 804 sub-base. There will be sections of temporary track alongside the permanent track to facilitate delivery of the transformer within the site. The autotrack analysis has demonstrated that delivery of the substation transformer can be safely accommodated.

2.1.4 Temporary Construction Compound

As outlined in the submitted site layout plans, it is proposed to provide a temporary construction compound, accessed from the entrance from the L3050. The temporary compound will include the following facilities at a minimum:

- Adequate canteen space to allow for all workers during the peak period;
- Office space with lighting, heating and internet facilities;
- Toilets and adequate welfare facilities for construction staff in accordance with the relevant statutory Health & Welfare guidelines;
- Parking space for both light and heavy vehicles;
- Designated skips and temporary storage areas.

2.1.5 Surface Water Drainage and Water Services

110kV & 220kV AIS Substations

It should be noted that the surface water drainage proposals are similar for both the 110kV and 220kV AIS substation options described in this report.

Surface water drainage for the 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 area of this permeable surface is circa 8,315m^2 for the 110kV AIS substation option and 13,600m^2 for the 220kV AIS substation option.
- The main areas to be drained includes the roofs and the compound road. These equate to approximately 1,592m^2 for the 110kV AIS substation option and 2,023m^2 for the 220kV AIS substation option. These areas are modest in themselves and in comparison to the overall compound area. 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.

220kV GIS Substation

Surface water drainage for the 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 area of this permeable surface is circa 7,660m^2 for the GIS substation.
- The main areas to be drained includes the roofs and the compound road. These equate to approximately 2,746m^2. The compound road will be drained via series of road gullies.

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.

2.1.6 Substation Foul Water Drainage

It should be noted that the foul water drainage proposals are the same for all AIS and GIS substation options described in this report.

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 both the EirGrid and IPP control buildings. The station will be unmanned in normal operation so demand for facilities which generate foul flows will be low.

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.

2.1.7 Substation Water Supply

It is proposed to provide the required potable water demand of the station (all options) 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.

2.1.8 Grid Connection

The substation will connect to the existing 220/110 kV Kellis substation via a proposed 110kV or 220 kV underground grid connection cable. The overall length of the grid connection is approximately 8.9km at its longest. The route is shown in Figure 2.4. All works will be carried out in accordance with international best practice and full compliance with health and safety requirements.

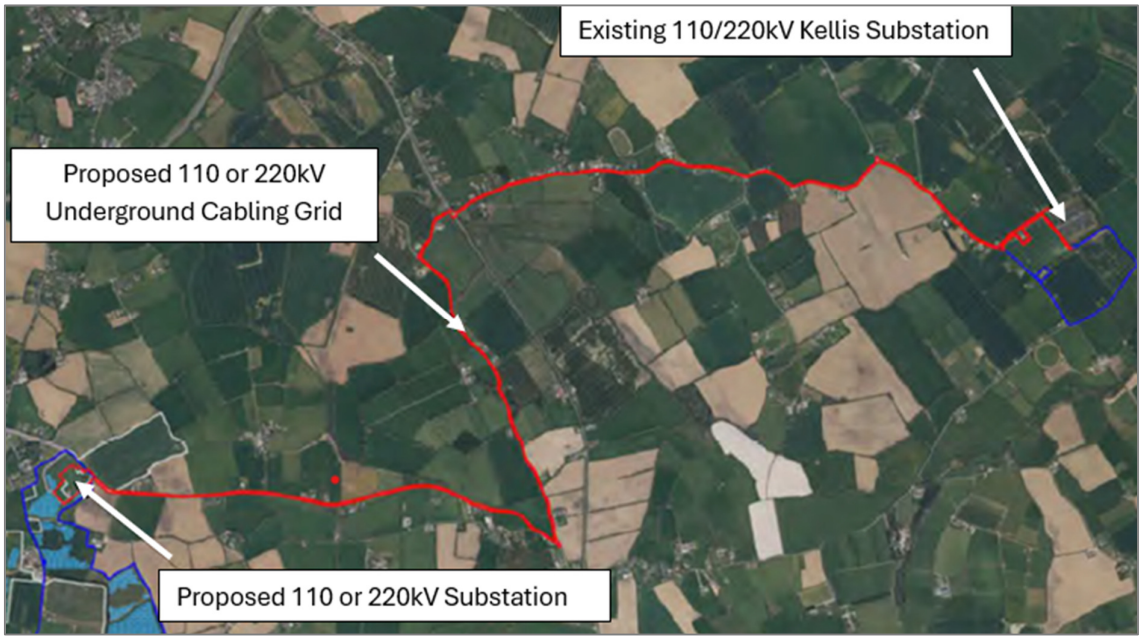

Figure 2.4 Underground Cabling Grid Connection Overview

It should be noted that the red line development application boundary is identical for both the 110kV and 220kV grid connection cable options. The route travels east from the proposed substation on the L3050 before turning north onto the L30504. It then crosses the N80 at Castletown Cross Roads and continues east on the L7148 before turning south onto the L3053. The cable would then turn east onto the L30535 which is the main road access to the existing 220/110kV Kellis substation. There are two options proposed for the final c. 0.35-0.6km section accessing the substation. One option (Option A) is within privately owned agricultural lands (see Figure 2.5) and the other option (Option B) is via the L30535 local road. Both options are indicated in Figure 2.5. In the case of Option A, c. 1m of hedgerow will be temporarily removed for the purposes of laying the cable into the substation lands. This will be reinstated.

Planning permission is being sought from An Coimisiún Pleanála for a proposed grid connection between the proposed Ballyloo Substation and Kellis 110/220kV Substation, and underground cable run of up to c. 8.9km metres which terminates at the boundary of the Kellis 110/220kV substation. As set out in the submitted plans and technical reports, it will be necessary to install a new line bay in the Kellis 220kV substation. This will require an additional short distance of underground cabling into the substation. The connecting line bay will consist of concrete bases, steelwork and electrical equipment similar to the already installed equipment within the station. This additional infrastructure will be subject to a future consenting process and is included for information in this planning application so that a robust assessment can be made of the entire application.

The cable will cross the Kilmeany stream, the N80 and at the junction between the L-3053 & L-30535 via Horizontal Directional Drill (HDD). The works will involve no in-stream works or alterations to the bridge.

Figure 2-6 shows the HDD for the bridge/stream along the L30504 road (HDD 1) and the N80 (HDD 2). Figure 2-7 shows the HDD crossing at the junction between the L-3053 & L-30535 (HDD 3) which provides access to the existing Kellis 110/220kV substation. Figure 2-8 shows a typical HDD crossing detail of a watercourse.

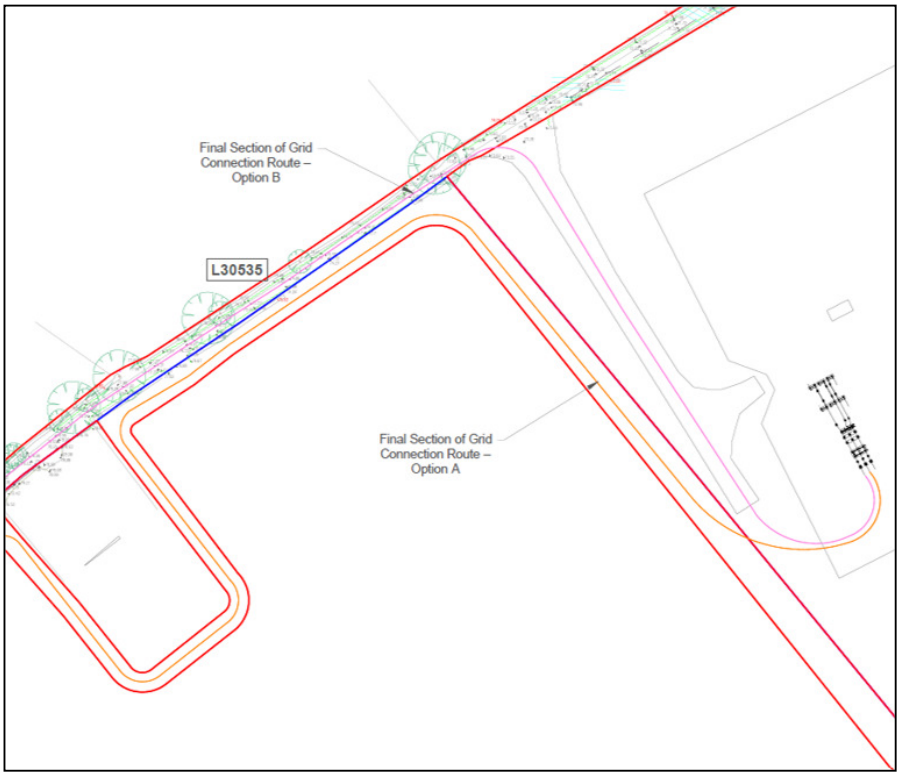

Figure 2.5 Alternative Grid Connection Routes into Existing Kellis Substation.

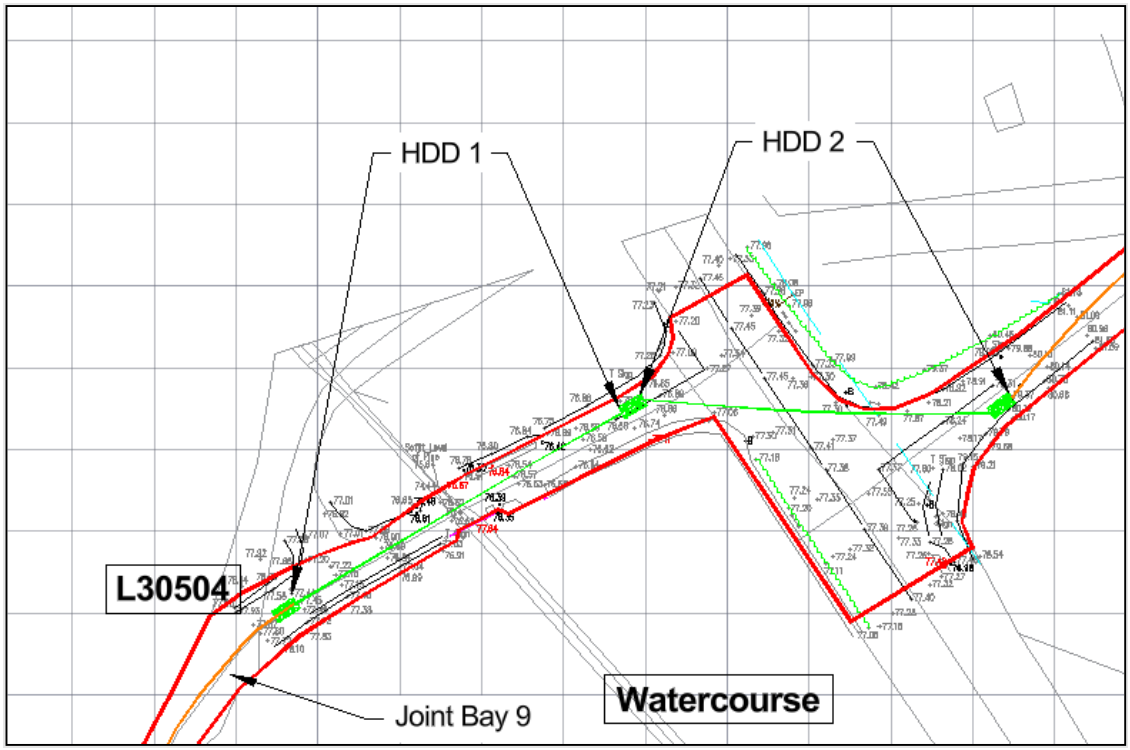

Figure 2-6 HDD under L30504 and N80

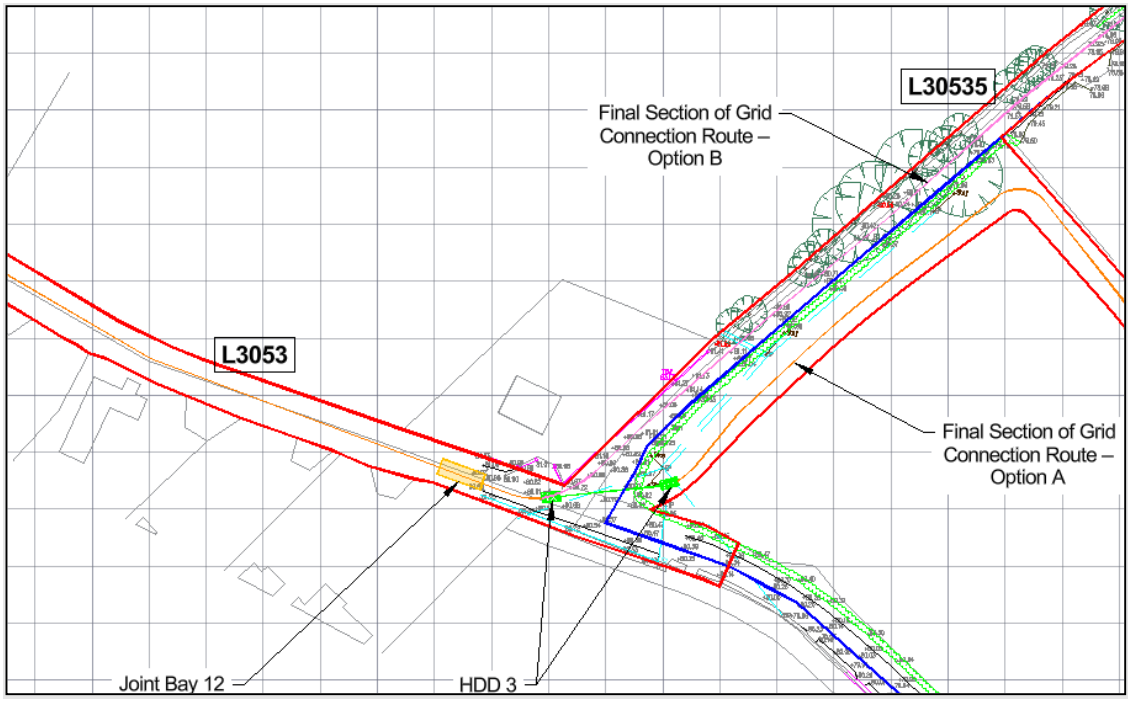

Figure 2-7 HDD between L-3053 & L-30535

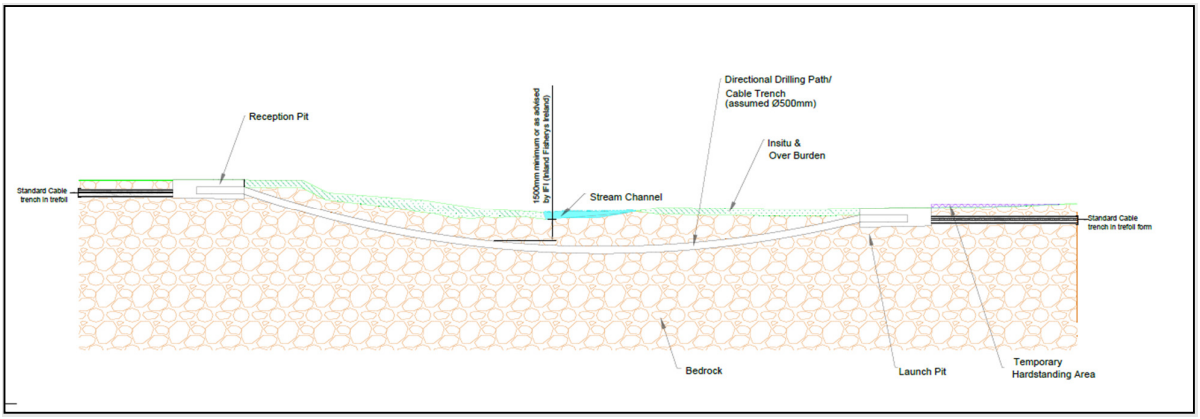

Figure 2-8 Typical Horizontal Directional Drill Water Crossing

3 Methods

This study involved undertaking a desktop review and a baseline field assessment, which are described in the relevant sections below. The field assessments (including deployment and collection of bat detectors and remote cameras) were undertaken in October and November 2023 with a contemporary survey of the grid route undertaken in September 2025 (See Table 3 3-1). Desktop information on the flora, fauna and habitats present in the area was collated and reviewed to inform the assessment including the contemporary field data collected at the other permitted solar farm developments in the area.

Table 3-1 Baseline field assessment details.

Date	Time	Weather	Ecologist	Task
31.10.2023	09:00 - 15.30	Overcast, Cloud 8/8, Dry, Wind F2/3 W, Visibility Good	Sean Dundon	Baseline ecological survey including the installation of bat detectors and remote cameras & eDNA sampling
07.11.2023	10.45 - 17.15	Sunny, Dry, Cloud 0/8, Wind F2 S, Visibility Good	John Deasy	Habitat and botanical baseline survey
08.11.2023	09.00 - 12.00	Overcast, Dry, Cloud 8/8, Wind F2/3 SW , Visibility Good	John Deasy	Habitat and botanical baseline survey, Grid Options checks for Invasive Plants and Mammal walkovers
10.11.2023	09:00 – 18:30	Mostly dty, occ. showers, Cloud Cover 5-7/8, Wind 3, Good Visibility	Sean Dundon	Bird survey transects, mammal walkovers including deployment of additional trail cameras.
22.11.2023	09:20 – 15:00	Dry, Cloud Cover 7/8, Wind F2, Good Visibility	Sean Dundon, Laura Hynes & Fiona May Aylward	Bird survey transects, baseline ecological monitoring, collection of trail cameras and bat detectors, checks of Grid Option routes
12.09.2025	14:00 – 16:30	Dry, Cloud Cover 4/8, Wind F1-2, Good Visibility	Gavin Fennessy	Survey of Grid connection route and around substation for ecological constraints including invasive plant species.

3.1 Designated Nature Conservation Sites Assessment

Designated nature conservation sites within 15km of the development site were identified through a desktop review. These conservation sites include Natural Heritage Areas (NHAs), Proposed Natural Heritage Areas (pNHAs), Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Nature Reserves and other Refuges for Fauna. NHAs are legally protected by the Irish Wildlife Acts (1976 - 2012), but pNHAs are not and only have limited protection through recognition by planning/licensing/forestry authorities and agri-environmental schemes. SACs and SPAs are European designated nature conservation sites that have

been designated under the EU Habitats Directive (92/43/EEC) and the EU Birds Directive (2009/147/EC) respectively. SACs and SPAs are collectively known as Natura 2000 sites and are legally protected by Irish law. Nature Reserves and Refuges for Fauna are protected under the Irish Wildlife Acts (1976 - 2012). Many designated sites overlap, *e.g.,* a site can be designated as both a NHA and SAC.

In the subsequent analysis of designated sites, particular attention was made on sites where a potential receptor zone of influence exists with the proposed development site. In other words, designated sites that may have a link to the development site (*e.g.,* through hydrological link, overlapping, proximity) were focused on in this assessment.

A Screening Assessment and subsequent Natura Impact Statement (NIS) was also prepared to consider the potential impacts arising from the development on the relevant Natura 2000 sites; the NIS is available in Appendix 1.

3.2 Habitat & Flora Assessment

Prior to the field survey, a desktop review of botanical data available for the study area was undertaken. The National Biodiversity Data Centre[1] (NBDC), Botanical Society of Britain and Ireland[2] (BSBI) and National Parks and Wildlife Service (NPWS)[3] FPO bryophyte mapping and online databases were consulted to identify any red-listed or legally protected botanical species located within the relevant national 10 km grid squares (*i.e.* S77 and S76) and the 2km tetrads encompassing the proposed substation and grid connection (S76P, S76U, S77K, S77V & S77Q).

The location of the substation and the grid connection were fully assessed as part of the desktop and field surveys carried out for the permitted Ballyloo Solar Farm development.

The habitat site and flora assessment was carried out in accordance with best practice guidance (Smith *et al.* 2011). This involved a walkover of the proposed development site where the habitats present were classified to level three using the classification scheme presented in *A Guide to Habitats of Ireland* (Fossitt, 2000). The extent of habitats was recorded on a field map along with notes of species present and their relative abundance described using the DAFOR scale. In addition, any other observations of interest (e.g. invasive plant species, etc.) were recorded using a Garmin eTrex10 GPS handheld unit. Evaluation of the habitats present in terms of their ecological value was assessed using the Biodiversity Evaluation Scheme presented in Appendix 2 (amended National Roads Authority 2009 scheme to include watercourse/aquatic evaluation elements from Nairn and Fossitt, 2004).

The route of the proposed grid connection was driven on three occasions (November 8th and 22nd 2023 and September 12th 2025) and note taken of any rare, protected or invasive plant species present.

[1] https://maps.biodiversityireland.ie/Map (accessed 08/10/2025)

[2] https://bsbi.org/maps (accessed 08/10/2025)

[3] https://dahg.maps.arcgis.com/apps/webappviewer/index.html?id=71f8df33693f48edbb70369d7fb26b7e (accessed 05/11/2023)

The conservation status of habitats and botanical species was also considered. The conservation status of habitats and botanical species within Ireland and Europe is indicated by inclusion in one or more of the following: Irish Red-list for Vascular Plants (Wyse Jackson *et al.* 2016); Flora (Protection) Order 2022 and the EU Habitats Directive (92/43/EEC).

3.3 Fauna Assessment

Prior to the field survey, the NPWS[2] and NBDC[3] online databases were consulted to identify any rare or protected faunal species historically recorded within the relevant national 10km (*i.e.,* S76 & S77; NPWS database[2]), and 2km grid squares (i.e. S76P, S76U, S77K, S77Q & S77V; NBDC database[3]) of the proposed site and potential grid connection options. In addition to records of rare/protected fauna, the NBDC website also hosts the Model of Bat Landscapes for Ireland, which has assessed the relative importance of landscape and habitat associations for bat species across Ireland (see Lundy *et al.* 2011). The landscape resource value for bats in the relevant national 10km square surrounding the development site was therefore assessed.

The field aspect of the initial fauna assessment involved a series of site walkovers of the wider study area where direct and/or indirect observations were noted (*e.g.,* nests, breeding sites, droppings, prints) in accordance with standard guidelines (*e.g.,* Hundt 2012, Bang & Dahlstrom 2004, JNCC 2004, Sutherland 1996). A series of mammal trail cameras (Browning Dark Ops 940 HD, Ltl Acorn camera, Wildcamera WK5 & Spypoint Force 10) and passive bat detectors (Wildlife Acoustics SM4BAT) were installed within the wider Ballyloo Solar Farm site which encompasses the proposed substation location during the site walkovers in order to collect further information on the mammal species present.

A total of 8 cameras were located across the wider Ballyloo Solar Farm site and a total of 5 passive bat detectors were deployed. Of these passive detector locations BD1 & BD2 and trail camera locations C1 & C2 are situated closest to the proposed substation location. The passive Bat detector recordings were analysed using the Kaleidoscope Pro v5.6.3 sonogram analysis software.

The avian community present in the permitted Ballyloo Solar Farm was assessed by use of four belt transects that were surveyed across two survey visits. The location of these c. 1km transects is shown in Figure 3-1. Transect 3 was located partially within the proposed substation site.

The potential presence of Smooth Newt, Atlantic Salmon, Freshwater Pearl Mussel and White-clawed Crayfish was assessed by gathering samples from drains/watercourses in the area – the samples were taken using a specialised kit and protocol developed by SureScreen Scientifics. The SureScreen Scientifics lab carried out the subsequent analysis of these samples. The sampling locations are shown in Figure 3-1.

The conservation status of faunal species was also considered in respect of the following: Irish Wildlife Acts (1976 - 2012); EU Birds Directive (2009/147/EC) Annex I list[4]; EU Habitats Directive (92/43/EEC); Birds of Conservation Concern in Ireland (BoCCI) Red, Amber and Green lists[5] (see Colhoun & Cummins 2013); Red List of Terrestrial Mammals (Marnell *et al.*, 2019); Irish Red List for Butterfly (Regan *et al.* 2010); Irish Red

[4] Annex I bird species are afforded additional protection through the designation of Special Protection Areas (SPAs) in EU countries in addition to existing National legislation.

[5] BoCCI Red-listed species are of high conservation concern, Amber-listed species are of medium conservation concern and Green-listed species are of no conservation concern.

List for Damselflies & Dragonflies (Nelson *et al.* 2011); Irish Red List for Amphibians, Reptiles & Freshwater Fish (King *et al.* 2011); Regional Red List of Irish Bees (Fitzpatrick *et al.* 2006).

3.4 Overall Ecological Site Evaluation & Impact Assessment

An overall ecological evaluation of the proposed development site follows the criteria set out in Appendix 2 (amended NRA 2009 & Nairn & Fossitt 2004). The description and evaluation of potential and residual impacts associated with the proposed development on the existing ecology of the study site and surrounding area follows guidelines published by the EPA (2022).

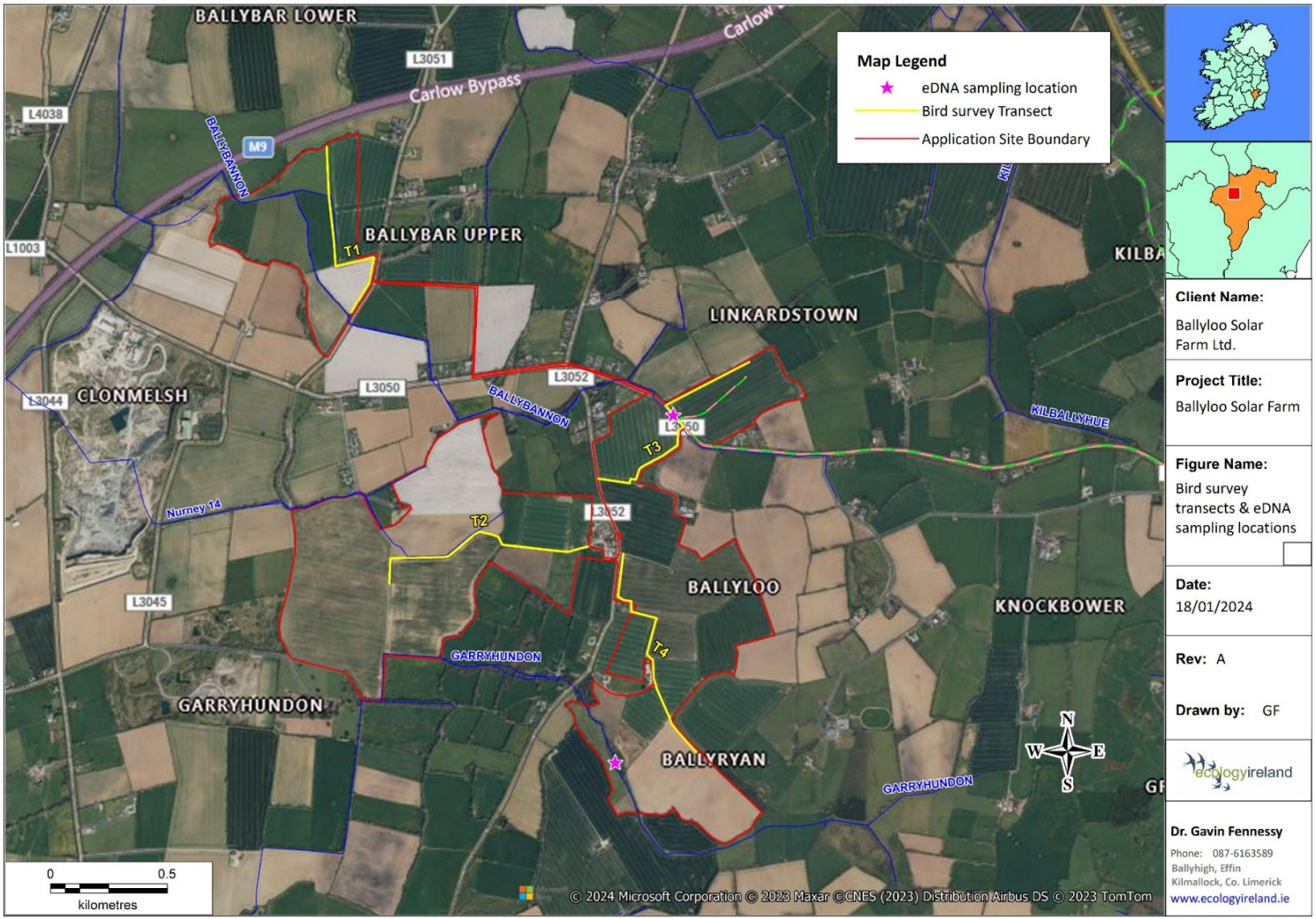

Figure 3-1. Bird survey transects and eDNA sampling locations across permitted solar farm site.

4 Ecology in the Existing Environment

4.1 Designated Nature Conservation Sites

Proposed Development Site

The proposed development site is not located within any designated sites, the nearest European site being the River Barrow and River Nore SAC located *c.* 3.9km to the west of the proposed development site boundary. The nearest designated sites are listed below in Table 4-1. There are a total of three SACs and no SPAs, within 15km of the study site (See Table 4-1; Figure 4-1). There is one NHA, Coan Bogs NHA (002382) and 8 pNHAs within 15 km of the study site (See Figure 4-2).

Note that for illustrative purposes, sites within a 15km distance of the development site are shown in Figure 4-1 and Figure 4-2. It is necessary to consider the likely Zone of Influence (or Impact) for a proposed development and not just consider sites out to a nominal distance of 15km. Where consideration of the S-P-R model indicates that there likely significant effects which in the absence of mitigation will occur in relation to more distant sites, these are considered as part of the NIS process.

Table 4-2 below provides the conservation summary of the Natura 2000 sites, including distance from the proposed development site.

Table 4-1 Designated sites located within 15km of the site and their distance from the site boundary.

Site Name	Site Code	Minimum Distance from Application Site (km)
Natura 2000 sites		
River Barrow and River Nore SAC	002162	3.9
Slaney River Valley SAC	000781	4.6
Blackstairs Mountains SAC	000770	14.1
Nationally Designated Sites		
Ardristan Fen pNHA	000788	2.6
Cloghristick Wood pNHA	000806	4.0
Slaney River Valley pNHA	000781	6.6
Ballymoon Esker pNHA	000797	7.5
Oakpark pNHA	000810	8.7
Whitehall Quarries pNHA	000855	12.4
Coan Bogs NHA	002382	12.7
Blackstairs Mountains pNHA	000770	14.1
Mothel Church, Coolcullen pNHA	000408	14.5

There is a potential impact-receptor pathway via hydrological links between the proposed development site and the designated site; River Barrow and River Nore SAC. The grid connection route crosses the Kilmeany stream, which is a tributary of the Burren Riven, itself a tributary of the River Barrow. The River Barrow and River Nore SAC is designated for a number of habitats associated with the aquatic and estuarine environments, including those found in the River Barrow and Upper Barrow Estuary. This SAC is also designated for a number of species associated with the aquatic environment, including Otter and White-clawed Crayfish, as discussed below. The conservation objectives and qualifying interests of the River Barrow and River Nore SAC are summarized in Table 2-2 below.

As outlined in Section 2, to the proposed grid connection options will transport electricity from the permitted solar farm development to the existing Kellis 220/110kV substation. As previously described, these options (which share an identical development footprint and red line boundary) cross the Kilmeany stream (by HDD) within the River Barrow catchment. Significant effects on the River Barrow and River Nore SAC from indirect hydrological impacts arising from the proposed development cannot be ruled out at this stage and this is assessed in the accompanying NIS (Appendix 1).

The distances between the proposed development site and the Natura 2000 sites listed in Table 4-1 above (minimum distance 3.9km overland and >9.5km downstream) and the nature of the intervening environment are as such that there is no risk of direct disturbance/displacement to any fauna occurring within the Natura 2000 sites.

White-clawed Crayfish, a qualifying interest of the River Barrow and Nore SAC, could potentially occur downstream of the proposed development site within the River Barrow and her tributaries. Deterioration in water quality, particularly excessive siltation, during the construction phase of the proposed development, particularly the HDD works near the Kilmeany could potentially impact this aquatic species. Potential impacts on White-clawed Crayfish associated with the River Barrow and Nore SAC are assessed in the NIS report that accompanies this planning application (Appendix 1).

Ex-situ disturbance impacts (*i.e.,* where highly mobile species from the designated sites may occur at the development site to forage or commute) must also be considered. This effect is only applicable to designated sites where such fauna are relevant (*e.g.* birds, bats), and where the development site supports habitats of ecological interest for the fauna in question. Otter is a qualifying interest of the River Barrow and Nore SAC (see Table 4-2). Otter activity was not recorded during site walkovers at the permitted solar farm and the watercourses do not provide optimal foraging and breeding habitat for this species. However, potential water quality deterioration as a result of the construction phase of the proposed development could negatively impact prey biomass for this species. Potential ex-situ impacts on Otter is also assessed in the NIS.

The proposed development site is located 4.6km from The Slaney River Valley SAC. Given the distance of the SAC from the proposed development site and the location of the SAC in a different catchment area (Nore Catchment, Hydrometric Area 15), there is no likelihood of significant effects on this SAC arising from the proposed development.

The proposed development site is located 14.1km from The Blackstairs Mountains SAC. This SAC is designated for habitats only (See Table 4-2). There is no hydrological link between the proposed development site and this SAC, there is no potential for significant impacts on the SAC as a result of the proposed development.

Table 4-2 Conservation Summary of the Natura 2000 Sites within 15km of the Proposed Development Site.

Site Name & Code	Conservation Summary	Minimum Distance From Site (km)
River Barrow and Nore SAC (002162)	The Conservation Objectives of this SAC are to maintain or restore the favourable conservation condition of the following qualifying interests **Habitat:** • Estuaries • Mudflats and sandflats not covered by seawater at low tide • Reefs • Salicornia and other annuals colonising mud and sand • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) • Mediterranean salt meadows (*Juncetalia maritimi*) • Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation • European dry heaths • *Hydrophilous* tall herb fringe communities of plains and of the montane to alpine levels • Petrifying springs with tufa formation (*Cratoneurion*) • Old sessile oak woods with Ilex and Blechnum in the British Isles • Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) **Species:** • Desmoulin's Whorl Snail, *Vertigo moulinsiana* • Freshwater Pearl Mussel, *Margaritifera margaritifera* • White-clawed Crayfish, *Austropotamobius pallipes* • Sea Lamprey, *Petromyzon marinus* • Brook Lamprey, *Lampetra planeri* • River Lamprey, *Lampetra fluviatilis* • Twaite Shad, *Alosa fallax fallax* • Salmon, *Salmo salar* • Otter, *Lutra lutra* • Killarney Fern, *Trichomanes speciosum* • Nore Pearl Mussel, *Margaritifera durrovensis* (after NPWS 2011a)	<u>Over Land</u>: 3.9 SAC <u>via watercourses</u> *c*. 9.5km downstream along the Kilmeany/Burren

Site Name & Code	Conservation Summary	Minimum Distance From Site (km)
Slaney River Valley SAC 000781	The conservation objectives of this site relate to maintaining the favourable conservation condition of the following qualifying interests; • Estuaries [1130] • Mudflats and sandflats not covered by seawater at low tide [1140] • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] • Mediterranean salt meadows (*Juncetalia maritimi*) [1410] • Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] • Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] • Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)* [91E0] • *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] • *Petromyzon marinus* (Sea Lamprey) [1095] • *Lampetra planeri* (Brook Lamprey) [1096] • *Lampetra fluviatilis* (River Lamprey) [1099] • *Alosa fallax fallax* (Twaite Shad) [1103] • *Salmo salar* (Salmon) [1106] • *Lutra lutra* (Otter) [1355] • *Phoca vitulina* (Harbour Seal) [1365] (After NPWS 2011b)	4.6
Blackstairs Mountains SAC 000770	The conservation objectives of this site relate to maintaining the favourable conservation condition of the following qualifying interests; • Northern Atlantic wet heaths with *Erica tetralix* [4010] • European dry heaths [4030] (After NPWS site synopsis 2019)	14.1

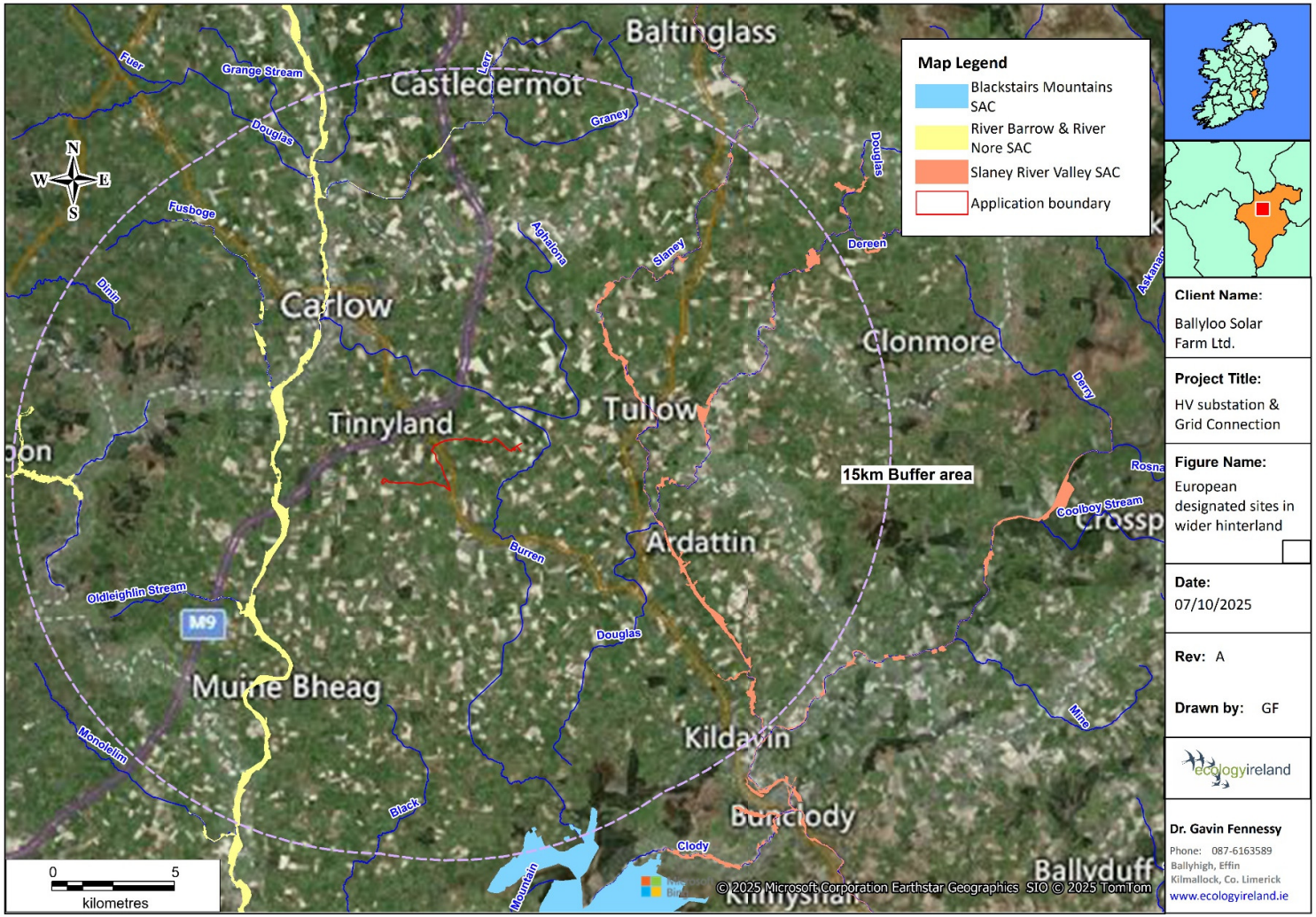

Figure 4-1 Natura 2000 sites in the 15km hinterland of the proposed site.

