2. PROJECT DESCRIPTION

2.1 Introduction

This Chapter provides a description of the physical characteristics of the elements of the Project and the main construction and operational activities associated with it for the purpose of identifying and assessing potential environmental effects.

2.2 Project Need

An increase in applications by developers of renewable generation seeking connection to the SSEN Transmission network in the Argyll and Kintyre area is driving the requirement for further reinforcement to the network.

The volume of contracted generation has significantly increased since 2019, with approximately 612MW signing connection offers since October 2019. Since then other developers have submitted connection applications, and a large volume of scoping generation has been identified by local stakeholder engagement events that were held in 2021. This significant increase in the generation background requires reinforcement of the network in order for SSEN Transmission to maintain compliance with the National Electricity Transmission System Security and Quality of Supply Standard (NETS SQSS).

The key drivers for the project are the connection of the Earraghail Wind Farm and Tangy IV Wind Farm both due to connect in April 2027.

2.3 Location

The site for the Project is located approximately 2.5 kilometres (km) north east of Lochgilphead and 2.9 km south west of Loch Glashan, at National Grid Reference (NGR) 187708, 691000. The Project is located wholly within the Argyll and Bute Council Local Authority and would be accessed from the A816 using an existing Forestry Land Scotland (FLS) track.

The location plan (**Figure 1.1**) shows the Proposed Development within the red line boundary, comprising of the substation platform along with additional land take to accommodate the ancillary works. This location plan also shows the route of the associated overhead line works required to tie in with the new substation identified as the Associated Development.

The Project's topography is relatively flat, approximately 110 m Above Ordnance Datum (AOD) to the south of the Project site, sloping upwards to the highest point of 120 m AOD at the centre and gently returning to 130 m AOD towards the north.

The surrounding land comprises mixed and coniferous woodland plantations, with some areas also having been recently felled. The Project is underlain by class 5 peat and does not support peatland habitats. The Project is approximately 200 metres south east of a tributary river and approximately 2.9 km south west of Loch Glashan.

Ancient woodland is located along the access to the south of the Project, however there are no other statutory or non-statutory ecology or landscape designations are located within the Project. The nearest designations are Moine Mhor Special Area of Conservation (SAC), Site of Special Scientific Interest (SSSI) and Local Nature Conservation Sites (LNCS), located 4 km to the east of the Proposed Development. Lochgilphead LNCS is 3.5 km to the south. Knapdale National Scenic Area (NSA) is approximately 1.8 km to the north west.

A Scheduled Monument (SM173) is currently located approximately 650 m west of the substation platform. The monument is a Clyde-type chambered long cairn of Neolithic date and is visible as a long, low mound of stones within the forestry clearing.

The nearest residential receptor to the Project is Auchoish, located approximately 1.27 km southwest of proposed substation platform.

There are potential Scottish Water assets near the Site entrance and along the access road to the south. Consultation with Scottish Water regarding the potential assets is discussed in **Section 1.8.3.**

More detailed descriptions of the baseline environment associated with the Project are described in **Chapters 3** to **9** of this EA.

2.4 Alternatives

A total of five potential Site Options were identified and these are shown below in **Figure 2.1**.

