

8.0 LAND, SOILS AND GEOLOGY

8.1 INTRODUCTION

This chapter of the EIAR assesses the effects of the proposed substation, as described in Chapter 3 'Description of the Development', on the land, soil and geological environment. Information on the existing soil and geological environment is presented as a baseline for the site. The potential effects of the proposed development are discussed along with recommended mitigation measures for each potential effect. Any residual and cumulative effects are also assessed.

The key design characteristics will include:

- EirGrid/ ESNB Control Room building
- Associated Internal 15kV and 110kV Underground Cabling
- Installation of a 15/110kV Transformer (TRAFO) with associated equipment including:
 - Cable Sealing End
 - Surge Arrestor
 - Earth Disconnect
 - Current /Voltage Transformer
 - Circuit Breaker
- 110kV underground cable to Barnakyle 110kV substation 3 No Power Ducts and 2 No Telecoms Ducts.
- Diesel Generator
- Security Fencing, Security Cameras and Poles
- Lights/Lamp Poles
- Lightning Masts
- Temporary Construction Compound
- And all other associated site development plant and equipment and other works including surface water and foul wastewater drainage, within an overall redline boundary measuring approximately 2.6 hectares.

Information on the design of the proposed development is provided in Chapter 3 'Description of Development'.

8.1.1 Statement of Authority

This chapter has been completed by John Dillon of TOBIN Consulting Engineers.

John Dillon (BSc., MSc., DIC, MCIWM, PGeo) is a hydrogeologist with 18 years' geological/hydrogeological experience on major infrastructure developments. John has authored numerous Land, Soils and Geology chapters for EIARs for a range of projects.

8.2 METHODOLOGY

The methodology used to produce this chapter included completing a desk study and a site walkover.

A desk study was undertaken to collate and review background information in advance of the site survey. The desk study involved the following:

- Examination of the Geological Survey of Ireland (GSI) datasets pertaining to geological and extractive industry data;
- Examination of Environmental Protection Agency (EPA) soil and subsoils datasets;
- Examination of National Parks and Wildlife Service (NPWS) nature conservation designations;
- Preparation of site maps and suitable field sheets for the site survey.

Site walkover surveys relating to the land, soil and geological environment was undertaken in February 2023. The site surveys included:

- A site walkover to review the ground conditions and assess the topography, land use, geomorphology and requirements for further investigations.

The information obtained is referenced throughout Section 8.3. Following the desk top study and the site survey, geological maps were generated in GIS and are included in Figures 8-1 and 8-2.

8.2.1 *Relevant Guidance*

This chapter has been prepared having regard to the following guidelines:

- Guidelines on the Information to be contained in Environmental Impact Assessment Reports (Environmental Protection Agency, 2022);
- Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (NRA 2008);
- Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (IGI 2013);
- Good practice guidelines on the control of water pollution from construction sites (Construction Industry Research and Information Association (c532 CIRIA 2001);
- Environmental Protection Agency., 2023. EPA Map Viewer. <http://gis.epa.ie/Envision>;
- Geological Survey of Ireland., 2023. Department of Communication, Energy and Natural Resources: Online Mapping. <https://www.gsi.ie/Mapping.htm>, and
- GeoHive., 2023. Ordnance Survey Ireland: Spatial data. www.geohive.ie.
- Consultation

These potential impacts are included below in Section 8.4.

8.2.2 *Public Information Sources*

- Published geological, soil, groundwater, surface water, aquifer, and recharge data obtained from the Geological Survey of Ireland (GSI);
- National Parks and Wildlife Service data of designated conservation areas;
- Waste and IPPC licensed facility data from EPA Geoportal;
- Irish Geological Heritage site map from the GSI (www.gsi.ie);
- EPA online Envision Map Viewer (www.epa.ie);

- Flood history of site from OPW National Flood Hazard Mapping website (www.floodmaps.ie);
- Catchment flood risk assessment & management study (<http://www.cfram.ie/pfra/>); and,
- Aerial Photography from ESRI (ArcGIS).

8.3 EXISTING ENVIRONMENT

The existing environment is discussed in this chapter in terms of geomorphology (landscape and topography) and superficial solid geology. The regional review of geological conditions covers a zone of 2 km from the site boundary, as suggested in the Institute of Geologists of Ireland (IGI) guidelines¹ (2013).

The proposed development site is located at Profile Park, Dublin 22. The site location is shown in Figure 8-1.

The proposed development site is located within industrial landscape which has recently be developed. An existing datacentre is adjacent to the proposed development's boundary.

The Grange Castle Golf Club is located approximately 0.2km to the east and northeast of the proposed development. The entire proposed project is described in detail in Chapter 3 of this EIAR.

8.3.1 Site Topography and Geomorphology

The topography of the proposed grid connection can be described as mostly flat. The GSI data does not indicate there are any geomorphology features within the site boundary.

8.3.2 Land Use

The overall site of the proposed development measures c. 2.6ha and is predominantly covered by rough grassland, surrounded by industrial, commercial and transport units. Access is via the existing road network, located off the R134.

The infrastructure delivery route is along the R134 through artificial surfaces associated with industrial, commercial and transport units, as shown in Figure 8-1.