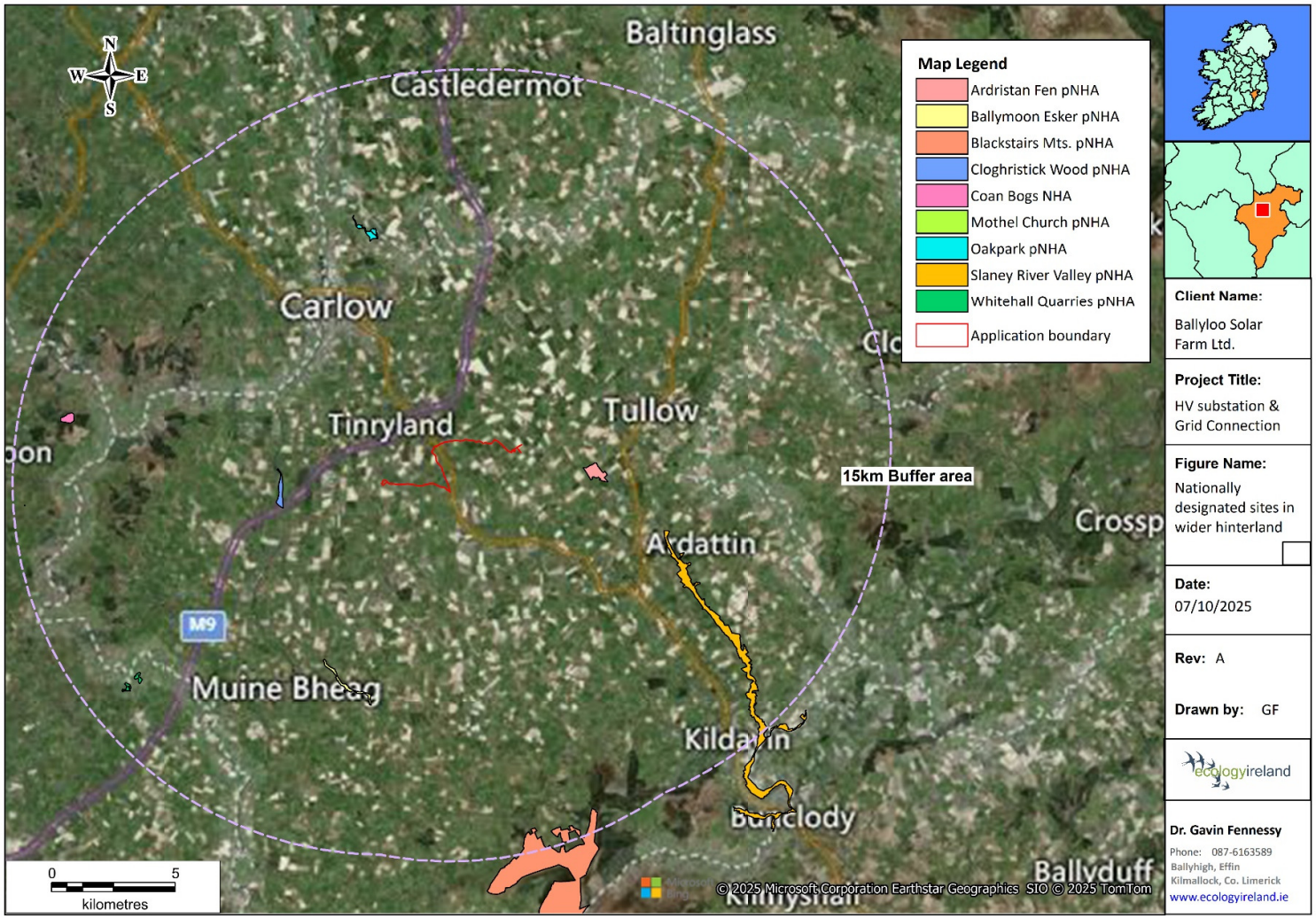

Figure 4-2 Nationally designated sites in the 15km hinterland of the proposed site.

4.2 Habitats & Flora in the Existing Environment

4.2.1 Desktop Review

The BSBI database holds historic (Pre-1930's) records for two species listed on the Flora (Protection) Order, 2022 for the 10 km grid square W77; five records for Meadow Saffron (*Colchicum autumnale*) and 4 records of Red Hemp-nettle (*Galeopsis angustifolia*). In addition, the BSBI database holds 4 historic (Pre-1930's) of Annual Knawel (*Scleranthus annuus*) and a record of Red Hemp-nettle from the period 1970-1986. Both of these species are listed on the Flora (Protection) Order, 2022.

The NBDC database does not records for any legally protected or Red-listed plant species within the 2 km grid squares which overlap with and surround the proposed development site boundary. No legally protected bryophyte species were recorded on the NPWS FPO Bryophyte mapping service for the 10 km grid square S77 or S76 within which the proposed development site is located.

Table 4-3 summarises the rare, protected and invasive species recorded historically in the two 10km Grid Squares which encompass the proposed substation development site and grid connection options from the NBDC database.

Table 4-3 Historical records of rare and protected and invasive plant species recorded in 10km Grid Square S76 & S77.

Species	Scientific Name	Grid Square	Conservation Status
Water Fern	*Azolla filiculoides*	S76 S77	Medium Impact Invasive Species Regulation S.I. 477 (Ireland)
Blue Fleabane	*Erigeron acer*	S76 S77	Threatened Species: Least concern
Butterfly-bush	*Buddleja davidii*	S76 S77	Medium Impact Invasive Species
Canadian Waterweed	*Elodea canadensis*	S76 S77	High Impact Invasive Species Regulation S.I. 477 (Ireland)
Cherry Laurel	*Prunus laurocerasus*	S76 S77	High Impact Invasive Species
Common Broomrape	*Orobanche minor*	S76 S77	Medium Impact Invasive Species
Fragrant Agrimony	*Agrimonia procera*	S76	Threatened Species: Near threatened
Giant Hogweed	*Heracleum mantegazzianum*	S76 S77	High Impact Invasive Species Regulation S.I. 477 (Ireland)
Corn Marigold	*Glebionis segetum*	S76	Threatened Species: Near threatened
Greater Knapweed	*Centaurea scabiosa*	S76	Threatened Species: Near threatened
Indian Balsam	*Impatiens glandulifera*	S76 S77	High Impact Invasive Species Regulation S.I. 477 (Ireland)
Japanese Knotweed	*Fallopia japonica*	S76 S77	High Impact Invasive Species Regulation S.I. 477 (Ireland)
Least Duckweed	*Lemna minuta*	S76	Medium Impact Invasive Species
Rhododendron sp.	*Rhododendron ponticum*	S76	High Impact Invasive Species Regulation S.I. 477 (Ireland)
Spanish Bluebell	*Hyacinthoides hispanica*	S76	High Impact Invasive Species Regulation S.I. 477 (Ireland)
Sycamore	*Acer pseudoplatanus*	S76 S77	Medium Impact Invasive Species

Species	Scientific Name	Grid Square	Conservation Status
Three-cornered Garlic	*Allium triquetrum*	S76 S77	High Impact Invasive Species Regulation S.I. 477 (Ireland)
Traveller's-joy	*Clematis vitalba*	S76 S77	Medium Impact Invasive Species
Cornflower	*Centaurea cyanus*	S77	Threatened species: Waiting list
Nuttall's Waterweed	*Elodea nuttallii*	S77	High Impact Invasive Species Regulation S.I. 477 (Ireland)
Pale Flax	*Linum bienne*	S77	Threatened Species: Near threatened
Ragweed	*Ambrosia artemisiifolia*	S77	Medium Impact Invasive Species
Slender Thistle	*Carduus tenuiflorus*	S77	Threatened Species: Near threatened

4.2.2 Field surveys

The substation development site is located within a large Arable Crop (BC1) field.

No habitats corresponding to those listed on Annex I of the EU Habitats Directive (92/43/EEC) were recorded within the substation boundary or along the grid route options. Botanical species protected under the Flora (Protection) Order 2022, listed in Annex II or IV of the EU Habitats Directive (92/43/EEC), or Red-listed in Ireland (Wyse-Jackson *et al*, 2016) were not recorded during the site visits.

The following habitats (with Fossitt codes) were recorded within the wider Ballyloo Solar Farm site. The habitats within and adjacent to the proposed substation site are shown in Figure 4-3. These include the solar farm for contextual information.

- Arable crops (BC1)
- Improved agricultural grassland (GA1)
- Dry calcareous and neutral grassland (GS1)
- Spoil and bare ground (ED2)
- Recolonising bare ground (ED3)
- Scrub/Dry meadows and grassy verges mosaic (WS1/GS2)
- Hedgerow (WL1)
- Treeline (WL2)
- Earth banks (BL2)
- Scrub (WS1)
- Broadleaf woodland (WD1))
- Buildings and artificial surfaces (BL3)
- Eroding/Upland River (FW1)
- Depositing/Lowland River (FW2)
- Drainage ditch (FW4)
- Other artificial lakes or ponds (FL8)

The ecological valuation of the arable crop habitat is considered to be of local importance (lower value).

Plate 4-1: Arable crops (BC1) (Immature cereal crop) habitat within the proposed development site.

Grid Connection Route

Outside of a short section within arable crops (BC1) habitat within the substation site, the proposed grid connection route is located completely within the corridor of the public road (buildings and artificial surfaces habitat BL3). The ecological valuation of these habitat types is considered to be of local importance (lower value) for the arable crops and negligible value for the roads (buildings and artificial surfaces habitat). The proposed grid connection route on the public road intersect with a crossing of the Kilmeany stream (FW2). This watercourse will be crossed by Horizontal Directional Drilling (HDD) and will not require any in-stream works.

The ecological valuation of the depositing/lowland river habitat is considered to be of local importance (higher value).

Protected and Red-listed Flora

No legally protected or Red-listed (Wyse-Jackson *et al*, 2016) plants were recorded within the study site boundary of the proposed development site during the baseline survey.

Invasive Species

No plant species that have been listed as an invasive alien plant species of European Union concern (IAS Regulation 1143/2014) were recorded within the proposed substation development site or along the grid connection route during the field survey visits.

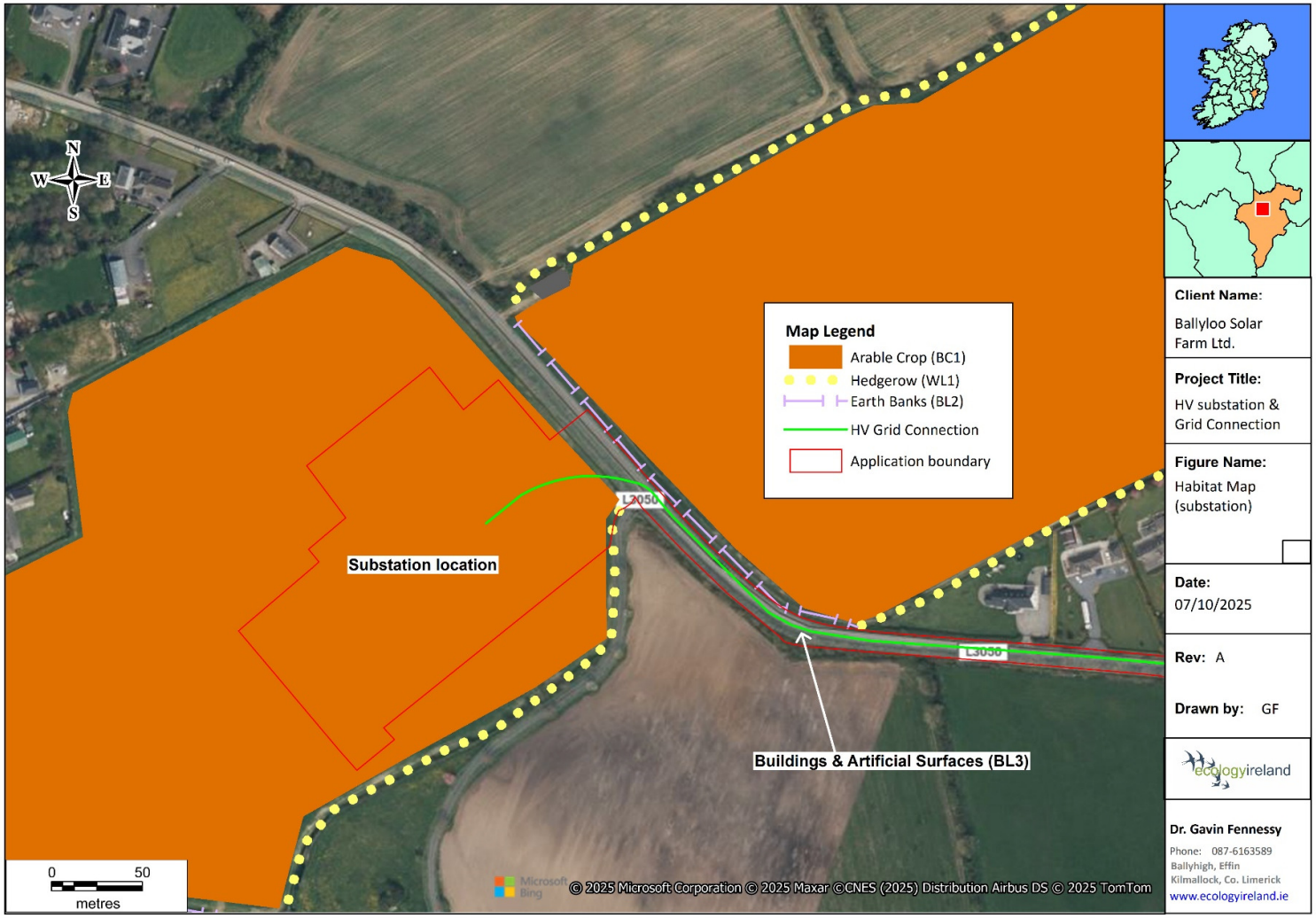

Figure 4-3 Habitats at the proposed substation development location.

4.3 Fauna in the Existing Environment

4.3.1 Birds

4.3.1.1 Desktop Study

A total of 53 species have been historically recorded in the 2km Grid Squares which overlap the proposed substation development site and grid connection routes to the existing Kellis substation (Table 4-4). This reflects the range of habitat present in the wider area including agricultural, woodland, riparian and man-made habitats. Most of these species are common locally and nationally.

A total of 11 of the species are currently Red-listed (Gilbert *et al*. 2021): Barn Owl, *Tyto alba*, Golden Plover, *Pluvialis apricaria*, Grey Wagtail, *Motacilla cinerea*, Kestrel, *Falco tinnunculus*, Lapwing, *Vanellus vanellus*, Meadow Pipit, *Anthus pratensis*, Redwing, *Turdus iliacus*, Snipe, *Gallinago gallinago*, Stock Dove, *Columba oenas*, Swift, *Apus apus* and Yellowhammer, *Emberiza citrinella*.

Table 3-4 Bird species historically recorded in the 2km Grid Squares that overlap the proposed solar farm and grid options.

Common Name	Scientific Name	2km Grid Squares
Barn Owl^	*Tyto alba*	S77K
Blackbird	*Turdus merula*	S76P S76U S76Z S77Q S77V
Blackcap	*Sylvia atricapilla*	S76P S76U S77V
Black-headed Gull*	*Chroicocephalus ridibundus*	S76J
Blue Tit	*Cyanistes caeruleus*	S76P S76U S76Z S77Q S77V
Bullfinch	*Pyrrhula pyrrhula*	S76U S77V
Buzzard	*Buteo buteo*	S76J S76U S77K
Chaffinch	*Fringilla coelebs*	S76P S76U S76Z S77Q S77V
Chiffchaff	*Phylloscopus collybita*	S76P S76U S77Q
Coal Tit	*Periparus ater*	S76U S76Z S77Q
Collared Dove	*Streptopelia decaocto*	S76P S76Z
Dipper	*Cinclus cinclus*	S77V
Dunnock	*Prunella modularis*	S76P S76U S76Z S77Q S77V
Fieldfare	*Turdus pilaris*	S76U S77V
Goldcrest*	*Regulus regulus*	S76U S77Q S77V
Golden Plover^	*Pluvialis apricaria*	S76Z S77F S77K S77Q S77V
Goldfinch	*Carduelis carduelis*	S76P S76U S76Z
Great Tit	*Parus major*	S76P S76U S76Z S77V
Greenfinch*	*Carduelis chloris*	S76P S76U S76Z S77Q S77V
Grey Heron	*Ardea cinerea*	S76U
Grey Wagtail^	*Motacilla cinerea*	S77Q S77V
Hooded Crow	*Corvus cornix*	S76P S76U S76Z S77F S77Q S77V
House Martin*	*Delichon urbicum*	S76P S76U
House Sparrow*	*Passer domesticus*	S76P S76U S76Z S77Q S77V

Common Name	Scientific Name	2km Grid Squares
Jackdaw	*Corvus monedula*	S76P S76U S76Z S77Q S77V
Kestrel^	*Falco tinnunculus*	S76J S77F S77K
Lapwing^	*Vanellus vanellus*	S76J S76U
Lesser Redpoll	*Carduelis cabaret*	S76P
Linnet*	*Carduelis cannabina*	S76P S76U S76Z
Little Egret	*Egretta garzetta*	S77F
Long-eared Owl	*Asio otus*	S76J
Long-tailed Tit	*Aegithalos caudatus*	S76U
Magpie	*Pica pica*	S76P S76U S76Z S77Q S77V
Meadow Pipit^	*Anthus pratensis*	S76U S77F
Mistle Thrush	*Turdus viscivorus*	S76P S76U S76Z S77Q S77V
Moorhen	*Gallinula chloropus*	S77V
Peregrine Falcon	*Falco peregrinus*	S76J
Pheasant	*Phasianus colchicus*	S76P S76U S76Z S77F S77Q S77V
Pied Wagtail	*Motacilla alba*	S76U S76Z S77Q S77V
Raven	*Corvus corax*	S76J S76U
Redwing^	*Turdus iliacus*	S76U S76Z
Reed Bunting	*Emberiza schoeniclus*	S77Q S77V
Robin	*Erithacus rubecula*	S76P S76U S76Z S77Q S77V
Rock Dove	*Columba livia*	S76U S76Z S77Q S77V
Rook	*Corvus frugilegus*	S76P S76U S76Z S77Q S77V
Skylark*	*Alauda arvensis*	S77V
Snipe^	*Gallinago gallinago*	S76Z S77F
Song Thrush	*Turdus philomelos*	S76P S76U S76Z S77Q S77V
Sparrowhawk	*Accipiter nisus*	S76J
Starling*	*Sturnus vulgaris*	S76U S76Z S77Q S77V
Stock Dove^	*Columba oenas*	S76J S76U S77Q S77V
Stonechat	*Saxicola torquata*	S77F
Swallow*	*Hirundo rustica*	S76P S76U S77Q S77V
Swift^	*Apus apus*	S76U
Tree Sparrow*	*Passer montanus*	S76Z
Treecreeper	*Certhia familiaris*	S76U
Wheatear*	*Oenanthe oenanthe*	S76J
Whitethroat	*Sylvia communis*	S76J S77F S77Q
Willow Warbler*	*Phylloscopus trochilus*	S76P S76U S77Q S77V
Woodpigeon	*Columba palumbus*	S76P S76U S76Z S77Q S77V
Wren	*Troglodytes troglodytes*	S76P S76U S76Z S77Q S77V
Yellowhammer^	*Emberiza citrinella*	S76J S76P S76U S77F S77Q S77V

BoCCI Status: ^ Red-listed * Amber-listed

Other bird surveys at solar farms (including Clonmacshane, Park and Ballybannon Solar Farms) which are in the wider area are also of relevance to the proposed development.

At the permitted Clonmacshane Solar Farm which is located a minimum of 1km south of Kellis substation, the diversity of winter birds recorded during 2021-2022 was 35 species (Ecology Ireland 2022). The majority of these birds are typical farmland bird species, common locally and nationally. Six *Red-listed* birds of high conservation concern in Ireland were recorded; Golden Plover Grey Wagtail, Meadow Pipit Redwing, Snipe and Yellowhammer (see Gilbert *et al*. 2021). Golden Plover is also listed on Annex I of the EU Birds Directive. Flocks of Golden Plover were recorded flying to the north offsite during the site walkover of Clonmacshane. The observed flock contained around 60 individuals. There was a sighting of a single Yellowhammer during the site walkovers.

Golden Plover (which was only recorded flying off-site) is likely to only occur in the area on a transient basis during the winter months. Numbers of Golden Plover in Ireland are boosted by immigrants from Iceland and the Faeroes in winter (Crowe 2005) where they are regularly found in large, densely-packed flocks, and in a variety of habitats, both coastal and inland. Their distribution is widespread in Ireland. This species feeds on a variety of soil and surface-living invertebrates, principally beetles and earthworms, but also on plant material such as berries, seeds and grasses. Flocks of Golden Plover were also recorded flying over the permitted Garreenleen Solar Farm site (adjacent to Clonmacshane) on three occasions during the field surveys (February 2020), where flock sizes varied between 120 and 500 birds (Ecology Ireland 2020). There is no suitable breeding habitat for Golden Plover (i.e. upland heath/bog/grassland) at or in the immediate vicinity of the proposed development site, although this species may forage in farmland on a transient basis during the winter months when suitable habitat such as tilled land is available. The proposed development site is not of known importance to this species (Crowe 2005, I-WeBS[6]), where the areas of highest concentrations of this species are coastal and inland wetland sites in winter (Crowe 2005).

Other Red-listed species observed at the Clonmacshane site were Grey Wagtail, Meadow Pipit, Redwing, Snipe and Yellowhammer. Grey Wagtail and Meadow Pipit are relatively common passerine species that have shown declines in breeding population in Ireland in recent decades. Grey Wagtail, is a species that is typically associated with streams and rivers and adjoining land. Meadow Pipit remains one of the most abundant and widespread songbirds in Ireland, although the species abundance has fallen from levels recorded a couple of decades ago. It is believed that the particularly severe winters of 2009/2010 and 2010/2011 may have been responsible for at least some of the observed decline in the abundance of both Meadow Pipit and Grey Wagtail at national level (Lewis *et al*. 2020). There is evidence that for Meadow Pipits at least, that their population is recovering in recent years (Lewis *et al*. 2020). Redwing, is a winter migrant thrush species that is showing declines in population across Europe which may be related to climate change given the species' northerly breeding distribution (e.g. https://bit.ly/3rHdlRD). Snipe is a nocturnally feeding wading bird that roosts on the ground, using cryptic colouration to avoid predation. They are locally common, especially during the winter months when the population is substantially increased by the influx of migrant birds. Snipe are Red-listed due to declines in their breeding population in Ireland. The lands within the proposed development site are unsuitable for breeding Snipe, which favour wetland/heath/bog type habitat. Yellowhammer is a resident, seed-eating passerine, that has shown significant decline in breeding population in Ireland over recent decades, believed to be associated with

[6] https://bwi.maps.arcgis.com/apps/View/index.html?appid=1043ba01fcb74c78bc75e306eda48d3a

changes in farming practices. There was a single Yellowhammer recorded on the proposed development site during the walkover surveys.

A breeding bird survey walkover was also conducted at Clonmacshane. A total of 30 bird species were recorded during the transect surveys, a similar species diversity and assemblage as recorded at the site in the winter period (Ecology Ireland 2022). In total, one of the species recorded is Red-listed, Yellowhammer and there were six Amber-listed birds recorded. The species recorded in the greatest abundance during the breeding season transect survey was Rook, with several hundred birds observed.

Breeding bird surveys at Park Solar Farm which is located a minimum of c. 2.5km west of the substation location at Ballyloo. A total of 32 bird species were recorded during the transect survey at the Park Solar site in 2024. Most of these species are common locally and nationally. Three of the species recorded at this site are currently Red-listed: Kestrel, Swift and Yellowhammer. The most abundant species recorded at the Park Solar Farm site were Rook and Woodpigeon. There were several observations of other birds of prey with regular sightings of Buzzard and two observations of Sparrowhawk.

Breeding and winter season bird surveys were carried out at the Ballybannon Solar Farm site. That site is located c. 3.2km to the west of the proposed substation location. Three survey transects, each of c. 1km in length were surveyed on two occasions in the winter period and a further two occasions in the early part of the 2025 breeding season. A total of 26 bird species were recorded during the winter transect survey in 2024/2025. Most of these species are common locally and nationally. Two of the bird species recorded are Red-listed: Meadow Pipit and Redwing. Redwing was recorded on two of three transects, although not in particularly high numbers. A number of Amber-listed species were also observed with two such species, Mallard and Cormorant recorded commuting along the River Barrow corridor.

The most abundant species recorded during the winter transect surveys was Rook. The only bird of prey recorded during the surveys was Buzzard. However, during the February walkover remains of a scavenged Barn Owl were recovered. A total of 29 bird species were recorded during the breeding bird season. Again, most of the bird species recorded are common locally and nationally. The most abundant species recorded at this site were Rook and Woodpigeon. Again, the only bird of prey observed was Buzzard. Jay was recorded on the trail cameras deployed at this site.

The bird species recorded across the winter and early breeding season at the site are typical of the habitats present, with farmland and woodland birds dominating the bird community.

Results of previous surveys carried out in the surrounding area for the permitted Garreenleen solar farm were also taken into account to gain a greater knowledge of the species in the wider surrounding area. A total of 41 species of bird were casually recorded during the site walkovers for the permitted solar farm which were carried out in February-March 2020. Three *Red-listed* species were recorded during the surveys at Garreenleen Solar Farm; Golden Plover, Meadow Pipit and Yellowhammer.

Wild bird species are protected under the Irish Wildlife Acts (1976 - 2012), where it is an offence to hunt, interfere with or destroy their breeding or resting places (unless under statutory licence/permission).

The Ballyloo Solar Farm study area (particularly the hedgerows and treelines) which includes the proposed substation location contains suitable foraging, commuting, nesting and perching habitats for terrestrial bird species in general. Similar habitats are also present in the wider landscape (*e.g.,* field boundaries). Most

bird species are protected under the Irish Wildlife Acts (1976 - 2012), where it is an offence to hunt, interfere with or destroy their breeding or resting places (unless under statutory licence/permission).

4.3.1.2 Transect Walkover & Camera Survey results

Four survey transects, each of c. 1km in length were surveyed at the permitted Ballyloo Solar Farm on two occasions. Table 4-5 present the peak counts recorded of each species seen or heard on each of these survey transects. A total of 35 bird species were recorded during the transect survey in 2023. Most of these species are common locally and nationally. Seven of the species are currently Red-listed: Golden Plover, Kestrel, Lapwing, Meadow Pipit, Redwing, Stock Dove and Yellowhammer.

Small numbers of Golden Plover and Lapwing were recorded in flight. These species were not observed at rest anywhere within the proposed development site. There were small numbers of observations of Kestrel, Redwing and Stock Dove. Meadow Pipit were also recorded in small numbers on three of the survey transects. Yellowhammer was also recorded on three of the four survey transects and were somewhat more frequently recorded.

The most abundant species recorded at the Ballyloo Solar Farm site were Rook, *Corvus frugilegus*, Skylark, *Alauda arvensis*, Starling, *Sturnus vulgaris* and Woodpigeon, *Columba palumbus*. Six additional bird species were recorded as casual records outside of the dedicated transects including Goldcrest, *Regulus regulus*, Great Tit, *Parus major*, Greenfinch, *Chloris chloris,* Green Sandpiper, *Tringa ochropus*, Grey Wagtail and Raven, *Corvus corax*. On transect 3 which overlaps the proposed substation location the most abundant species recorded were Rook and Woodpigeon reflecting the agricultural nature of the habitats present.

The analysis of the 8 trail cameras deployed at the wider solar farm site recorded the presence of a total of 12 species. Among the species recorded was Bullfinch, *Pyrrhula pyrrhula*, not observed during the transect walkovers. The most frequently recorded bird species included Blackbird, *Turdus merula*, Woodpigeon, *Columba palumbus*, Chaffinch, *Fringilla coelebs* and Song Thrush, *Turdus philomelos*.

The survey walkovers were carried outside of the breeding season but given the habitats present and the result of the desktop study it is reasonable to predict that the Ballyloo site supports a similar level of species diversity in the breeding season as recorded on the site in the winter period. The breeding bird community is likely to be very similar to that recorded at Clonmacshane which is located close to the Ballyloo site and has a similar range of habitats. Summer migrants such as Willow Warbler, *Phylloscopus trochilus*, Swallow, *Hirundo rustica* and Whitethroat, *Sylvia communis* are all likely to occur in the area during the summer months. The relatively large field size and habitat homogeneity makes it unlikely that the site would support a very broad range or high overall density of breeding bird species. It is noted that only 30 bird species were recorded at Clonmacshane during breeding season transect surveys.

Table 4-5 Results of bird survey transects across permitted solar farm. Peak counts of each species recorded are shown.

Common Name	Scientific Name	T1		T2		T3		T4	
		<100m	>100m	<100m	>100m	<100m	>100m	<100m	>100m
Blackbird	*Turdus merula*	4				1			
Blue Tit	*Cyanistes caeruleus*	4				3		1	

Common Name	Scientific Name	T1		T2		T3		T4	
		<100m	>100m	<100m	>100m	<100m	>100m	<100m	>100m
Buzzard	*Buteo buteo*		4			1	2		1
Chaffinch	*Fribilla coelebs*	6		1		4		2	
Dunnock	*Prunella modularis*	2							
Feral Pigeon	*Columba livia dom.*						35		
Fieldfare	*Turdus pilaris*					5			
Golden Plover^	*Pluvialis apricaria*							1	
Goldfinch	*Carduelis carduelis*	18		5	8	8			
Hooded Crow	*Corvus cornix*	2	6	2	16		13		3
House Sparrow*	*Passer domesticus*					6		2	
Jackdaw	*Corvus monedula*	6			2			3	
Kestrel^	*Falco tinnunculus*							1	1
Lapwing^	*Vanellus vanellus*		7						
Lesser Black-backed Gull*	*Larus fuscus*		7						
Linnet*	*Linaria cannabina*	2							
Long-tailed Tit	*Aegithalos caudatus*	3							
Magpie	*Pica pica*	3				1	1		1
Meadow Pipit^	*Anthus pratensis*	4		2		1			
Mistle Thrush	*Turdus viscivorus*			2					
Peregrine Falcon	*Falco peregrinus*		1						
Pheasant	*Phasianus colchicus*		1						
Pied Wagtail	*Motacilla alba*			1		2		2	
Raven	*Corvus corax*							1	
Redwing^	*Turdus iliacus*						1		
Robin	*Erithacus rubecula*	3		2		3		2	
Rook	*Corvus frugilegus*	2	50	70	43	100	33	12	6
Skylark*	*Alauda arvensis*	25		56	75	2		203	
Song Thrush	*Turdus philomelos*	3				2			

Common Name	Scientific Name	T1		T2		T3		T4	
		<100m	>100m	<100m	>100m	<100m	>100m	<100m	>100m
Starling*	*Sturnus vulgaris*	2	8	64		1			
Stock Dove^	*Columba oenas*					1			
Stonechat	*Saxicola torquata*	3				4		1	
Woodpigeon	*Columba palumbus*		8		1	230			1
Wren	*Troglodytes troglodytes*	4		1		1		1	
Yellowhammer^	*Emberiza citrinella*	6		1		4			

BoCCI Status: ^ Red-listed * Amber-listed

4.3.2 Non-volant Mammals (and Trail Camera record)

4.3.2.1 Desktop Study

The historical records of non-volant mammal species recorded in the 2km Grid Squares in which the proposed substation and grid connection options are located is summarised in Table 4-6. Five species in total have been recorded in this area.

Badger, *Meles meles*, has been recorded widely in this locality. Fox, *Vulpes vulpes* has also been recorded widely in this area. The other species recorded locally include invasive species Grey Squirrel, *Sciurus carolinensis*.

Table 4-6 Historical records of non-volant mammal species from the 2km grid squares that overlap the proposed solar farm and grid connection options.

Species	Scientific Name	Grid Square
Badger	*Meles meles*	S76P S76U S77K S77Q S77V
Fox	*Vulpes vulpes*	S76U S77K
Grey Squirrel	*Sciurus carolinensis*	S76P S77K
Hedgehog	*Erinaceus europaeus*	S76U
Rabbit	*Oryctolagus cuniculus*	S76U

The species recorded in the two 10km Grid Squares (S76 & S77) historically are shown in Table 4-7. Overall, 20 non-volant species have been recorded in these grid squares of which 9 species are invasive species e.g. Sika Deer, *Cervus nippon*. A total of 11 species are protected under Irish and/or European legislation, including Hedgehog, *Erinaceus europaeus* and Pine Marten*, Martes martes*.

Table 4-7 Species recorded historically in the overlapping 10km Grid Squares and the conservation status of these species.

Species	Scientific Name	Grid Square	Conservation Status
Badger	*Meles meles*	S76 S77	Protected Species: Wildlife Acts
Bank Vole	*Myodes glareolus*	S76	Invasive Species: Invasive Species >> Medium Impact Invasive Species
Brown Rat	*Rattus norvegicus*	S76 S77	Invasive Species: Invasive Species >> High Impact Invasive Species || Regulation S.I. 477 (Ireland)
Fallow Deer	*Dama dama*	S76	Invasive Species >> High Impact Invasive Species >> Regulation S.I. 477 (Ireland) || Protected Species: Wildlife Acts
Greater White-toothed Shrew	*Crocidura russula*	S76 S77	Invasive Species: Invasive Species || Invasive Species: Invasive Species >> Medium Impact Invasive Species
Grey Squirrel	*Sciurus carolinensis*	S76 S77	Invasive Species: Invasive Species >> High Impact Invasive Species || EU Regulation No. 1143/2014 || Regulation S.I. 477 (Ireland)
Hedgehog	*Erinaceus europaeus*	S76 S77	Protected Species: Wildlife Acts
House Mouse	*Mus musculus*	S77	Invasive Species: Invasive Species >> High Impact Invasive Species
Irish Hare	*Lepus timidus subsp. hibernicus*	S76 S77	
Mink	*Mustela vison*	S76 S77	Invasive Species: Invasive Species >> High Impact Invasive Species Regulation S.I. 477 (Ireland)
Otter	*Lutra lutra*	S76 S77	Protected Species: EU Habitats Directive || Annex II Annex IV || Protected Species: Wildlife Acts
Pine Marten	*Martes martes*	S77	Protected Species: EU Habitats Directive || >> Annex V || Protected Species: Wildlife Acts
Pygmy Shrew	*Sorex minutus*	S76 S77	Protected Species: Wildlife Acts
Rabbit	*Oryctolagus cuniculus*	S76 S77	Invasive Species: Invasive Species >> Medium Impact Invasive Species
Red Deer	*Cervus elaphus*	S77	Protected Species: Wildlife Acts
Red Fox	*Vulpes vulpes*	S76 S77	
Red Squirrel	*Sciurus vulgaris*	S77	Protected Species: Wildlife Acts
Sika Deer	*Cervus nippon*	S77	Invasive Species: Invasive Species >> High Impact Invasive Species || >> Regulation S.I. 477 (Ireland) || Protected Species: Wildlife Acts
Stoat	*Mustela erminea subsp. hibernica*	S77	
Wood Mouse	*Apodemus sylvaticus*	S76 S77	

Field surveys carried out at the permitted Clonmacshane Solar Farm (Ecology Ireland 2022) recorded a total of 8 species: Fox, Greater White-toothed Shrew, Wood Mouse, Brown Rat, Grey Squirrel, Rabbit, Mink, *Mustela vison* and Badger. Surveys carried out in the surrounding area for the permitted adjoining Garreenleen Solar Farm development and substation were also considered (Ecology Ireland 2020). A total of 11 non-volant mammal species were confirmed during the field survey and trail camera analysis for the permitted solar farm (from surveys in 2020) including Bank Vole, *Myodes glareolus*.

4.3.2.2 Field surveys

Eight trail cameras were deployed at the permitted Ballyloo Solar Farm site in October and November 2023. The analysis of the trail camera record is summarised in Table 4-8.

No signs of Otter were recorded at the site. The banks of the watercourses and drains were walked and no spraints, slides, couches or holts were observed.

A total of 5 wild non-volant mammal species were confirmed to occur on the wider solar farm site during the field survey and trail camera study (Table 4-8): Fox, Rabbit, *Oryctolagus cuniculus*, Brown Rat, *Rattus norvegicus*, Wood Mouse, *Apodemus sylvaticus* and Badger.

Two domestic species were also recorded on the trail cameras, Cat, *Felis catus* and Dog, *Canis familiaris*. There were a number of records of registrations of small mammals that it was not possible to definitively identify. These registrations are likely to have included Wood Mouse and very possibly other small mammal species such as Greater White-toothed Shrew, *Crocidura russula*.

Fox was recorded at 4 of the 8 camera locations. Rabbits were registered on cameras deployed in Parcel 1 only. Rabbit droppings were recorded in Parcel 1, 2 and 3. Rat was frequently recorded and recorded on 6 of the 8 camera locations. At locations C1 and C2, closest to the proposed substation location the only non-volant mammals recorded were Brown Rat, Wood Mouse and an unidentified small mammal, possibly a Greater White-toothed Shrew.

Table 4-8 Recordings and observations from trail camera footage at the proposed site in 2023.

Species	Scientific Name	C1	C2	C3	C4	C5	C6	C7	C8	TOTALS
Badger	*Meles meles*					1	66	15	101	**183**
Cat	*Felis catus*					4				**4**
Dog	*Canis familiaris*		4			1		1	1	**7**
Fox	*Vulpes vulpes*			3	3			1		**7**
Rabbit	*Oryctolagus cuniculus*						5	4	3	**12**
Brown Rat	*Rattus norvegicus*	16			34	179	1	3	7	**240**
Unid. Small Mammal		1			9	96		3	16	**125**
Wood Mouse	*Apodemus sylvaticus*	1								**1**

4.3.3 Bats

4.3.3.1 Desktop Survey

There are no records of bats specific to the 2km Grid Squares in which the proposed substation and grid connection options are located. However, a total of 8 taxa have been recorded historically in the two 10km

Grid Squares that overlap the proposed development site (Table 4-9). The species recorded are all protected under the Wildlife Act and Annex IV of the EU Habitats Directive.

Table 4-9 Historical records of bat taxa from the two 10km Grid Squares that overlap the proposed development site.

Species	Scientific Name	Grid Square	Conservation Status
Brown Long-eared Bat	*Plecotus auritus*	S76 S77	Protected Species: EU Habitats Directive || Annex IV || Protected Species: Wildlife Acts
Daubenton's Bat	*Myotis daubentonii*	S76 S77	Protected Species: EU Habitats Directive || Annex IV || Protected Species: Wildlife Acts
Leisler's Bat	*Nyctalus leisleri*	S76 S77	Protected Species: EU Habitats Directive || >> Annex IV || Protected Species: Wildlife Acts
Nathusius's Pipistrelle	*Pipistrellus nathusii*	S76	Protected Species: EU Habitats Directive || >> Annex IV || Protected Species: Wildlife Acts
Natterer's Bat	*Myotis nattereri*	S76 S77	Protected Species: EU Habitats Directive || >> Annex IV || Protected Species: Wildlife Acts
Pipistrelle sp.	*Pipistrellus pipistrellus sensu lato*	S76 S77	Protected Species: EU Habitats Directive || >> Annex IV || Protected Species: Wildlife Acts
Soprano Pipistrelle	*Pipistrellus pygmaeus*	S77	Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts
Whiskered Bat	*Myotis mystacinus*	S76	Protected Species: EU Habitats Directive >> Annex IV || Protected Species: Wildlife Acts

There were extensive bat surveys carried out as part of the ecological assessments for the permitted Clonmacshane and Garreenleen Solar Farm projects. Four species were confirmed from Clonmacshane in winter 2021/2022 (Ecology Ireland 2022): Common Pipistrelle, *Pipistrellus pipistrellus*, Soprano Pipistrelle, *Pipistrellus pygmaeus*, Leisler's Bat, *Nyctalus leisleri*, Daubenton's Bat, *Myotis daubentonii*. Follow up summer season surveys in 2022 confirmed the presence of one additional species, Brown Long-eared Bat, *Plecotus auritus*. Analysis from previous surveys carried out for the permitted Garreenleen Solar Farm recorded three species of bat present: Common and Soprano Pipistrelle and Leisler's Bat (Ecology Ireland 2020).