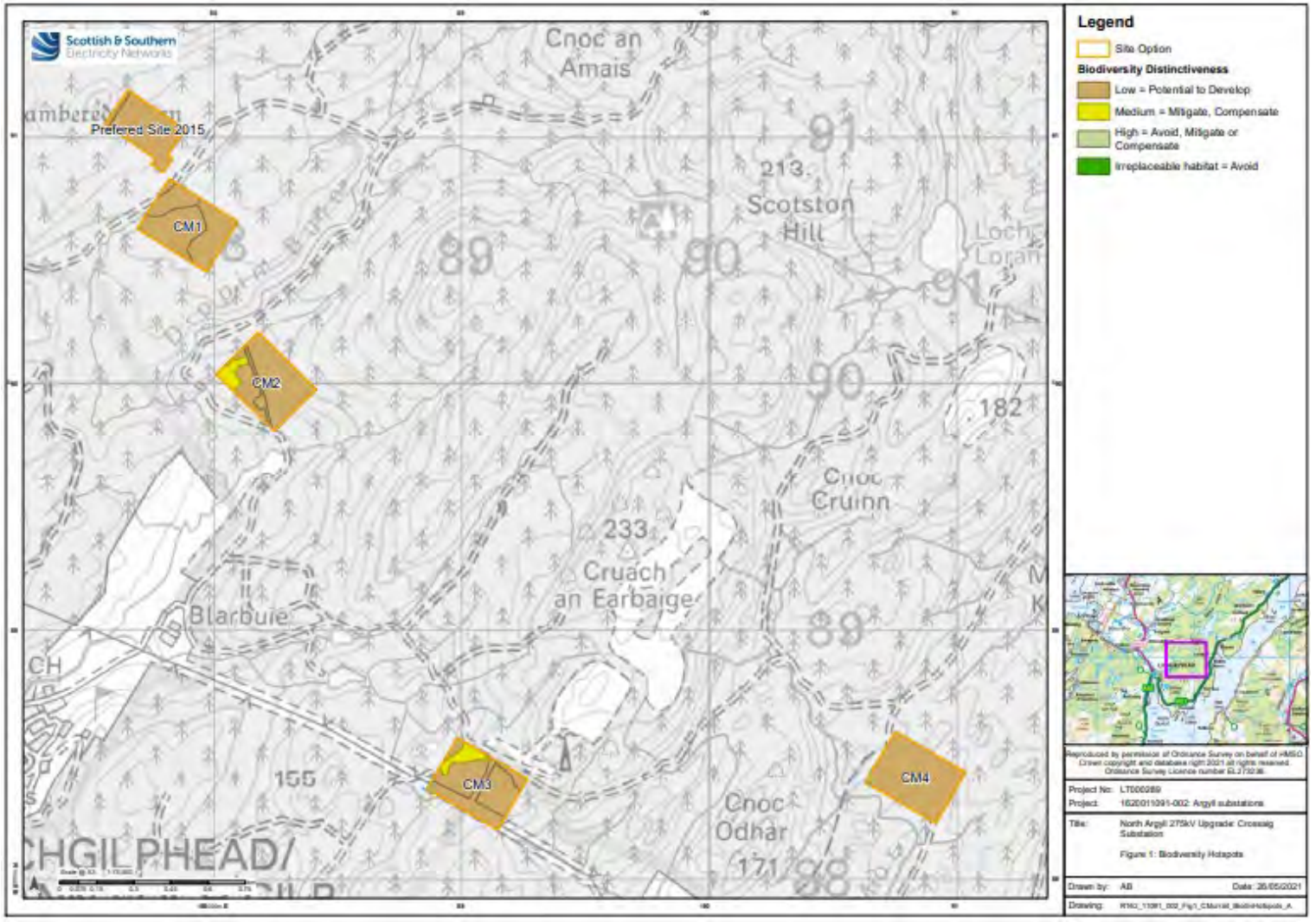


Figure 2.1 Alternative Sites

The selection of the preferred substation Site Option at Craig Murrail was undertaken through an appraisal of environmental, operational, technical, health and safety and economic factors.

A site selection exercise was initially undertaken in 2015 which identified a number of potential locations for the substation (Site Options). At that time, four substation Site Options were identified and compared. These can be seen in **Figure 2.1** above as CM1, CM2 CM3 and CM4. A preference for two of the four sites was identified initially, subject to further site investigation. Based on a civil engineering desk study, an amendment to one of the two preferred sites was made to create a fifth Site Option which was identified as the Preferred Site. Following this, further design work was undertaken; however, no site surveys were complete as the Proposed Development was put on hold until the following year.

In March 2016, SSEN Transmission reconsidered the proposal and consulted with stakeholders on the design and construction of the Preferred Site. The Preferred Site was not progressed any further due to generation requirements at the time. Since then, increases in generation requests across the region have now triggered the requirement for the substation.