8.3.3 Regional Soils and Subsoils

The regional soils in this area, including the grid and gas connection. Based on mapping by the EPA this indicates that this site consists of 2 no. types of soil, namely:

- BminPD – Basic deep poorly drained mineral;
- BminDW – Basic deep well drained mineral.

¹ Institute of Geologists of Ireland (2013) Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements

The development area within the red line boundary is underlain mostly by basic deep poorly drained material.

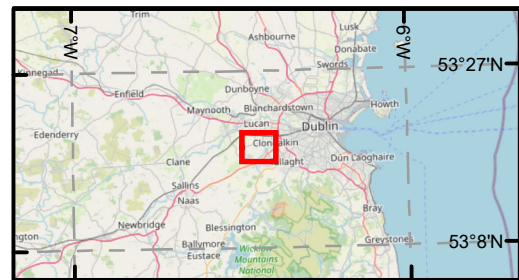
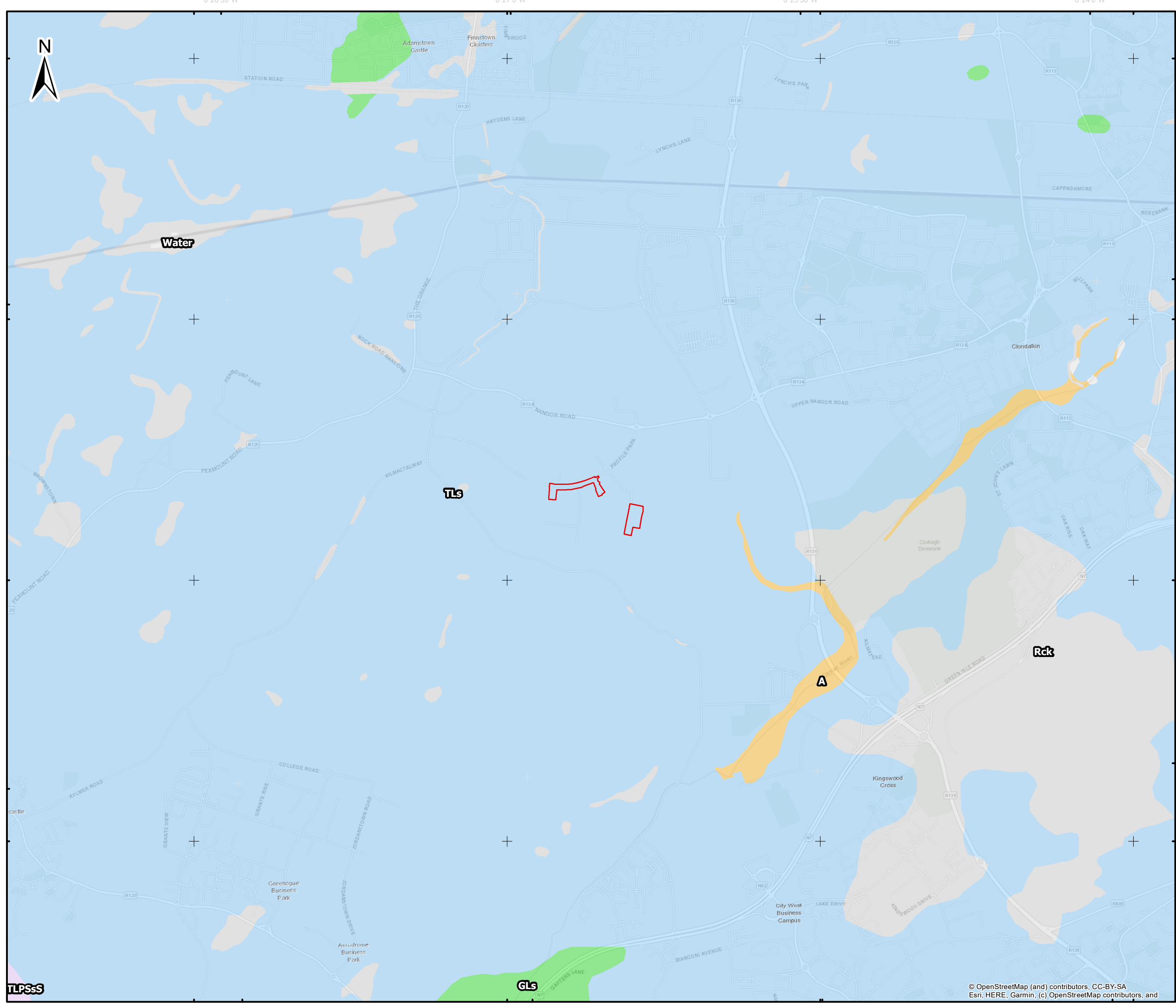
Figure 8-1 Subsoil Map shows the regional subsoils in this area, including the area within the red line boundary and grid/gas connection. The dominant subsoil occurring in the region is classified as till. The site is underlain by till derived from limestone (TLS).