No bat roosts were identified at either of the permitted solar farm sites. The bat species identified in the wider receiving environment are considered to be relatively widespread and common nationally (Lysaght & Marnell 2016, Roche *et al.* 2014, Marnell *et al*. 2019) and are largely considered to be of least concern in terms of conservation status. All bat species occurring in Ireland are legally protected under the Irish Wildlife Acts (1976 - 2018), where it is an offence to hunt or interfere with or destroy their breeding or resting places (unless under statutory licence / permission).

4.3.3.2 Passive detector deployment results

Analysis of the 5 passive detectors deployed at the permitted Ballyloo Solar Farm development site is presented in Table 4-10. A total of five species were confirmed to be present: Common Pipistrelle, Soprano Pipistrelle, Leisler's Bat, Daubenton's Bat and Brown Long-eared Bat. All of these species were previously recorded foraging/commuting at the other permitted solar farms in the wider area.

At BD1 and BD2 the closest deployment locations to the proposed substation location all of the species were recorded with the exception of Brown Long-eared Bat.

The level of bat activity was relatively low notwithstanding the time of year in which the deployment occurred. Common and Soprano Pipistrelle were the most frequently registered species. This is consistent with the surveys undertaken previously at Clonmacshane and Garreenleen Solar Farm sites.

Table 4-10 Summary of bat recording analysis at Ballyloo Solar Farm.

Species	Scientific Name	BD1	BD2	BD3	BD4	BD5
Common Pipistrelle	*Pipistrellus pipistrellus*	13	28	12		21
Soprano Pipistrelle	*Pipistrellus pygmaeus*	10	10	6		12
Leisler's Bat	*Nyctalus leisleri*	5	4	1	3	4
Daubenton's Bat	*Myotis daubentonii*		1	5		
Myotis sp.	*Myotis* sp.	6	2	2		8
Brown Long-eared Bat	*Plecotus auritus*			1	1	4

There is a lack of man-made potential roost features within wider permitted solar farm development site. Trees/bushes can provide roosting opportunities for bats via crevices/holes within the trunk, crevice behind peeling bark or amongst ivy that is growing on the tree. Large mature trees generally provide the best such opportunities as crevices/holes tend to develop on trees with age. Tree-roosts are not as widely used in Ireland as in the rest of Europe due to the low proportion of mature deciduous woodland and (until recent years) the absence of woodpecker species which create roosting opportunities through the excavation of hollows in trees. Tree roosts are more likely to be used by small numbers of bats as day/night roosts during the summer period on a transient basis. While some bat species can also locate maternity roosts in trees (e.g. Leisler's bat), these appear to be quite rare in Ireland, where the majority of known bat roosts are in buildings (Roche *et al*. 2014). No evidence of bat roosting activity (i.e. bimodal spikes in bat activity at dawn and dusk) were recorded during the bat detector survey completed as part of the EcIA for the permitted solar farm development and the likelihood of a large tree roost being present on the site is considered very low.

The substation site lacks linear habitat features likely to provide optimal commuting or foraging opportunities for bats. There are no features present which support roosting opportunities for bats, such existing linear/edge features and riparian corridors which will support commuting/feeding bats associated with roosts in the wider area also. The site is therefore considered to be of low local value for bats overall.

4.3.4 Other Taxa

4.3.4.1 Desktop Study

A desktop study was undertaken to consider the other taxa of interest that have been recorded in the receiving environment. The other taxa of interest including rare, protected and invasive species recorded in the overlapping 10km Grid Squares is presented in Table 4-11. Species recorded include Common Frog, *Rana temporaria*, Smooth Newt, *Lissotriton vulgaris* and Freshwater White-clawed Crayfish.

Table 4-11 Other taxa of interest recorded in S76 & S77.

Species	Scientific Name	Grid Square	Conservation Status
Barbut's Cuckoo Bee	*Bombus/Psithyrus barbutellus*	S76	Endangered
Bare-saddled Colletes Bee	*Colletes similis*	S76	Near Threatened
Buffish Mining-Bee	*Andrena/Melandrena nigroaenea*	S76	Vulnerable
Common Frog	*Rana temporaria*	S76 S77	Protected Species: EU Habitats Directive Annex V || Protected Species: Wildlife Acts
Common Garden Snail	*Cornu aspersum*	S76 S77	Invasive species
Common Lizard	*Zootoca vivipara*	S77	Protected Species: Wildlife Acts
Dingy Skipper	*Erynnis tages*	S76	Near Threatened
English Chrysalis Snail	*Leiostyla anglica*	S76	Near Threatened
Freshwater Shrimp	*Gammarus pulex*	S76 S77	Medium Impact Invasive Species
Freshwater White-clawed Crayfish	*Austropotamobius pallipes*	S76 S77	Protected Species: EU Habitats Directive Annex II Annex V || Protected Species: Wildlife Acts
Globular Pea Mussel	*Pisidium hibernicum*	S76	Vulnerable
Gooden's Nomad Bee	*Nomada goodeniana*	S76	Endangered
Water beetle species	*Haliplinus lineolatus*	S77	Threatened Species: Near threatened
Heath Snail	*Helicella itala*	S76	Vulnerable
Hill Cuckoo Bee	*Bombus/Psithyrus rupestris*	S76	Endangered
Jenkins' Spire Snail	*Potamopyrgus antipodarum*	S76 S77	Invasive species
Lake Orb Mussel	*Musculium lacustre*	S76 S77	Vulnerable
Large Red Tailed Bumble Bee	*Bombus/Melanobombus lapidarius*	S76 S77	Near Threatened
Lesser Bulin	*Merdigera obscura*	S77	Endangered

Species	Scientific Name	Grid Square	Conservation Status
Marsh Whorl Snail	*Vertigo antivertigo*	S76	Vulnerable
Megachile sp.	*Megachile centuncularis*	S77	Threatened Species: Near threatened
Moss Carder-bee	*Bombus/Thoracombus muscorum*	S76 S77	Near Threatened
Point Snail	*Acicula fusca*	S76	Vulnerable
Shrill Carder Bee	*Bombus/Thoracombus sylvarum*	S76	Endangered
Small Blue	*Cupido minimus*	S76	Endangered
Small Heath	*Coenonympha pamphilus*	S77	Near threatened
Small Sallow Mining Bee	*Andrena (Andrena) praecox*	S76	Vulnerable
Smooth Newt	*Lissotriton vulgaris*	S76 S77	Protected Species: Wildlife Acts
Tawny Mining Bee	*Andrena fulva*	S76 S77	Regionally extinct
Tree Snail	*Balea perversa*	S77	Vulnerable
Wall	*Lasiommata megera*	S76	Near Threatened
Wrinkled Snail	*Candidula intersecta*	S76 S77	Invasive species
Crayfish Plague	*Aphanomyces astaci*	S76	High Impact Invasive Species

4.3.4.2 Survey Results

The were no observations of Common Frog or any other taxa during the field walkovers of the wider permitted solar farm site. It is likely that Common Frog are present at locations on the site with the manmade ponds (FL8) providing some attractive breeding habitat.

In general, the dominant habitats present at the substation location are arable crops (BC1) and the wider area also contains improved agricultural grassland (GA1). These provide a limited source of food for invertebrates such as butterflies and bees. Overall, due to the modified, disturbed and/or transient nature of the habitats present, they are considered of lower local value for most other taxa species at present.

Watercourses in the area of the permitted solar farm were sampled for signs of the presence of Smooth Newt, Freshwater White-clawed Crayfish, Atlantic Salmon and Freshwater Pearl Mussel in the receiving environment. The samples were analysed by SureScreen Scientifics for eDNA. Environmental DNA (eDNA) is nuclear or mitochondrial DNA that is released from an organism into the environment. Sources of eDNA include secreted faeces, mucous, gametes, shed skin, hair and carcasses. Two samples were collected for analysis and these did not indicate the presence of Smooth Newt or indeed of Atlantic Salmon, Freshwater White-clawed Crayfish or Freshwater Pearl Mussel.

4.4 Overall Site Evaluation

Overall based on this current assessment, the study site is of lower local importance to biodiversity. The main habitats which will be directly impacted by the proposed farm development are; Arable crops (BC1) and with a very limited temporary impact upon Buildings and Artificial Surfaces (BL3). The grid connection

Option B will involve a temporary removal of an area of c. 5m of hedgerow to facilitate access to Kellis substation. This access location has been selected to avoid impact upon any mature trees and the hedgerow is intended to be reinstated upon completion of the grid connection works.

Given the habitats present the study site is of lower local importance for general birds, mammals (non-volant), bats and other taxa overall.

Potential impacts arising from the proposed development on existing biodiversity of the site and wider locality, which may arise during construction and/or operation, are considered further below.

5 Potential Impacts

Potential impacts of the proposed development on ecology are discussed below. The assessment of potential impacts is informed by the desktop and field surveys carried out in 2023 and 2025, augmented by a thorough review of historical data and contemporary field surveys from nearby permitted solar farm sites Clonmacshane, Park and Garreenleen Solar Farms and proposed Ballybannon Solar Farm also conducted by Ecology Ireland.

In general, measures to protect the local watercourses, particularly during the construction phase and to minimise the disturbance or loss of existing field boundary habitat are considered key in minimising the potential effects of the proposed development. The construction and commissioning phase for the proposed development is estimated to take c. 24 months.

5.1 Potential Effects on Designated Sites

Construction Phase

The proposed substation and grid connection routes are within the River Barrow catchment. The location of the proposed substation and of the grid connection options considered in this assessment are not situated within or closely adjacent to any European designated site. It is anticipated that the substation and grid connection will be constructed in parallel with the proposed solar farm development.

The substation will be located in an area of low local ecological importance, currently under Arable Crop (BC1). Standard construction phase environmental controls will be effective in minimising any wider environmental effects arising from the construction of the substation at this location.

The grid connection will be undergrounded between the on-site substation and the existing Kellis substation. No Third Schedule Invasive species were recorded along the route of the proposed grid connection. There is some potential for localised temporary disturbance and displacement effects on locally occurring fauna during the construction phase. However, as the chosen route largely follow existing roads the construction activity will represent only a marginal and highly localised source of potential disturbance for fauna species. Any watercourse crossings will need to be carried out in accordance with proven construction and environmental protection methodology. It is proposed to cross the Kilmeany stream by HDD, thereby avoiding the need for any in-stream works. The Kilmeany crossing is >9.5km upstream of the River Barrow and River Nore SAC.

Notwithstanding the distances involved between the proposed development and the River Barrow and River Nore SAC it is determined that in the absence of appropriate environmental controls and suitable mitigation measures that there is some likelihood of significant effects on the European site. As a result a Natura Impact Statement is provided (Appendix 1) which fully considers the potential for the project on its own and cumulatively to result in adverse impacts on the SAC.

The grid connection cable will be undergrounded and there is no likelihood of any significant effects arising in relation to ecological impacts during the operational phase. The substation will have welfare facilities and will be manned on occasion. However, these are all potential sources of disturbance and emissions that are readily amenable to mitigation. With the application of such standard controls there will be negligible risk of effects on the designated sites in the wider hinterland associated with the operation of the substation and grid cable connection.

5.2 Potential Effects on Habitats and Flora

Construction Phase

Habitats corresponding to those listed on Annex I of the EU Habitats Directive are not present within the proposed development study area. Botanical species protected under the Flora (Protection) Order 2022, listed in the EU Habitats Directive (92/43/EEC) or Red-listed (Wyse-Jackson *et al*, 2016) were not recorded during the site survey.

Arable crop (BC1) is the main habitat which will be directly impacted by the proposed development as this is where the substation will be located. Depending on the configuration of substation selected the footprint of the development will take up a larger, or smaller, portion of the red-line application boundary at this location. However, the difference is not significant in relation to the impact on habitats, given that the lands are highly modified intensive agriculture and of low ecological value. As a worst case scenario, the assessment has considered the complete removal of the Arable Crop habitat at this location. The substation and associated electrical infrastructure is of negligible ecological value.

The grid connection route follow the local roads. Close to Kellis substation, Option A continues on the local road and accesses the substation at the existing entrance. Option B crosses an open field (Arable Crop; BC1) and will require the temporary removal of a short section of hedgerow to facilitate access to the substation along the western boundary. The route has been selected to ensure that the works will not require the removal of any mature trees. Once the cable is laid the hedgerow will be reinstated and any remedial planting necessary will be implemented.

The modification of intensively managed agricultural habitats of mainly low conservation value, as a result of the proposed development, will lead to a slight, negative impact on habitats and flora at the proposed substation site. The wider associated Ballyloo solar farm, which is adjacent to the proposed substation, has significant landscaping commitments that will result in the net gain of linear habitats, as well as planting of 2,611m^2 of native woodland. Hedgerow establishment and enhancement measures along with the establishment of a woodland habitat will result in a net gain of hedgerow and woodland habitat within the proposed development site which will result in an overall moderate, positive effect on this habitat over the operational lifetime of the project.

A further measure to benefit biodiversity within the proposed solar farm site includes the creation of field margins using Farm Habitat Management Guidelines established by the EIP BRIDE project. These margins will be established around the perimeter of the proposed development between the perimeter fence and nearest hedgerow to provide additional benefits to pollinating insects and local wildlife including red-listed farmland bird species e.g. Yellowhammer and potentially maintaining suitable habitats for arable crop weed species e.g. Corn Marigold.

Temporary disturbance of modified habitats such as buildings and artificial surfaces (BL3), Arable Crop (BC1) and potentially Hedgerow (WL1; Option B) will occur as a result of the proposed grid connection works. The affected highly modified habitats will be returned to their original state following completion of works. As a result, impacts will be neutral, imperceptible on these habitats.

Construction activities associated with the proposed development works have the potential to introduce non-native invasive species into the proposed development site. No Third Schedule Invasive species were recorded within the development footprint. The status of non-native invasive species shall be determined

prior to the commencement of any construction activities and appropriate management undertaken if necessary. With the implementation of these measures, the risk of introduction and/or spread of non-native invasive species due to the proposed construction activities would be low and deemed a neutral effect.

No other habitats identified during the current survey will be impacted by the construction phase of the proposed development.

Operational Phase Impacts

There will be no additional removal of habitat during the operational phase of the proposed development and there is no potential for significant negative impacts on habitat and flora arising for the operational phase of the proposed development.

5.3 Potential Effects on Fauna

Construction Phase

Potential construction effects on fauna could be associated with disturbance/displacement effects, loss or degradation of feeding or resting places, exclusion or even direct mortality. Most of these effects are rendered highly unlikely due to the nature of the receiving environment and the general commitments (e.g. setback from watercourses) which serve to minimise the loss and disturbance of key habitats within the site.

During construction there may be some lighting of the temporary works compound and lighting has the potential to be disturbing to local fauna. Similarly, the construction phase of the proposed development has the potential to cause disturbance (noise/visual cues) to fauna occurring at the substation development site and along the grid connection route. Movement of plant and personnel and the associated noise and visual stimuli could potentially cause localised disturbance and displacement of certain faunal species. The introduction of edible and putrescible wastes can attract scavenging species and disrupt the local ecology. Given the scale of the works the potential effects are localised and temporary in nature and amenable to mitigation.

The loss of Arable Crop (BC1) at the proposed substation site will lead to a highly localised non-significant loss of foraging habitat for farmland bird species such as Woodpigeon and Rook. There will be no net loss of linear habitats (treeline/hedgerow) as a result of the proposed development. The proposed development will result in the removal of the arable crops for the lifetime of the project and may therefore reduce the availability of food for Yellowhammer on the site. However, similar suitable habitat is relatively abundant in the wider area, as the proposed development site is situated in a landscape dominated by pasture and non-irrigated arable land (CORINE 2018, www.epa.ie).

There is no suitable breeding habitat for Golden Plover or Lapwing at or in the immediate vicinity of the proposed development site, although these species may forage at the development site on a transient basis during the winter months when suitable habitat is available. The proposed development site is not of

known importance to either species (Crowe 2005, I-WeBS[7]), where the areas of highest concentrations of this species are coastal and inland wetland sites in winter (Crowe 2005).

Several mammal species occur or are likely to occur in the vicinity of the works footprint at least on an occasional basis when foraging/commuting. None of the non-volant mammals recorded locally are of high conservation concern in Ireland. Otter, a 'Least Concern' species (Marnell *et al.* 2019) was previously recorded along the River Burren during surveys undertaken for the permitted Garreenleen Solar Farm but was not recorded during surveys for the permitted Ballyloo Solar Farm or at the permitted Clonmacshane Solar Farm. Given the presence of some suitable riparian habitat on the Kilmeany it is possible that Otters may occur locally from time to time. However, as the crossing of the Kilmeany will be achieved by HDD the potential for disturbance of the aquatic environment is minimised.

No significant impacts on fauna are expected as a result of the proposed development.

Operational Phase Effects

The built nature of the substation infrastructure makes it relatively unattractive for most fauna species. Some species such as House Martin, *Delichon urbicum* are capable of using standalone structures as a suitable nesting site and others bird species such as Gulls and Corvids will also use perches within this type of built environment. However, due to the lack of foraging habitat and cover the substation will be unattractive for most fauna species.

There will be some switchable lighting at the substation, but this will be minimal and used only as necessary. The substation will be visited occasionally but this will tend to be during daylight hours and the activity at the substation will not represent a significant source of ongoing disturbance.

The potential effects on fauna arising from the operation of the proposed development are therefore considered to be neutral.

5.4 Cumulative Impacts

For projects to act cumulatively in a manner that significantly impacts upon biodiversity there needs to be a mechanism by which such an effect is mediated. For instance, this could occur if there was cumulative impacts upon water quality, or loss of an important habitat feature. In general, if individual projects and plans adequately address the potential risks to the receiving environment there is significantly less risk of cumulative and in combination effects. Indeed, in circumstances where projects have landscaping and biodiversity measures that are compatible it may be the case that ecological connectivity may be improved through creation or enhancement of hedgerow, woodland and field margin habitats.

The proposed development is associated with the development of a number of other renewable energy projects in this part of Co. Carlow. Several of these projects involve a grid connection into Kellis substation.

The permitted Ballyloo Solar Farm is located to the west of the permitted Clonmacshane Solar Farm which itself is located on farmland south of the permitted Garreenleen Solar Farm. Ballybannon Solar Farm (permitted by Carlow County Council 31/10/2025) and the permitted Park Solar Farm sites are located to

[7] https://bwi.maps.arcgis.com/apps/View/index.html?appid=1043ba01fcb74c78bc75e306eda48d3a

the west of the proposed substation at Ballyloo. Ecology Ireland also carried out the assessments (including preparing the EcIA and NIS) for these solar farm developments. All of these developments are located within the same catchment and have a hydrological connection to the River Barrow and River Nore SAC.

The potential for significant effects on designated sites and their conservation objectives arising from the Garreenleen Solar Farm project was fully assessed by An Bord Pleanála as part of the AA process (ABP Ref: 307891) and by Carlow County Council for the permitted Clonmacshane and Park Solar Farm developments (22/163 & 24/60205).

Ecology Ireland has considered other projects and plans relevant to this area and their potential to act cumulatively or in combination with the proposed development. Included in this review was consideration of Carlow CDP (2022-2028) and the draft Carlow Biodiversity Action Plan (2023-2028). The latter document identifies several challenges to biodiversity in the county including water pollution, improper hedgerow management and the spread of invasive species. All of these elements are key items that have been identified as risks and addressed in the mitigation strategy and biodiversity management strategy for the current development. As such, the measures that minimise the risk of any negative effects on water quality, the introduction or spread of invasive plant species and the substantial improvement in the amount and quality of hedgerow envisaged as part of the current project are very much aligned with the local biodiversity strategy.

Potential cumulative ex-situ impacts on Otter as a result of the proposed development, in combination with the permitted Ballyloo solar farm could potentially be relevant as the local watercourses are all part of the Barrow catchment. Otter was recorded on the Burren River during surveys carried out for Garreenleen solar farm. No signs of Otter were recorded during the site walkovers for the current proposed development and no holts were recorded locally. No significant disturbance impacts on Otter are deemed likely as construction activities will not take place at night (when this nocturnal species is active) and the solar farms will not be lit at night. The landscaping plan for Ballyloo Solar Farm (and other local solar farms) will enhance the habitats along the riparian corridor and provide a habitat and visual buffer between the solar farm infrastructure and the river, with access to the site for Otter and other wild mammals to be maintained via a 200m void at the base of the perimeter fence.

The potential for impacts arising from polarotaxis and the 'lake effect' were considered as part of the EcIA for the other local solar farm developments. No cumulative disturbance/displacement impacts on rare or protected species or habitats are expected as a result of the proposed development in combination with the permitted developments in the wider area, where the residual impact on fauna is considered to be neutral to slight positive overall given the landscape enhancement/biodiversity management measures proposed. It has to be noted that these sites are located in an area with intensive agriculture where activities such as ploughing and spreading of fertiliser have the potential to impact negatively upon the receiving environment. During the lifetime of the solar farm developments there will be no run-off from ploughed fields, or as a result of nutrients from land-spread fertilisers.

The other planning permissions and live applications in this area were reviewed using myplan.ie. A selection of the projects considered as part of this assessment is presented in Table 5-1. The local planning applications are dominated by one-off housing developments and projects associated with agricultural activity. There is one nearby site at Ballintrane, operated by O'Toole Composting Ltd. under IEL (W0284-

01) for the recovery, or a mix of recovery and disposal, of non-hazardous waste with a capacity exceeding 75 tonnes per day involving biological treatment. The EIA prepared to accompany a planning application for development at the site, as well as annual environmental reports (AERs) available on the EPA website were reviewed. It was concluded that operations on that site have no direct impact on this SAC and there is no potential for cumulative or in combination impacts on the receiving environment as there are no emissions to groundwater at that facility, with all surface water emissions strictly controlled and monitored and all wastes and consumables on site are stored in bunded areas and any process waste tankered off site directly to the County Council's Waste Water Treatment Plant.

No potential for significant negative cumulative impacts upon the local biodiversity was identified. On the contrary, the landscaping and biodiversity management measures provided with the permitted Ballyloo Solar Farm as well as the similar commitments for the permitted Park, Garreenleen and Clonmacshane Solar Farm developments are likely to collectively yield local positive biodiversity enhancements for the range of species that occur in the area.

Table 5-1 Some of the projects considered in the assessment of potential cumulative and in combination effects.

Ref. Number	Distance from Subject Site	Status	Description
24/60205	0km	Granted Permission – 24/04/2025	A 10 Year planning permission for a solar farm with a total area of circa 73 hectares in the townlands of Ballybar Lower, Ballybar Upper, Ballycarney, Ballyloo, Linkardstown, Park and Tinryland in County Carlow. The solar farm will consist of solar panels on ground mounted frames, 11 no. single storey electrical inverter/transformer stations, 3 no. single storey spare parts containers, 2 no. Ring Main Units, 3 no. weather stations, underground electrical ducting and cabling within the development site, private lands and within the L1010, L3051, L3052 and L3050 public roads to connect solar farm field parcels, security fencing, CCTV, access tracks, 3 no. watercourse/drain deck crossings and 2 no. horizontal directional drill crossings (under M9 motorway and L3050), temporary construction compounds, landscaping and all associated ancillary development and drainage works. Construction and operational access will be via 2 no. entrances from the L1022 and L1010. Sections of the proposed underground electrical cabling will traverse the solar farm proposed under Carlow County Council Reference 24/60043, but will not alter infrastructure proposed under that application. The operational lifespan of the solar farm will be 40 years and planning permission is requested for this duration. A Natura Impact Statement (NIS) has been prepared and will be submitted to the Planning Authority with the application
24/60043	0km	Granted Permission – 05/09/2025	A 10 Year Planning Permission for a solar farm with a total area of circa 192 hectares. The solar farm will consist of solar panels on ground mounted frames, 30 no. single storey electrical inverter/transformer stations, 4 no. single storey spare parts containers, 4 no. Ring Main Units, 8 no. weather stations, underground electrical ducting and cabling within the development site, private lands and within

Ref. Number	Distance from Subject Site	Status	Description
			the L3051, L3052 and L3050 public roads to connect solar farm field parcels, security fencing, CCTV, access tracks, 2 no. stream deck crossings and 1 no. horizontal directional drill, temporary construction compounds, landscaping and all associated ancillary development and drainage works. Construction and operational access will be via 4 no. entrances from the L3051, L3052 and L3050. The operational lifespan of the solar farm will be 40 years and planning permission is requested for this duration. A Natura Impact Statement (NIS) has been prepared and will be submitted to the Planning Authority with the application
25/60137	0km	Notification to grant – 31/10/25	A 10 Year Planning Permission for a solar farm with a total area of circa 57 hectares. The solar farm will consist of solar panels on ground mounted frames, 8 no. single storey electrical inverter/transformer stations, 2 no. single storey spare parts containers, 1 no. Ring Main Unit, 3 no. weather stations, underground electrical ducting and cabling within the development site, private lands and within the L4038, L8185, R448, L3051, L3052 and L3050 public roads to connect solar farm field parcels, security fencing, CCTV, access tracks, 5 no. watercourse/drain deck crossings and 2 no. horizontal directional drill crossings (under M9 motorway and the Dublin - Waterford railway), temporary construction compounds, landscaping and all associated ancillary development and drainage works. Construction and operational access will be via 2 no. existing entrances from the R448 and L1010. Sections of the proposed underground electrical cabling will traverse the solar farms proposed under Carlow County Council References 24/60043 and 24/60205, but will not alter infrastructure proposed under these applications. The operational lifespan of the solar farm will be 40 years and planning permission is requested for this duration. A Natura Impact Statement (NIS) has been prepared and will be submitted to the Planning Authority with the application.

Ref. Number	Distance from Subject Site	Status	Description
24/60410	0.1km	Granted Permission – 06/06/25	The replacement ("restringing") of the existing overhead line circuit conductor wires with a new higher capacity conductor • the strengthening of foundations at 7no. locations • shear block remedial works at 77no. locations • the strengthening of towers (i.e., member replacement) at 34no. locations • the replacement of 5.1km of earthwire • the painting of all structures • the replacement of insulating and ancillary hardware at structures • all associated works within the existing Kellis 220kV substation to accommodate the uprated 220kV OHL including uprating of the Great Island bay in Kellis 220kV substation.
24/60223	0.1km	Granted Permission – 20/09/2024	110kV underground electricity cabling and all associated ancillary site development works. The cabling will extend from and connect with permitted 110kV underground electricity cabling (under An Bord Pleanála reference ABP-313139-22) on the L30535 public road to a line bay in the Kellis 220kV substation.
313139-22	0.1km	Granted Permission – 03/11/2022	Proposed 110kV substation and underground grid connection.
20143	0.1km	Granted Permission – 2/09/2021	A 10 year Planning Permission for a solar farm.
24/60295	2.0km	Live Application, Decision Due – 07/01/2026	Ten year planning permission for renewable energy development comprising of the construction of a solar farm.
ABP-303821	0.2km	Granted Permission – 23/09/2019	10 year permission for an up to 100MW Battery Energy Storage Facility providing energy services to the National Grid consisting of construction and operation of up to 34 metal containers.

Ref. Number	Distance from Subject Site	Status	Description
ABP-320354	c. 5.5km	Live Application, Decision Due – 04/12/2024 (Decision delayed at Board)	Permission for the construction of 7 wind turbines and all associated works. A 10 year planning permission and 35 year operational life of the wind farm from the date of commissioning is sought. Environmental Impact Assessment Report and Natura Impact Statement submitted with application.
24/60295	c.2.4km	Live Application, Decision Due – 7/01/2026	Ten year planning permission for renewable energy development comprising of the construction of a solar farm.
24/60332	c. 1.8km	Granted Permission – 12/12/2024	the demolition of all existing structures within the Tinryland Wastewater Treatment Plant and the construction on an extended site (0.09 ha in total) which will consist of a new pumping station (17m2), new below-ground storm tank (total storage of 123m^3), replacement welfare facility (33m2), ground-mounted photovoltaic array (83 m2), new palisade perimeter fencing (2.4m high) and associated works; the construction of a new rising main and gravity main (3.7km in length) along the Nurney Road, L1023 and N80, connecting to the existing wastewater sewer at Ballinacarrig; and all ancillary and associated temporary works. A Natura Impact Statement (NIS) will be submitted to the Planning Authority with the application
ABP-318295	c. 3.7km	Granted Permission – 21/11/2024	Construction of five wind turbines, meteorological mast, electricity substation and associated site works. The application is accompanied by a Planning Report, Environmental Impact Assessment Report and a Natura Impact Statement.
24/60149	c. 1.4km	Granted Permission – 27/09/2024	The expansion of the existing commercial store into the adjoining agricultural use buildings including raised roof height to the unit to the east and the provision of a retention pond and all associated ancillary works, the buildings will be repurposed as whiskey maturation warehouses

Ref. Number	Distance from Subject Site	Status	Description
ABP-318475	c. 8km	Granted Permission – 04/06/2024	A ten year planning permission for a solar energy development with a total site area of 77 hectares and all associated site works.
ABP-315063	c. 0.1km	Granted Permission – 02/05/2024	Development of a synchronous condenser grid support facility and all associated works
ABP-315365	c. 5.5km	Granted Permission – 21/11/2023	Wind energy development consisting of 7 no. wind turbines and all associated works.
ABP-322690	c.0km	Live Application - due to be decided by 01/12/2025	Proposed 110kV electrical substation and grid connection.
ABP-321416	c.3km	Live Application – undetermined at present	Proposed development along a section of the N80 Road known as the N80 Leagh Bends Scheme.
21/23	c.3.75km	Granted 26/10/21	Construction of a Solar PV development and all associated site works.
23/92	c.3.85km	Granted 04/06/2024	A ten year planning permission for a solar energy development with a total site area of 77 hectares and all associated site works.

Ref. Number	Distance from Subject Site	Status	Description
22/142	c.3km	Granted Permission – 22/03/2023	Clonmacshane Solar Farm.
ABP-314421	c. 460m	Granted Permission – 26/07/2022	To construct a 30m multi-user lattice telecommunications support structure, carrying antenna and dishes enclosed within a 2.4 metre high palisade fence compound together with associated ground equipment cabinets and associated site works including new access track and to replace existing gated access. The installation will form part of eir mobile telecommunications network. A Natura Impact Statement (N.I.S.) will accompany the planning application.

5 Mitigation Measures

The following mitigation measures will be implemented as part of the proposed project in order to minimise the potential effects on the existing ecology as discussed above. These measures are to be read in conjunction with the detailed construction phase commitments presented in the Construction Method Statement for Ballyloo Substation and Grid Connection that accompanies the planning application. These include standard measures such as the proper handling of edible and putrescible wastes etc.

The measures outlined below will be implemented to ensure that any impacts on the receiving environment will be avoided during the project's construction and operational phases. The substation will be located in an area of low local ecological importance, currently under Arable Crop (BC1). There are no drains or watercourses within the substation footprint, irrespective of the configuration chosen. Standard construction phase environmental controls will be effective in minimising any wider environmental effects arising from the construction of the substation at this location.

The grid connection will be undergrounded between the on-site substation and Kellis substation. No Third Schedule Invasive species were recorded along the routes under consideration. There is some potential for localised temporary disturbance and displacement effects on locally occurring fauna during the construction phase. However, as the chosen routes largely follow existing roads the construction activity will represent only a marginal and highly localised source of potential disturbance for fauna species. The watercourse crossing will need to be carried out in accordance with proven construction and environmental protection methodology.

As described in the assessments for the permitted solar farm application, the construction activities for Ballyloo Solar Farm will be subject to the commitments presented in a CEMP. The environmental controls described in the following sections are considered compatible and complementary with those commitments. The Ballyloo Substation & Grid Connection - Construction Methodology (October 2025) details the mitigation measures that will be applied during the construction and commissioning of the substation and underground grid connection.

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.

General Environmental Controls and Mitigation

The final Construction Method Statement and CEMP will comply with any conditions of planning. The environmental measures to be included in the final CEMP will include the measures as set out in the following sections:

The environmental control measures for construction phase will 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.
- A buffer of 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.
- 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.
- 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.

- 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.

Surface/Foul Water

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.

It should be noted that the foul water drainage proposals are the same for all AIS and GIS substation options described in this report. There are no existing foul sewer water drains on or near the proposed substation site.

HDD Crossing – Environmental Controls

The proposed drilling methodology for each HDD is as follows:

- A works area of approximately 40m^2 will be fenced on both side (launch/receptor) creating an easement/wayleave.
- The drilling rig and fluid handling units located on one side of the crossing will be stored on double bunded 0.5mm PVC bunds which will contain any accidental fluid spills and storm water run-off.
- Entry and exit pits (1m x 1m x 2m) will be excavated; the excavated material will be temporarily stored within the works area and used for reinstatement or disposed of to a licensed facility.
- A 1m x 1m x 2m steel box will be placed in each pit. This box will capture any drilling fluid returns from the borehole.
- The drill bit will be set up by a surveyor, and the driller will push the drill string into the ground and will steer the bore path under the stream.
- A surveyor will monitor drilling works to ensure that the modelled stresses and collapse pressures are not exceeded.
- The drilled cuttings will be flushed back by drilling fluid to the steel box in the entry pit.
- Once the first pilot hole has been completed a hole-opener or back reamer will be fitted in the exit pit and will pull a drill pipe back through the bore to the entry side.
- When all bore holes have been completed, a towing assembly will be set up on the drill and this will pull the ducting into the bore.
- The steel boxes will be removed, and the drilling fluid disposed of to a licensed facility.
- The ducts will be cleaned and proven and their installed location surveyed.
- The entry and exit pits will be reinstated as per the landowners' requirements.

Additional Ecological Mitigation

The following mitigation measures will be implemented as part of the proposed project in order to minimise the potential effects on the existing ecology as discussed above. These measures are to be read in conjunction with the detailed construction phase commitments presented in the CEMP and Construction Methodology for Electrical Infrastructure that accompanies the planning application.

- An Ecological Clerk of Works (ECoW) will be appointed to ensure that the mitigation strategy is correctly implemented both during the construction phase, establishment of the landscaping measures and for the duration of the eventual decommissioning of the project.
- As a precautionary measure, the soil stripping and construction of the site access tracks will be carried out outside of periods of wet weather. Scheduling of works will avoid insofar as practicable the wetter months of the year. In addition, appropriate run-off control will be installed and maintained for the duration of the construction phase. It will help minimise the risk of run-off from the site by limiting the earthworks undertaken in the wetter months of the year.
- All lighting, temporary and permanent will be cowled and downward directed with a colour temperature maximum of 2,700K. Thus light spill will be minimised and the lighting will be less disruptive to foraging/commuting bats.
- Buffer zones from watercourses/drains will be strictly maintained.
- 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.
- 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.
- All construction works will be carried out according to best practice with standard environmental controls in place to prevent any damaging run-off from the site (see CIRIA 2001, 2010 & 2015). The construction of the proposed development will be implemented in accordance with the Construction Environmental Management Plan (CEMP) for the proposed development.
- 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.
- Silt fencing will be installed where the grid route is proximate to drain or watercourse crossings. The silt fence will provide protection from sediment and potential site water runoff.

a. 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.
b. 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.).
c. The contractor will ensure that good housekeeping is always maintained and that al site personnel are made aware of the importance of the nearby aquatic environments and the requirement to avoid pollution of all types.

- A pre-construction survey will be undertaken to identify and map the occurrence and extent of any Third Schedule Invasive Plant species within or adjacent to the works footprint. If such species are found to occur at this time an Invasive Species Management Plan (ISMP) to control invasive species shall be developed following best practice guidance (e.g. after NRA 2010 and Fennell *et al*. 2018) with the advice of a suitably qualified ecologist. The ISMP should be finalised in consultation with and based on advice provided by the appointed specialist contractor, who will continue to review and, if necessary, update the Management Plan, in order to ensure that current relevant guidelines and regulations are followed at the time when the management of these species is implemented.

- To confirm the findings of the field studies that informed the assessment of the proposed development and the permitted Ballyloo Solar Farm and in keeping with recommended best practice, a pre-construction walkover of the site will be conducted immediately before the scheduled commencement of construction or vegetation clearance works.

- No 'woody' vegetation (hedgerows/trees) will be removed during the bird breeding season (March 1st to August 31st inclusive).

- All excavations/trenches will be covered at night, or a suitable means of escape (escape board) provided for nocturnal mammals. Any excavations open overnight will be inspected visually prior to restarting work. In the event that any fauna are discovered (including Frog spawn) in an area where construction work is scheduled the ECoW will be informed and appropriate advice sought before any work can proceed in the affected area.

    - In the event that protected fauna are discovered actively using the site for breeding/roosting (*e.g.,* bird nest, bat roosting) during the construction phase, works in the area will cease immediately, and the area will be cordoned off and all non-essential personnel and vehicles excluded until advice is sought from a suitably qualified/experienced ecologist.

Operational Phase

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

The foul holding tanks will have a capacity of 5m^3 which is a multiple of the foul water which will be 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 (7.5m³) of foul sewer water waste. The 5m³ tank proposed will be emptied approximately every three months. As outlined, the capacity provided is well in excess of what is required.

It is proposed to provide the required potable water demand of the station (all options) 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.

No significant effects are expected on the local environment during the operational phase of the proposed development. 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.

The grid connection will be undergrounded and there is no likelihood of any significant ecological effects arising in relation to the underground cable when in operation. It is also concluded in the accompanying NIS (Appendix 1) that with the application of such standard controls there will be negligible risk of effects

on the designated sites in the wider hinterland associated with the operation of the substation and grid cable connection.

6 Residual Effects and Conclusion

The proposed substation development site is currently considered to be of Local Importance (lower level) as it contains intensively managed agricultural land and regularly occurring species. There will be no permanent impacts on semi-natural habitats. The development footprint is confined to open intensively managed agricultural fields, which are considered to be of lower local ecological value.

Any potential effects on ecology as a result of the proposed development are confined to the construction phase, which will be relatively short in duration (approximately 2 years) and will be insignificant due to the minor nature of the earthworks involved combined with the implementation of standard environmental controls as part of the project. The HDD crossing of the Kilmeany removes the requirement for works in or adjacent to a watercourse which is distantly upstream of the River Barrow and River Nore SAC (>9.5km upstream).

No significant effects on designated sites, habitats, flora or fauna have been identified as a result of the proposed development. Furthermore, the Natura Impact Statement (NIS) in support of the Appropriate Assessment process, which accompanies this EcIA, objectively concludes that, with the implementation of mitigation measures, no significant effects arising from the development will impact upon any Natura 2000 sites (see Appendix 1).

Taking the above into consideration, it is deemed that the proposed development will result in a neutral effect on ecology overall.

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APPENDIX 1
Natura Impact Statement (NIS)

In support of the Appropriate Assessment Process

Natura Impact Statement

PROPOSED HV SUBSTATION AND GRID CONNECTION

in support of the Appropriate Assessment Process

Prepared for:

HW Planning Ltd.

On behalf of Ballyloo Solar Farm Limited

Prepared by:

Ecology Ireland Wildlife Consultants Ltd.