The proposals were again reconsidered and the Preferred Site was the subject of a consultation exercise in July 2021**).** It remains the preferred Site Option, on the basis of the least potential for environmental, technical and cost constraints.

Compared to the Preferred Site, Site Option CM1 presented higher risks to environmental features due to an increased risk to Hydrology. This was in part due to the close proximity of a tributary of the Dippin Burn which lies to the west. The CM1 Site Option was, like the Preferred Site, underlain by an aquifer assessed by the British Geological Survey (BGS) to be of low productivity and is underlain by Class 5 peat deposits.

Site Option CM2 presented a higher environmental risk due to a risk to natural heritage. An area of semi-natural broadleaved woodland is present on this Site Option, which is of higher ecological importance than the surrounding conifer habitat, which is present on the Preferred Site. An area of marshy grassland had potential to comprise ground water dependent terrestrial ecosystems (GWDTEs) and there is potential for disturbance impacts on breeding red-throated diver and black grouse lek. A tributary of the Dippin Burn lies to the west of this Site Option. The technical constraints were considered to be of higher risk in terms of health and safety, access and connectivity and availability and flexibility.

Similar to Site Option CM2, Site Option CM3 also presented a higher environmental risk due to natural heritage as areas of semi-natural broadleaved woodland and marshy grassland were present. Site Option CM3 is situated adjacent, although outside of the 30 m buffer to tributaries forming headwaters of Allt Oigh to the south and a tributary to the Cuilarstich Burn to the northwest. The technical constraints were considered to be of higher risk than the Preferred Site for the same reasons as Site Option CM2.

Site Option CM4 presented low levels of environmental constraint due to lesser impacts on geology and designated heritage assets however the technical constraints were considered to be of higher risk in terms of health and safety and the construction timescales were also assessed to be greater.

2.5 The Project

The Project comprises of the construction of a new 275 kV electricity substation which will connect into the recently completed overhead line between Inveraray and Crossaig which is capable of operation at 275kV. The Project will support the export of renewable energy from the Argyll area.

2.5.1 The Proposed Development

The layout of the Proposed Development is shown in **Figure 2.2 and Figure 2.3** and building elevations on **Figure 2.4** and comprises the following:

Components of the Proposed Development that will be subject to an application for consent under the Town and Country Planning (Scotland) Act 2007 (as amended) are as follows:

- A substation platform approximately 2.93 ha at a height of 115 m AOD;
- Gas insulated Switchgear (GIS) building, maximum height 22 m and single storey control building annex;
- Two 275/33 kV grid transformers (GT), rated at 120 MVA, each located in a ventilated building of maximum height 16 m;
- 33kV Switchroom;
- Two gantries and electrical equipment to connect the OHL and the proposed substation;
- Three temporary work areas, one adjacent to the substation platform and two areas south west of the Proposed Development, adjacent to the existing access track and temporary peat storage;
- Diesel generator;
- Borehole for water;
- Turning and parking areas;
- Use of existing forestry access track with some upgrades, approximately 5 km in length;
- A permanent access track approximately 153m long connecting the proposed substation to the existing forestry track;
- A permanent access track approximately 285m long providing access to the existing track to the north east of the site;
- A 2.4 m high security fence of palisade construction around the substation platform perimeter;
- Designation of the area around the substation site as bog/mire to provide biodiversity enhancement; and
- Foul and surface water drainage (Sustainable Drainage System (SuDS) pond and outfall pipe).

In addition, tree felling and compensatory planting will be required, as described in **Chapter 5 Forestry Appraisal** and **Appendix J.**

Components of the Associated Development subject to an application for consent under Section 37 of the Electricity Act 1989 are as follows:

- Construction of two temporary steel lattice towers to support the temporary realignment of the existing overhead line during construction. Post construction, the overhead line will be realigned to its existing alignment and connected into the new substation and the temporary towers will be removed;
- Two downleads from the realigned overhead line into the substation and
- Two temporary access tracks leading from the proposed substation access track to the temporary towers.