The till, which is Quaternary in age, formed as an extensive envelope of the landscape in the area since deglaciation approximately 7,000 – 10,000 years ago. Based on the site walkover date the site is underlain by firm, brown and grey slightly gravelly silty CLAY with occasional cobbles and pieces of broken rock. Gravel is subangular to subrounded, fine to medium. Cobbles are subangular to subrounded.

8.3.4 Bedrock

The bedrock geology on the GSI 1:100 000 map indicate that this site is underlain by Lucan Formation limestone. The regional bedrock geology covering the proposed site and grid/ gas connection is shown in Figure 8-2 Geology Map and a description of the formation is presented below.

The GSI database contain records of verified borehole logs, groundwater wells and springs within and close to the site of the granted power plant. Bedrock exposures in the local area indicate strong to moderately strong, dark grey, fine grained, argillaceous limestones with minor calcareous shales.



Legend

- Planning Application Boundary

Subsoils

- A, Alluvium
- GLs, Gravels derived from Limestones
- Rck, Bedrock outcrop or subcrop
- TLPSsS, Till derived from Lower Palaeozoic sandstones and shales
- TLs, Till derived from limestones
- Water



- NOTES**
- FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
 - ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE
 - ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES
 - ALL LEVELS RELATE TO ORDANCE SURVEY DATUM AT MALIN HEAD

Rev	Date	Description	By	Chkd.
A	23/05/2023	Final issue	S.P	C.N

Client:

Project: Profile Park power plant - Substation Application

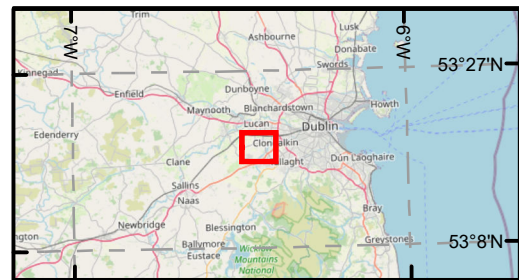
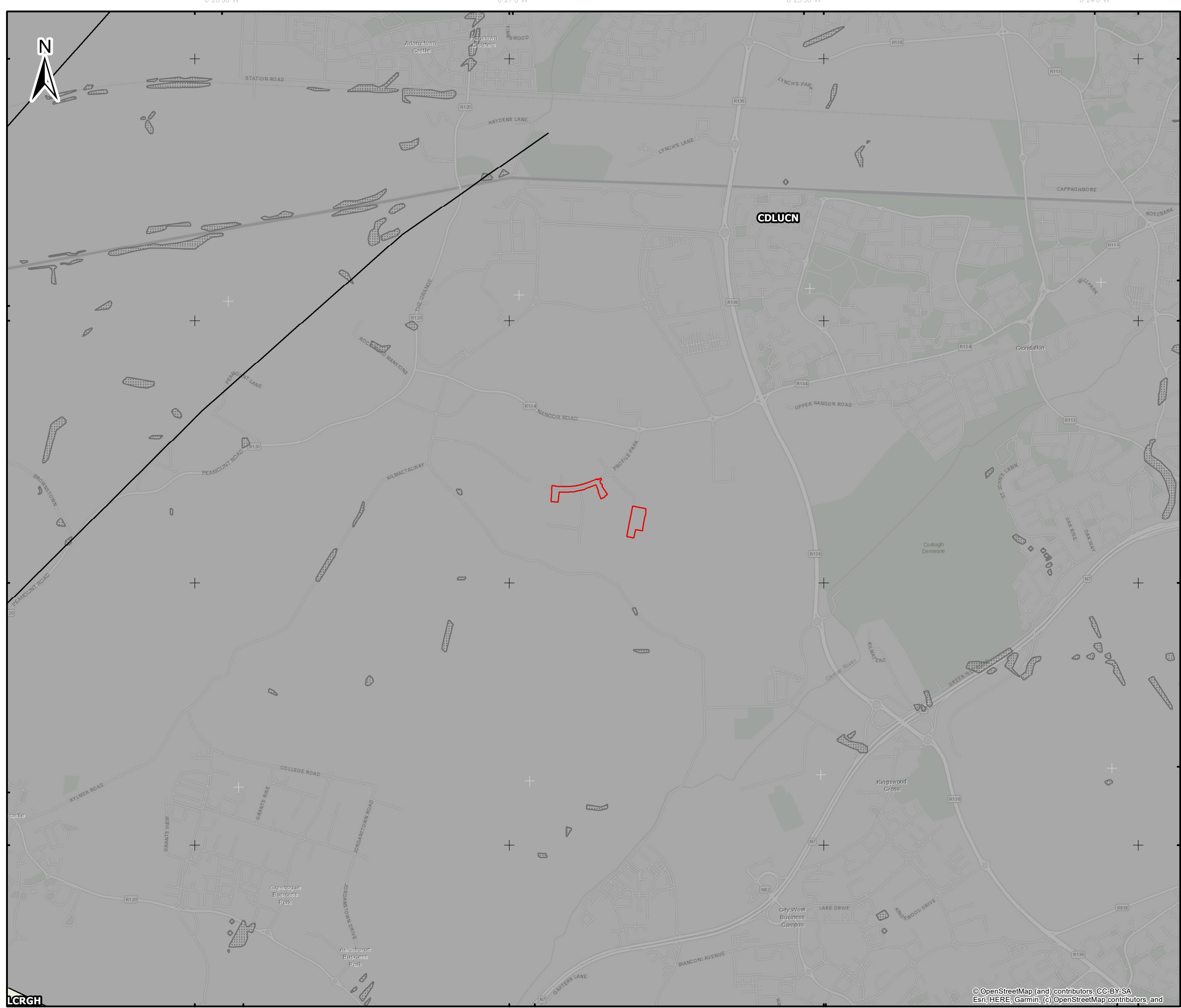
Title: Figure 8-1: Subsoils Map