November 2025

Natura Impact Statement

PROPOSED HV SUBSTATION AND GRID CONNECTION

in support of the Appropriate Assessment Process

Document Rev. No.	Details	Contributors	Date
2	For Issue	MK, GF	04.11.2025

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Executive Summary

Ecology Ireland Wildlife Consultants Ltd. were commissioned by HW Planning Ltd., on behalf of Ballyloo Solar Farm Limited to undertake an appraisal of the potential impacts of a proposed HV substation and connection to the grid. The proposed substation will be either an Air Insulated Switchgear (AIS) or Gas Insulated Switchgear (GIS) tail fed substation at Ballyloo Solar Farm with the associated grid connection comprising underground cabling which will connect into the existing 220/110kV Kellis substation.

The underground cable grid connection is located primarily in the public road network. However, after c. 8.3km there are two options proposed for its final entry into the existing 220/110kV Kellis substation. Option A is to leave the L30535 local road and enter onto private lands where it will cross agricultural farmland into the existing 220/110kV Kellis substation. The length of this section of the underground grid connection cable within the application boundary is c. 0.6km. Option B is to be situated within the L30535 local road which provides road access into the existing 220/110kV Kellis substation. The length of this section of the underground grid connection cable within the application boundary is 0.35km. It should be noted that the options described above apply to both the 110kV and 220kV underground grid connection cables.

The operational lifetime of the solar farms is assumed to be 40 years. However, following the decommissioning of the solar farm, it is envisaged that the substation (and underground cable grid connection) will remain in situ as a valuable functioning and operational part of the electricity transmission network managed by the Transmission Systems Operator, EirGrid.

The development of a HV substation and grid connection options to Kellis substation were previously assessed as part of the ecological impact assessment and Natura Impact Statement that accompanied the planning application for the permitted Ballyloo, Park and proposed Ballybannon Solar Farms.

Following a Screening for Appropriate Assessment (AA) in relation to a proposed substation and grid connection, it was determined that likely significant effects could arise, in the absence of adequate mitigation, which could adversely impact upon one Natura 2000 site in particular. The proposed development is located within the River Barrow catchment and there are potential hydrological links between the proposed development site, and the Natura 2000 site; River Barrow and River Nore SAC. This SAC is located over 9.5km downstream of the proposed development and is considered on a precautionary basis as within the project Zone of Influence (ZoI). Therefore, the potential impact of the development on the River Barrow and River Nore SAC and its conservation objectives are considered further in this Natura Impact Statement (NIS).

Following the application of detailed mitigation measures, it is objectively concluded that there will be no adverse impacts on the integrity of any of the Natura 2000 sites within the zone of influence of the proposed development as a result of the proposed development and other projects and plans of relevance in the area.

1 Introduction

Ecology Ireland Wildlife Consultants Ltd. (Ecology Ireland) were commissioned by HW Planning Ltd., on behalf of Ballyloo Solar Farm Limited to undertake an appraisal of the potential impacts of a proposed HV substation and connection to the grid. The proposed substation will be either an Air Insulated Switchgear (AIS) or Gas Insulated Switchgear (GIS) tail fed substation at Ballyloo Solar Farm with the associated grid connection comprising underground cabling which will connect into the existing 220/110kV Kellis substation. This assessment was undertaken as part of an application by the client for planning permission, where European designated conservation sites are present in the wider surrounding area.

Ecology Ireland previously prepared an ecological impact assessment and Natura Impact Statement for the permitted Ballyloo Solar Farm development, as well as the permitted Park and Clonmacshane Solar Farms and proposed Ballybannon Solar Farm, all located in this part of Co. Carlow. Notwithstanding the dual consent processes, these reports considered both the solar farm developments and the substation and grid connection development for the purposes of completing a robust assessment of the entire project. The current report presents an updated assessment of the proposed development with some minor amendments to the grid route options and more detailed information available in relation to the potential designs of the substation.

A screening assessment is part of an appropriate assessment process that consists of up to four stages, where each stage follows on from the preceding one. In Stage 1, a screening process is undertaken to identify whether significant impacts on a Natura 2000 site are likely to arise from the project or plan in question. If significant impacts are likely to occur, then the process moves on to Stage 2 where an AA considers potential mitigation measures for adverse impacts. If it is considered that mitigation measures will not be able to adequately minimise potential adverse impacts on a Natura 2000 site, then an assessment of alternative solutions is considered in Stage 3. This may then be followed by Stage 4 of the process in the event that adverse impacts remain, and the proposed activity or development is deemed to be of Imperative Reasons of Overriding Public Interest (IROPI), allowing an assessment of compensatory measures to be considered. The outcome of a Stage 2 and higher assessment is presented in a report known as a Natura Impact Statement (NIS).

The first part of the assessment is a screening process to identify whether significant[1] effects on a Natura 2000 site are likely to arise from the project or plan in question, in view of best scientific knowledge and in light of the conservation objectives of any relevant European sites, when considered as an individual project or in combination with other plans and projects. If significant effects are likely to occur or if it is unclear whether significant effects are likely to occur, then the process moves onto the next phase where the project is subject to AA to determine whether the plan or project would directly affect the integrity of a European site. At this stage, potential mitigation measures for adverse impacts identified in Screening are considered. Typically, a Natura Impact Statement (NIS) is prepared by consultants on behalf of the promoter/developer of a plan or project, and this is part of the information used by the competent

[1] A European Court of Justice ruling in 2013 (Case C-258/11) has stated the following regarding significant effect: "Where a plan or project not directly connected with or necessary to the management of a site is likely to undermine the site's conservation objectives, it must be considered likely to have a significant effect on that site."

authority in carrying out an Appropriate Assessment of the proposed plan or project. If the competent authority is satisfied that the plan or project will not adversely affect the integrity of the site concerned, it may approve the project. If it is considered that mitigation measures will not be able to satisfactorily reduce potential adverse impact on a Natura 2000 site, then an assessment of alternative solutions is considered in third phase of the assessment process. If adverse impacts remain and the proposed activity or development is deemed to be of Imperative Reasons of Overriding Public Interest (IROPI), the final assessment step permits consideration of permission for development with consideration of compensatory measures.

While a screening assessment appraisal or NIS may be provided by the advocate of the plan or project in question, the AA itself is undertaken by the competent authority (*e.g.* Planning authority, An Coimisiún Pleanála). So, in this case, the Appropriate Assessment for the project, described herein, is undertaken by An Coimisiún Pleanála; informed by this Screening for AA and NIS and any other relevant information provided to the statutory body.

1.1 Methodology

This report presents in brief the outcome of a Screening for AA. The subsequent Natura Impact Statement (NIS) is prepared to identify whether the proposed solar development, in view of best scientific knowledge and in light of the conservation objectives of any relevant European sites, when considered as an individual project or in combination with other plans and projects, will have an adverse effect on the integrity of any European Site. It is important to emphasise that a screening assessment does not have to ascertain the existence of a significant effect or impact on a Natura 2000 site as such; it only has to establish whether a significant effect or impact is possible or may occur (as per judgement by Ms. Justice Finlay Geoghegan; see guidelines below). At the NIS stage, all mitigation measures necessary to avoid, reduce or offset negative effects are considered.

The conservation objectives of Natura 2000 sites have been compiled by the National Parks & Wildlife Service (NPWS) in relation to the habitats and species (*i.e.,* qualifying interests) for which the sites are selected. These conservation objectives are referred to when carrying out appropriate assessments for plans and projects that might impact on these sites.

1.1.1 Guidance

Documents associated with the proposed development and relevant ecology databases were consulted as part of this assessment. Field assessments were completed at the proposed development site in 2023 in order to inform the EcIA and Screening Assessment. The following guidelines and legal judgements were used in the completion of this assessment;

- Assessment of plans and projects in relation to Natura 2000 sites - Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC (European Commission 2021).
- Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites – European Commission Methodical Guidance on the provisions of Article 6(3) and 6(4) of the 'Habitats' Directive 92/43/EEC (European Commission 2001)
- Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities (DoEHLG 2009)

- OPR Practice Note PN01 Appropriate Assessment Screening for Development Management (OPR, March 2021).
- Integrated Biodiversity Impact Assessment – Streamlining AA, SEA and EIA Processes: Practitioner's Manual (EPA 2013)
- European Court of Justice Ruling 11th April 2013 Case C‑258/11 Peter Sweetman and Others v An Bord Pleanála - Criteria to be applied when assessing the likelihood that N6 Galway City Outer Bypass Road scheme will adversely affect the integrity of Lough Corrib SAC
- High Court Ruling 25th July 2014 by Ms. Justice Finlay Geoghegan; Neutral Citation [2014] IEHC 400; High Court Record No. 2013 802 JR; Kelly -v- An Bord Pleanála – Judicial review of grant of planning by An Bord Pleanála for two wind farm phases in County Roscommon
- High Court Ruling 24th November 2014 by Mr. Justice Hedigan; Neutral Citation [2014] IEHC 557; High Court Record No. 2014 320 JR; Rossmore Properties Limited & Anor -v- An Bord Pleanála
- High Court Ruling 25th February 2016 by Mr. Justice Barton. Neutral Citation [2016] IEHC 134; High Court Record No. 2013 450 JR; Balz & Anor -v- An Bord Pleanála.
- European Court of Justice ruling 12th April 2018 in respect of Case C-323/17 (People Over Wind & Sweetman) - it is not appropriate for the purposes of Appropriate Assessment (AA), at the screening stage, to take account of the measures intended to avoid or reduce the harmful effects of a plan or project.
- European Court of Justice ruling 19th April 2018 in respect of Case C-164/17, Compensation vs Mitigation, Grace & Sweetman Vs ABP.
- High Court Ruling 8th February 2019 by Justice Barniville in respect of Kelly -v- An Bord Pleanála & anor. The Court concludes "*as a matter of fact and law, that SUDS are not mitigation measures which a competent authority is precluded from considering at the stage 1 screening stage*". The Irish High Court ([2019] IEHC 84)
- Heather Hill Management Company CLG v An Bord Pleanála (Burkeway Homes Limited as Notice Party) [2019] IEHC 450. Mr. Justice Garrett Simons granted an order of certiorari setting aside the decision of the Board to grant permission for a residential development of 197 units at Bearna Co. Galway, on the basis that it was a material contravention of the Galway County Development Plan (the CDP), it failed to carry out a 'justification test' as required and failed to carry out proper Appropriate Assessment screening.
- European Commission. *Managing Natura 2000 Sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC*, (21-11-18) C (2018) 7261 Final. Commission Notice Brussels.

1.1.2 Information Consulted for this Report

This assessment has been informed by the following sources of data:

- Desk based surveys and site surveys of the proposed development site;
- The Ecological Impact Assessment completed for the proposed development Ballyloo Solar Farm and;
    - Ecological assessments completed for neighbouring solar farm development sites, Garreenleen, Park, Ballybannon & Clonmacshance, Co. Carlow.
- Information on the location, nature and design of the proposed project as provided by the client;

- Department of Housing, Planning, Community and Local Government (DHPCLG) online land-use mapping (www.myplan.ie/en/index.html);
- Office of Public Works (OPW) National Flood Hazard Mapping website (www.floodmaps.ie)
- Environmental Protection Agency (EPA) geoportal mapping tool (https://gis.epa.ie/EPAMaps/);
- National Parks and Wildlife Service protected site and species information and data (https://www.npws.ie/protected-sites);
- National Biodiversity Data Centre (www.biodiversityireland.ie); and
- Ordnance Survey of Ireland mapping and aerial photography (www.osi.ie).

2 Stage 1: Screening for Appropriate Assessment

2.1 Brief Description of the Site & Project

2.1.1 Application Context

The purpose of the proposed development is to transport the electricity generated at the Ballyloo, Park and Ballybannon Solar Farms to the national electricity grid via the existing 220/110kV Kellis substation. The planning status of those solar farms is set out below:

- An application for the Ballyloo Solar Farm was made to Carlow County Council on the 28th February 2024 (Council Reference: 24/60043). The Council issued a Notification of Decision to Refuse Permission on the 25th March 2025 and a First Party Appeal was submitted by to An Coimisiún Pleanála on the 22nd April 2024. Permission was granted by An Coimisiún Pleanála on the 5th September.

- An application for the Park Solar Farm was made to Carlow County Council on the 19th July 2024 (Council Reference: 24/60205). The Council issued a Notification of Decision to Grant Permission on the 24th April 2025.

- An application for the Ballybannon Solar Farm was made to Carlow County Council on the 22nd May 2025 (Council Reference: 25/60137). Planning permission was granted by Carlow County Council on 31st October 2025.

Early in the project development phase, it was identified that the proposed substation and grid connection may constitute 'strategic infrastructure development' having regard to the provisions of the Planning and Development (Strategic Infrastructure) Act 2006 and established case precedent on such matters. The Act provides that applications for permission/approval for specified private and public strategic infrastructure developments be made directly to An Coimisiún Pleanála. The applicant entered into pre-application consultations with An Coimisiún Pleanála on the 10th February 2025, with a meeting held on 31st March 2025. An Coimisiún confirmed their opinion that the proposed development meets the definition of 'strategic infrastructure development' as defined in the legislation by means of a formal notice dated 14th July 2025. The subject application is made pursuant to this determination.

In addition to the above pre-application consultation, the applicant also requested a meeting under section 182F of the Planning and Development Act 2000, as amended, to determine An Coimisiún Pleanála's opinion as to flexibility with regard to the proposed development. The applicant proposed design flexibility for the following development:

1. The substation will be either 110kV or 220kV voltage. The 110kV substation will use Air Insulated Switchgear (AIS) switchgear, whilst the 220kV substation might use AIS or Gas Insulated Switchgear (GIS) depending on the requirements of EirGrid.
2. The underground cable grid connection from the proposed substation to the existing 110/220kV Kellis substation will be at either 110kV or 220kV voltage.

3. The underground cable grid connection is located primarily in the public road network. However, there are two options proposed for its final entry into the existing 220/110kV Kellis substation.
    - Option A is to leave the L30535 local road and enter onto private lands where it will cross agricultural farmland into the existing 220/110kV Kellis substation.
    - Option B is to be situated within the L30535 local road which provides road access into the existing 220/110kV Kellis substation.
    - *It should be noted that the options described above apply to both the 110kV and 220kV underground grid connection cables.*

An Coimisiún confirmed that the above referred design flexibility can be facilitated by means of a formal notice dated 14th July 2025. The location of the application site and the local watercourses is shown in Figure 2-1.

It should be noted that the red line development application boundary is identical for the substation options and the grid connection options. For clarity, it should be noted that this assessment considers all options as described above.

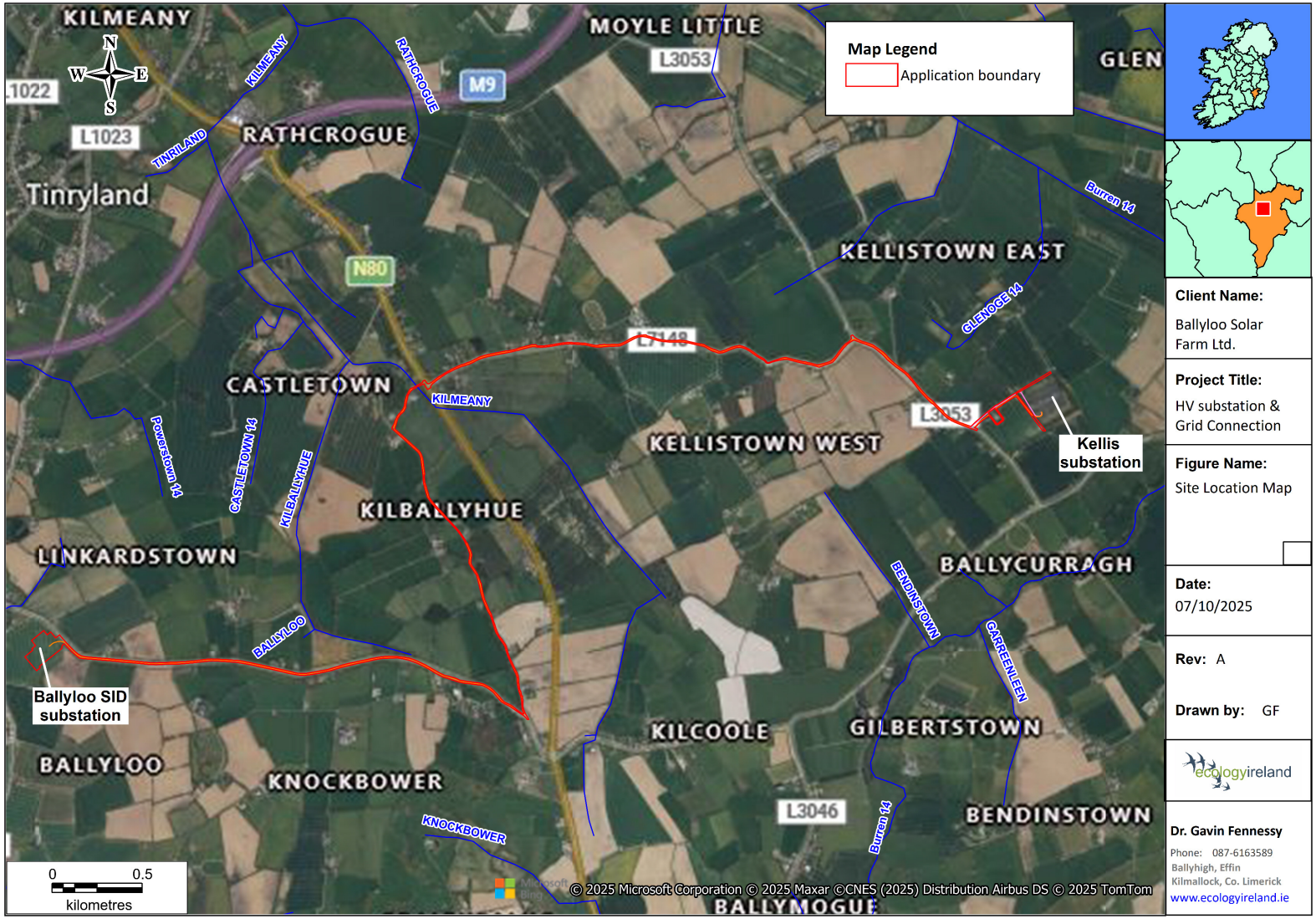

Figure 2-1 Proposed HV substation and grid connection route to Kellis substation.

2.2 Proposed Development

2.2.1 General

It is proposed that the electricity produced from the Ballyloo, Park and Ballybannon Solar Farms will be transported into the proposed substation. The proposed substation will be either an Air Insulated Switchgear (AIS) or Gas Insulated Switchgear (GIS) tail fed substation with the associated grid connection comprising underground cabling which will connect into the existing 220/110kV Kellis substation.

The applicant proposes design flexibility for the following development, as follows:

1. A 220kV Air Insulated Switchgear (AIS) or Gas Insulated Switchgear (GIS) electricity substation or a 110kV AIS electricity substation, including two control buildings, associated electrical structures and apparatus, lightning protection, telecom pole, perimeter security fencing, security lighting, water and drainage infrastructure, temporary construction compound to connect to and serve solar farms;
2. Associated grid connection between the proposed substation and the existing 110/220kV Kellis substation comprising 220kV or 110kV underground electricity cables (reflecting final substation option) of c. 8.9 km or c. 8.65 km in length to be provided in an excavated trench including associated fibre cable and ducting, and all associated site development and reinstatement works. Two options are proposed after the first c.8.3 km of underground grid connection and for the final c.0.35 – 0.6 km of the underground cable grid connection route comprising (i) cabling in the L30535 public road, or (ii) cabling in private agricultural land;
3. Temporary construction and permanent operational access to the substation from the L3050, vehicular entrance and access track from this public road;
4. All ancillary site development, excavation, construction, landscaping and reinstatement works;
5. The development subject to this application forms part of grid connection and access arrangements which will facilitate the connection of the permitted Ballyloo Solar Farm (Carlow County Council Reference 24/60043 / An Coimisiún Pleanála Reference ABP-322347-25), permitted Park Solar Farm (Carlow County Council Reference 24/60205), and proposed Ballybannon Solar Farm (Carlow County Council Reference 25/60137) to the national electricity grid via the existing 110/220kV Kellis substation. A Natura Impact Statement (NIS) has been prepared in respect of the proposed development. The NIS includes consideration of the permitted Ballyloo, Park and proposed Ballybannon Solar Farms which are located in County Carlow.

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 the substation 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 for all substation options.

Site investigations for the underground grid connection will be determined following detailed design, however it is anticipated that a single closure Stop/Go system can be implemented for the slit trenches on all the roads in each of the three options. It is anticipated that these preliminary site works associated with the grid connection cable will take approximately 2-3 weeks to complete. Where temporary road closures are necessary, a suitable diversion will be implemented using appropriate signage, following consultation and agreement with Carlow County Council.

The operational lifetime of the solar farms is assumed to be 40 years. However, following the decommissioning of the solar farm, it is envisaged that the substation (and underground cable grid connection) will remain in situ as a valuable functioning and operational part of the electricity transmission network managed by the Transmission Systems Operator, EirGrid. It should be noted that the red line development application boundary is identical for the substation options and the grid connection options. For clarity, it should be noted that this EcIA considers all options as described above.

2.2.2 Substation

110kV AIS Substation

The substation will be based on EirGrid design specifications. The 110kV AIS substation will consist of both EirGrid and Independent Power Producer (IPP) including IPP Control Room buildings, 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 (TRAFO) with associated equipment along with:

- Cable Sealing End (CSE);
- Surge Arrestor (SA);
- Earth Disconnect (DT);
- Current /Voltage Transformer (CT/VT);
- House Transformer (HT);
- Circuit Breaker (CB);
- Lightning Mast (LM);
- Diesel Generator;
- Security Fencing and Cameras;
- Drainage, access etc.

Earthworks will be undertaken so the compound is level, with a finish compound level of 100.72m. The 110kV AIS substation layout is indicated in Figure 2.1.

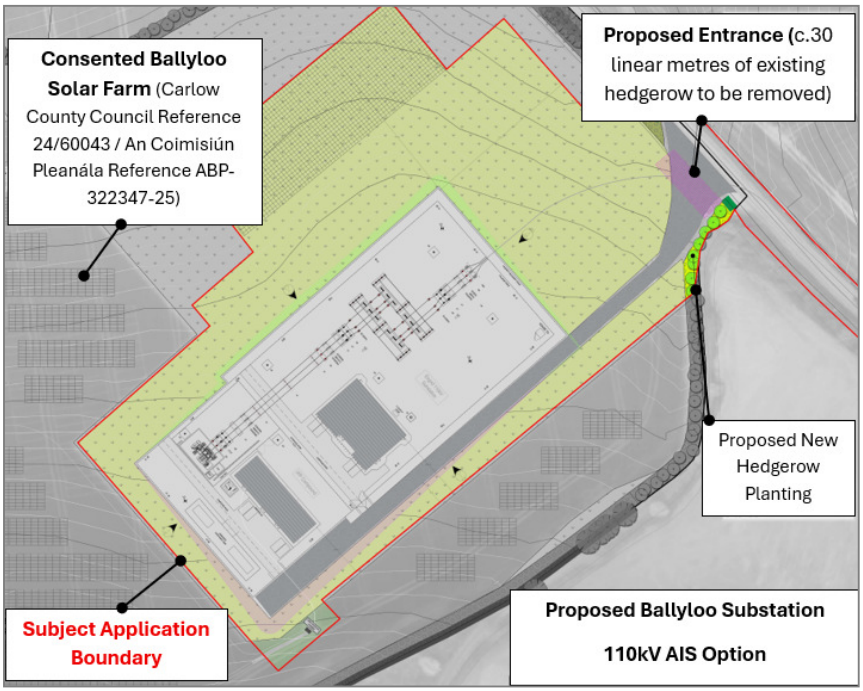

Figure 2.1 Proposed 110kV AIS Substation Option

220kV AIS Substation

The 220kV AIS substation will comprise the same infrastructure and equipment as the 110kV AIS substation option. The key difference is that the clearance distances required between individual components becomes greater at 220kV and therefore it has a larger footprint. The 220kV AIS substation layout is indicated in Figure 2.2.

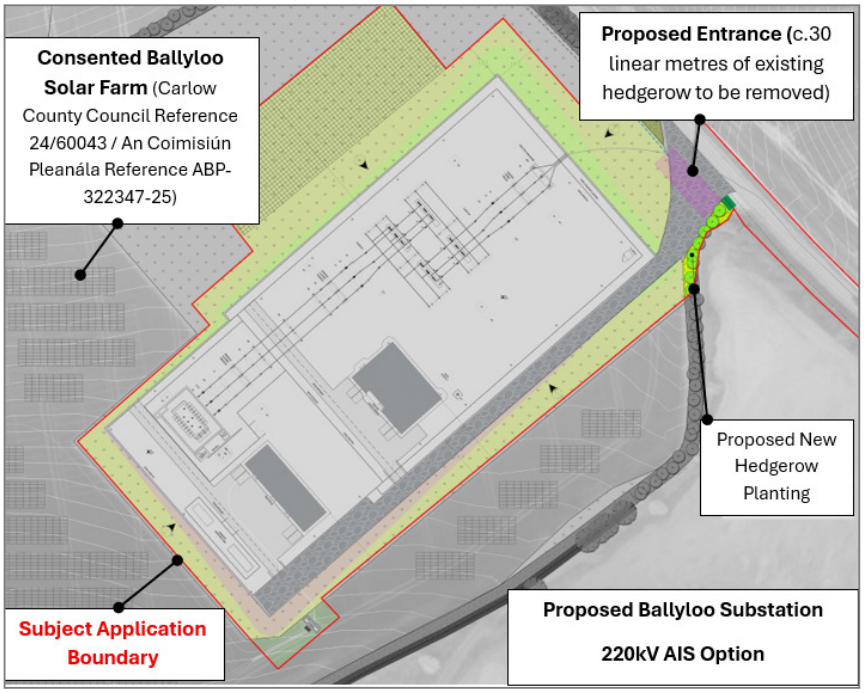

Figure 2.2 Proposed 220kV AIS Substation Option

220kV GIS Substation

The substation will be based on EirGrid design specifications. The substation compound will consist 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;
- Harmonic filters if required by EirGrid;
- Capacitor Bank if required by EirGrid;
- Fire/Blast Wall;
- Telecoms Pole.

The 220kV GIS substation layout is indicated in Figure 2.3.

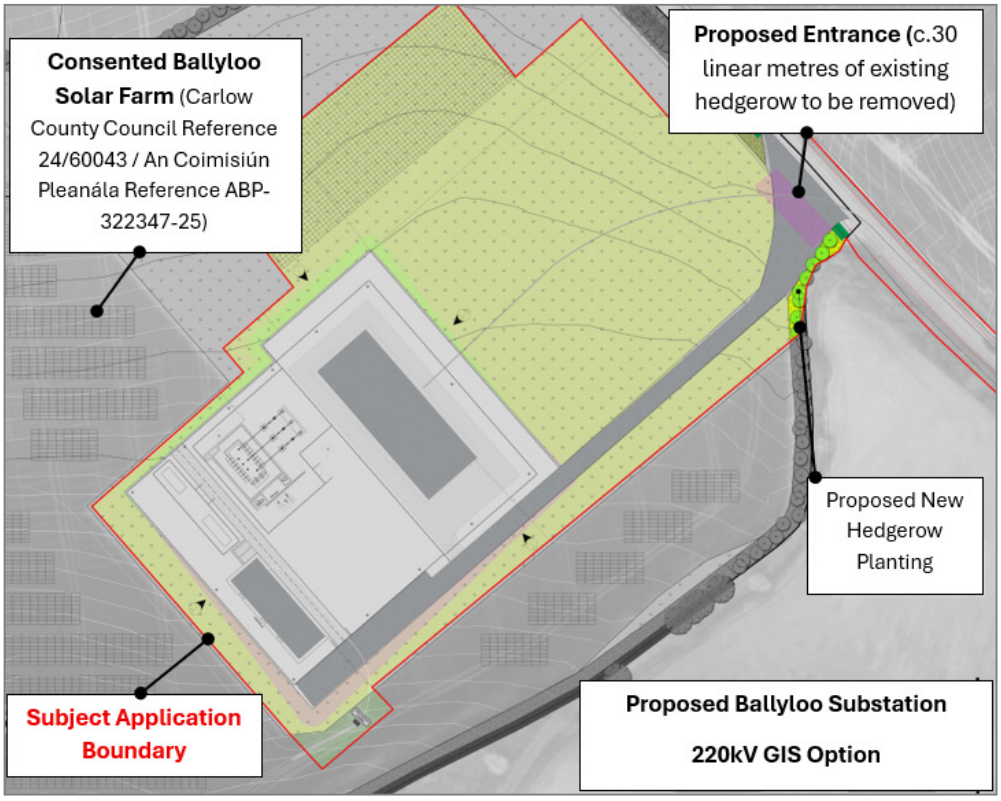

Figure 2.3 Proposed 220kV GIS Substation Option

2.2.3 Substation Access

It should be noted that the red line development application boundary is identical for all substation options. Construction access to the substation will be provided by private lands, with a new entrance from the public road L3050. c. 30 linear metres of existing hedgerow will be removed to facilitate the entrance. The entrance will be suitably splayed and has been subject to sight line and autotrack analysis, with the latter including modelling of abnormal load delivery for the transformer. The entrance will include a linear drain to ensure there is no potential for runoff to the public road.

A compacted access track will extend from the entrance to the substation compound. The track will include a geotextile base and filter membrane and 200mm of Clause 804 sub-base. There will be sections of temporary track alongside the permanent track to facilitate delivery of the transformer within the site. The autotrack analysis has demonstrated that delivery of the substation transformer can be safely accommodated.

2.2.4 Temporary Construction Compound

As outlined in the submitted site layout plans, it is proposed to provide a temporary construction compound, accessed from the entrance from the L3050. The temporary compound will include the following facilities at a minimum:

- Adequate canteen space to allow for all workers during the peak period;
- Office space with lighting, heating and internet facilities;
- Toilets and adequate welfare facilities for construction staff in accordance with the relevant statutory Health & Welfare guidelines;
- Parking space for both light and heavy vehicles;
- Designated skips and temporary storage areas.

2.2.5 Surface Water Drainage and Water Services

110kV & 220kV AIS Substations

It should be noted that the surface water drainage proposals are similar for both the 110kV and 220kV AIS substation options described in this report.

Surface water drainage for the 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 area of this permeable surface is circa 8,315m^2 for the 110kV AIS substation option and 13,600m^2 for the 220kV AIS substation option.
- The main areas to be drained includes the roofs and the compound road. These equate to approximately 1,592m^2 for the 110kV AIS substation option and 2,023m^2 for the 220kV AIS substation option. These areas are modest in themselves and in comparison to the overall compound area. 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.

220kV GIS Substation

Surface water drainage for the 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 area of this permeable surface is circa 7,660m^2 for the GIS substation.
- The main areas to be drained includes the roofs and the compound road. These equate to approximately 2,746m². The compound road will be drained via series of road gullies.

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.

2.2.6 Substation Foul Water Drainage

It should be noted that the foul water drainage proposals are the same for all AIS and GIS substation options described in this report.

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 both the EirGrid and IPP control buildings. The station will be unmanned in normal operation so demand for facilities which generate foul flows will be low.

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.

2.2.7 Substation Water Supply

It is proposed to provide the required potable water demand of the station (all options) 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.

2.2.8 Grid Connection

The substation will connect to the existing 220/110 kV Kellis substation via a proposed 110kV or 220 kV underground grid connection cable. The overall length of the grid connection is approximately 8.9km at its longest. The route is shown in Figure 2.4. All works will be carried out in accordance with international best practice and full compliance with health and safety requirements.

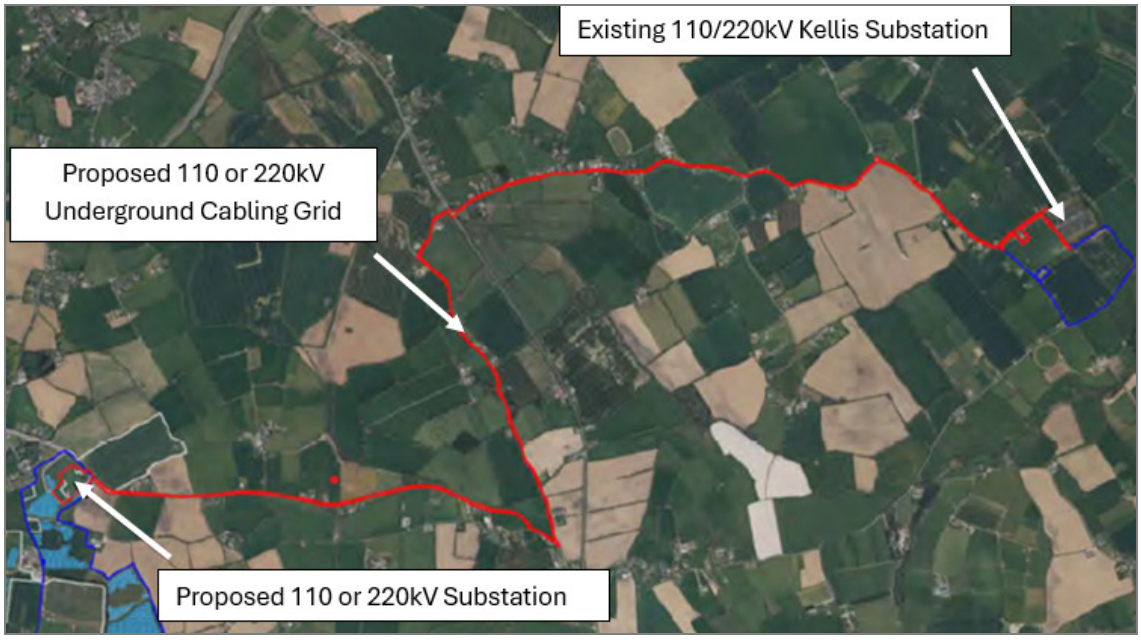

Figure 2.4 Underground Cabling Grid Connection Overview

It should be noted that the red line development application boundary is identical for both the 110kV and 220kV grid connection cable options. The route travels east from the proposed substation on the L3050 before turning north onto the L30504. It then crosses the N80 at Castletown Cross Roads and continues east on the L7148 before turning south onto the L3053. The cable would then turn east onto the L30535 which is the main road access to the existing 220/110kV Kellis substation. There are two options proposed for the final c 0.35-0.6km section accessing the substation. One option (Option A) is within privately owned agricultural lands (see Figure 2.5) and the other option (Option B) is via the L30535 local road. Both options are indicated in Figure 2.5. In the case of Option A, c. 1m of hedgerow will be temporarily removed for the purposes of laying the cable into the substation lands. This will be reinstated.

Planning permission is being sought from An Coimisiún Pleanála for a proposed grid connection between the proposed Ballyloo Substation and Kellis 110/220kV Substation, and underground cable run of up to c. 8.9km metres which terminates at the boundary of the Kellis 110/220kV substation. As set out in the submitted plans and technical reports, it will be necessary to install a new line bay in the Kellis 220kV substation. This will require an additional short distance of underground cabling into the substation. The connecting line bay will consist of concrete bases, steelwork and electrical equipment similar to the already installed equipment within the station. This additional infrastructure will be subject to a future consenting process and is included for information in this planning application so that a robust assessment can be made of the entire application.

The cable will cross the Kilmeany stream, the N80 and at the junction between the L-3053 & L-30535 via Horizontal Directional Drill (HDD). The works will involve no in-stream works or alterations to the bridge.

Figure 2-6 shows the HDD for the bridge/stream along the L30504 road (HDD 1) and the N80 (HDD 2). Figure 2-7 shows the HDD crossing at the junction between the L-3053 & L-30535 (HDD 3) which provides access to the existing Kellis 110/220kV substation. Figure 2-8 shows a typical HDD crossing detail of a watercourse.

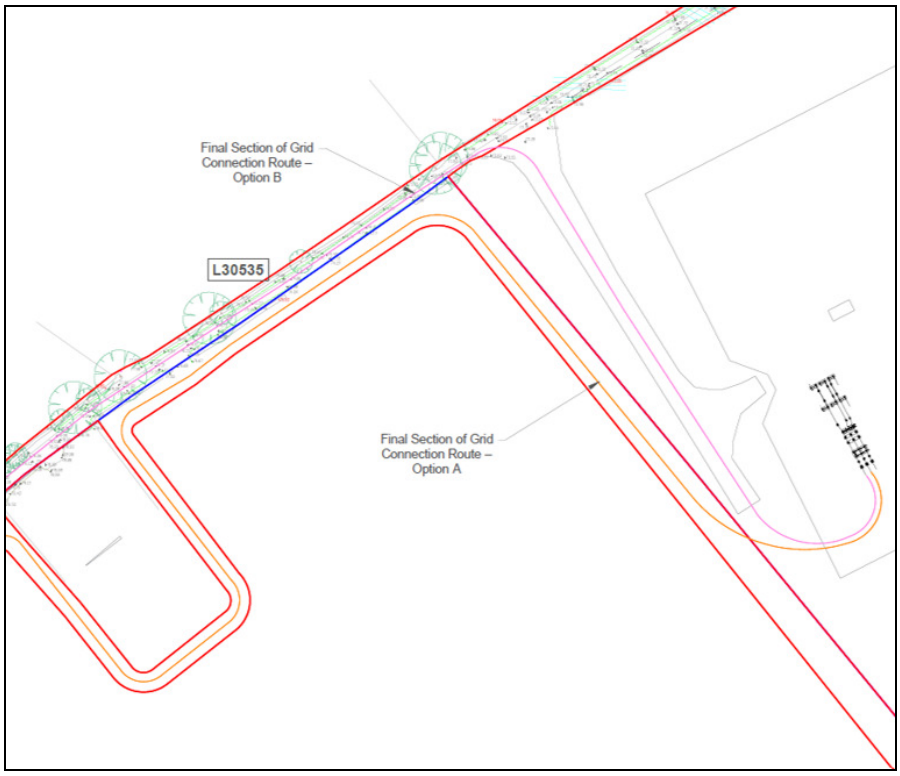

Figure 2.5 Alternative Grid Connection Routes into Existing Kellis Substation.