In addition tree felling will be required. Dismantling of 31 redundant towers which currently connect to the Port Ann substation will also be undertaken under Permitted Development Rights.

Buildings will comprise steel portal frames with metal cladding and roof. There would be some un-housed electrical switchgear and plant located within the platform area.

The substation would not be illuminated at night during normal operational activities. Flood lights would be installed but would only be used in the event of a fault during the hours of darkness; or during the over-run of planning works; or when sensor activated as security lighting for night-time access.

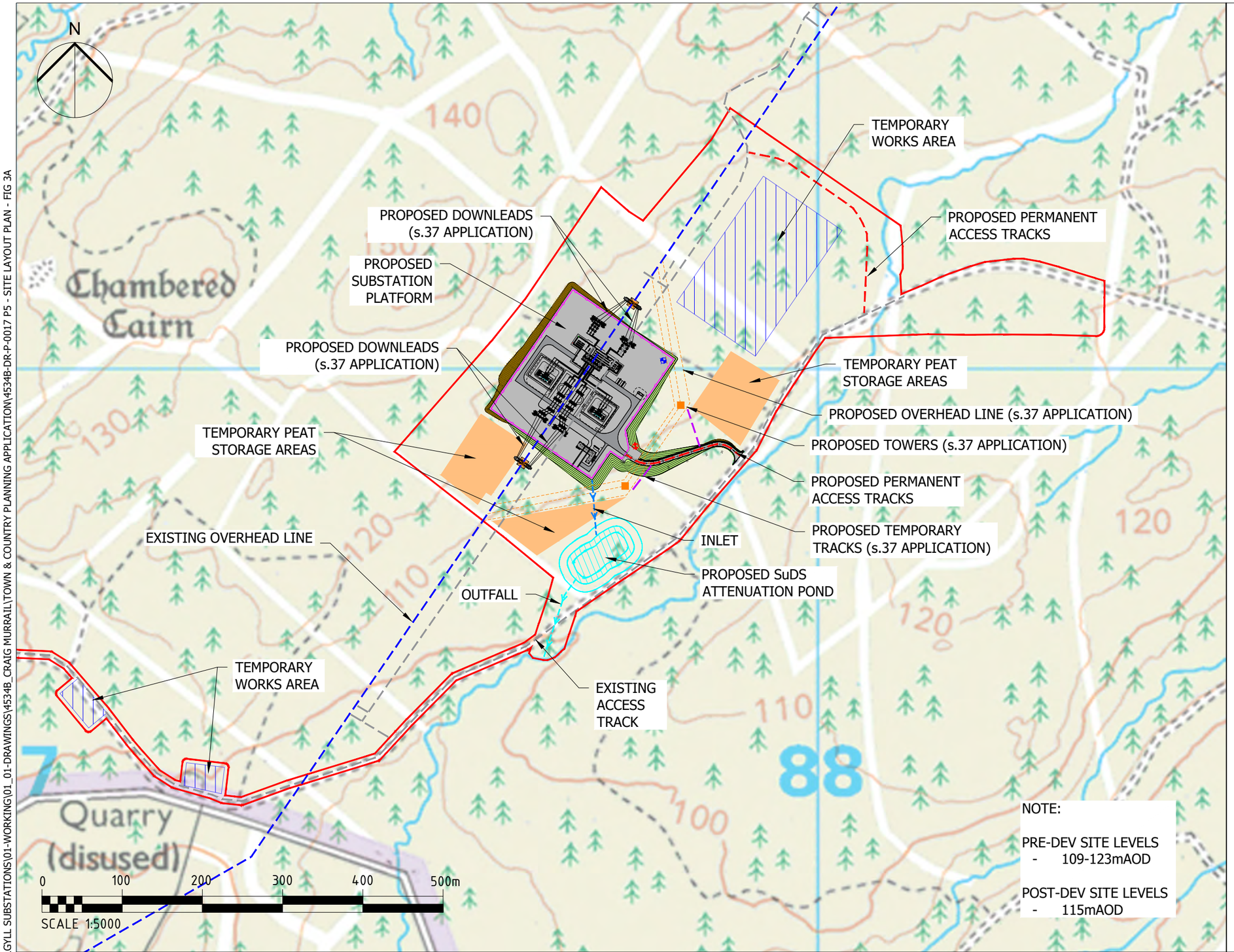
The main noise source within the substation during operation would be the two 33/120 grid transformers. A noise assessment has been carried out to estimate the noise levels emitted from the Proposed Development and to understand the future operational impacts at noise sensitive receptors (NSRs) (see **Chapter 8 Noise Appraisal** and **Annex S**).