Scale @ A3: 1:20,000

Prepared by: S.Pezzetta Checked by: C.Naughton Date: May 2023

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Map Ref: 11069-006-SSO-S.BO-TOB-A Draft: A



Legend

- Planning Application Boundary
- Bedrock Geology**
- Lucan Formation
- Carrighill Formation
- Faults
- ▨ Bedrock Outcrop

0 250 500 750 1,000
Meters

- NOTES**
1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
 2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE
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Rev	Date	Description	By	Chkd.
A	23/05/2023	Final issue	S.P	C.N

Client:

Project: Profile Park power plant - Substation Application

Title: Figure 8-2: Bedrock Geology Map

Scale @ A3: 1:20,000

Prepared by: S.Pezzetta Checked by: C.Naughton Date: May 2023

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Map Ref: 11069-007-B.GEO-S.BO-TOB-A Draft: A

8.3.5 Mineral / Aggregate Resources

A historical (currently inactive) quarry lies approximately 0.6km to the south of the southern site boundary. No active mineral or aggregate sources have been identified by GSI data within 2km of the site boundary.

The GSI online Aggregate Potential Mapping Database shows that the site is located within an area mapped as being typically moderate in terms of crushed rock aggregate potential, with some areas of low to high potential. There are no significant mapped areas of granular aggregate potential (i.e., potential for gravel reserves).

8.3.6 Geological Heritage

According to the Geological Survey of Ireland Spatial Resources, there are no Irish Geological Heritage sites inside the site boundary. No geological heritage sites have been identified within 2km of the site boundary. Belgard Quarry, a large active quarry, is located 2.2 km southeast of the proposed development. Belgard is the largest limestone quarry in the country and is excavating the Lucan Formation limestones. It is a designated County Geological Site (Site Code: SD002) of vital economic importance and of geological heritage significance.

8.3.7 Soil Contamination

A review of the EPA website² for both existing and historic licensed and illegal waste activities was carried out to identify any potential contamination sources present in the area and to identify any potential contaminating activities near the proposed development. The desk study indicated that no waste facilities, illegal waste activities within a 2km radius of the proposed site. The has is a greenfield site with no previous development. No visual or olfactory evidence of contamination was noted during the site walkover.

8.3.8 Geohazards

A review of the landslide information on the GSI Irish Landslides Database indicate that there are no recorded landslide events within 2km, or within a wider context of 6km of the site. The site walkover conducted on the 13th February 2023 confirmed the site is generally very flat comprising topsoil underlain by firm glacial till.

² www.epa.ie – accessed in April 2023

8.4 POTENTIAL EFFECTS OF THE DEVELOPMENT

The environmental effect of the development of the proposed project are discussed and assessed in the following sections. The 'do-nothing' scenario is reviewed and potential effects are assessed for three stages of the project life cycle; i.e., construction, operation and decommissioning.

8.4.1 Do-Nothing Scenario

The do-nothing situation relevant to soils and geology is where the proposed project does not proceed, the areas would remain as they currently are (i.e., artificial surfaces made up of industrial, commercial and transport units).

Within the proposed grid connection, the clayey soil and artificial surfaces would remain as present. The site as a whole would fall under the industrial management at Profile Park but given its zoning it is a reasonable assumption that it would be developed with similar infrastructure to the granted power plant which is a land use type compatible with the zoning objectives set out in the South Dublin County Development Plan 2022-2028.

The do-nothing scenario would result in no effect to the existing soils and geology conditions in the area.

8.4.2 Potential Effects During Construction

The proposed development is characterised by pre-construction gradually phasing out to a number of main civil engineering works to provide the necessary infrastructure for completion.

The pre-construction phase of development includes preparatory works (i.e., post planning surveys and reporting) and consultation with statutory bodies and the public. Following this process, site clearance activities will commence, the construction phase comprise civil and plant construction works. These include:

- Construction of access and hardstands (temporary contractor's compound, temporary site offices, welfare facilities, car parking and equipment laydown areas);
- Topsoil stripping of the construction working area (and localised at certain locations along the cable/ gas pipeline route), the removal of ditches, trees, and other vegetation from the site;
- Processing of materials and reinstatement;
- Construction of infrastructure foundations (infrastructure foundations, parking, site entrance);
- Excavation for cable ducts, gas pipeline, tank farm, infrastructure foundations;
- Management of excavated materials; and,
- Construction of surface water drainage system along the new access to site.

The entire project as described in Chapter 2 of this EIAR (Description of the Proposed Development) has been considered in this impact assessment. The effects of the construction activities are discussed further in the following sections.