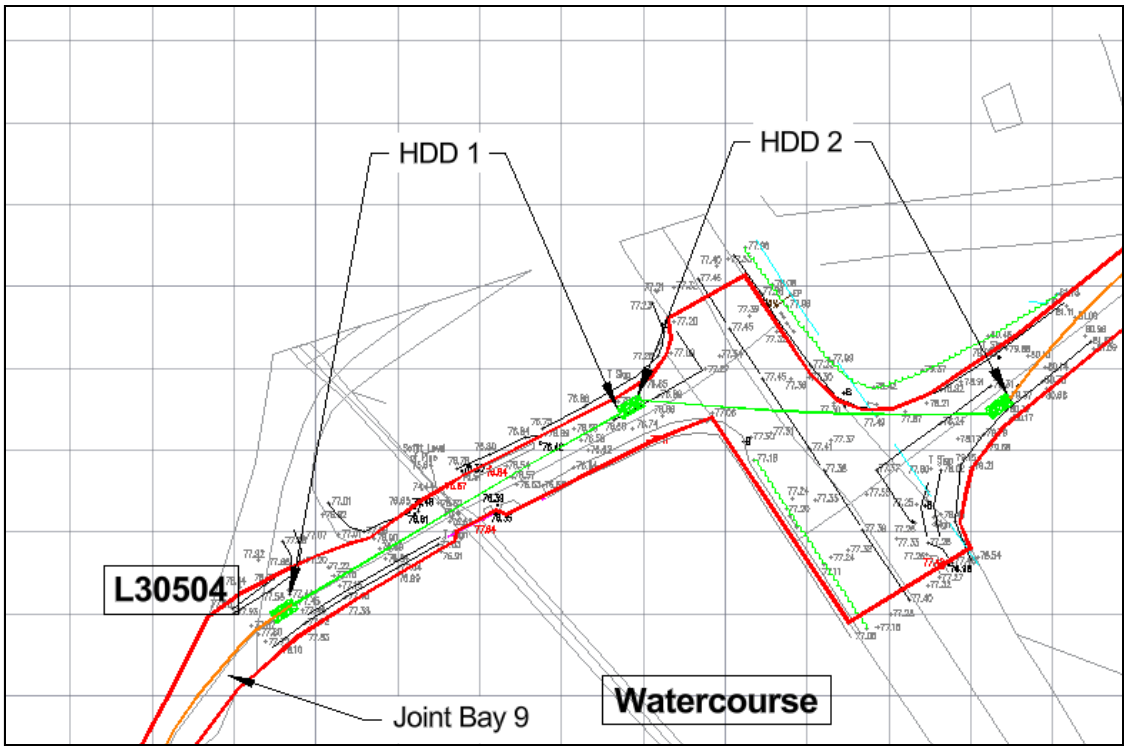

Figure 2.6 HDD under L30504 and N80

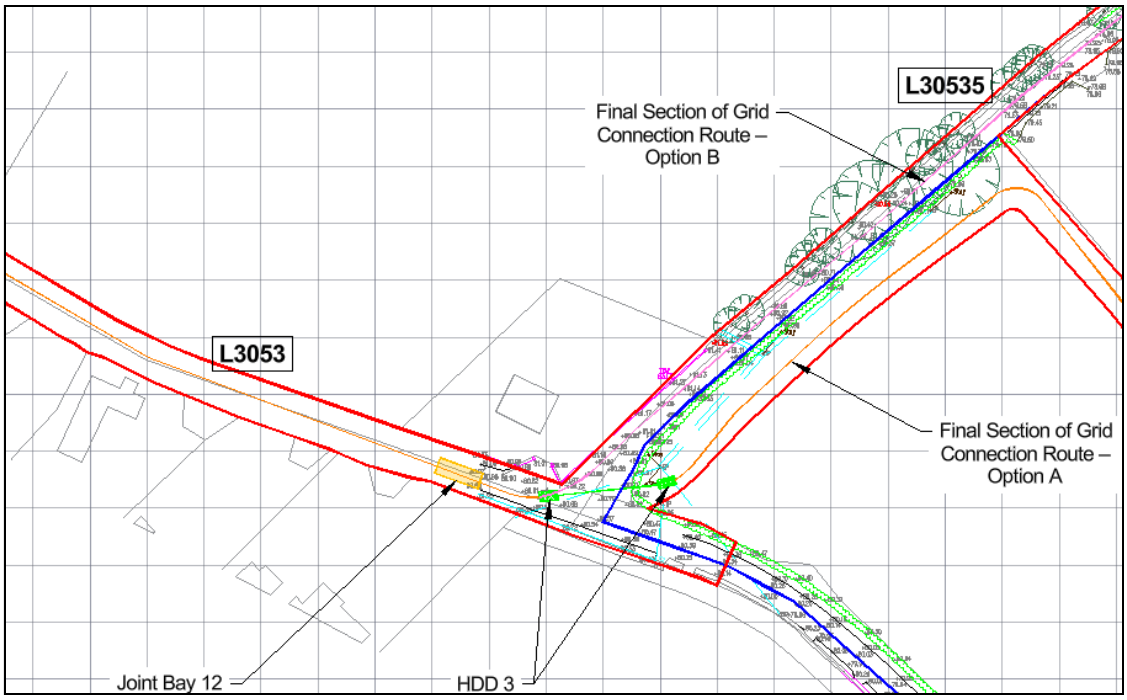

Figure 2.7 HDD between L-3053 & L-30535

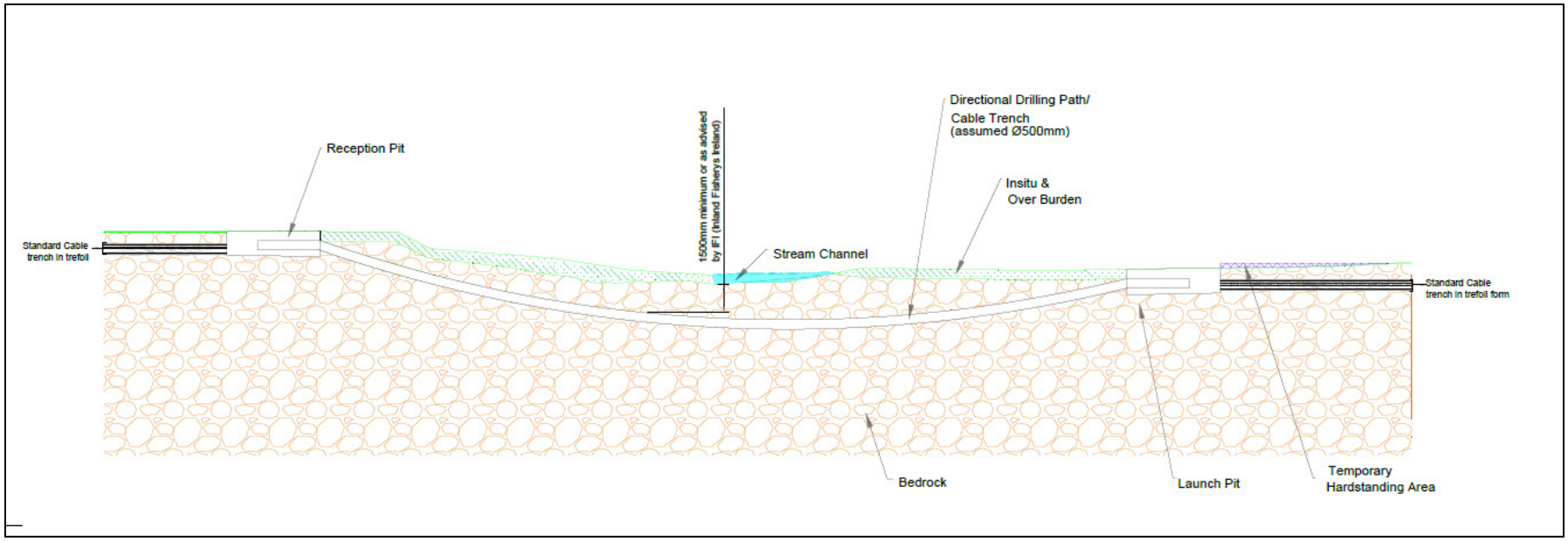

Figure 2.8 Typical Horizontal Directional Drill Water Crossing

2.2.9 Receiving Environment

The development site is located in the Southeastern River Basin District, within the Barrow Catchment (Hydrometric Area 14), sub-catchment Barrow_SC_100 (www.epa.ie). There are a number of watercourses that cross the proposed development site. The proposed grid route crosses the Kilmeany watercourse while travelling north within the N80 road corridor before turning east into the existing Kellis 220/110kV substation. The Kilmeany is a tributary of the River Burren. The River Burren flows north and joins the River Barrow, and associated River Barrow and Nore SAC in Carlow Town. The Kilmeany crossing for both grid route options occurs *c*. 9.5km upstream of River Barrow and Nore SAC.

Under the Water Framework Directive, the River Barrow and its tributaries are considered to be "At Risk" under the WFD Risk Status and has been assigned a "Moderate" WFD Status 2016-2021 (www.epa.ie).

No Annex I habitats listed under the EU Habitats Directive are present within the application site. The dominant habitats present are primarily of low ecological value. No botanical species protected under the Flora (Protection) Order 2022, listed in Annex II or IV of the EU Habitats Directive (92/43/EEC), or Red listed in Ireland (Wyse-Jackson et al. 2016) were recorded. All species recorded during the botanical survey are considered common for similar habitats in the general area.

The location of the proposed substation is located within an area of Arable crops (BC1) considered of local importance (lower value; Figure 2.9). The grid route largely follows the public road (BL3) a habitat of local importance (lower value). Option A is to leave the L30535 local road and enter private lands where it will cross agricultural farmland (Arable Crop; BC1) into the existing 220/110kV Kellis substation. Kellis substation is becoming a busy node on the network with multiple underground cable connections planned to travel up the L30535 public road to reach the substation. This is a narrow, single lane, road and as a result, there may not be sufficient space for all cables to fit within the carriageway without derating effects occurring. Therefore, an 'off-road' route option is included on adjacent private lands to the east which would allow the grid connection cable to reach Kellis without being impacted by other cables travelling in the L30535, if this is required.

There are no Special Protection Areas (SPAs) within 15km of the proposed development site, the nearest being the River Nore SPA, located >20km to the west of the proposed development site. Otter (*Lutra lutra*) is a qualifying interest of the River Barrow and Nore SAC and is listed on Annex II and Annex IV of the EU Habitat's Directive. According to records held by the NBDC database[2], this species is known to occur in the wider environment of the 10km grid squares (S76, S77) in which the proposed development is located. No sign of Otter activity was recorded during site walkovers or on the deployed trail cameras at the permitted solar farm site.

White-clawed Crayfish (*Austropotamobius pallipes*) is a qualifying interest of the River Barrow and Nore SAC and is listed on Annex II of the EU Habitat's Directive. The NBDC database also holds records for this aquatic species in the 10km grid squares (S76, S77) overlapping the proposed development site, including downstream of the proposed development site on the River Barrow.

[2] https://maps.biodiversityireland.ie/Map

Invasive Species

No plant species that have been listed as an invasive alien plant species of European Union concern (IAS Regulation 1143/2014) were recorded within the proposed development site boundary during the baseline survey. The route of the grid options was resurveyed on 12th September 2025.

Sycamore has been identified as an invasive species with a 'risk of medium impact' (Kelly *et al*, 2013). This species is widespread and naturalised throughout the Irish landscape.

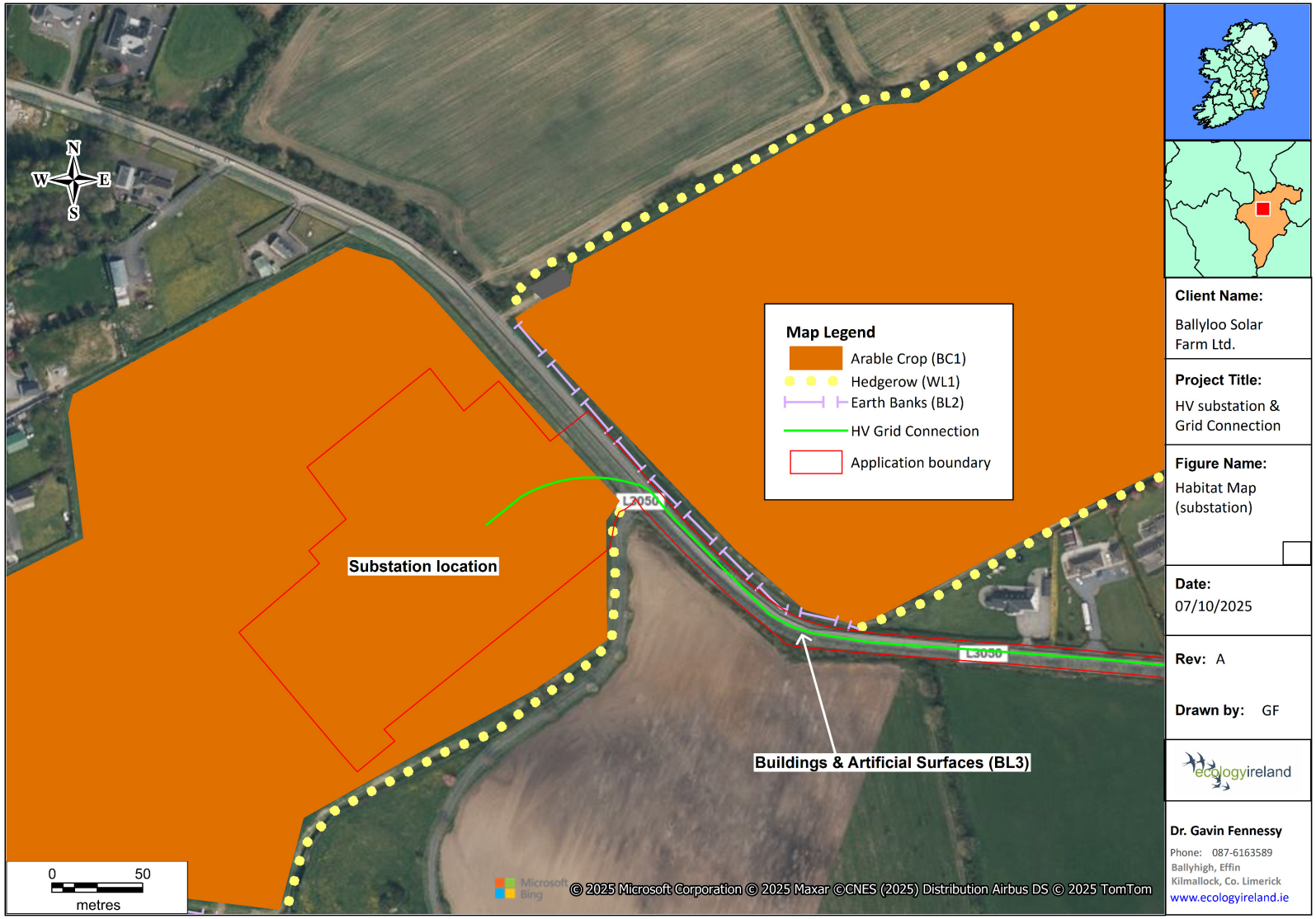

Figure 2.9 Habitat map of the proposed substation location

2.3 Description of the Natura 2000 Sites

Proposed Development Site

The proposed development site is not located within any designated sites, the nearest European site being the River Barrow and River Nore SAC located *c*. 3.9km to the west of the proposed development site boundary. The nearest designated sites are listed below in Table 2-1. There are a total of three SACs and no SPAs, within 15km of the study site (See Table 2-1; Figure 2.10). There is one NHA, Coan Bogs NHA (002382) and 8 pNHAs within 15 km of the study site (See Figure 2.11).

Note that for illustrative purposes, sites within a 15km distance of the development site are shown in Figure 2.10 and Figure 2.11. It is necessary to consider the likely Zone of Influence (or Impact) for a proposed development and not just consider sites out to a nominal distance of 15km. Where consideration of the S-P-R model indicates that there likely significant effects which in the absence of mitigation will occur in relation to more distant sites, these are considered as part of the NIS process.

Table 2-2 below provides the conservation summary of the Natura 2000 sites, including distance from the proposed development site.

Table 2-1 Designated sites located within 15km of the site and their distance from the site boundary.

Site Name	Site Code	Minimum Distance from Application Site (km)
Natura 2000 sites		
River Barrow and River Nore SAC	002162	3.9
Slaney River Valley SAC	000781	4.6
Blackstairs Mountains SAC	000770	14.1
Nationally Designated Sites		
Ardristan Fen pNHA	000788	2.6
Cloghristick Wood pNHA	000806	4.0
Slaney River Valley pNHA	000781	6.6
Ballymoon Esker pNHA	000797	7.5
Oakpark pNHA	000810	8.7
Whitehall Quarries pNHA	000855	12.4
Coan Bogs NHA	002382	12.7
Blackstairs Mountains pNHA	000770	14.1
Mothel Church, Coolcullen pNHA	000408	14.5

There is a potential impact-receptor pathway via hydrological links between the proposed development site and the designated site; River Barrow and River Nore SAC. The grid route crosses the Kilmeany stream, which is a tributary of the Burren Riven, itself a tributary of the River Barrow. The River Barrow and River Nore SAC is designated for a number of habitats associated with the aquatic and estuarine environments, including those found in the River Barrow and Upper Barrow Estuary. This SAC is also designated for a number of species associated with the aquatic environment, including Otter and White-clawed Crayfish, as discussed below. The conservation objectives and qualifying interests of the River Barrow and River Nore SAC are summarized in Table 2-2 below.

As outlined in Section 2, there are two Grid Options under consideration to connect the permitted solar farm development to the existing Kellis 220/110kV substation. As previously described, these options cross the Kilmeany stream (by HDD) within the River Barrow catchment. Significant effects on the River Barrow and River Nore SAC from indirect hydrological impacts arising from the proposed development cannot be ruled out at this stage and will be assessed in Section 3.1 of this NIS.

The distances between the proposed development site and the Natura 2000 sites listed in Table 2-1 above (minimum distance 3.9km overland and >9.5km downstream) and the nature of the intervening environment are as such that there is no risk of direct disturbance/displacement to any fauna occurring within the Natura 2000 sites.

White-clawed Crayfish, a qualifying interest of the River Barrow and Nore SAC, could potentially occur downstream of the proposed development site within the River Barrow and her tributaries. Deterioration in water quality, particularly excessive siltation, during the construction phase of the proposed development, particularly the HDD works near the Kilmeany could potentially impact this aquatic species. Potential impacts on White-clawed Crayfish associated with the River Barrow and Nore SAC will be assessed in Section 3.1 of this report.

Ex-situ disturbance impacts (*i.e.,* where highly mobile species from the designated sites may occur at the development site to forage or commute) must also be considered. This effect is only applicable to designated sites where such fauna are relevant (*e.g.* birds, bats), and where the development site supports habitats of ecological interest for the fauna in question. Otter is a qualifying interest of the River Barrow and Nore SAC (see Table 2-2). Otter activity was not recorded during site walkovers at the permitted solar farm and the watercourses do not provide optimal foraging and breeding habitat for this species. However, potential water quality deterioration as a result of the construction phase of the proposed development could negatively impact prey biomass for this species. Potential ex-situ impacts on Otter will be assessed in Section 3.1 of this NIS.

The proposed development site is located 4.6km from The Slaney River Valley SAC. Given the distance of the SAC from the proposed development site and the location of the SAC in a different catchment area (Nore Catchment, Hydrometric Area 15), there is no likelihood of significant effects on this SAC arising from the proposed development.

The proposed development site is located 14.1km from The Blackstairs Mountains SAC. This SAC is designated for habitats only (See Table 2-2). There is no hydrological link between the proposed development site and this SAC, there is no potential for significant impacts on the SAC as a result of the proposed development.

Table 2-2 Conservation Summary of the Natura 2000 Sites within 15km of the Proposed Development Site.

Site Name & Code	Conservation Summary	Minimum Distance From Site (km)
River Barrow and Nore SAC (002162)	The Conservation Objectives of this SAC are to maintain or restore the favourable conservation condition of the following qualifying interests **Habitat:** • Estuaries • Mudflats and sandflats not covered by seawater at low tide • Reefs • Salicornia and other annuals colonising mud and sand • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) • Mediterranean salt meadows (*Juncetalia maritimi*) • Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation • European dry heaths • *Hydrophilous* tall herb fringe communities of plains and of the montane to alpine levels • Petrifying springs with tufa formation (*Cratoneurion*) • Old sessile oak woods with Ilex and Blechnum in the British Isles • Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) **Species:** • Desmoulin's Whorl Snail, *Vertigo moulinsiana* • Freshwater Pearl Mussel, *Margaritifera margaritifera* • White-clawed Crayfish, *Austropotamobius pallipes* • Sea Lamprey, *Petromyzon marinus* • Brook Lamprey, *Lampetra planeri* • River Lamprey, *Lampetra fluviatilis* • Twaite Shad, *Alosa fallax fallax* • Salmon, *Salmo salar* • Otter, *Lutra lutra* • Killarney Fern, *Trichomanes speciosum* • Nore Pearl Mussel, *Margaritifera durrovensis* (after NPWS 2011a)	<u>Over Land</u>: 3.9 SAC <u>via watercourses</u> *c*. 9.5km downstream along the Kilmeany/Burren

Site Name & Code	Conservation Summary	Minimum Distance From Site (km)
Slaney River Valley SAC 000781	The conservation objectives of this site relate to maintaining the favourable conservation condition of the following qualifying interests; • Estuaries [1130] • Mudflats and sandflats not covered by seawater at low tide [1140] • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] • Mediterranean salt meadows (*Juncetalia maritimi*) [1410] • Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] • Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] • Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)* [91E0] • *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] • *Petromyzon marinus* (Sea Lamprey) [1095] • *Lampetra planeri* (Brook Lamprey) [1096] • *Lampetra fluviatilis* (River Lamprey) [1099] • *Alosa fallax fallax* (Twaite Shad) [1103] • *Salmo salar* (Salmon) [1106] • *Lutra lutra* (Otter) [1355] • *Phoca vitulina* (Harbour Seal) [1365] (After NPWS 2011b)	4.6
Blackstairs Mountains SAC 000770	The conservation objectives of this site relate to maintaining the favourable conservation condition of the following qualifying interests; • Northern Atlantic wet heaths with *Erica tetralix* [4010] • European dry heaths [4030] (After NPWS site synopsis 2019)	14.1

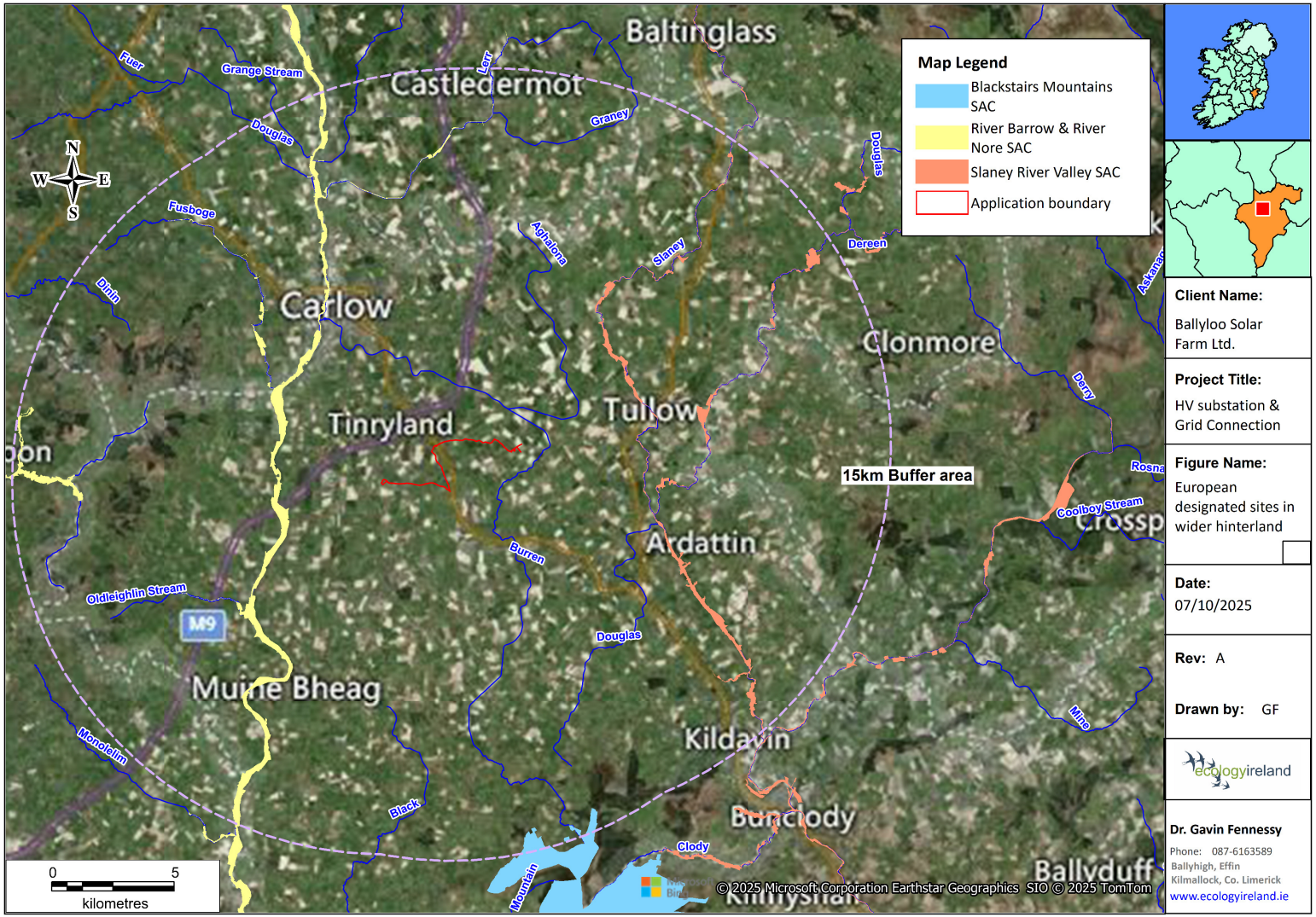

Figure 2.10 Natura 2000 sites in the 15km hinterland of the proposed site.

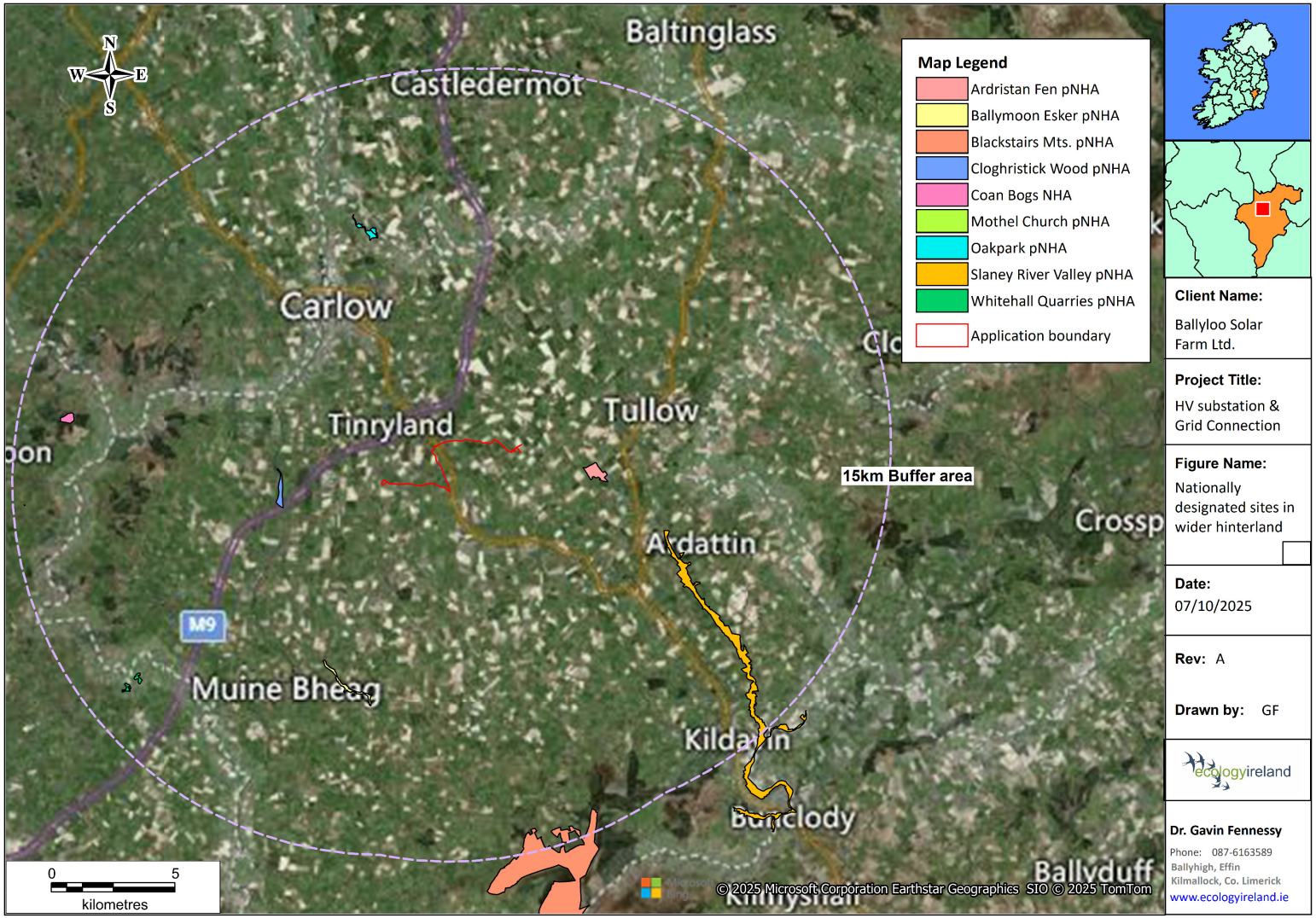

Figure 2.11 Nationally designated sites in the 15km hinterland of the proposed site.

Stage 1: Assessment Criteria

2.4 Elements of the Project Likely to Impact on the Natura 2000 Sites

Consideration of the following potential impacts is assessed here in respect of the Natura 2000 sites identified as requiring further consideration in this screening assessment;

- River Barrow and River Nore SAC

2.4.1 Direct Habitat Loss

The development site is not part of any designated site, nor does it require any resources from them; thereby ruling out any direct habitat loss at the conservation sites in question.

2.4.2 Indirect Habitat Loss or Deterioration

Proposed Development Site

Indirect habitat loss or deterioration of designated sites within the surrounding area can occur from the effects of run-off or discharge into the aquatic environment through impacts such as increased siltation, nutrient release and/or contamination. This requires connectivity between the site and the designated site in question through watercourses and/or drainage ditches. In this case, there are potential hydrological links between the proposed substation development site and grid connection and the designated site; River Barrow and River Nore SAC, and an impact-receptor pathway therefore exists between the designated site and the proposed development site. The application site is located within the Barrow catchment and the grid options cross the Kilmeany stream which is upstream (>9.5km) of the River Barrow and River Nore SAC. The cabling route will pass under the watercourse using a HDD to accurately drill along the chosen bore path whilst leaving the channel of the watercourse undisturbed. This will require the movement of plant and personnel within the vicinity of the watercourse, which could potentially result in water quality deterioration arising from increased sediment-laden run-off or the accidental release of contaminants to the watercourse if the appropriate environmental controls are not in place. By design, implementing underground directional drilling to cross the watercourse will avoid significant disturbance to the riverbed or banks. Furthermore, a *ca.* 30m set-back zone for the launch pit and reception zone of the directional drilling process will be in place.

The substation location is located in an area of Arable Crop (BC1) with no opens drains or watercourses within or closely adjacent to the construction footprint. The excavation and storage of soil has the potential to cause temporary siltation of watercourses in the event of prolonged heavy rain where excavated areas and spoil heaps are unprotected or sited in close proximity to watercourses. In the case of the proposed development, the earthworks are minor and there will be no storage of spoil within 20m of any watercourses. The temporary construction compounds will be located near the site entrances, away from the surrounding watercourses. Furthermore, the design of the substation incorporates a buffer zone of a minimum of 10m between all site infrastructure and the closest drain or watercourses.

Given that in the absence of adequate mitigation (e.g., standard environmental controls and implementation of buffer zones to watercourses) there is some likelihood of significant effects arising

from run-off of contaminants from the site, particularly during the construction phase, the potential for indirect habitat loss or deterioration cannot be discounted.

It is worth noting that in the 'do-nothing' scenario, the substation and wider (permitted) solar farm development site (*i.e.*, agricultural grassland and arable fields) would be subject to regular ploughing, re-seeding, fertiliser and weed spraying activities, which would represent a much higher and repeated risk of watercourse siltation/contamination than the relatively minor earthworks associated with the construction of the proposed development.

2.4.3 Disturbance / Displacement of Fauna

Proposed Development Site

Activities associated with the construction of the proposed development could disturb and/or displace faunal species associated with designated conservation sites through noise and/or visual cues. Direct disturbance/displacement effects in relation to noise and/or visual cues on fauna associated with designated sites is not of relevance here given the distances (minimum 3.9km River Barrow and River Nore SAC). However, ex-situ disturbance/displacement effects need to be considered in relation to highly mobile fauna associated with designated sites that can occur outside of the designated site itself, such as the proposed development site here. As outlined in Section 2.2, the River Barrow and River Nore SAC may be potentially relevant here.

One mobile terrestrial mammal species, Otter, is a qualifying interest of the River Barrow and Nore SAC. The construction phase of the proposed development does not have the potential to cause significant disturbance to Otters resulting in significant negative impacts to this qualifying interest species, through the movement of vehicles (noise) and site workers. No Otter activity was recorded during site walkovers of the permitted solar farm and proposed grid route. The watercourse crossed by the grid route options is not deemed to provide optimal foraging/breeding habitat for this species. However, it is possible that Otters occur on watercourses downstream at least occasionally, most probably commuting and foraging along the riparian corridor. It is also worth noting that Otters are primarily nocturnal and are therefore much more likely to be active during times when construction noise and activity levels at the site are low. Also, research indicates that Otters can be tolerant of human related disturbance (*e.g.* Bailey and Rochford 2006, Sleeman *et al.* 2006 and Sleeman & Moore 2005). Taking the above into consideration, no significant effects (including ex-situ effects) on otters in terms of direct disturbance are therefore considered to be of particular concern here and no further assessment is required. The potential impacts on local watercourses, discussed in detail above, could result in impacts to prey biomass for this species, in the absence of adequate mitigation (*e.g.*, standard environmental controls and implementation of buffer zones to watercourses). The likelihood of significant effects arising from run-off of contaminants from the site, particularly during the construction phase, resulting in indirect habitat deterioration for Otter cannot be discounted at this stage.

One other qualifying species of the River Barrow and Nore SAC which was known to occur within the Barrow, downstream of the proposed development site is White-clawed Crayfish. This aquatic species is listed on Annex II of the EU Habitat's Directive and could potentially be impacted by siltation or water quality impacts as a result of the proposed development. Crayfish is a QI species of the River Barrow & River Nore. However, the population of Crayfish in the Barrow catchment has been decimated in recent years by 'Crayfish Plague' a highly infectious lethal disease caused by a fungal-like organism,

Aphanomyces astaci, which infects white-clawed crayfish and can cause up to 100% mortality (https://www.fishhealth.ie/fhu/news-media/news/update-crayfish-plague-ireland-0). The presence / absence of White-Clawed Crayfish in the watercourses at the permitted solar farm was assessed by sampling for eDNA markers in 2023. The laboratory analysis revealed that there was no indication of the local presence of Crayfish, Atlantic Salmon or Freshwater Pearl Mussel (as well as Smooth Newt) in the watercourses that drain the development site. It may be the case that White Clawed Crayfish are effectively extinct in large parts of the Barrow catchment. However, as the overall status of the species is not fully known it must be assumed that there may be live individuals at areas downstream of the site.

The potential impacts on local watercourses are discussed in detail above. Given that, in the absence of adequate mitigation (e.g., standard environmental controls and implementation of buffer zones to watercourses), there is some likelihood of significant effects arising from run-off of contaminants from the site, particularly during the construction phase, the potential for indirect habitat loss or deterioration of White-clawed Crayfish and other QI species that may be present in the downstream habitats cannot be discounted.

2.4.4 Potential Significant Effects: Conclusion

The development site is not part of the Natura 2000 sites under consideration here and does not require any resources from them – thereby ruling out any direct habitat loss impacts.

The proposed substation and grid connection are within the River Barrow catchment. The location of the proposed substation and the grid connection options considered in this assessment are not situated within or closely adjacent to any European designated site. It is anticipated that the substation and grid connection will be constructed in parallel with the permitted solar farm development.

The substation will be located in an area of low local ecological importance, currently under Arable Crop (BC1). Standard construction phase environmental controls will be effective in minimising any wider environmental effects arising from the construction of the substation at this location.

The grid connection will be undergrounded between the on-site solar farm substation and the existing Kellis substation. No Third Schedule Invasive species were recorded along the routes under consideration. There is some potential for localised temporary disturbance and displacement effects on locally occurring fauna during the construction phase. However, as the chosen routes largely follow existing roads the construction activity will represent only a marginal and highly localised source of potential disturbance for fauna species. The watercourse crossing (HDD) will need to be carried out in accordance with proven construction and environmental protection methodology.

It is considered that construction phase elements of the project (in particular potential overland flow of construction stage silt/pollutants from the watercourses crossing the proposed development site to the River Barrow) have the potential to impact on Natura 2000 sites (*i.e.,* River Barrow and River Nore SAC) within the project Zone of Influence (*i.e.,* without the implementation of best practice measures or site-specific mitigation measures during the project construction phase). Therefore, the proposed development has the potential to result in indirect significant negative effects to the Natura 2000 sites within the project ZoI; River Barrow and River Nore SAC.

2.5 Likely Impacts of the Project on the Natura 2000 Sites

As outlined in Section 2.4.4 above, it is deemed that construction phase elements of the project (in particular potential overland flow of construction stage silt/pollutants to the River Barrow) have the potential to impact Natura 2000 sites (*i.e.*, River Barrow and River Nore SAC) within the project Zone of Influence, without the implementation of best practice measures, a CEMP or site-specific mitigation measures during the project construction phase.

2.5.1 Size, Scale & Land-take

The substation footprint will be contained within the red-line application boundary assessed for the project irrespective of the type of substation selected. The grid route options follow the public road (BL3) a habitat of local importance (lower value). Option A is to leave the L30535 local road and enter private lands where it will cross agricultural farmland (Arable Crop; BC1) into the existing 220/110kV Kellis substation. Kellis substation is becoming a busy node on the network with multiple underground cable connections planned to travel up the L30535 public road to reach the substation. This is a narrow, single lane, road and as a result, there may not be sufficient space for all cables to fit within the carriageway without derating effects occurring. Therefore, an 'off-road' route option (Option B) is included on adjacent private lands to the east which would allow the grid connection cable to reach Kellis without being impacted by other cables travelling in the L30535, if this is required.

2.5.2 Distance from or Key Features of the Natura 2000 Sites

As described in Table 2-1 and Table 2-2 above.

2.5.3 Resource Requirements (water abstraction *etc.*)

Not applicable.

2.5.4 Excavation Requirements

The construction phase of the development will involve the earthworks differing in scale depending on the configuration chosen. A level compound will be created to facilitate construction. 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.

Topographical data for the location the proposed substation shows the site does not have any severe or steep slopes, with most areas being relatively flat or with moderate slopes.

Analysis of available topographic data suggest that cutting and filling of the existing terrain will be required to establish a level platform for the substation compound. See below the proposed compound levels for the 110kV/220kV AIS Substation and GIS Substation.

Table 2-3 Estimated earthworks volumes for the proposed substation configurations.

Substation Layout	Compound Level (m)	Cut (m^3)	Fill (m^3)
110kV AIS	100.72	3,443	3,383
220kV AIS	100.20	7,229	7,868

Substation Layout	Compound Level (m)	Cut (m^3)	Fill (m^3)
220kV GIS	100.75	3,495	3,472

Excavated material along the grid route 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. The HDD works will not require any in-stream operations.

The excavation and storage of soil has the potential to cause temporary siltation of watercourses in the event of prolonged heavy rain where excavated areas and spoil heaps are unprotected or sited in close proximity to watercourses. In the case of the proposed development, the earthworks are minor and there will be no storage of spoil within 20m of any watercourses and a minimum of 10m from field drains. The temporary construction compounds will be located near the site entrances, well away from the watercourses within the proposed development site.

2.5.5 Emission (disposal to land, water or air)

It is considered that construction phase elements of the project (in particular potential overland flow of construction stage silt/pollutants to the watercourses crossing or closely adjacent to the proposed development site to the River Barrow) have the potential to impact Natura 2000 sites (*i.e.,* River Barrow and River Nore SAC) within the project Zone of Influence. Such impacts cannot be discounted without appropriate Construction and Environmental Management Plan (CEMP) commitments being implemented and/or site-specific mitigation measures being put in place during the project construction phase. Such mitigation cannot be considered as part of the Screening stage.