8.4.2.1 Land Use

The site of the proposed development is predominantly covered by till soils. There is an extensive network of existing access roads adjacent to the site to facilitate the ongoing commercial needs of Profile Park, Dublin 22.

The proposed development makes use of existing access roads thereby further minimising the potential for land use impacts.

The pre-mitigation construction potential impact is imperceptible, negative, and long-term due to the relatively small footprint of infrastructure and its location.

8.4.2.2 Hydrocarbon Release

Wherever there are vehicles and plant in use, there is the potential for hydro-carbon release which may contaminate the soil and subsoil. A spill has the potential to indirectly pollute water, if the soil and subsoil act as a pathway from any source of pollution. Any spill of fuel or oil would potentially present a moderate, long-term negative effect on the soil and geological environment. Good site practice can mitigate any effect (Refer to Section 8.5 Mitigation Measures).

8.4.2.3 Excavations

The construction of the development will require removal of topsoil and subsoil to a competent founding layer and upfilling with structural fill and/or concrete (concrete only proposed for the (tank farm, oil supply and storage, engine hall, electrical annex building, transformers, workshop, parking and plant associated structures) to the required finished floor level.

Materials required for the construction works will be sourced locally. Material importation to site will be required such as ready mixed concrete, road surface, etc. The use of off-site material importation will increase the environmental effect of other aspects of the development by requiring the need to transport material to site. The relatively shallow excavations into bedrock will create a temporary exposure of bedrock which will provide additional in-situ information of the soils and geology in the area. Overall, the excavations will have a neutral environmental effect.

All grid-connection cable laying works will be carried out as per EirGrid requirements, which have been described in Chapter 3 (Description of Development) of this EIAR.

The grid connection will be laid beneath the ground surface and/or private road. The area where excavations are planned will be the subject of a confirmatory survey, prior to the commencement of works. A verification condition survey will be carried out for all parts of the route within the public road. A trench will be opened using an excavator to accommodate the formation. The excavated material will be cast to the side to be reused as backfilling material where appropriate. This material will not be stored in the vicinity of any watercourse and will be smoothed with the back of an excavator bucket to minimise runoff. It will be cast on the upgradient side of the trench, so if any runoff did occur it will run into the downgradient trench. Excess material will be used on the site of the proposed development for local landscaping, further detail is provided in Chapter 3 (Description of Development,).

Overall, the excavation required for the grid connection will have an imperceptible, temporary and neutral environmental effect on soils and geology.

8.4.2.4 Geohazards

The walkover study carried out in February 2023 found the entire area within the site boundary comprising low permeability clays, matching the till cover mapped by the GSI. The lay of the land across the site is considered to be relatively flat.

The local subsoil data has been reviewed together with the GSI landslide susceptibility classification. No areas of peat or other geohazards were identified within or in proximity to the site proposed development. No areas of potential instability were identified during the site walkovers.

Mitigation measures to address localised stability issues such as battering of excavations are outlined in Section 8.5.

8.4.3 Potential Effects During Operation

During the operational phase of the project, no new impacts on the soil and geological environment will arise. A few direct impacts are possible during the operational phase of the proposed development. These may include:

- Some construction traffic may be necessary for maintenance of the site which could result in minor accidental leaks or spills of fuels/ oils affecting the groundwater; and
- There is potential for spills and leaks of oils from infrastructure and equipment resulting in contamination of soils and water.

The operational impacts have the potential to negatively affect the ground or water directly. However, mitigation measures/standard design measures and management controls will negate this risk (refer to Section 8.5.2).

No cumulative impacts on the soils and geology environment are envisaged during the operational stage, as there will be no significant movement of soils/subsoils, or construction works, during this period.

The effects of operation on natural resources such as land, soils and geology will be imperceptible and long-term.

8.4.4 Potential Effects During Decommissioning

In general, the potential effects associated with decommissioning will be similar to those associated with construction but of reduced magnitude because extensive excavation, and wet concrete handling will not be required. The potential environmental effect of soil stockpiling and contamination by fuel leaks are present during decommissioning. The potential for impact as a result is slight to not significant.

Foundations and the grid connection infrastructure will remain in place underground and would be covered with earth and allowed to revegetate or reseed as appropriate. The site access/ road will be in use for additional purposes to the operation of the commercial usage (e.g., for Profile Park) by the time the decommissioning of the project is to be considered, and therefore will remain in-situ for future use.

The proposed substation is expected to be operational for at least 25 years. On cessation of activities, the substation will either be redeveloped / upgraded and continue in its current use as a substation, or the site will be redeveloped in an alternative form.

8.4.5 Summary of Potential Impacts

A summary of the significance criteria is outlined below for the construction, operational and decommissioning phase in Tables 8-1 to 8-3.