2.5.6 Transportation Requirements

There will be some localised increase in construction traffic during the construction phase however operational phase maintenance requirements are low. The facility will not require any day-to-day staffing and security will be remote and monitored via CCTV.

2.5.7 Duration of Operations

The operational lifetime of the solar farms is assumed to be 40 years. However, following the decommissioning of the solar farm, it is envisaged that the substation (and underground cable grid connection) will remain in situ as a valuable functioning and operational part of the electricity transmission network managed by the Transmission Systems Operator, EirGrid.

2.5.8 Cumulative and In-combination Effects

For projects to act cumulatively in a manner that significantly impacts upon biodiversity there needs to be a mechanism by which such an effect is mediated. For instance, this could occur if there was cumulative impacts upon water quality, or loss of an important habitat feature. In general, if individual projects and plans adequately address the potential risks to the receiving environment there is significantly less risk of

cumulative and in combination effects. Indeed, in circumstances where projects have landscaping and biodiversity measures that are compatible it may be the case that ecological connectivity may be improved through creation or enhancement of hedgerow, woodland and field margin habitats.

The proposed development is associated with the development of a number of other renewable energy projects in this part of Co. Carlow. Several of these projects involve a grid connection into Kellis substation.

The permitted Ballyloo Solar Farm is located to the west of the permitted Clonmacshane Solar Farm which itself is located on farmland south of the permitted Garreenleen Solar Farm. Ballybannon Solar Farm (Permission granted 31/10/2025; currently within the Appeal period) and the permitted Park Solar Farm sites are located to the west of the proposed substation at Ballyloo. Ecology Ireland also carried out the assessments (including preparing the EcIA and NIS) for these solar farm developments. All of these developments are located within the same catchment and have a hydrological connection to the River Barrow and River Nore SAC.

The potential for significant effects on designated sites and their conservation objectives arising from the Garreenleen Solar Farm project was fully assessed by An Bord Pleanála as part of the AA process (ABP Ref: 307891) and by Carlow County Council for the permitted Clonmacshane and Park Solar Farm developments (22/163 & 24/60205).

Ecology Ireland has considered other projects and plans relevant to this area and their potential to act cumulatively or in combination with the proposed development. Included in this review was consideration of Carlow CDP (2022-2028) and the draft Carlow Biodiversity Action Plan (2023-2028). The latter document identifies several challenges to biodiversity in the county including water pollution, improper hedgerow management and the spread of invasive species. All of these elements are key items that have been identified as risks and addressed in the mitigation strategy and biodiversity management strategy for the current development. As such, the measures that minimise the risk of any negative effects on water quality, the introduction or spread of invasive plant species and the substantial improvement in the amount and quality of hedgerow envisaged as part of the current project are very much aligned with the local biodiversity strategy.

Potential cumulative ex-situ impacts on Otter as a result of the proposed development, in combination with the permitted Ballyloo solar farm could potentially be relevant as the local watercourses are all part of the Barrow catchment. Otter was recorded on the Burren River during surveys carried out for Garreenleen solar farm. No signs of Otter were recorded during the site walkovers for the current proposed development and no holts were recorded locally. No significant disturbance impacts on Otter are deemed likely as construction activities will not take place at night (when this nocturnal species is active) and the solar farms will not be lit at night. The landscaping plan for Ballyloo Solar Farm (and other local solar farms) will enhance the habitats along the riparian corridor and provide a habitat and visual buffer between the solar farm infrastructure and the river, with access to the site for Otter and other wild mammals to be maintained via a 200m void at the base of the perimeter fence.

The potential for impacts arising from polarotaxis and the ‘lake effect’ were considered as part of the EcIA for the other local solar farm developments. No cumulative disturbance/displacement impacts on rare or

protected species or habitats are expected as a result of the proposed development in combination with the permitted developments in the wider area, where the residual impact on fauna is considered to be neutral to slight positive overall given the landscape enhancement/biodiversity management measures proposed. It has to be noted that these sites are located in an area with intensive agriculture where activities such as ploughing and spreading of fertiliser have the potential to impact negatively upon the receiving environment. During the lifetime of the solar farm developments there will be no run-off from ploughed fields, or as a result of nutrients from land-spread fertilisers.

The other planning permissions and live applications in this area were reviewed using myplan.ie. A selection of the projects considered as part of this assessment is presented in Table 5-1. The local planning applications are dominated by one-off housing developments and projects associated with agricultural activity. There is one nearby site at Ballintrane, operated by O'Toole Composting Ltd. under IEL (W0284-01) for the recovery, or a mix of recovery and disposal, of non-hazardous waste with a capacity exceeding 75 tonnes per day involving biological treatment. The EIA prepared to accompany a planning application for development at the site, as well as annual environmental reports (AERs) available on the EPA website were reviewed. It was concluded that operations on that site have no direct impact on this SAC and there is no potential for cumulative or in combination impacts on the receiving environment as there are no emissions to groundwater at that facility, with all surface water emissions strictly controlled and monitored and all wastes and consumables on site are stored in bunded areas and any process waste tankered off site directly to the County Council's Waste Water Treatment Plant.

No potential for significant negative cumulative impacts upon the local biodiversity was identified. On the contrary, the landscaping and biodiversity management measures provided with the permitted Ballyloo Solar Farm as well as the similar commitments for the permitted Park, Garreenleen and Clonmacshane Solar Farm developments are likely to collectively yield local positive biodiversity enhancements for the range of species that occur in the area.

Table 2-4 Selection of projects considered as part of this assessment.

Ref. Number	Distance from Subject Site	Status	Description
24/60205	0km	Granted Permission – 24/04/2025	A 10 Year planning permission for a solar farm with a total area of circa 73 hectares in the townlands of Ballybar Lower, Ballybar Upper, Ballycarney, Ballyloo, Linkardstown, Park and Tinryland in County Carlow. The solar farm will consist of solar panels on ground mounted frames, 11 no. single storey electrical inverter/transformer stations, 3 no. single storey spare parts containers, 2 no. Ring Main Units, 3 no. weather stations, underground electrical ducting and cabling within the development site, private lands and within the L1010, L3051, L3052 and L3050 public roads to connect solar farm field parcels, security fencing, CCTV, access tracks, 3 no. watercourse/drain deck crossings and 2 no. horizontal directional drill crossings (under M9 motorway and L3050), temporary construction compounds, landscaping and all associated ancillary development and drainage works. Construction and operational access will be via 2 no. entrances from the L1022 and L1010. Sections of the proposed underground electrical cabling will traverse the solar farm proposed under Carlow County Council Reference 24/60043, but will not alter infrastructure proposed under that application. The operational lifespan of the solar farm will be 40 years and planning permission is requested for this duration. A Natura Impact Statement (NIS) has been prepared and will be submitted to the Planning Authority with the application
24/60043	0km	Granted Permission – 05/09/2025	A 10 Year Planning Permission for a solar farm with a total area of circa 192 hectares. The solar farm will consist of solar panels on ground mounted frames, 30 no. single storey electrical inverter/transformer stations, 4 no. single storey spare parts containers, 4 no. Ring Main Units, 8 no. weather stations, underground electrical ducting and cabling within the development site, private lands and within the L3051, L3052 and L3050 public roads to connect solar farm field parcels, security fencing, CCTV, access tracks, 2 no. stream deck crossings and 1 no. horizontal directional drill, temporary construction

Ref. Number	Distance from Subject Site	Status	Description
			compounds, landscaping and all associated ancillary development and drainage works. Construction and operational access will be via 4 no. entrances from the L3051, L3052 and L3050. The operational lifespan of the solar farm will be 40 years and planning permission is requested for this duration. A Natura Impact Statement (NIS) has been prepared and will be submitted to the Planning Authority with the application
25/60137	0km	Notification to grant – 31/10/25	A 10 Year Planning Permission for a solar farm with a total area of circa 57 hectares. The solar farm will consist of solar panels on ground mounted frames, 8 no. single storey electrical inverter/transformer stations, 2 no. single storey spare parts containers, 1 no. Ring Main Unit, 3 no. weather stations, underground electrical ducting and cabling within the development site, private lands and within the L4038, L8185, R448, L3051, L3052 and L3050 public roads to connect solar farm field parcels, security fencing, CCTV, access tracks, 5 no. watercourse/drain deck crossings and 2 no. horizontal directional drill crossings (under M9 motorway and the Dublin - Waterford railway), temporary construction compounds, landscaping and all associated ancillary development and drainage works. Construction and operational access will be via 2 no. existing entrances from the R448 and L1010. Sections of the proposed underground electrical cabling will traverse the solar farms proposed under Carlow County Council References 24/60043 and 24/60205, but will not alter infrastructure proposed under these applications. The operational lifespan of the solar farm will be 40 years and planning permission is requested for this duration. A Natura Impact Statement (NIS) has been prepared and will be submitted to the Planning Authority with the application.
24/60410	0.1km	Granted Permission – 06/06/25	The replacement (“restringing”) of the existing overhead line circuit conductor wires with a new higher capacity conductor • the strengthening of foundations at 7no. locations • shear block remedial works at 77no. locations • the strengthening of towers (i.e., member replacement) at 34no. locations • the

Ref. Number	Distance from Subject Site	Status	Description
			replacement of 5.1km of earthwire • the painting of all structures • the replacement of insulating and ancillary hardware at structures • all associated works within the existing Kellis 220kV substation to accommodate the uprated 220kV OHL including uprating of the Great Island bay in Kellis 220kV substation.
24/60223	0.1km	Granted Permission – 20/09/2024	110kV underground electricity cabling and all associated ancillary site development works. The cabling will extend from and connect with permitted 110kV underground electricity cabling (under An Bord Pleanála reference ABP-313139-22) on the L30535 public road to a line bay in the Kellis 220kV substation.
313139-22	0.1km	Granted Permission – 03/11/2022	Proposed 110kV substation and underground grid connection.
20143	0.1km	Granted Permission – 2/09/2021	A 10 year Planning Permission for a solar farm.
24/60295	2.0km	Live Application, Decision Due – 07/01/2026	Ten year planning permission for renewable energy development comprising of the construction of a solar farm.
ABP-303821	0.2km	Granted Permission – 23/09/2019	10 year permission for an up to 100MW Battery Energy Storage Facility providing energy services to the National Grid consisting of construction and operation of up to 34 metal containers.

Ref. Number	Distance from Subject Site	Status	Description
ABP-320354	c. 5.5km	Live Application, Decision Due – 04/12/2024 (Decision delayed at Board)	Permission for the construction of 7 wind turbines and all associated works. A 10 year planning permission and 35 year operational life of the wind farm from the date of commissioning is sought. Environmental Impact Assessment Report and Natura Impact Statement submitted with application.
24/60295	c.2.4km	Live Application, Decision Due – 7/01/2026	Ten year planning permission for renewable energy development comprising of the construction of a solar farm.
24/60332	c. 1.8km	Granted Permission – 12/12/2024	the demolition of all existing structures within the Tinryland Wastewater Treatment Plant and the construction on an extended site (0.09 ha in total) which will consist of a new pumping station (17m2), new below-ground storm tank (total storage of 123m^3), replacement welfare facility (33m2), ground-mounted photovoltaic array (83 m2), new palisade perimeter fencing (2.4m high) and associated works; the construction of a new rising main and gravity main (3.7km in length) along the Nurney Road, L1023 and N80, connecting to the existing wastewater sewer at Ballinacarrig; and all ancillary and associated temporary works. A Natura Impact Statement (NIS) will be submitted to the Planning Authority with the application
ABP-318295	c. 3.7km	Granted Permission – 21/11/2024	Construction of five wind turbines, meteorological mast, electricity substation and associated site works. The application is accompanied by a Planning Report, Environmental Impact Assessment Report and a Natura Impact Statement.
24/60149	c. 1.4km	Granted Permission – 27/09/2024	The expansion of the existing commercial store into the adjoining agricultural use buildings including raised roof height to the unit to the east and the provision of a retention pond and all associated ancillary works, the buildings will be repurposed as whiskey maturation warehouses

Ref. Number	Distance from Subject Site	Status	Description
ABP-318475	c. 8km	Granted Permission – 04/06/2024	A ten year planning permission for a solar energy development with a total site area of 77 hectares and all associated site works.
ABP-315063	c. 0.1km	Granted Permission – 02/05/2024	Development of a synchronous condenser grid support facility and all associated works
ABP-315365	c. 5.5km	Granted Permission – 21/11/2023	Wind energy development consisting of 7 no. wind turbines and all associated works.
ABP-322690	c.0km	Live Application - due to be decided by 01/12/2025	Proposed 110kV electrical substation and grid connection.
ABP-321416	c.3km	Live Application – undetermined at present	Proposed development along a section of the N80 Road known as the N80 Leagh Bends Scheme.
21/23	c.3.75km	Granted 26/10/21	Construction of a Solar PV development and all associated site works.
23/92	c.3.85km	Granted 04/06/2024	A ten year planning permission for a solar energy development with a total site area of 77 hectares and all associated site works.

Ref. Number	Distance from Subject Site	Status	Description
22/142	c.3km	Granted Permission – 22/03/2023	Clonmacshane Solar Farm.
ABP-314421	c. 460m	Granted Permission – 26/07/2022	To construct a 30m multi-user lattice telecommunications support structure, carrying antenna and dishes enclosed within a 2.4 metre high palisade fence compound together with associated ground equipment cabinets and associated site works including new access track and to replace existing gated access. The installation will form part of eir mobile telecommunications network. A Natura Impact Statement (N.I.S.) will accompany the planning application.

2.6 Mitigation Likely Changes to the Natura 2000 Sites

As outlined in Section 2.2.2 above, it is deemed that construction phase elements of the project (in particular potential overland flow of construction stage silt/pollutants to the River Barrow) have the potential to impact Natura 2000 sites (*i.e.*, River Barrow and River Nore SAC) within the project Zone of Influence, without the implementation of best practice measures, a CEMP or site-specific mitigation measures during the project construction phase.

2.6.1 Reduction of Habitat Area

There is the potential for indirect habitat loss or deterioration of Natura 2000 sites within the project ZoI from the effects of run-off or discharge into the aquatic environment through impacts such as increased siltation, nutrient release and/or contamination, particularly during the project construction phase.

2.6.2 Disturbance to Key Species

Not applicable.

2.6.3 Habitat or Species Fragmentation

Not applicable.

2.6.4 Reduction in Species Density

There is some potential for the proposed project to contribute towards changes in water quality of Natura 2000 sites within the project ZoI. This is related to the potential for run-off or discharge into the aquatic environment (e.g. to watercourses upstream of the River Barrow) contributing to downstream impacts such as increased siltation, nutrient release and/or contamination, particularly during the project construction phase. This may result in a reduction in density of some aquatic qualifying species, such as White-clawed Crayfish, which are known to occur in the River Barrow and which are a qualifying interest of the River Barrow and River Nore SAC, and is a prey species of Otter, another qualifying interest species of this SAC.

2.6.5 Changes in Key Indicators of Conservation Value (water quality *etc*.)

There is some potential for the proposed project to contribute towards changes in water quality of Natura 2000 sites within the project ZoI. This is related to the potential for run-off or discharge into the aquatic environment (upstream of the River Barrow) contributing to downstream impacts such as increased siltation, nutrient release and/or contamination, particularly during the project construction phase.

2.7 Likely Impacts on the Natura 2000 Sites as a Whole

It is considered that in the absence of adequate mitigation that construction phase elements of the project (in particular potential overland flow of construction stage silt/pollutants to watercourses upstream of the River Barrow) have the potential to impact Natura 2000 sites (i.e., River Barrow and River Nore SAC) within the project Zone of Influence. The possibility of likely significant effects cannot be discounted without suitable adequate CEMP commitments being implemented and/or site-specific mitigation measures being put in place during the project construction phase.

2.7.1 Interference with the Key Relationships that Define the Structure and Function of the Natura 2000 Sites

Without the implementation of best practice measures, a Construction and Environmental Management Plan (CEMP) or site specific mitigation measures during the project construction phase, it is considered that construction phase elements of the project (in particular potential overland flow of construction stage silt/pollutants to watercourses upstream of the River Barrow) may have the potential to contribute towards significant negative effects that may interfere with the structure and function of Natura 2000 sites within the project ZoI; River Barrow and River Nore SAC.

2.8 Indicators of Significance as a Result of the Identification of Effects Set Out Above

As outlined in in the above sections, it is considered that construction phase elements of the project (e.g. potential overland flow of construction stage silt/pollutants to watercourses upstream of the River Barrow) have the potential to impact Natura 2000 sites (*i.e*. River Barrow and River Nore SAC) within the project Zone of Influence without the implementation of best practice measures, or site-specific mitigation measures during the project construction phase.

2.8.1 Loss

There is the potential for indirect habitat loss or deterioration of Natura 2000 sites within the project ZoI from the effects of run-off or discharge into the aquatic environment through impacts such as increased siltation, nutrient release and/or contamination, particularly during the project construction phase.

2.8.2 Fragmentation

Not applicable.

2.8.3 Disruption

There is the potential for indirect habitat loss or disruption of Natura 2000 sites within the project ZoI from the effects of run-off or discharge into the aquatic environment through impacts such as increased siltation, nutrient release and/or contamination, particularly during the project construction phase.

2.8.4 Disturbance

Not applicable.

2.8.5 Change to Key Elements of the Site

Without the implementation of best practice measures, a CEMP or site specific mitigation measures during the project construction phase, it is considered that construction phase elements of the project (in particular potential overland flow of construction stage silt/pollutants to watercourses upstream of the River Barrow) may have the potential to contribute towards significant negative effects that may interfere with the structure and function of Natura 2000 sites within the project ZoI; River Barrow and River Nore SAC.

2.9 Elements of the Project Likely to Significantly Impact on the Natura 2000 Sites or where the Scale or Magnitude of Impacts are Unknown

The proposed development site including the substation options and underground grid connection options have hydrological connectivity with the Natura 2000 site (River Barrow and River Nore SAC) e.g via the Kilmeany stream upstream of the River Barrow. Significant effects during the project construction phase cannot be discounted without the implementation of best practice constriction design measures and the implementation of a Construction & Environmental Management Plan (CEMP).

Therefore, it cannot be concluded, that the proposed project, individually or in combination with other plans or projects, will not have a significant effect on a Natura 2000 sites, without the consideration and analysis of further information. Therefore Stage 2 NIS (AA) is required.

A Natura Impact Statement (NIS) is presented in **Section 3**, to provide scientific examination of the project to enable the competent authority to undertake an AA. The NIS will examine potential effects to Natura 2000 sites screened in as part of this Screening for Appropriate Assessment; River Barrow and River Nore SAC.

3 Natura Impact Statement

This section of the report provides the necessary information to inform AA to be completed by the competent authority, An Coimisiún Pleanála. This NIS provides the relevant scientific information to enable the competent authority in carrying out its AA to determine whether or not the proposed development would adversely affect the integrity of Natura 2000 sites.

The NIS assesses whether or not the proposed development would adversely affect the integrity of Natura 2000 sites within the project ZoI, for which effects could not be excluded during the Screening for AA (see Section 3 for details). The Natura 2000 sites are as follows:

- River Barrow and River Nore SAC

As outlined in Section 2, the proposed development site has potential hydrological connectivity with the Natura 2000 site (River Barrow and River Nore SAC). The entire project area is within the Barrow catchment and the grid options cross (by HDD) the Kilmeany stream which is a tributary of the Burren River, itself a tributary of the River Barrow.

The Conservation Objectives of the River Barrow and River Nore SAC are to maintain or restore the favourable conservation condition of the qualifying interests for which they have been designated. Not all of these qualifying interests will be relevant in terms of potential impacts from the proposed development site however, as outlined below in Table 3.1. For example, there are many habitats located in estuarine and coastal environments only and which are considered to be outside the potential zone of influence given the large distances involved (i.e., >30km from the development site) and the nature of the proposed development. Similarly, some qualifying habitats or species of the SACs are not located downstream of the proposed development site as they occur in different catchments within the SAC boundary. Other habitats are terrestrial in nature and therefore not subject to potential indirect hydrological impacts from the proposed development. Only the qualifying interest species indicated as having a potential impact-receptor pathway to the proposed development site below are relevant to this assessment (i.e., Lamprey species, Salmon, Otter and White-clawed Crayfish, Table 3.1). Many of these species require good water quality (minimum Q3-4) and are highly sensitive to siltation and vulnerable to pollution incidents. For example, the delicate gills of White-clawed crayfish are easily clogged by sediment, and this may cause physio-pathological changes in the long term (Peay, 2000 in Reynolds 2010). Suspended solids also have the potential to physically abrade and mechanically disrupt the respiratory epithelia of larvae (Reynolds 2010).

Detailed water protection measures have been included for all works near watercourses (See Ballyloo Substation & Grid Connection - Construction Methodology; Appendix B) which will ensure there is no potential water quality impacts on local watercourses and associated aquatic habitats and flora species in the wider area as a result of the proposed development. Construction works will for instance be carried out according to best practice regarding control of run-off and water-quality maintenance (see CIRIA 2001; CIRIA 2010; CIRIA 2015). All general/sanitary waste generated at the site during construction will be appropriately managed prior to removal off-site by licenced

contractors and there will be no disposal of such waste to nearby watercourses or any designated site.

The mitigation measures outlined in Section 3.2 have been designed to prevent any damaging run-off or pollution into the watercourses that have been identified as having hydrological links to the Natura 2000 site.

Table 3-1 The Qualifying Interests of the River Barrow and River Nore SAC and their relevance in terms of potential Impact-Receptor Pathways.

River Barrow and River Nore SAC		
Qualifying Interests (after NPWS 2011b)	**Impact-Receptor Pathway Relevant?**	**Reason**
Habitats		
• Estuaries • Mudflats and sandflats not covered by seawater at low tide River Barrow and River Nore SAC • Reefs • Atlantic salt meadows (Glauco-Puccinellietalia maritimae) • Mediterranean salt meadows (Juncetalia maritimi)	No	Located > 30km downstream, considered to be outside the zone of influence of this project
• Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation • Petrifying springs with tufa formation (Cratoneurion)	No	Not downstream. Only located in the Nore Catchment.
• European dry heaths • Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels • Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles • Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae)	Yes	Terrestrial Habitat, not subject to potential hydrological Impacts such as fugitive sediment emissions. However, some potential for spread of Invasive species by hydrological link.
Species		
• Desmoulin's Whorl Snail, *Vertigo moulinsiana*	No	Occurs > 30km downstream, considered to be outside the zone of influence of this project
• Freshwater Pearl Mussel, *Margaritifera margaritifera*	No	The Status of this species as a qualifying interest of this SAC is currently under review (NPWS 2011b)
• White-clawed Crayfish, *Austropotamobius pallipes*	Yes	Widespread distribution throughout SAC (NPWS 2011b). Known to occur in the River Burren (NBDC database). Crayfish Plague (*Aphanomyces astaci*), a disease which causes mortality of White-Clawed Crayfish is known to be present in the River Barrow, downstream of the proposed development. eDNA sampling did not

River Barrow and River Nore SAC		
Qualifying Interests (after NPWS 2011b)	**Impact-Receptor Pathway Relevant?**	**Reason**
		indicate the current presence of the species in the watercourses that intersect with the proposed development site.
• Sea Lamprey, *Petromyzon marinus*	Yes	Occurs in the main Barrow River Channel downstream of the proposed development site (King, 2006)
• Brook Lamprey, *Lampetra planeri*	Yes	Occurs in the main Barrow River Channel downstream of the proposed development site (King, 2006)
• River Lamprey, *Lampetra fluviatilis*	Yes	Occurs in the main Barrow River Channel downstream of the proposed development site (King, 2006)
• Twaite Shad, *Alosa fallax fallax*	No	Occurs >30km downstream (King, 2006), considered to be outside the zone of influence of this project
• Salmon *Salmo salar*	Yes	Widespread distribution throughout SAC (NPWS 2011b)
• Otter, *Lutra lutra*	Yes	Widespread distribution throughout SAC (NPWS 2011b)
• Killarney Fern, *Trichomanes speciosum*	No	Occurs > 30km downstream, considered to be outside the zone of influence of this project (NPWS 2011b)
• Nore Pearl Mussel, *Margaritifera durrovensis*	No	Not downstream. Only located in the Nore Catchment.

3.1 Impact Assessment

3.1.1 Characterising Impacts

The methodology for the assessment of impacts is derived from the Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites (EC, 2002). When describing changes/activities and impacts on ecosystem structure and function, the types of impacts that are commonly presented include the following:

- direct and indirect effects,
- short- and long-term effects,
- construction, operational and deconstruction / demolition effects, and
- isolated, interactive and cumulative effects.

Impacts that could potentially occur through the implementation of the project can be categorised under a number of impact categories as outlined in the EC 2002 document as follows:

- Loss/Reduction of habitat area,
- Disturbance to key species,
- Habitat or species fragmentation,
- Reduction in species density, and

- Changes in key indicators of conservation value such as decrease in water quality and quantity.

Meaning of 'Adversely Affect the Integrity of the Site'

The concept of the 'integrity of the site' is explained in the EU publication Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC, as follows;

'It is clear from the context and from the purpose of the directive that the 'integrity of the site' relates to the site's conservation objectives. For example, it is possible that a plan or project will adversely affect the integrity of a site only in a visual sense or only habitat types or species other than those listed in Annex I or Annex II. In such cases, the effects do not amount to an adverse effect for purposes of Article 6(3), provided that the coherence of the network is not affected. On the other hand, the expression 'integrity of the site' shows that focus is here on the specific site. Thus, it is not allowed to destroy a site or part of it on the basis that the conservation status of the habitat types and species it hosts will anyway remain favourable within the European territory of the Member State.

As regards the connotation or meaning of 'integrity', this can be considered as a quality or condition of being whole or complete. In a dynamic ecological context, it can also be considered as having the sense of resilience and ability to evolve in ways that are favourable to conservation. The 'integrity of the site' has been usefully defined as 'the coherence of the site's ecological structure and function, across its whole area, or the habitats, complex of habitats and/or populations of species for which the site is or will be classified'

A site can be described as having a high degree of integrity where the inherent potential for meeting site conservation objectives is realised, the capacity for self-repair and self-renewal under dynamic conditions is maintained, and a minimum of external management support is required. When looking at the 'integrity of the site', it is therefore important to take into account a range of factors, including the possibility of effects manifesting themselves in the short, medium and long-term.

The integrity of the site involves its ecological functions. The decision as to whether it is adversely affected should focus on and be limited to the site's conservation objectives.

3.1.2 Potential Effects from the Proposed Development to Qualifying Habitats and Species of Natura 2000 Sites within the Project Zone of Influence

Potential effects associated with the proposed development to the Qualifying Habitats and Species of Natura 2000 Sites within the project Zone of Influence (River Barrow and River Nore SAC) are as follows:

- Construction phase elements of the project (in particular potential overland flow of construction stage silt/pollutants into watercourses upstream of the River Barrow) have the potential to impact Natura 2000 sites (*i.e.*, River Barrow and River Nore SAC). Such effects can result in indirect habitat loss or deterioration of these Natura 2000 sites, as well as reduction in density of qualifying aquatic species.

3.2 Best Practice Design and Mitigation Measures

The measures outlined below will be implemented to ensure that any impacts on the receiving environment will be avoided during the project's construction and operational phases. The substation will be located in an area of low local ecological importance, currently under Arable Crop (BC1). There are no drains or watercourses within the substation footprint, irrespective of the configuration chosen. Standard construction phase environmental controls will be effective in minimising any wider environmental effects arising from the construction of the substation at this location.

The grid connection will be undergrounded between the on-site substation and Kellis substation. No Third Schedule Invasive species were recorded along the routes under consideration. There is some potential for localised temporary disturbance and displacement effects on locally occurring fauna during the construction phase. However, as the chosen routes largely follow existing roads the construction activity will represent only a marginal and highly localised source of potential disturbance for fauna species. The watercourse crossing will need to be carried out in accordance with proven construction and environmental protection methodology.

As described in the assessments for the permitted solar farm application, the construction activities for Ballyloo Solar Farm will be subject to the commitments presented in a CEMP. The environmental controls described in the following sections are considered compatible and complementary with those commitments. The Ballyloo Substation & Grid Connection - Construction Methodology (September 2025) details the mitigation measures that will be applied during the construction and commissioning of the substation and underground grid connection.

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.

General Environmental Controls and Mitigation

The final Construction Method Statement and CEMP will comply with any conditions of planning. The environmental measures to be included in the final CEMP will include the measures as set out in the following sections:

The environmental control measures for construction phase will 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.
- A buffer of 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.
- 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.

- 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.

- 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.

Surface/Foul Water

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.

It should be noted that the foul water drainage proposals are the same for all AIS and GIS substation options described in this report. There are no existing foul sewer water drains on or near the proposed substation site.

HDD Crossing – Environmental Controls

The proposed drilling methodology for each HDD is as follows:

- A works area of approximately 40m^2 will be fenced on both side (launch/receptor) creating an easement/wayleave.
- The drilling rig and fluid handling units located on one side of the crossing will be stored on double bunded 0.5mm PVC bunds which will contain any accidental fluid spills and storm water run-off.
- Entry and exit pits (1m x 1m x 2m) will be excavated; the excavated material will be temporarily stored within the works area and used for reinstatement or disposed of to a licensed facility.
- A 1m x 1m x 2m steel box will be placed in each pit. This box will capture any drilling fluid returns from the borehole.
- The drill bit will be set up by a surveyor, and the driller will push the drill string into the ground and will steer the bore path under the stream.
- A surveyor will monitor drilling works to ensure that the modelled stresses and collapse pressures are not exceeded.
- The drilled cuttings will be flushed back by drilling fluid to the steel box in the entry pit.
- Once the first pilot hole has been completed a hole-opener or back reamer will be fitted in the exit pit and will pull a drill pipe back through the bore to the entry side.
- When all bore holes have been completed, a towing assembly will be set up on the drill and this will pull the ducting into the bore.
- The steel boxes will be removed, and the drilling fluid disposed of to a licensed facility.
- The ducts will be cleaned and proven and their installed location surveyed.
- The entry and exit pits will be reinstated as per the landowners' requirements.

Ecological Mitigation

The following mitigation measures will be implemented as part of the proposed project in order to minimise the potential effects on the existing ecology as discussed above. These measures are to be read in conjunction with the detailed construction phase commitments presented in the CEMP and Construction Methodology for Electrical Infrastructure that accompanies the planning application (Appendix 2).

- An Ecological Clerk of Works (ECoW) will be appointed to ensure that the mitigation strategy is correctly implemented both during the construction phase, establishment of the landscaping measures and for the duration of the eventual decommissioning of the project.
- As a precautionary measure, the soil stripping and construction of the site access tracks will be carried out outside of periods of wet weather. Scheduling of works will avoid insofar as practicable the wetter months of the year. In addition, appropriate run-off control will be installed and maintained for the duration of the construction phase. It will help minimise the risk of run-off from the site by limiting the earthworks undertaken in the wetter months of the year.
- Buffer zones from watercourses/drains will be strictly maintained.
- 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.
- 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.
- All construction works will be carried out according to best practice with standard environmental controls in place to prevent any damaging run-off from the site (see CIRIA 2001, 2010 & 2015). The construction of the proposed development will be implemented in accordance with the Construction Environmental Management Plan (CEMP) for the proposed development.
- 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.
- Silt fencing will be installed where the grid route is proximate to drain or watercourse crossings. The silt fence will provide protection from sediment and potential site water runoff.

a. 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.
b. 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.).
c. The contractor will ensure that good housekeeping is always maintained and that al site personnel are made aware of the importance of the nearby aquatic environments and the requirement to avoid pollution of all types.

- A pre-construction survey will be undertaken to identify and map the occurrence and extent of any Third Schedule Invasive Plant species within or adjacent to the works footprint. If such species are found to occur at this time an Invasive Species Management Plan (ISMP) to control invasive species shall be developed following best practice guidance (e.g. after NRA 2010 and Fennell *et al*. 2018) with the advice of a suitably qualified ecologist. The ISMP should be finalised in consultation with and based on advice provided by the appointed specialist contractor, who will continue to review and, if necessary, update the Management Plan, in order to ensure that current relevant guidelines and regulations are followed at the time when the management of these species is implemented.

- To confirm the findings of the field studies that informed the assessment of the proposed development and the permitted Ballyloo Solar Farm and in keeping with recommended best practice, a pre-construction walkover of the site will be conducted immediately before the scheduled commencement of construction or vegetation clearance works.

- No 'woody' vegetation (hedgerows/trees) will be removed during the bird breeding season (March 1st to August 31st inclusive).

- All excavations/trenches will be covered at night, or a suitable means of escape (escape board) provided for nocturnal mammals. Any excavations open overnight will be inspected visually prior to restarting work. In the event that any fauna are discovered (including Frog spawn) in an area where construction work is scheduled the ECoW will be informed and appropriate advice sought before any work can proceed in the affected area.

    - In the event that protected fauna are discovered actively using the site for breeding/roosting (*e.g.,* bird nest, bat roosting) during the construction phase, works in the area will cease immediately, and the area will be cordoned off and all non-essential personnel and vehicles excluded until advice is sought from a suitably qualified/experienced ecologist.

Operational Phase

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

The foul holding tanks will have a capacity of 5m^3 which is a multiple of the foul water which will be 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.

It is proposed to provide the required potable water demand of the station (all options) 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.

No significant effects are expected on designated sites during the operational phase of the proposed development. 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.

The grid will be undergrounded and there is no likelihood of any significant effects arising in relation to the underground cable when in operation. With the application of such standard controls there will be negligible risk of effects on the designated sites in the wider hinterland associated with the operation of the substation and grid cable connection.

3.3 NIS Summary and Conclusion

3.3.1 Integrity Of The Site

From the *Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC* (EC, 2002), the meaning of integrity is described as follows:

'*The integrity of a site involves its ecological functions. The decision as to whether it is adversely affected should focus on and be limited to the site's conservation objectives'*.

The concept of the 'integrity of the site' is also explained in the EU publication Managing Natura 2000 sites: The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC (EC, 2000), as follows:

'It is clear from the context and from the purpose of the directive that the 'integrity of the site' relates to the site's conservation objectives. For example, it is possible that a plan or project will adversely affect the integrity of a site only in a visual sense or only habitat types or species other than those listed in Annex I or Annex II. In such cases, the effects do not amount to an adverse effect for purposes of Article 6(3), provided that the coherence of the network is not affected. On the other hand, the expression 'integrity of the site' shows that focus is here on the specific site. Thus, it is not allowed to destroy a site or part of it on the basis that the conservation status of the habitat types and species it hosts will anyway remain favourable within the European territory of the Member State.

3.3.2 Integrity of the Natura 2000 Sites within the Project Zone of Influence

Potential for any significant adverse effects will be resolved through the implementation of the mitigation commitments outlined herein (see also Appendix B).

From the information gathered and the predictions made about the changes that are likely to result from the construction and operational stages of the project and the mitigation measures proposed to avoid impacts to the hydrologically connected Natura 2000 site, an Integrity of Site Checklist for Natura 2000 sites considered in this Natura Impact Statement is presented in Table 3-2 below.

Table 3-2: Integrity of Site Checklist for Natura 2000 Sites within the Project Zone of Influence

Conservation Objectives		
Does the project have the potential to:	Yes or No	Comment
Cause delays in progress towards achieving the conservation objectives of the site?	No	There will be no direct impacts to the QIs/SCIs of Natura 2000 sites located within the project ZoI and considered in this NIS. Potential indirect effects to Natura 2000 sites via overland flow to

Conservation Objectives		
Does the project have the potential to:	**Yes or No**	**Comment**
		the watercourses with a hydrological link to the River Barrow & River Nore SAC have been considered in the above assessment. Works practices and design measures have been proposed in the accompanying planning phase CEMP to address all potential impacts to the watercourses and by extension effects to the Natura 2000 site located downstream; i.e. River Barrow and River Nore SAC. The proposed development will therefore not cause delays in achieving the conservation objectives of Natura 2000 sites within project ZoI.
Interrupt progress towards achieving the conservation objectives of the site?	No	The proposed development will not interrupt the achievement the site's Conservation Objectives or those factors that help maintain the favourable conditions of the site or interfere with the distribution and density of key indicator species. Potential indirect effects to Natura 2000 sites via overland flow to the watercourses with a hydrological link to the River Barrow & River Nore SAC have been considered in the above assessment. Works practices and design measures have been proposed in the accompanying planning phase CEMP to address all potential impacts to the watercourses and by extension effects to the Natura 2000 site located downstream; i.e. River Barrow and River Nore SAC. The proposed development will therefore not interrupt or disrupt the progress in achieving the conservation objectives of Natura 2000 sites within project ZoI.
Disrupt those factors that help to maintain the favourable conditions of the site?	No	
Interfere with the balance, distribution and density of key species that are the indicators of the favourable condition of the site?	No	
Other Objectives: Does the project have the potential to:	Yes or No	Comment
Cause changes to the vital defining aspects (e.g. nutrient balance) that determine how the site functions as a habitat or ecosystem?	No	The proposed development will not cause changes to the defining aspects, or the dynamics of key relationships associated with Natura 2000 sites. Potential indirect effects to Natura 2000 sites via overland flow to the hydrologically

Conservation Objectives		
Does the project have the potential to:	**Yes or No**	**Comment**
Change the dynamics of the relationships (between, for example, soil and water or plants and animals) that define the structure and/or function of the site?	No	connected watercourses have been considered in the above assessment. Works practices and design measures have been proposed to address all potential impacts to these watercourses and by extension effects to those Natura 2000 sites located downstream; i.e. River Barrow and River Nore SAC.
Interfere with predicted or expected natural changes to the site (such as water dynamics or chemical composition)?	No	The proposed development will not interfere with predicted or expected natural changes to Natura 2000 sites. Potential indirect effects to Natura 2000 sites via overland flow to the hydrologically connected watercourses to the River Barrow have been considered in the above assessment. Works practices and design measures have been proposed to address all potential impacts to these watercourses and by extension effects to those Natura 2000 sites located downstream; i.e. River Barrow and River Nore SAC.
Reduce the area of key habitats?	No	The proposed development will not result in the loss, reduction or change of key features associated with Natura 2000 sites. The proposed development is not located within proximity of a Natura 2000 site. The proposed development is located within an area of intensive agriculture and the development footprint is not within or closely adjacent to any designated conservation sites, nor does it require any resources from these sites; thereby ruling out any direct habitat loss at the conservation sites in question. Indirect habitat loss or deterioration of designated sites within the surrounding area could occur from the effects of run-off or discharge into the aquatic environment through impacts such as increased siltation, nutrient release and/or contamination. However, works practices and design measures have been committed to address all potential impacts to these watercourses and by extension effects to those Natura 2000 sites located downstream; i.e. River Barrow and River Nore SAC.
Reduce the population of key species?	No	
Change the balance between key species?	No	
Reduce diversity of the site?	No	

Conservation Objectives		
Does the project have the potential to:	**Yes or No**	**Comment**
Result in disturbance that could affect population size or density or the balance between key species?	No	The proposed development will not result in disturbance that will affect population size or densities of Qualifying features associated with the Natura 2000 sites within the project ZoI. The proposed development is not located within proximity to Natura 2000 sites that would result in disturbance effects to species of qualifying interest and ex-situ impacts have not been deemed relevant.
Result in fragmentation?	No	There will be no fragmentation of Natura 2000 sites within the project ZoI given the distance from and lack of immediate proximity and connectivity to Natura 2000 sites within the project ZoI.
Result in loss or reduction of key features (e.g. tree cover, tidal exposure, annual flooding, etc.)?	No	The proposed development will not result in the loss or reduction of key features of Natura 2000 Sites. The proposed development is not located within proximity of Natura 2000 sites.