Table 8-1: Significance of Land and Soils Criteria – Construction Phase (Pre-mitigation)

Environmental Attribute (Land, Soil and Geology)	Cable Route and substation
Geological heritage sites	No Irish Geological Heritage (IGH) sites at proposed site. -Imperceptible
Contaminated sites	No contaminated sites identified - Imperceptible
Contamination of soil by potential pollutants/hydrocarbons	Slight - unlikely, direct and short term on localised soils and bedrock within the site boundary
Identification of karst/geohazard features	No Karst/peat features - Imperceptible
Mineral resources and Mines	None identified, imperceptible
Land and Soils (Natural resources)	Negligible and permanent due to relocation of soils within the site boundary

Table 8-2: Significance of Land and Soils Criteria – Operational Phase (Pre-mitigation)

Environmental Attribute (Land, Soil and Geology)	Cable Route and substation
Geological heritage sites	No IGH sites at proposed site. -Imperceptible
Contaminated sites	No contaminated sites identified - Imperceptible
Contamination of soil by potential pollutants/hydrocarbons	Slight - unlikely, direct and long-term
Karst/geohazards features	No Karst features- Imperceptible
Mineral resources and Mines	None identified, imperceptible
Land and Soils (Natural resources)	Not significant no excavations during operational phase- Imperceptible

Table 8-3: Significance of Land and Soils Criteria – Decommissioning Phase (Pre-mitigation)

Environmental Attribute (Land, Soil and Geology)	Cable Route and substation
Geological heritage sites	No IGH sites at proposed site. -Imperceptible
Contaminated sites	No contaminated sites identified - Imperceptible
Contamination of soil by potential pollutants/hydrocarbons	Slight - unlikely, direct and short term due to relocation of soils and bedrock within the site boundary
Identification of hydrogeological features from the GSI karst database	No Karst features Imperceptible
Mineral resources and Mines	None identified, imperceptible
Geohazards	Not significant, certain and permanent
Land and Soils (Natural resources)	Slight - certain and permanent due to relocation of soils within the site boundary

Overall, the potential impacts are slight/not significant. Mitigation measures are identified in Section 8.5 to address these impacts.

8.4.6 Major Accidents

As part of the requirements of the EIA Directive, the applicant is requested to consider the “Expected Significant Adverse Effects of the project on the environment deriving from the vulnerability of the project to risks of major accidents and/or disasters which are relevant to the project concerned.”

This section describes the expected significant effects on the environment arising from the vulnerability of the proposed development to risks of major accidents and/or natural disasters which are relevant to the project.

As set out in the EIA guidance there are two main considerations:

- The potential of the project to cause accidents and/or disasters, including implications for human health, cultural heritage, and the environment;
- The vulnerability of the project to potential disasters/accidents, including the risk to the project of both natural disasters (e.g., flooding) and man-made disasters (e.g., technological disasters).

Low consequence events, such as minor spills, have been scoped out as these events are unlikely to result in significant adverse effects as they do not fall into the definition of a Major Accidents and Disasters. The proposed development (and associated works) to natural disasters

In relation to major accidents, the following geological hazards do not occur on the site:

- Earthquakes do not occur in a sufficient intensity at the site;
- No karst risk occurs on the site due to the underlying geology; and

- There are no deposits in the proposed footprint that give rise to a major accident or disaster (e.g., landslide).

No significant geohazards arise on the site due to the lack of peat soils or low gradients in the proposed footprint. Hardstand areas surround the substations and infrastructure areas which further limits fire risk potential. There is no significant impact from fire on the land and soils environment as a result of the proposed development.

In relation to land, soils and geology, it can be concluded that the risk of accidents associated with this development is very low and would not cause unusual, significant or adverse effects on land and soils environment during the construction, operational and decommissioning phase.

8.5 MITIGATION MEASURES

Mitigation measures for the construction, operation and decommissioning of Baldonnell Substation to avoid or reduce the potential effect of the proposed development are presented below. A number of mitigation measures considered for soil and geology are similar to those relating to hydrology and hydrogeology, further detail can be found in Chapter 9 'Hydrology and Hydrogeology'.

8.5.1 *Mitigation Measures During Construction Phase*

The construction of the development has the potential (with no mitigation) to cause "not significant" short-term to long-term effects to the soil and geology of the proposed development site. Implementing mitigation measures detailed below will reduce the significance of the effects. The mitigation measures have been based on CIRIA (Construction Industry Research and Information Association, UK) technical guidance on water pollution control and on current accepted best practice (CIRIA, 2001). Good site practice will be applied to ensure no fuels, oils, wastes or any other substances are stored in a manner on site in which they may spill and enter the ground. Dedicated, bunded storage areas will be used for all fuels or hazardous substances.

All works will be managed and carried out in accordance with the Construction and Environmental Management Plan (CEMP) which is included in Appendix 3-2.

8.5.2 *Management of Excavated Materials*

The disturbance and excavation of soil, subsoil and bedrock is an unavoidable effect of the development, but every effort will be made to ensure that the amount of earth materials excavated is kept to a minimum in order to limit the effect on the geological aspects of the site. The management of geological materials and spoil is an important component of controlling dust and sediment and erosion control. Excavated soils and bedrock will only be moved short distances from the point of extraction and will be used locally for landscaping. Landscaping areas will be sealed and levelled using the back of an excavator bucket to prevent erosion. The upper vegetative layer will be stored with the vegetation part of the sod facing the right way up to encourage growth of plants and vegetation at the surface of the landscaped soils.

These measures will prevent the erosion of soil in the short and long term. Soils, overburden, and rock will be reused on site to reinstate any excavations where appropriate.

To ensure slope stability, excavations will be battered back (sloped) to between 1:1 and 1:2 depending on depth and type of material. All excavation works during the construction stage will be monitored by an experienced engineer.

Mitigation measures will be put in place during the construction of the scheme to reduce the likelihood of an excavation collapsing. Mitigation measures include construction of a granular berm or temporary sheet pile wall to support the clays during construction. There is a very low risk of landslide (high factor of safety) which is further reduced by implementation of the mitigation measures.

8.5.2.1.1 Management of Fuel and Oil

The CEMP (Appendix 3-2 of this EIAR) provides details on measures and mitigation in relation to the management of fuels and oils on site. These include:

- Minimal refuelling or maintenance of construction vehicles or plant will take place on site. Off-site refuelling will occur at a controlled fuelling station;
- Mobile bowsers, tanks and drums will be stored in secure, bunded, impermeable storage area, away from drains and open water;
- Fuel containers will be stored within a secondary containment system e.g., bund for static tanks or a drip tray for mobile stores;
- Ancillary equipment such as hoses, pipes will be contained within the bund;
- Taps, nozzles or valves will be fitted with a lock system;
- Fuel and oil stores including tanks and drums will be regularly inspected for leaks and signs of damage;
- Only designated trained operators will be authorised to refuel plant on site;
- An emergency plan for the construction phase to deal with emergency accidents or spills is contained within the CEMP (Appendix 3-2 of this EIAR); and
- An emergency spill kit with oil boom and absorbers will be kept on site in the event of an accidental spill. All site operatives will be trained in its use.

8.5.2.2 Excavations

The materials to be encountered are likely to be relatively stable during the excavation for the infrastructure foundations. A physical barrier can be implemented between the excavations and the potentially unstable material at unstable conditions, in the form of a granular berm or sheet piles. The long-term stability of the area around the proposed development will be achieved by filling the area back up to existing ground level following installation of the foundation and sealing the subsoil environment with artificial surfaces with managed drainage network.

Excavation works will be monitored by a suitably qualified and experienced geotechnical engineer or engineering geologist. The earthworks will not be scheduled to be carried out during severe weather conditions.

Following these mitigation measures, the resultant effect will be not significant, permanent and negative.

8.5.3 Mitigation Measures During Operational Phase

Fuel will be bunded in accordance with the requirements set out in the EPA publication, 'Storage and Transfer of Materials for Scheduled Activities' (2004), which states bunds are to contain 110% of the volume of the tank in the event of a tank rupture.

The operational team will carry out maintenance works and will put in place mitigation measures to reduce the risk of hydrocarbon or oil spills during the operational phase of the substation.

The proposed mitigation measures during the operational phase are as follows:

- Minimal refuelling or maintenance of operational vehicles or plant will take place on site.
- Potential impact of spillages and/ or leaks will be mitigated against by proper management and design of plant including impermeable bunded areas, where required. All storage areas will be designed in accordance with current oil storage regulations, local fire authority requirements and in accordance with BS8007:1987, Code of Practice for design of concrete structures for retaining aqueous liquids; and
- Fuel Storage areas where required will be bunded appropriately for the fuel storage volume for the time period of the operation and fitted with a storm drainage system and an appropriate oil interceptor; and
- On site re-fuelling will be undertaken using a double skinned bowser with spill kits on the ready for accidental leakages or spillages.

8.5.3.1 Land Use

It is intended that soils (topsoil) and subsoils will be reused for site landscaping.

In order to minimise the potential impacts to Land Use, the following mitigation measures are proposed:

- Minimising areas for earthworks thereby reducing land take requirements;
- Restricting areas for construction works and temporary storage to a minimum within site boundary;
- The handling, storage and re-use of excavated materials are of importance during the construction phase of the project. Stockpiles will be located away from the watercourses and drainage ditches. Topsoil and subsoils will be stored near the landscaping and in the reinstatement of development site areas. Topsoil will be stockpiled no higher than 2.5m and follow the recommendations set out in the NRA Guidelines for the Management of Waste from National Road Construction Projects (NRA, 2014);

8.5.4 Mitigation Measures During Decommissioning Phase

Decommissioning will comprise the removal of all over ground elements.

The site roadways / access roads may be in use for additional purposes to the operation of or future use of the development area (e.g., for commercial access/ egress) by the time the decommissioning of the project is to be considered, and therefore the site roads will remain in-situ for future use. Some of the hardstand material will be removed where required, and along with the substation foundations, covered in topsoil and revegetated. The substation and grid connection infrastructure will form part of the permanent national grid network.

The risks associated with leaving roads and site entrance in-situ are relatively low. The decommissioning phase will not require any significant works that will impact the land and soils environment.

A fuel management plan to avoid contamination by fuel leakage during decommissioning works will be implemented as per the construction phase mitigation measures.