3.4 Conclusion

The AA Screening (see **Section 2**) found that it could not be excluded, on the basis of objective scientific information that the proposed works, individually or in combination with other plans or projects, would have a significant effect on a Natura 2000 site. Therefore, a NIS (presented in **Section 3**) was required to ascertain whether the proposed works would have an adverse effect on the integrity of the Natura 2000 sites.

This NIS has considered the potential for effects on the River Barrow and River Nore SAC which has a potential hydrological connection to the proposed development site. Additional consideration was given to the potential for impacts on mobile qualifying interests, in particular Otter. In addition, the potential for cumulative impacts arising from other developments, such as the permitted solar farm developments in the area including Ballyloo, Park, Ballybannon, Garreenleen and Clonmacshane Solar Farms was examined.

Best practice measures and mitigation measures (as outlined within Section 3.2; see also Appendix B) have been identified to ensure that potential pollutant sources are not released from the proposed development to the receiving environment such that there will be no risk of adverse effects on these Qualifying Features of Natura 2000 sites within this project's ZoI.

It has been objectively concluded that the proposed development will not adversely affect the integrity of a Natura 2000 sites, and there is no reasonable scientific doubt in relation to this conclusion.

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APPENDIX A

Finding of No Significant Effects Report:

Blackstairs Mountains SAC and Slaney River Valley SAC

Name and location of the Natura 2000 sites.	Blackstairs Mountains SAC 00770; *c.* 14.1 km south of development site, see Figure 2.1 above. Slaney River Valley SAC 000781; c. 4.6 km east of development site.
Description of the project or plan.	It is proposed that the electricity produced from the Ballyloo, Park and Ballybannon Solar Farms will be transported into the proposed substation. The proposed substation will be either an Air Insulated Switchgear (AIS) or Gas Insulated Switchgear (GIS) tail fed substation with the associated grid connection comprising underground cabling which will connect into the existing 220/110kV Kellis substation. The applicant proposes design flexibility for the following development, as follows: 1. The substation will be either 110kV or 220kV voltage. The 110kV substation will use Air Insulated Switchgear (AIS) switchgear, whilst the 220kV substation might use AIS or Gas Insulated Switchgear (GIS) depending on the requirements of EirGrid. It should be noted that the red line development application boundary is identical for all substation options. 2. The underground cable grid connection from the proposed substation to the existing 110/220kV Kellis substation will be at either 110kV or 220kV voltage. 3. The underground cable grid connection is located primarily in the public road network. However, after c. 8.3km there are two options proposed for its final entry into the existing 220/110kV Kellis substation. ▪ Option A is to leave the L30535 local road and enter onto private lands where it will cross agricultural farmland into the existing 220/110kV Kellis substation. The length of this section of the underground grid connection cable within the application boundary is c. 0.6km. ▪ Option B is to be situated within the L30535 local road which provides road access into the existing 220/110kV Kellis substation. The length of this section of the underground grid connection cable within the application boundary is c. 0.35km. ▪ *It should be noted that the options described above apply to both the 110kV and 220kV underground grid connection cables.*
Is the Project or Plan directly connected with or necessary to the management of the site (provide details)?	No.
Are there other projects or plans that together	No.

with the project of plan being assessed could affect the site (provide details)?	
The Assessment of Significant Effects	
Describe how the project or plan (alone or in combination) is likely to affect the Natura 2000 site.	Due to the reasons outlined in the following section, it is felt that no elements of the project are likely to impact on the Natura 2000 site; Blackstairs Mountains SAC or the Slaney River Valley SAC.
Explain why these effects are not considered significant.	▪ As Blackstairs Mountains SAC site does not overlap the study site, direct impacts via habitat loss are not relevant. ▪ Indirect surface-water run-off impacts on Blackstairs Mountains SAC as a result of the proposed development are not relevant here as the SAC is not downstream of the study site. ▪ The Slaney River Valley SAC lies within a different catchment to the proposed development and has no hydrological connectivity to the site. ▪ Disturbance/displacement impacts (including ex-situ impacts) are not relevant to Blackstairs Mountains SAC as its conservation objectives relate to habitats and not fauna.
List of agencies consulted.	None.
Response to consultation.	n/a

Data Collected to Carry out the Assessment			
Who carried out the assessment	**Sources of Data**	**Level of assessment completed**	**Where can the full results of the assessment be accessed and viewed**
Ms Marie Kearns BSc MSc & Dr Gavin Fennessy BSc. & PhD Zoology & MCIEEM on behalf of Ecology Ireland Ltd.	▪ Associated documents/drawings. ▪ Site walkovers. ▪ eDNA sampling ▪ EPA online river mapping database ▪ NPWS online designated site data/mapping. ▪ National Biodiversity Data Centre (NBDC) online mapping ▪ References (below)	Desktop study & site visit; we are satisfied that this has yielded enough information to adequately complete a screening assessment.	Full results of the assessment are available in Sections 1-3 above.

Appendix B

Ballyloo Substation & Grid Connection

Construction Method Statement

2025

Ballyloo Substation & Grid Connection - Construction Methodology

BALLYLOO SOLAR FARM LIMITED

NOVEMBER 2025

1 Contents

List of Figures

Revision	Date	Author	Checked	Notes
03	03/11/2025	RH	ND/MMC	Planning Issue

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 proposed Ballyloo substation and underground grid connection cable in County Carlow.

The purpose of the substation and underground grid connection is to transport the electricity generated at the proposed Ballyloo, Park and Ballybannon Solar Farms to the national electricity grid.

The substation will be at either 110kV or 220kV voltage and will be either an Air Insulated Switchgear (AIS) or Gas Insulated Switchgear (GIS) tail fed substation with the associated 110kV or 220kV grid connection comprising underground cabling which will connect to the national electricity grid via the existing 220/110kV Kellis substation.

This document is intended as an aid to understand the construction methods and timelines of the proposed substation and grid connection and should be read in conjunction with all other specialist reports submitted with the Strategic Infrastructure Development (SID) application to An Coimisiún Pleanála. This document will be updated prior to the commencement of any construction activities by the 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 purpose of the proposed substation and grid connection is to transport the electricity generated at the proposed Ballyloo, Park and Ballybannon Solar Farms to the national electricity grid via the existing 220/110kV Kellis substation.

The planning status of those solar farms is set out below:

- An application for the Ballyloo Solar Farm was made to Carlow County Council on the 28th February 2024 (Council Reference: 24/60043). The Council issued a Notification of Decision to Refuse Permission on the 25th March 2025 and a First Party Appeal was submitted by to An Coimisiún Pleanala on the 22nd April 2025. Permission was granted by An Coimisiún Pleanala on the 5th September 2025.
- An application for the Park Solar Farm was made to Carlow County Council on the 19th July 2024 (Council Reference: 24/60205). The Council issued a Notification of Decision to Grant Permission on the 24th April 2025.
- An application for the Ballybannon Solar Farm was made to Carlow County Council on the 22nd May 2025 (Council Reference: 25/60137). A Notification of Decision to Grant Permission was issued on the 31st October 2025.

The substation and grid connection options referenced in this report are subject to a SID application to An Coimisiún Pleanala in accordance with section 182A of the Planning and Development Act 2000.

1.3 Structure of Report

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

- Section 2: provides details the proposed substation and grid connection infrastructure.
- Section 3: provides information on the preliminary site investigations to be undertaken;
- Section 4: provides details of the substation construction methodologies;
- Section 5: provides details of the underground cable grid connection construction methodologies.
- 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 Substation & Grid Connection Infrastructure

2.1 Overview

The substation will be either 110kV or 220kV voltage. The 110kV substation will use Air Insulated Switchgear (AIS) switchgear, whilst the 220kV substation might use AIS or Gas Insulated Switchgear (GIS) depending on the requirements of EirGrid.

The underground cable grid connection from the proposed substation to the existing 110/220kV Kellis substation will be at either 110kV or 220kV voltage.

The underground cable grid connection is located primarily in the public road network. However, after ca. 8.3km there are two options proposed for its final entry into the existing 220/110kV Kellis substation.

- Option A is to leave the L30535 local road and enter onto private lands where it will cross agricultural farmland into the existing 220/110kV Kellis substation.
- Option B is to be situated within the L30535 local road which provides road access into the existing 220/110kV Kellis substation.
- It should be noted that the options described above apply to both the 110kV and 220kV underground grid connection cables.

It should be noted that the red line development application boundary is identical for all substation and grid connection options described in this report. The location of the proposed substation, grid connection and its associated solar farms are shown in Figure 1.

Figure 1: Solar Farms, Substation & Grid Connection

The reason why different options are proposed for the substation and grid connection are as follows:

- The associated solar farms are subject to a grid connection application being made to EirGrid via the ECP-GSS 1 batch process. After this application has been made, EirGrid will assess the 'least cost, technically acceptable' method of connecting the project to the national network. The expected point of connection for the project will be the Kellis 220/110kV substation due to its proximity. However, depending on the outcome of their studies, EirGrid may conclude that the project should connect at either the 110kV side or the 220kV side of the Kellis substation. This will be driven by factors such as space/bay availability on the 110kV and 220kV busbars in Kellis; capacity of the 110kV and 220kV lines feeding power in and out of Kellis vis-à-vis the MW output of Ballyloo solar farm; and the interaction of the solar farm projects with any other projects applying at the same time. Therefore, for the purposes of this SID application, it is sought that design flexibility is accommodated between developing a 110kV or a 220kV substation and grid connection cable. Substations at either voltage use fundamentally the same type of equipment, except, when using air-insulated (AIS) switchgear, the clearance distances required between individual components becomes greater at 220kV and therefore it has a larger footprint. To allow for this potentially greater footprint area requirement at 220kV, it is also sought to incorporate an option for developing the substation with gas-insulated (GIS) switchgear instead

which, although more expensive, allows for significantly smaller clearance distances to be maintained between the switchgear components. The decision between using AIS or GIS switchgear for the 220kV substation option will ultimately be dependent on the level of future expandability and number of 'bays' that EirGrid will seek the Ballyloo substation to have when it comes to study the project prior to issuing a grid offer.

- The other aspect of flexibility relates to the routing of the final section of the grid connection cable before it enters Kellis substation. Kellis substation is becoming a busy node on the network with multiple underground cable connections planned to travel up the L30535 public road to reach the substation. This is a narrow, single lane, road and as a result, there may not be sufficient space for all cables to fit within the carriageway without derating effects occurring. Therefore, an 'off-road' route option is included on adjacent private lands to the east which would allow the grid connection cable to reach Kellis without being impacted by other cables travelling in the L30535, if this is required.

2.2 Substation Options

2.2.1 110kV AIS Substation

The substation will be based on EirGrid design specifications. The 110kV AIS substation will consist of both EirGrid and Independent Power Producer (IPP) including IPP Control Room buildings, 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 (TRAFO) with associated equipment along with:

- Cable Sealing End (CSE);
- Surge Arrestor (SA);
- Earth Disconnect (DT);
- Current /Voltage Transformer (CT/VT);
- House Transformer (HT);
- Circuit Breaker (CB);
- Lightning Mast (LM);
- Diesel Generator;
- Security Fencing and Cameras;
- Drainage, access etc.

The 110kV AIS substation layout is indicated in Figure 2.

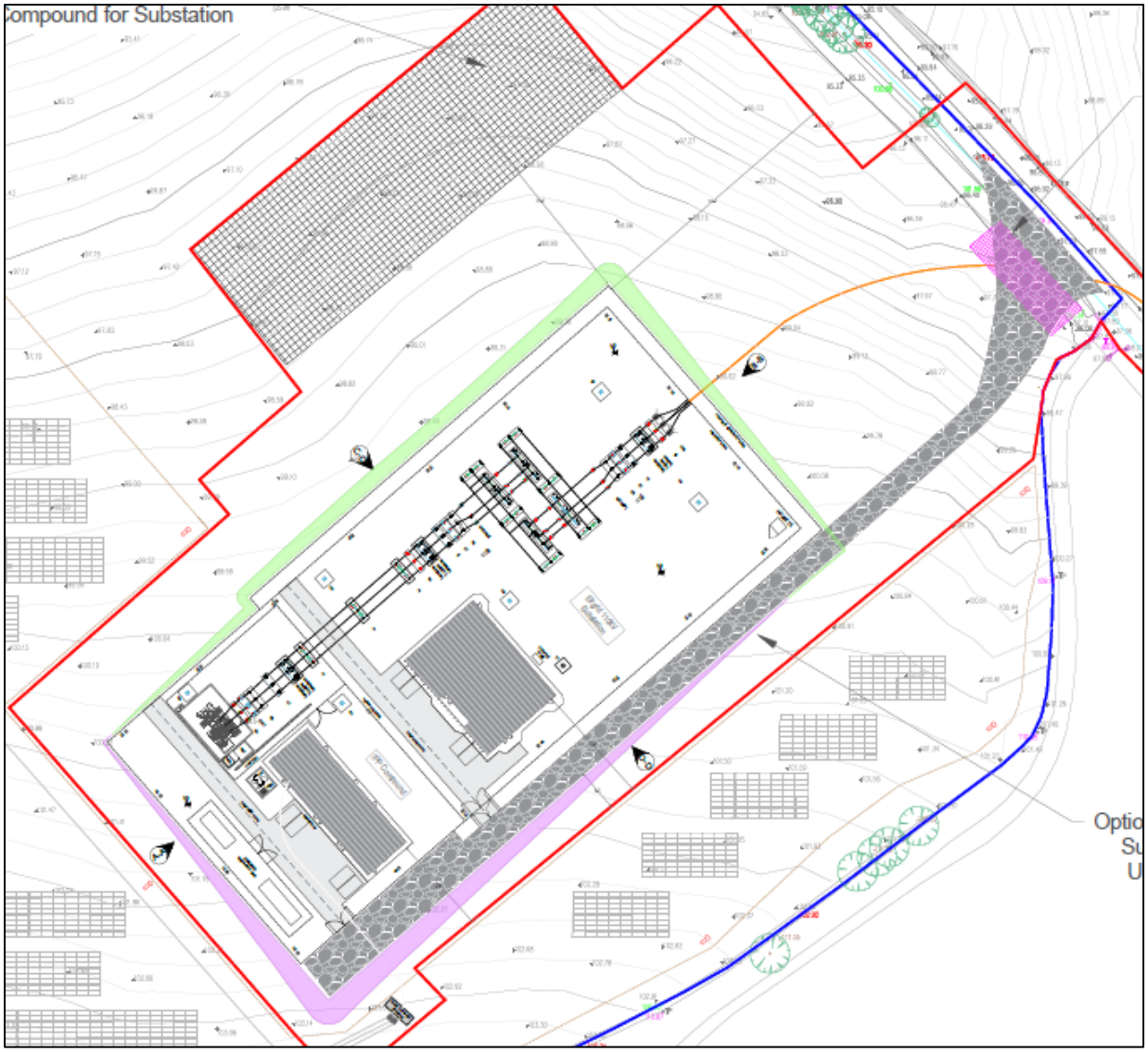

Figure 2: 110kV AIS Substation

2.2.2 220kV AIS Substation

The 220kV AIS substation will comprise the same infrastructure and equipment as the 110kV AIS substation option. The key difference is that the clearance distances required between individual components becomes greater at 220kV and therefore it has a larger footprint.

The 220kV AIS substation layout is indicated in Figure 3.

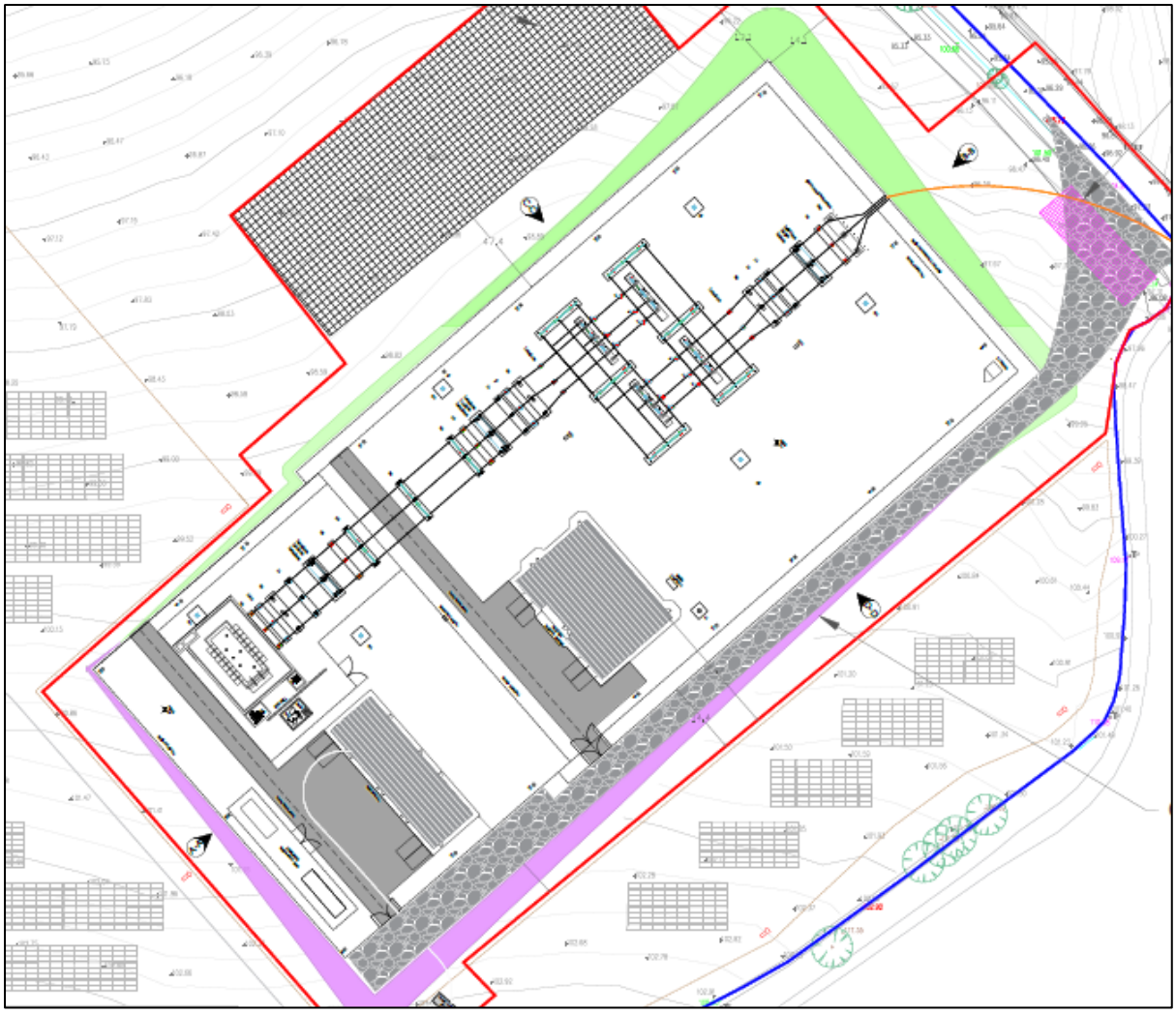

Figure 3: 220kV AIS Substation

2.2.3 220kV GIS Substation

The substation will be based on EirGrid design specifications. The substation compound will consist 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;
- Harmonic filters if required by EirGrid;
- Capacitor Bank if required by EirGrid;
- Fire/Blast Wall;
- Telecoms Pole.

The 220kV GIS substation layout is indicated in Figure 4.

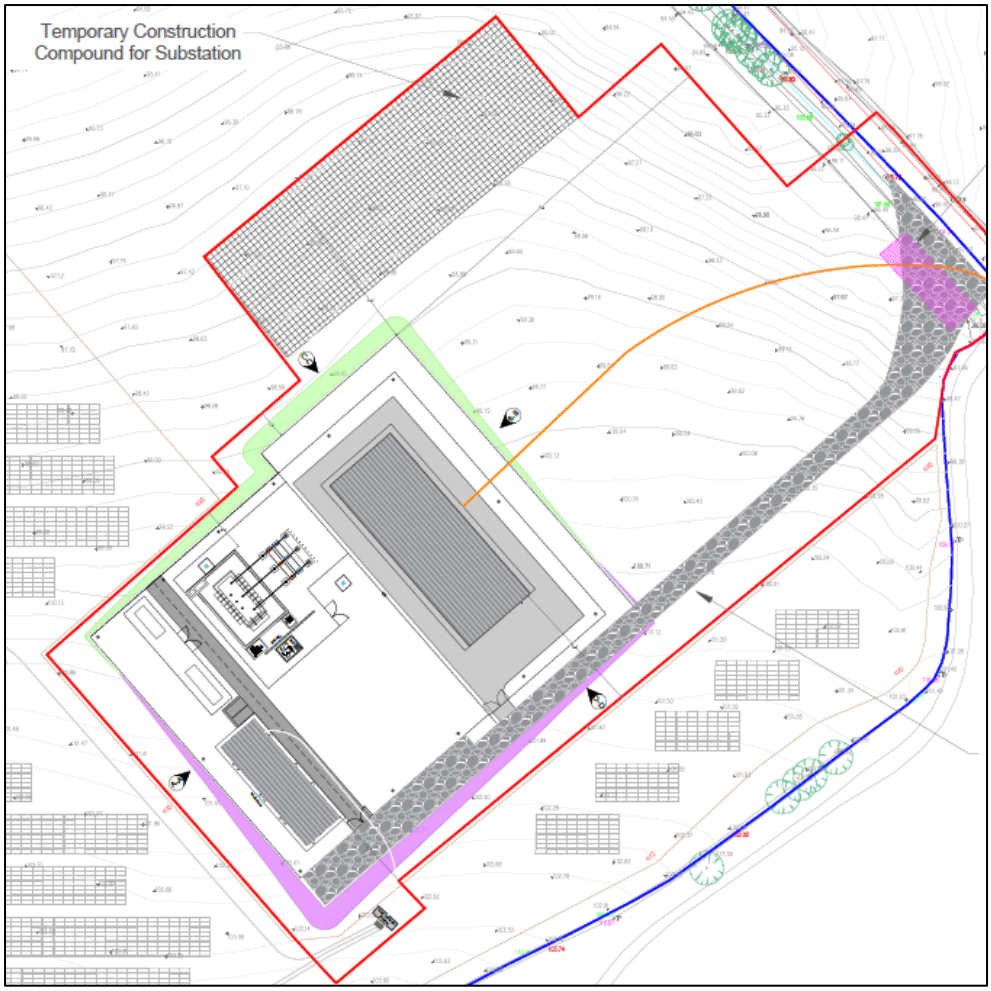

Figure 4: 220kV GIS Substation

2.3 Grid Connection Options

The substation will connect to the existing 220/110 kV Kellis substation via a proposed 110kV or 220 kV underground grid connection cable.

The overall length of the grid connection is approximately 8.9km. The route is shown in Figure 1. An indicative section of a 110kV underground cable trench is provided in Figure 5 and an indicative section of a 220kV underground cable trench is provided in Figure 6. Further section drawing are included in the SID planning application drawing pack.

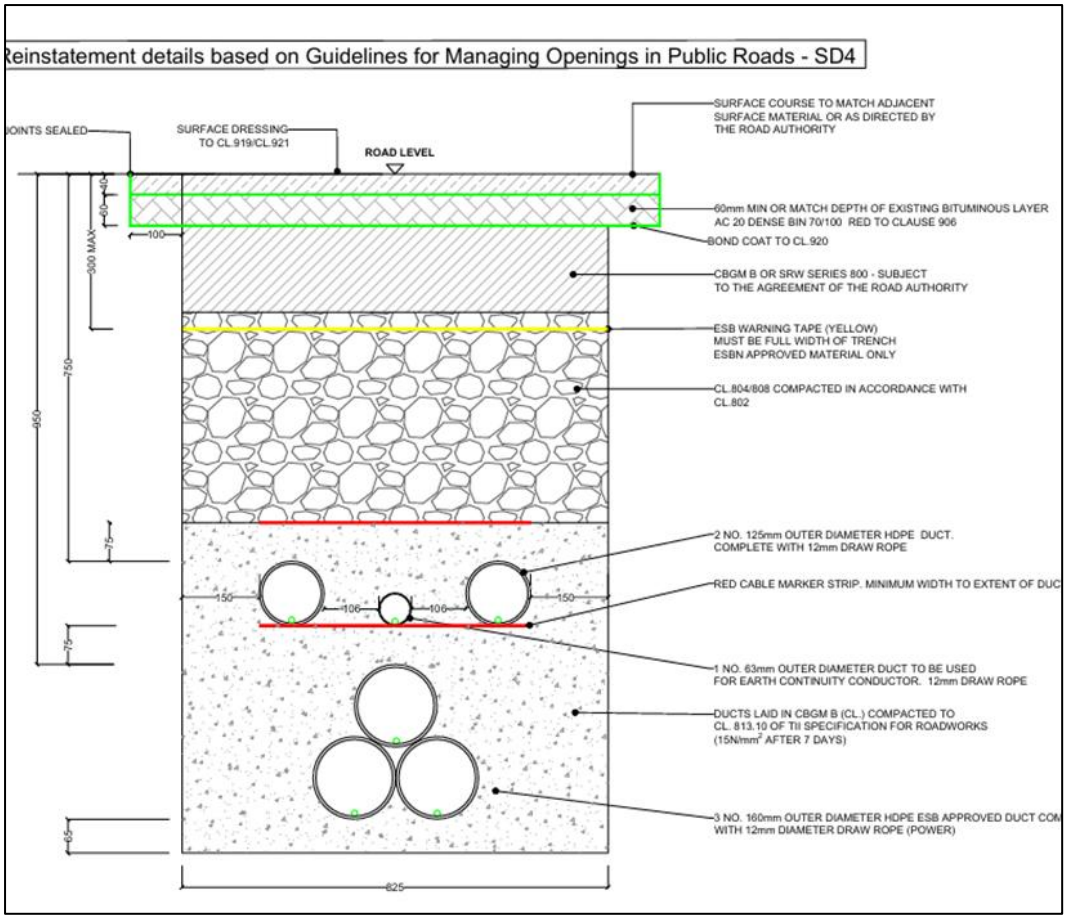

Figure 5: Typical Installation in Roadway for 110kV UGC Grid Connection

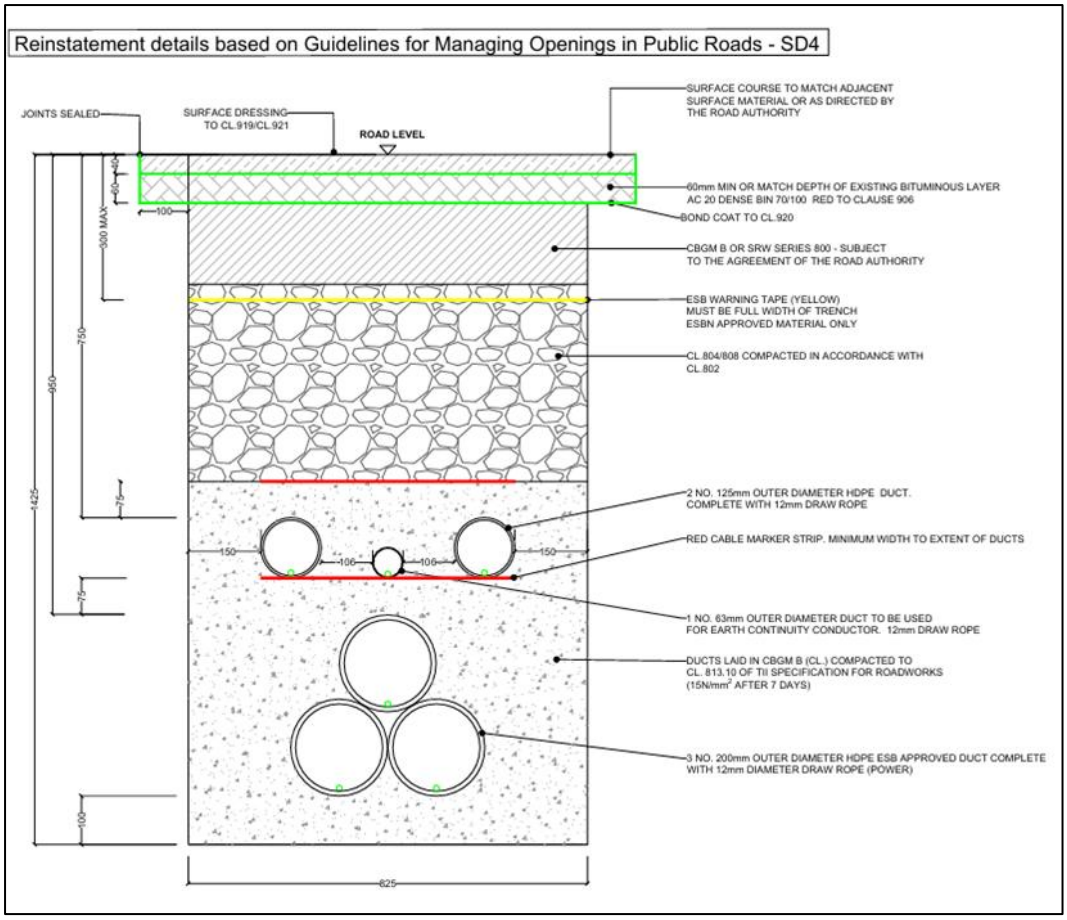

Figure 6: Typical Installation in Roadway for 220kV UGC Grid Connection

It should be noted that the red line development application boundary is identical for both the 110kV and 220kV grid connection cable options. The route travels east from the proposed substation on the L3050 before turning north onto the L30504. It then crosses the N80 at Castletown Cross Roads and continues east on the L7148 before turning south onto the L3053. The cable would then turn east onto the L30535 which is the main road access to the existing 220/110kV Kellis substation. As described in section 2.1, there are two options proposed for accessing the substation. One option is the L30535 local road and the other option is within privately owned agricultural lands. Both options are indicated in Figure 7.

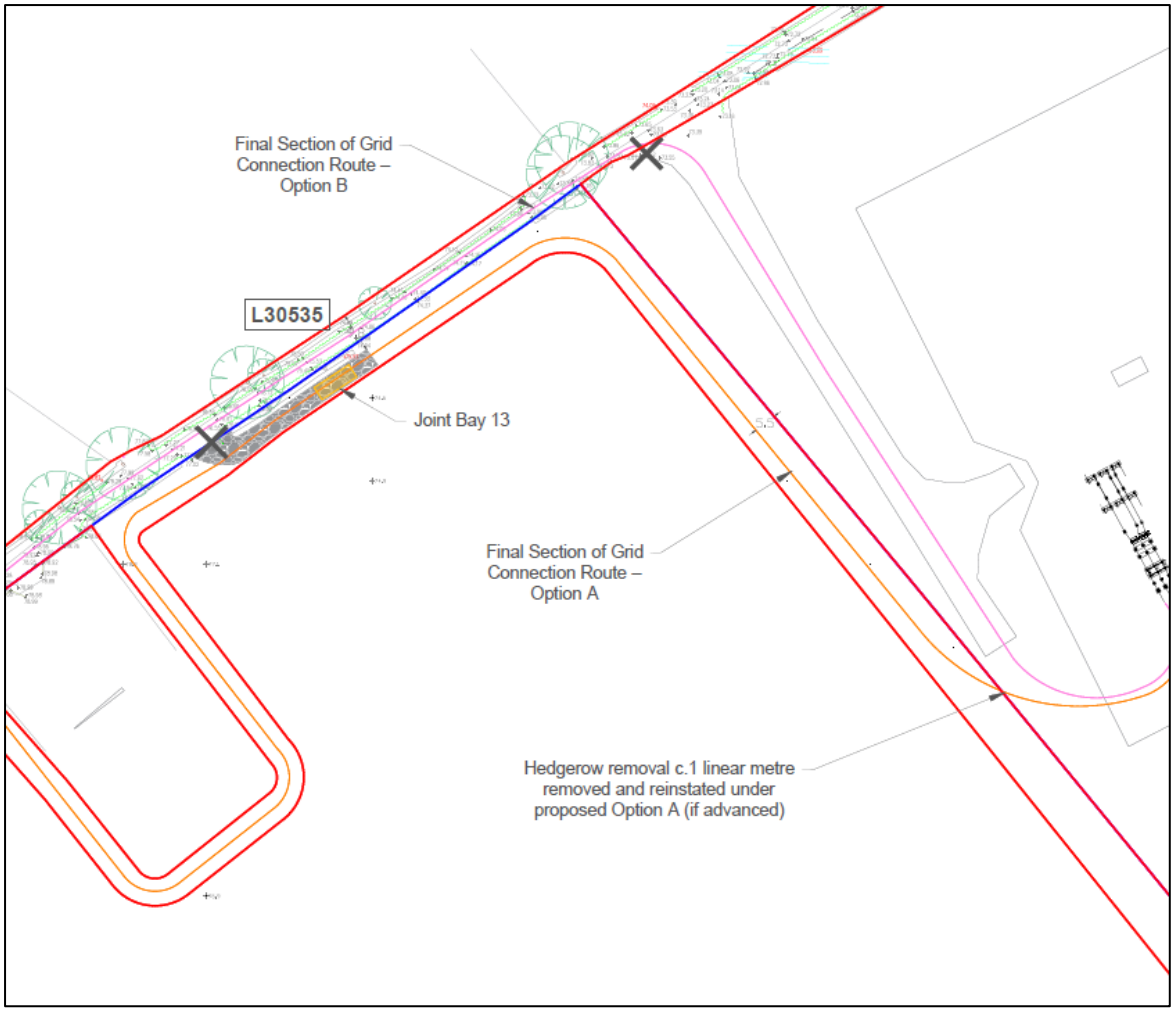

Figure 7: Connection Options into Existing Kellis Substation

3 Site Investigations

3.1 Substation

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 the substation 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 for all substation options.

3.2 Underground Grid Connection

Site investigations for the underground grid connection will be determined following detailed design, however it is anticipated that a single closure Stop/Go system can be implemented for the slit trenches on all the roads in each of the three options.

Depending on the final route selected, it is anticipated that these preliminary site works associated with the grid connection cable will take approximately 2-3 weeks to complete.

Where temporary road closures are necessary, a suitable diversion will be implemented using appropriate signage, following consultation and agreement with Carlow County Council.

4 Substation Construction Methodology

4.1 AIS Substation Construction Methodology

The proposed 110kV AIS substation compound area is approximately 8,385m^2 including the surrounding fence. The proposed 220kV AIS substation compound area is approximately 13,600m^2. The substation area for both options will be secured by a 2.6m high palisade fence. The construction sequence for both options 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. For the 110kV substation option, the amount of cut to be transported off site is expected to be ca. 3,443m^3. Similarly, the necessary amounts of fill material will be transported onto site. This is expected to be ca. 3,838m^3. For the 220kV substation option, the amount of cut to be transported off site is expected to be ca. 7,229m^3. Similarly, the necessary amounts of fill material will be transported onto site. This is expected to be ca. 7,868m^3.
- 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 EirGrid substation control 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 substation 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 contractors 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 (both options):

- 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 GIS Substation Construction Methodology

The proposed 220kV GIS substation compound area is approximately 7,660m^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. The amount of cut to be transported off site is expected to be ca. 3,495m^3. Similarly, the necessary amounts of fill material will be transported onto site. This is expected to be ca. 3,472m^3.

- 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 substation 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 contractors 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.

4.3 Access Track

It should be noted that the construction access is the same for all substation options described in this report.

Construction access to the substation will be provided by private lands, with an entrance from the public road L3050. A traffic management plan will be implemented for the delivery of the 33kV/110kV transformer.

4.4 Surface Water Drainage

4.4.1 AIS Substation

It should be noted that the surface water drainage proposals are similar for both the 110kV and 220kV AIS substation options described in this report.

Surface water drainage for the 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 area of this permeable surface is circa 8,315m^2 for the 110kV AIS substation option and 13,600m^2 for the 220kV AIS substation option.
- The main areas to be drained includes the roofs and the compound road. These equate to approximately 1,592m² for the 110kV AIS substation option and 2,023m^2 for the 220kV AIS substation option. These areas are modest in themselves and in comparison to the overall compound area. 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.

4.4.2 GIS Substation

Surface water drainage for the 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 area of this permeable surface is circa 7,660m^2 for the GIS substation.
- The main areas to be drained includes the roofs and the compound road. These equate to approximately 2,746m². The compound road will be drained via series of road gullies.

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.

4.5 Foul Water

It should be noted that the foul water drainage proposals are the same for all AIS and GIS substation options described in this report.

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 both the EirGrid and IPP control buildings. 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 (7.5m³) of foul sewer water waste. The 5m³ tank proposed will be emptied approximately every three months. As outlined, the capacity provided is well in excess of what is required.

4.5.1 Water Supply

It is proposed to provide the required potable water demand of the station (all options) 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.

4.6 Earthworks

Topographical data for the location the proposed substation shows the site does not have any severe or steep slopes, with most areas being relatively flat or with moderate slopes.

Analysis of available topographic data suggest that cutting and filling of the existing terrain will be required to establish a level platform for the substation compound. See below the proposed compound levels for the 110kV/220kV AIS Substation and GIS Substation.

Substation Layout	**Compound Level (m)**	**Cut (m^3)**	**Fill (m^3)**
110kV AIS	100.72	3,443	3,383
220kV AIS	100.20	7,229	7,868
220kV GIS	100.75	3,495	3,472

5 Grid Connection Construction Methodology

5.1 Overview

The underground grid connection is proposed to run primarily within the public road network with the exception of the final section of the grid connection cable before it enters Kellis substation. Kellis substation is becoming a busy node on the network with multiple underground cable connections planned to travel up the L30535 public road to reach the substation. This is a narrow, single lane, road and as a result, there may not be sufficient space for all cables to fit within the carriageway without derating effects occurring. Therefore, an 'off-road' route option is included on adjacent private lands to the east which would allow the grid connection cable to reach Kellis without being impacted by other cables travelling in the L30535, if this is required.

5.2 Underground Cable Construction Methodology

The bullet points below outline the construction methodologies to be used during trenching works for the underground cables associated with both the 110kV an 220kV options:

- 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 conditions of planning.
- All works will be subject to a road opening licence from Carlow County Council.
- A detailed traffic management plan will be prepared by the appointed contractor and agreed with Carlow County Council at construction stage, outlining how traffic will be managed during the course of the works on the public road. Where road closures and diversions are required to facilitate the works, these will be agreed with Carlow County Council and An Garda Siochana and the appropriate road closure licenses will be applied for.
- 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.
- Public road trenching will be reinstated in line with Carlow County Council requirements and as per the Guidelines for Managing Openings in Public Roads (Purple Book – April 2017);
- 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 excavation, installation and reinstatement process typically take an average of 1 day to complete a 50m section; and

- Following the installation of ducting, pulling the cable will take approximately 1 no. day between each joint bay, with the jointing of cables taking approximately 2 no. days.

The following equipment is required for trench construction:

- 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;
- Trench backfilling material to relevant specifications;
- Temporary Surface Reinstatement Materials; and
- Permanent Surface Reinstatement Materials to Carlow County Council specifications.

5.3 Joint Bays and Associated Chambers Construction Methodology

The final location and number of joint bays will be determined by the electrical contractor during the detailed design phase.

The location of the joint bays for the proposed grid connection cable (both options) will be determined as part of detailed design. Typical joint bays are 8 x 2.1m consists of a precast concrete unit with have link boxes and communication chambers located adjacent to them. These are required approximately every 400-600 metres. A typical joint bay section is provided in Figure 8 for a 110kV cable and Figure 9 for a 220kV cable.