Mitigation measures applied during decommissioning activities will be similar to those applied during construction where relevant. Some of the impacts will be avoided by leaving elements of the Proposed Development in place where appropriate. The foundations will be rehabilitated by covering with local topsoil in order to regenerate vegetation which will reduce runoff and

sedimentation effects. Roads and site entrances will be maintained for future users. Mitigation measures to avoid contamination by accidental fuel leakage and compaction of soil by on-site plant will be implemented as per the construction phase mitigation measures in Section 8.5.1.

8.6 CUMULATIVE IMPACTS

Cumulative effects of this project with other developments in the region, as discussed in Chapter 4 - Policy, Planning and Development Context, relate to the effects on soils and geology. Due to the majority of access roads to the site development are pre-existing at the site, the demand for external aggregate (natural resources) for roads is greatly reduced, therefore limiting the potential for cumulative impacts.

It is not envisioned that there will be any significant effects in relation to soils and geology during the construction phase given efficient design along with material management such as using local nearby quarries for the construction phase will ensure optimisation of the volume of materials required to be imported to site. This will mitigate any cumulative effects relating to importing of material and use of public roads as haul roads.

A review of the Local Authority Planning Register shows that the following 'other developments' as described below are relevant planning applications in terms of the 10km zone of influence radius surrounding the proposed development site.

Based on a review of the projects within 5km of the site there are no projects which give rise to significant cumulative impacts on land, soils and geology.

No cumulative impacts on the soils and geology environment are envisaged during the construction, operational and decommissioning stage. Pre mitigation, there will be a slight risk of pollution from hydrocarbons or other leakage from machinery but with mitigation, this is not likely to add to a significant cumulative effect.

8.7 RESIDUAL IMPACTS

The replacement of topsoil, subsoils and rock, with gravels, concrete and impermeable surfaces for the construction of the infrastructure (temporary and permanent) will result in a change in ground conditions within the proposed development site. Overall, this residual effect is permanent but not significant.

All potential effects on the soil and geological environment will be mitigated through good site practice on vehicular movements, management of fuels, sustainable use of soils etc. Overall, the residual effects from these aspects will be not significant to imperceptible, temporary and negative.

8.7.1 Summary of Residual Impacts

A summary of the significance criteria is outlined below for the construction, operational and decommissioning phase in Tables 8-4 to 8-6.

Table 8-4: Significance of Land and Soils Criteria – Construction Phase (Post-mitigation)

Environmental Attribute (Land, Soil and Geology)	Cable Route and substation
Geological heritage sites	No IGH sites at proposed site. -Imperceptible
Contaminated sites	No contaminated sites identified - Imperceptible
Contamination of soil by potential pollutants/hydrocarbons	Not significant - unlikely, direct and short term on localised soils and bedrock within the site boundary
Identification of karst features	No Karst features - Imperceptible
Mineral resources and Mines	Not applicable, imperceptible
Geohazards	No significant peat deposits encountered. Unlikely Imperceptible to Not significant
Land and Soils (Natural resources)	Not significant - certain and permanent due to relocation of soils and bedrock within the site boundary. Soils to be reused within the site for the landscaping.

Table 8-5: Significance of Land and Soils Criteria – Operational Phase (Post-mitigation)

Environmental Attribute (Land, Soil and Geology)	Cable Route and substation
Geological heritage sites	No IGH sites at proposed site. -Imperceptible
Contaminated sites	No contaminated sites identified – Imperceptible
Contamination of soil by potential pollutants/hydrocarbons	Not Significant - unlikely, direct and short term due to relocation of soils and bedrock within the site boundary
Identification of karst features	No Karst features- Imperceptible
Mineral resources and Mines	None identified, imperceptible
Peat stability	No peat deposits encountered Imperceptible
Geohazards	No significant excavations - Imperceptible
Land and Soils (Natural resources)	No significant excavations - Imperceptible

Table 8-6: Significance of Land and Soils Criteria – Decommissioning Phase (Post-mitigation)

Environmental Attribute (Land, Soil and Geology)	Cable Route and substation
Geological heritage sites	No IGH sites at proposed site. -Imperceptible

Environmental Attribute (Land, Soil and Geology)	Cable Route and substation
Contaminated sites	No contaminated sites identified - Imperceptible
Contamination of soil by potential pollutants/hydrocarbons	Not Significant - unlikely, direct and short term due to relocation of soils and bedrock within the site boundary
Identification of hydrogeological features from the GSI karst database	No Karst features Imperceptible
Mineral resources and Mines	None identified, imperceptible
Geohazards	Not significant, certain and permanent
Land and Soils (Natural resources)	Imperceptible - No changes to substation and cables as a result of decommissioning

Overall, the potential impacts are of imperceptible/not significant with the implementation of the mitigation measures.

8.8 CONCLUSION

Overall, the development at Profile Park, Dublin 22 will not have a significant negative impact on the soil and geological environment based on the mitigations measures that will be put in place and managed.

No significant Geohazards or contamination issues occur on the proposed site. The proposed development site is not a sensitive site in terms of the soils and geological environment. This is primarily due to predeveloped commercial land with artificial surfaces mixed with historical agricultural soils. In terms of the soil and geological environment, the proposed project is not expected to contribute to any significant, negative cumulative effects on other existing developments in the vicinity.