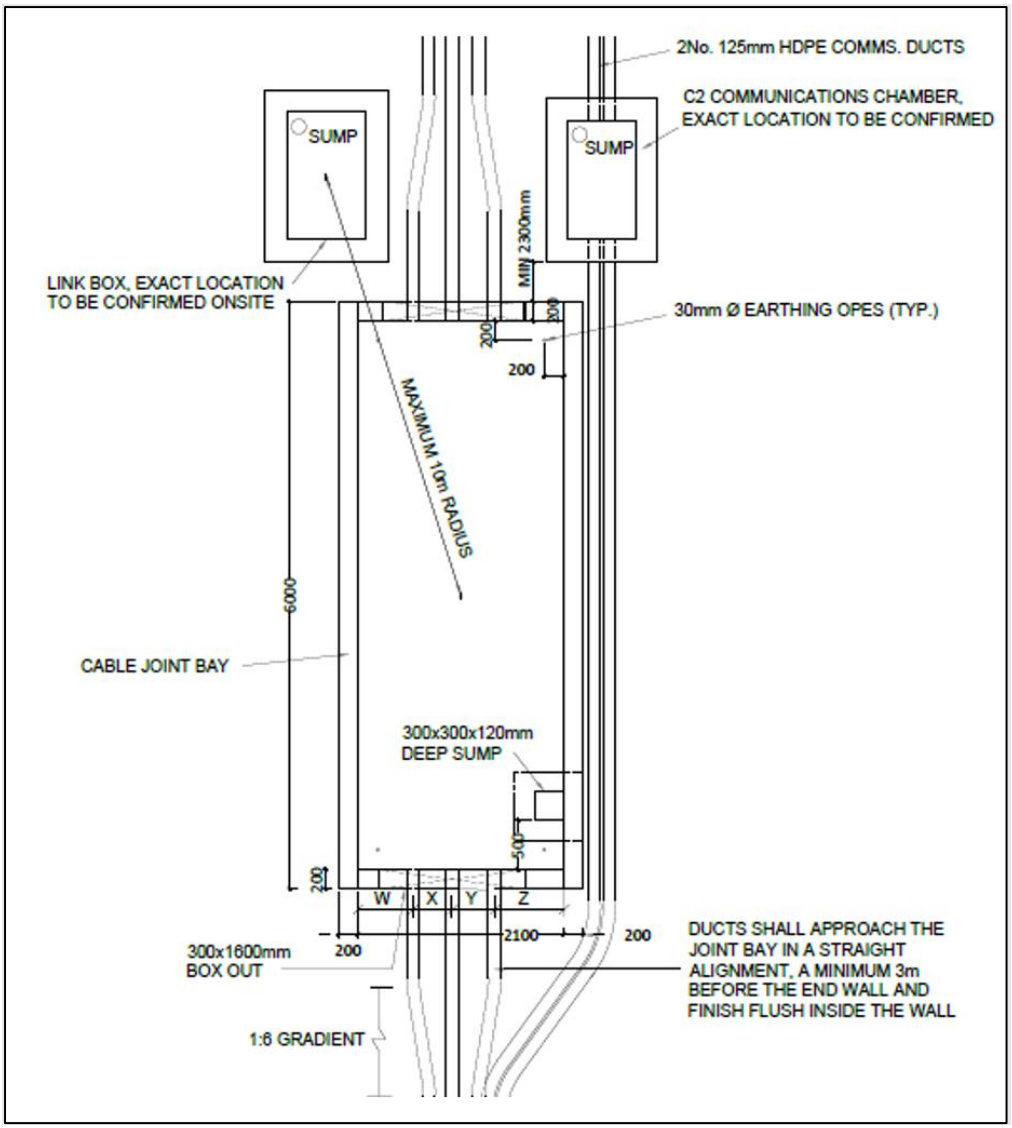

Figure 8: Typical 110kV Joint Bay

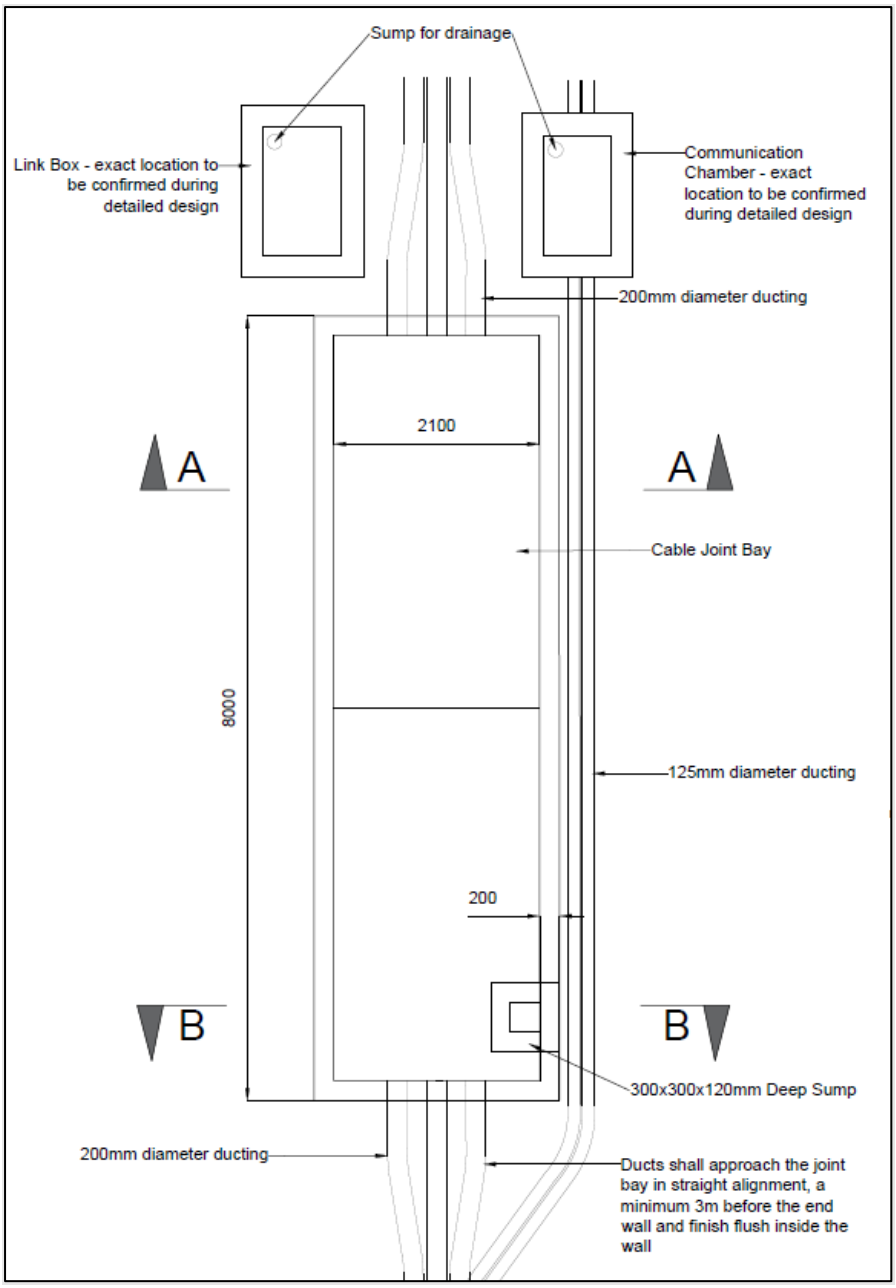

Figure 9: Typical 220kV Joint Bay

5.4 Utilities Crossings

Irish Water services are located along the public road L3050 where the proposed underground cable grid connection will cross. As built drawings and slit trenches are required to determine the depth of services and whether a cable undercrossing or cable overcrossing is required. A typical service undercrossing is shown below in Figures 10. The Applicant has consulted with Uisce Eireann in respect of the proposed crossing and UE has provided a provisional Confirmation of Feasibility (CoF) which is subject to further consultation and agreement post planning. A copy of the CoF is included in Appendix A of this report.

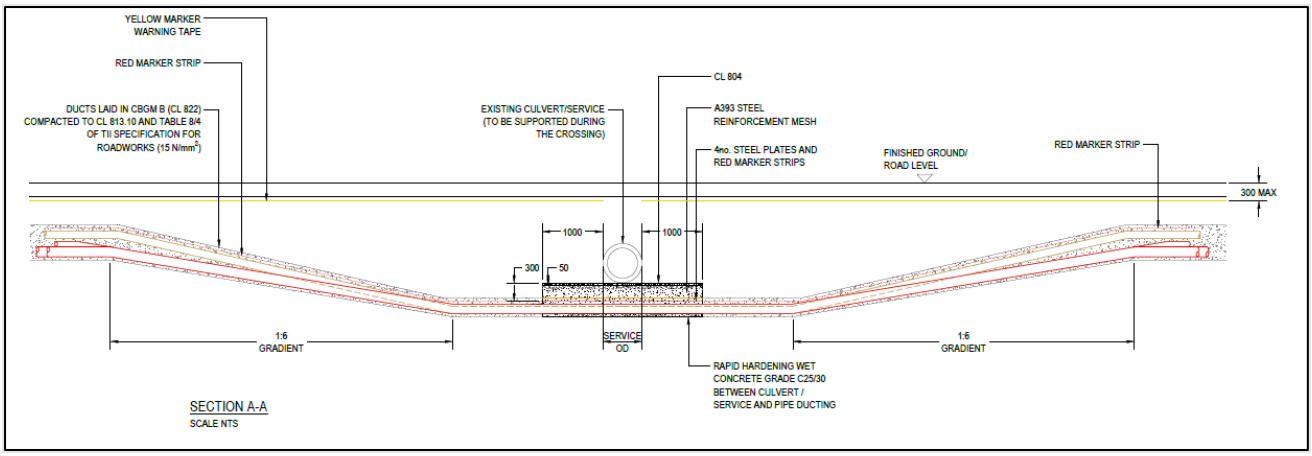

Figure 10: Typical Cable Service Pipe Undercrossing Detail

5.5 Watercourse Crossings

The underground cable grid connection route will cross a bridge/stream along the L30504 road. The cable will cross this stream via HDD, involving no in-stream works or alterations to the bridge. Further detail on HDD is provided in the following section.

5.6 Horizontal Directional Drill Methodology

A HDD is proposed for the bridge/stream along the L30504 road (HDD 1), the N80 (HDD 2) and at the junction between the L-3053 & L-30535 (HDD 3) which provides access to the existing Kellis 110/220kV substation. These locations are shown in Figures 11 and 12.

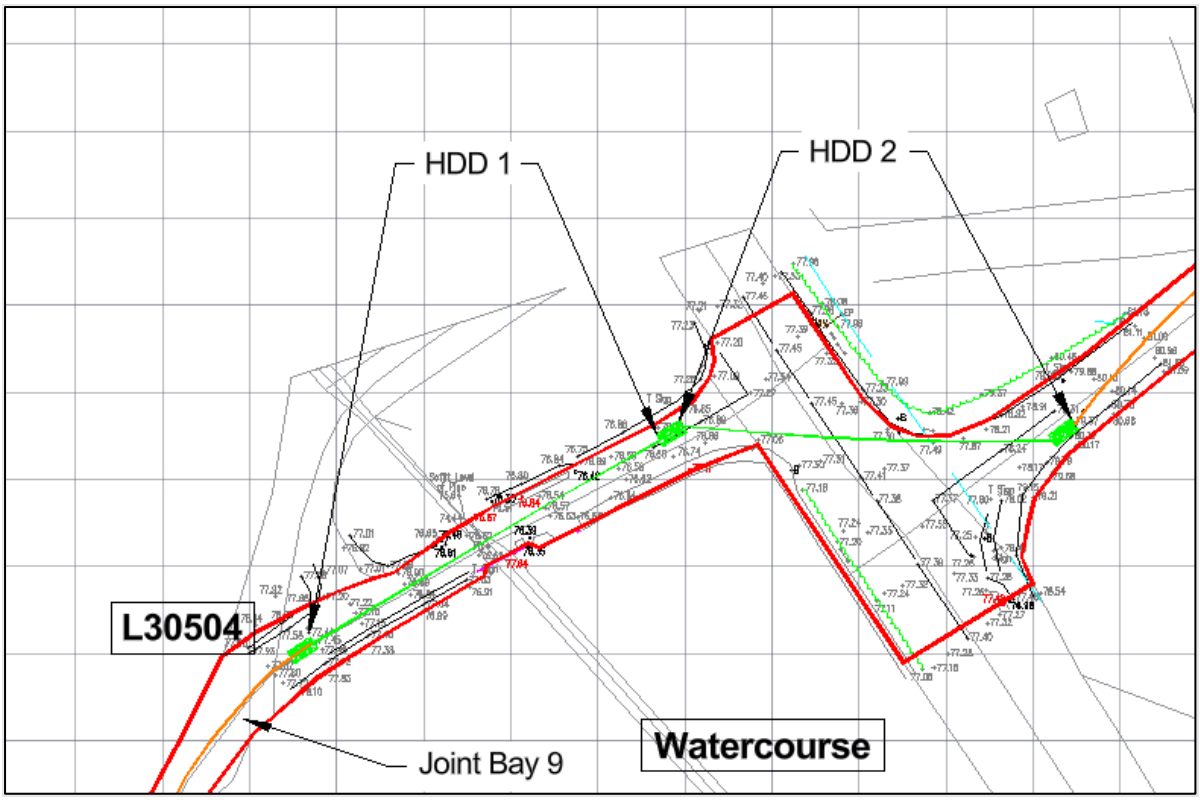

Figure 11: HDD under L30504 and N80

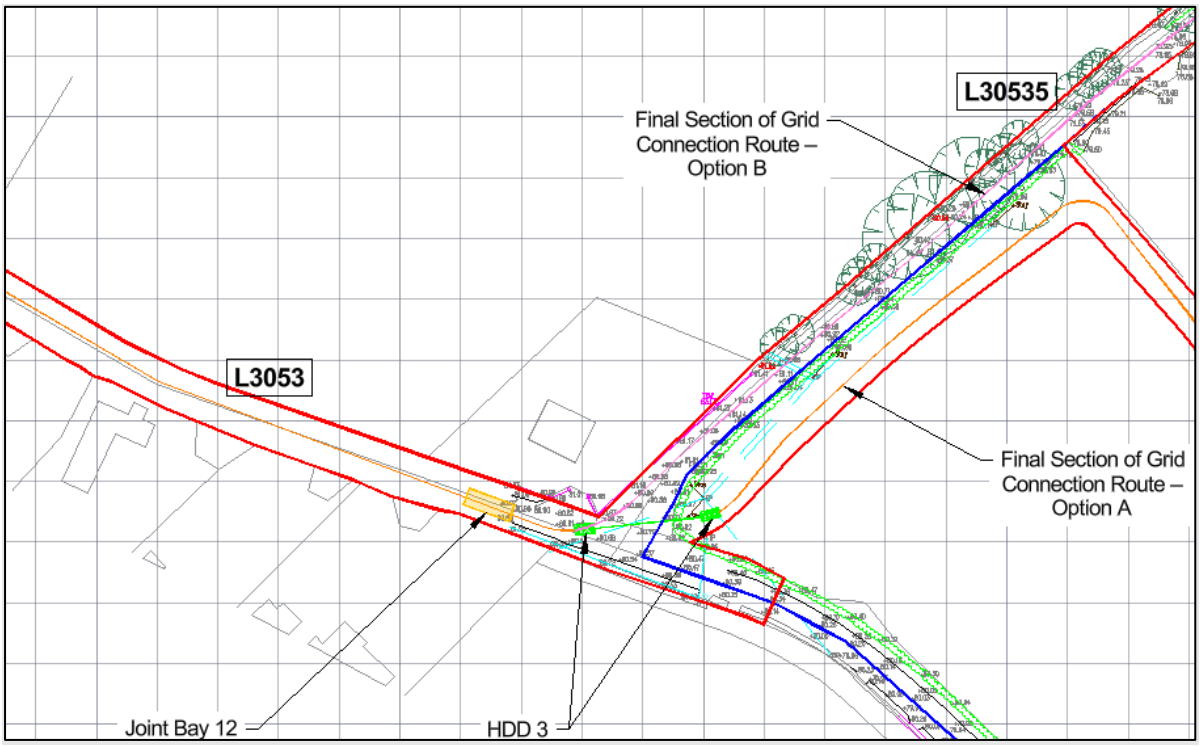

Figure 12: HDD between L-3053 & L-30535

The proposed drilling methodology for each HDD is as follows:

- A works area of approximately 40m^2 will be fenced on both sides creating an easement/wayleave.
- The drilling rig and fluid handling units located on one side of the crossing will be stored on double bunded 0.5mm PVC bunds which will contain any accidental fluid spills and storm water run-off.
- Entry and exit pits (1m x 1m x 2m) will be excavated; the excavated material will be temporarily stored within the works area and used for reinstatement or disposed of to a licensed facility.
- A 1m x 1m x 2m steel box will be placed in each pit. This box will capture any drilling fluid returns from the borehole.
- The drill bit will be set up by a surveyor, and the driller will push the drill string into the ground and will steer the bore path under the stream.
- A surveyor will monitor drilling works to ensure that the modelled stresses and collapse pressures are not exceeded.
- The drilled cuttings will be flushed back by drilling fluid to the steel box in the entry pit.
- Once the first pilot hole has been completed a hole-opener or back reamer will be fitted in the exit pit and will pull a drill pipe back through the bore to the entry side.
- When all bore holes have been completed, a towing assembly will be set up on the drill and this will pull the ducting into the bore.
- The steel boxes will be removed, and the drilling fluid disposed of to a licensed facility.
- The ducts will be cleaned and proven and their installed location surveyed.
- The entry and exit pits will be reinstated as per the landowners' requirements.

It should be noted that the applicant, through its parent company Terra Solar Development, has engaged with various planning authorities and Transport Infrastructure Ireland (TII) in relation to proposed HDDs under the national road network. Most recently, on the Park Solar Farm (Council Reference: 24/60205), the issues raised by TII as part of a request for further information on that application were resolved following consultation with TII's Network Management and TII's Land Use Planning Unit. The Park Solar Farm is considered directly relevant to this SID application as 1) both developments require a crossing of road

infrastructure for which TII are the responsible authority and 2) there are similar construction haulage considerations.

The context provided by the Park Solar Farm is as follows:

1. As part of the solar farm planning application RFI, TII Land Use Planning Unit advised in relation to the HDD crossing under the M9 that this would require Works Specific Deeds of Indemnities and consent from TII in accordance with Section 53 of the Roads Act, 1993. It was advised that consultation should be undertaken with TII Network Management / Third Paty Works in respect of same.
    - The applicant subsequently consulted with TII Network Management / Third Party Works who confirmed that 1) at the 'planning' stage of projects any queries should be directed to TIIs Land Use Planning Unit and 2) the Third Party Works process is only for developments that have already secured planning permission.
    - Following on from the above confirmation, the Applicant consulted with the Land Use Planning Unit who advised that they only consult with the planning authority during the planning application process.
    - In response to the RFI, the applicant noted that its understanding and experience of projects of this nature is that Works Specific Deeds of Indemnities and consent take place in advance of the commencement of construction, once planning permission has already been secured. The RFI response noted that this understanding has been confirmed by TIIs Network Management / Third Party Works. The Applicant further noted its commitment to consulting with TII at this time and agreeing all necessary statutory requirements. This commitment will apply to the subject substation and grid connection development also.
2. As part of the RFI on the Park Solar Farm, TII Land Use Planning Unit had raised a point in relation to the technical information submitted with the planning application and whether it had demonstrated the feasibility of the HDD crossing under the M9.
    - The Applicant responded that the details in relation to the HDD were set out in the 'Electrical Infrastructure - Construction Methodology' report submitted with the planning application. The level of detail provided was comparative to other projects where the Applicants team has agreed a Deed of Indemnity with TIIs

Network Management / Third Party Works team for HDD works. The same level of detail is provided in this report to An Coimisiún Pleanála.

- In addition to the above, the Applicant also proposed to consult with TII again when finalising the detailed design of the proposed HDD crossing prior to the commencement of the construction phase of development. This Method Statement would set out additional detail on engineering, environmental and safety management procedures of relevance to such works. It is highlighted that this is a process that the Applicant and TIIs Network Management / Third Party Works teams have navigated successfully on other projects.

3. TII also outlined in its RFI its general requirements for HDD under a motorway. These requirements, and how they are considered as part of the N80 crossing, are outlined below:

    - *Requirement 1: "The launch and receptions pits for the crossing are located outside the motorway boundary*" As per the planning application drawings the launch and receptor pits for the Horizontal Directional Drills (HDDs) will be outside the N80 road boundaries. The final Contractor led CEMP will include a detailed Method Statement relating to the HDD crossings and will provide for any short term temporary traffic management measures associated with this and all other HDD crossings.

    - *Requirement 2: "The crossing will be installed at such a depth so as not to conflict with the drainage of the motorway."* The N80 HDD crossing will follow TII Guidelines and will be placed at depths where there is no conflict with any drainage assets belonging to TII within its ownership boundary. The HDD crossing will be kept at a minimum of 3m below any drainage assets TII have installed in the area. During detailed design as built records for the drainage will be requested from TII by the designer and the design of the crossing will be submitted to TII and its representatives for comment and input prior to construction.

    - *Requirement 3: "Neither the works nor the crossing will damage or interfere with the motorway".* The HDDs will not damage or interfere with the N80. HDD crossings of motorways and national roads are common practice. Works at any one location will be temporary and of short duration. It was proposed that the final Contractor led CEMP would include a detailed Method Statement relating to the HDD crossings. There have been numerous crossings of this style carried out throughout the country on

behalf of independent power producers and ESBN/ EirGrid in recent years. The undertaker of construction works will ensure that best practice is adhered to with respect to safeguarding the motorway from damage or interference.

- *Requirement 4: "There are no bolted joints in that part of the crossing within the motorway fence line".* HDD crossings do not use pipes/ducts with bolted joints. HDD ducts are a continuous pipe that are welded together to ensure a smooth transition for the cable pulling process. The pipe/duct will be made from High Density Polyethylene (HDPE). This proven process and material will ensure that there are no potential locations for repair, in contrast with bolted joints which fatigue over time.
- *Requirement 5: "Specific requirements may also arise for these proposed works".* The applicant is committed to consulting with TII and agreeing all necessary technical details relating to the HDDs prior to the commencement of construction.

4. As part of the RFI, TII provided details of construction stage considerations for the implementation of any permission related to the national road network. These relate to the content of a future Construction Traffic Management Plan (CTMP) and will include:
    - Any proposed works to the national road network including signage shall comply with TII publications and shall be subject to a road safety audits. All necessary licences or agreements shall be secured from TII, PPP Concession, Motorway Maintenance, MMaRC Companies, local road authorities, as necessary.
    - Any proposals or agreements referred to above will be shared with TII;
    - Any damage caused to the pavement of the existing national road shall be rectified in accordance with TII Pavement Standards.

The Applicant can confirm in the case of the development subject to this SID application that it will reference the above requirements in the final CTMP and will consult with TII, and other parties where necessary, prior to the commencement of development. It should be noted also that on the Park Solar Farm, this detail was considered acceptable by TII who on review of same advised no objection to the proposed development.

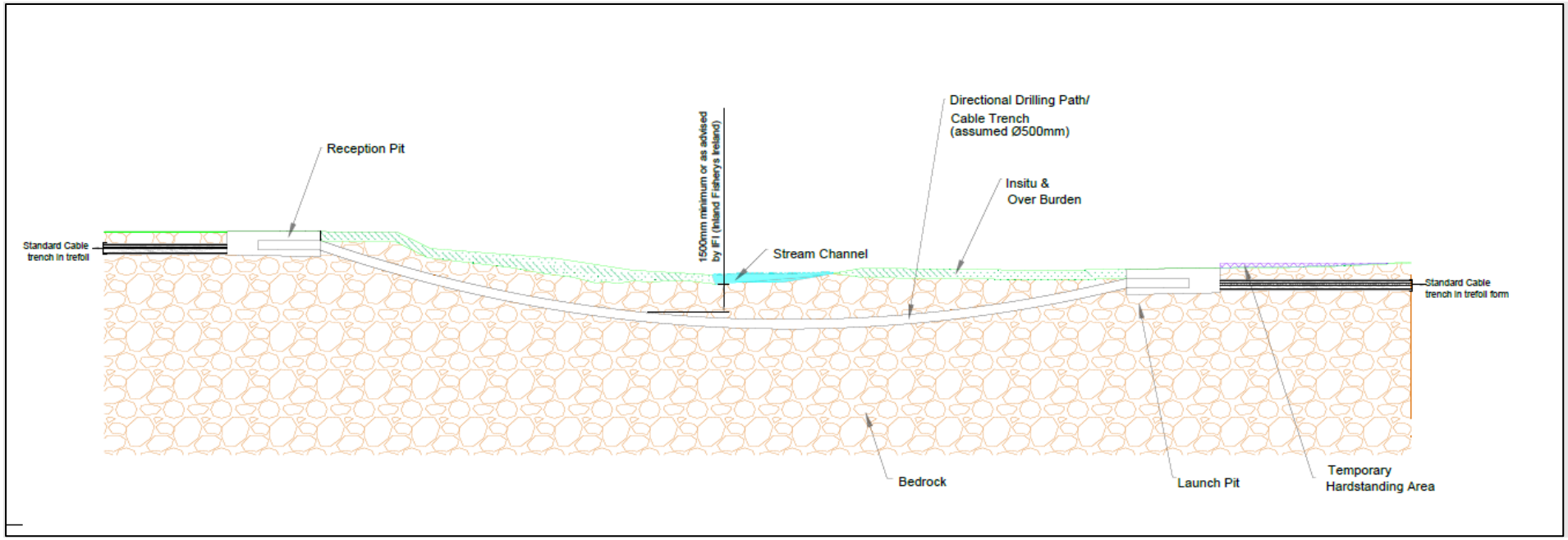

Figure 13: Typical Horizontal Directional Drill Water Crossing

5.7 Traffic Management

Road opening licenses will be submitted to cover the full extent of the underground cable grid connection within the public roads. In relation to the underground grid connection cable, the length of work exceeds 1000m of rural road and as such a T1 License Notification will be submitted through the MapRoadWorks licensing system to Carlow County Council to facilitate coordination and planning of these works with the Roads department. T2 (Road Works) Licenses will be prepared and applied for under the overarching T1 Notification.

Where road widths permit, the underground cable construction works will allow for one side of the road to be open to traffic at all times by means of a 'Stop/Go' type traffic management system, where a minimum 2.5m roadway will be maintained at all times. Temporary traffic signals will be implemented to allow road users safely pass through the works area by directing them onto the open side of the road. The underground cables will be installed in 100m sections with no more than 100m will be excavated without the majority of the previous section being reinstated.

Some work areas may require a temporary road closure where it is not possible to safely implement a Stop/Go system. Where temporary road closures are necessary, a suitable diversion will be implemented using appropriate signage, following consultation and agreement with Carlow County Council.

Full details of any traffic management plan for these works will be developed as part of the Road Opening License application process with a Traffic Management provider and shall be in accordance with Chapter 8 of the Traffic Signs Manual, but the following considerations are identified at this stage:

- Statutory processes for road closures as outlined in Section 75 of the Roads Act 1993 and expanded in Section 8.6.3 of Traffic Signs Manual will be followed – i.e. any proposed road closure is to be approved/implemented by the local Road Authority with consultation of the public, and proposed diversions will need to be approved by the Road Authority.
- An information campaign (letter drop/notification on local radio/advance information signs etc.) will be undertaken to inform local residents of the works.
- The process for applying for, and securing a road closure is separate to that of applying for a Road Opening Licence, but both are to be in place and valid for the full period of works. Carlow County Council advise that a Road Closure Application must be submitted within 5 weeks of the proposed closure. It is intended to engage with the

Roads Authority as early as possible due to the length of the works requiring road closures and road opening licenses to be in place.

- Provision of local access to residences along the active works area will be maintained with minimal disruption. This will be coordinated through signposted detour routes, advance notice to residents of anticipated works dates and details and facilitating access and egress of residences adjoining the works area during the periods where the UGC will be installed in the road outside these. The length of closure (as defined on site by signage/cones etc) is intended to be kept to the minimum length practicable for the works to be undertaken where homes are adjacent, and to avoid access restrictions to local residences being in place for multiple working days.
- Minimising the closure period of junctions with other local roads will dictate maximum length of any one closure (unless specified otherwise by Roads Authority) to avoid excessive disruption to the local area.
- Where ground conditions, weather, and third party services permit, approximately 100m of the route can be excavated, ducting installed, backfilled, and reinstated within one working day. This permits indicative time estimates for closures to be provided to locals, and will similarly permit works to be programmed so that restrictions on access to local houses can be kept to a minimum, such as by phasing works between driveways so that disruption to access from the works area is limited to the start or end of a single work day.

Temporary and Permanent Road Reinstatements are envisaged to be in accordance with the standard details provided in the Purple Book – namely SD1 & SD4 where the existing road consists of an Asphaltic Concrete build-up, or SD2 & SD5 in the event that the roads are surface dressed, unless otherwise directed by the roads authority during the T1 consultation period or approval process of specific T2 licenses. All longitudinal and transverse openings will be carried out in accordance with Purple Book drawings GA1 and GA2 respectively.

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 conditions of planning. 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 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 Archaeology

An Archaeological, Architectural and Cultural Heritage Impact Assessment undertaken for the project includes a suite of construction management measures devised as part of a considered mitigation strategy. Identified measures, including the capacity for preservation in situ by design, and any actions arising from associated findings will be integrated into the final pre-construction CEMP. The proposed layout of the development has been adjusted during the Request for Further Information stage of the Ballyloo Solar Farm planning application to take account of findings from the extensive archaeological site investigations undertaken and consultation with National Monuments Service (NMS). The NMS confirmed as part of those consultations that the location of the proposed substation is acceptable.

7.6 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.

7.7 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.

7.8 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 underground cable grid connection can be summarised as follows:

- The purpose of the substation and underground grid connection is to transport the electricity generated at the proposed Ballyloo, Park and Ballybannon Solar Farms to the national electricity grid.
- The substation will be at either 110kV or 220kV voltage and will be either an Air Insulated Switchgear (AIS) or Gas Insulated Switchgear (GIS) tail fed substation with the associated 110kV or 220kV grid connection comprising underground cabling which will connect to the national electricity grid via the existing 220/110kV Kellis substation.
- All substation construction activities will take place at fixed construction sites 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 substation and grid connection is estimated to be a total of 24 months. Further detail on this programme is provided in Appendix B.
- Prior to commencement of development, a detailed Construction Environment Management Plan (CEMP) shall be submitted to, and agreed in writing with, the planning authority, 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.

APPENDICES

APPENDIX A

UISCE ÉIREANN PROVISIONAL CONFIRMATION OF FEASIBILITY

Ballyloo Solar Farm Limited
191 Stepaside Park
Stepaside
Dublin 18
D18 X20F

9 September 2024

Uisce Éireann
Teach Colvill
24-26 Sráid Thalbóid
Baile Átha Cliath 1
D01 NP86
Éire

Uisce Éireann
Colvill House
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T: +353 1 89 25000
F: +353 1 89 25001
www.water.ie

Dear Mr McCarthy,

Re: Diversion Reference DIV24201 Diversion enquiry. Subject to contract | Contract denied

Uisce Éireann has reviewed your enquiry in relation to a build-over of Uisce Éireann's water network as part of the proposed Development at townlands of Ballybar Upper, Ballyloo, Ballyryan, Garryhundon and Linkardstown County Carlow, as indicated on drawings no. BYLOO-DR-01(A), BYLOO-DR-01, BYLOO-DR-02(A), BYLOO-DR-02, BYLOO-DR-03(A), BYLOO-DR-03, BYLOO-DR-04(A), BYLOO-DR-04, BYLOO-DR-05(A), BYLOO-DR-05, BYLOO-DR-06(A), BYLOO-DR-06, BYLOO-DR-07(A), BYLOO-DR-07, BYLOO-DR-08(A), BYLOO-DR-08, BYLOO-ED-DR-12_Service Crossing - 33kV Interconnectors and EirGrid Drawing XDC-CBL-STND-H-004.

Based upon the details you have provided with your enquiry and as assessed by Uisce Éireann, we wish to advise you that, subject to valid agreement/s being put in place, the proposed build over can be facilitated.

1. Uisce Eireann must be provided with a detailed method statement and risk assessment for working in the vicinity of Uisce Eireann assets as part of the build-over or near agreement process.
2. Ballyloo Solar Farm Limited will submit project specific drawings as part of the Build over/ near Agreement application following grant of planning permission and completion of site investigations and detailed design. The specific clearance requirements will be agreed with Uisce Éireann during this process and 500 mm vertical separation provided if deemed necessary.
3. Private water schemes are indicated on UÉ records at locations covered on drawings BYLOO-DR-02(A)/ BYLOO-DR-02, BYLOO-DR-03(A)/ BYLOO-DR-03, and BYLOO-DR-04(A)/ BYLOO-DR-04 you will need to engage separately with these schemes to get agreement for works in the vicinity of their water mains.

You are advised that this correspondence does not constitute an agreement in whole or in part to provide a diversion or to build near any Uisce Éireann infrastructure and is provided subject to build over agreement being executed at a later date. You are advised to make contact with the diversions team at diversions@water.ie once planning permission has been granted and prior to any works commencing on site in order to enter into a build over agreement with Uisce Éireann Water.

If you have any further questions, please contact Stephen O'Beirne from the diversions team on 083 087 8337 or email sobeirne@water.ie. For further information, visit www.water.ie/connections.

Yours sincerely,

Dermot Phelan
Connections Delivery Manager

APPENDIX B

CONSTRUCTION PROGRAMME AND CONSTRUCTION TRAFFIC

Estimated Construction Programme & Vehicle Numbers

		Construction Programme (Months)																							
	Week	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
Substation Construction	Enabling Works	175	175	150																					
	Civil Works				20	20	20	20	20	20	20														
	Electrical Works											20	20	15	10	5									
Grid Connection Construction	Civil and Electrical Works											205	205	205	205	205	205	205	205						
Substation Electrical Commissioning	Pre-commissioning																								
	ESB Commissioning																								
Solar Farm Construction	Solar Farm Site Set Up & Installation							264.4	344	158.4	223.7	112.6	112.6	112.6	142.8	135.9	135.9	247	247	242.8	17	17	4	118.1	71
Solar Farm Electrical Commissioning	Electrical Commissioning																					100	100	80	
	Close Out																							80	80
	Estimated Vehicles Per Month	**175**	**175**	**150**	**20**	**20**	**20**	**284.4**	**364**	**178.4**	**243.7**	**337.6**	**337.6**	**332.6**	**357.8**	**345.9**	**340.9**	**452**	**452**	**242.8**	**17**	**117**	**104**	**278.1**	**151**
	Estimated Vehicles Per Week	**43.75**	**43.75**	**37.5**	**5**	**5**	**5**	**71.11**	**91**	**44.59**	**60.93**	**84.4**	**84.4**	**83.15**	**89.45**	**86.47**	**85.22**	**113**	**113**	**60.7**	**4.25**	**29.25**	**26**	**69.53**	**37.75**
	Estimated Vehicles Per Day (5.5 days)	**8**	**8**	**7**	**1**	**1**	**1**	**13**	**17**	**8**	**11**	**15**	**15**	**15**	**16**	**16**	**15**	**21**	**21**	**11**	**1**	**5**	**5**	**13**	**7**
	Peak Daily Vehicles	**21**																							
	Peak Hourly Vehicles	**2.625**																							
	Average Daily Vehicles	**10**																							
	Average Hourly Vehicles	**1**																							

- The duration of the construction works will be confirmed and agreed with the Local Authority prior to construction. The construction programme for the entire substation and grid connection is estimated to be a total of 24 months. Given that the substation is located adjacent to the Ballyloo Solar Farm and that construction timelines will overlap, the cumulative construction traffic volumes associated with both developments are considered in the above table.

APPENDIX 2
Biodiversity Evaluation Scheme
(amended after NRA 2009 and Nairn & Fossitt 2004)

Biodiversity Evaluation Scheme[8].

Biodiversity Evaluation Criteria
International Importance: ▪ 'European Site 'including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation. ▪ Proposed Special Protection Area (pSPA). ▪ Site that fulfils the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended). ▪ Features essential to maintaining the coherence of the Natura 2000 Network. ▪ Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive. ▪ Resident or regularly occurring populations (assessed to be important at the national level*) of the following: - Species of bird listed in Annex I and/or referred to in Article 4(2) of the Birds Directive and/or; - Species of animal and plants listed in Annex II and/or IV of the Habitats Directive. ▪ Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971). ▪ World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972). ▪ Biosphere Reserve (UNESCO Man & The Biosphere Programme). ▪ Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979). ▪ Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979). ▪ Biogenetic Reserve under the Council of Europe. ▪ European Diploma Site under the Council of Europe. ▪ Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988). ▪ Major salmon river fisheries.
National Importance: ▪ Site designated or proposed as a Natural Heritage Area (NHA). ▪ Statutory Nature Reserve. ▪ Refuge for Fauna and Flora protected under the Wildlife Acts. ▪ National Park. ▪ Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park. ▪ Resident or regularly occurring populations (assessed to be important at the national level*) of the following: - Species protected under the Wildlife Acts; and/or - Species listed on the relevant Red Data list. ▪ Site containing 'viable areas'** of the habitat types listed in Annex I of the Habitats Directive. ▪ Major trout river fisheries. ▪ Commercially important coarse fisheries. ▪ Waterbodies with major amenity fishery value.

[8] amended after NRA 2009 and Nairn & Fossitt 2004

Biodiversity Evaluation Criteria

County Importance:

- Area of Special Amenity^.
- Area subject to a Tree Preservation Order^.
- Area of High Amenity^, or equivalent, designated under the County Development Plan.
- Resident or regularly occurring populations (assessed to be important at the County level*) of the following:
  - Species of bird listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;
  - Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;
  - Species protected under the Wildlife Acts; and/or
  - Species listed on the relevant Red Data list.
- Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance.
- County important populations of species, or viable areas** of semi-natural habitats or natural heritage features identified in the National or Local Biodiversity Action Plan (BAP) if this has been prepared.
- Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county.
- Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.
- Small waterbodies with known salmonid populations or with good potential salmonid habitat.
- Large waterbodies with some coarse fisheries value.

Local Importance (higher value):

- Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP if this has been prepared.
- Resident or regularly occurring populations (assessed to be important at the Local level*) of the following:
  - Species of bird listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;
  - Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;
  - Species protected under the Wildlife Acts; and/or
  - Species listed on the relevant Red Data list.
- Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality.
- Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.
- Small waterbodies with some coarse fisheries value or some potential salmonid habitat.
- Waterbodies with unpolluted 'High' water quality status (Q4-5, Q5).

Local Importance (lower value):

- Sites containing small areas of semi-natural habitat that are of some local importance for wildlife.
- Sites or features containing non-native species that are of some importance in maintaining habitat links.

Biodiversity Evaluation Criteria
▪ Waterbodies with no current fisheries value, no significant potential fisheries value, poor fisheries habitat.

* A general suggestion is that 1% of the national population of such species qualifies as an internationally or nationally or county or locally important population. However, a smaller population may qualify as internationally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

** A 'viable area' is defined as an area of a habitat that, given the particular characteristics of that habitat, was of a sufficient size and shape, such that its integrity (in terms of species composition, and ecological processes and function) would be maintained in the face of stochastic change (for example, as a result of climatic variation).

^ It should be noted that whilst areas such as Areas of Special Amenity, areas subject to a Tree Preservation Order and Areas of High Amenity are often designated on the basis of their ecological value, they may also be designated for other reasons, such as their amenity or recreational value. Therefore, it should not be automatically assumed that such sites are of County importance from an ecological perspective.