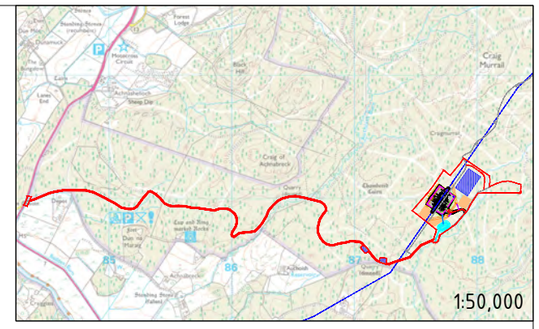
Small scale alterations to the existing FLS access track off the A816 may be required. Subject to survey, and to satisfy the requirements of ABC Roads Department, works may include widening of the existing bellmouth, increasing turning radii and improving visibility splays. Between the access point and the Proposed Development site, works may include widening at bends/road strengthening to accommodate the long and heavy construction vehicles. A Traffic Management Plan will be submitted post application as part of the discharge of conditions along with a delivery and transport assessment (including swept path analysis and abnormal loads assessment).

To illustrate the appearance of the Proposed Development in situ, visualisations have been produced at **Annex E**. Each visualisation includes a baseline photograph, terrain model view, and two visualisations: one on completion (including any proposed earthworks); and the other after 10 years (including any proposed earthworks and planting). The visualisations have been prepared in accordance with NatureScot visualisation guidance[1].

Within a GIS substation, live electrical equipment uses a dense gas as the insulating medium, usually Sulphur Hexa-Fluoride (SF6); however, SSEN are reviewing an alternative SF6 free technology solution in support of their commitments and responsibilities to the decarbonisation of the electricity network. GIS typically allows safe clearance distances between live conductors to be reduced. This results in a smaller footprint compared to the more traditional substations comprising Air Insulated Switchgear (AIS).

[1] Scottish Natural Heritage (2017) *Visual Representation of Wind Farms Guidance. Version 2.2*.





KEY

- SITE BOUNDARY
- PROPOSED SUBSTATION PLATFORM
- EXISTING ACCESS TRACK
- EXISTING OVERHEAD LINE
- PROPOSED PERMANENT ACCESS TRACKS
- PROPOSED PALISADE FENCING
- PROPOSED AREAS OF CUT
- PROPOSED AREAS OF FILL
- TEMPORARY PEAT STORAGE AREA
- PROPOSED SuDS ATTENUATION POND
- INLET
- OUTFALL
- TEMPORARY WORKS AREA
- BOREHOLE WATER SUPPLY PIPE
- SEPTIC TANK

APPLICATIONS UNDER S.37 OF THE ELECTRICITY ACT 1989

- PROPOSED OVERHEAD LINE
- PROPOSED TEMPORARY ACCESS TRACKS

NOTE:

PRE-DEV SITE LEVELS
- 109-123mAOD

POST-DEV SITE LEVELS
- 115mAOD

Project Title: CRAIG MURRAIL SUBSTATION

Client: Scottish & Southern Electricity Networks TRANSMISSION

Drawing Title: FIGURE 2.2 SITE LAYOUT PLAN

Purpose of issue: PLANNING

Designed	Drawn	Checked	Approved
-	RC	RC	KG

Arcus Internal Project No.: 4534

Scale @ A3: 1:5000

Date: 13/12/22

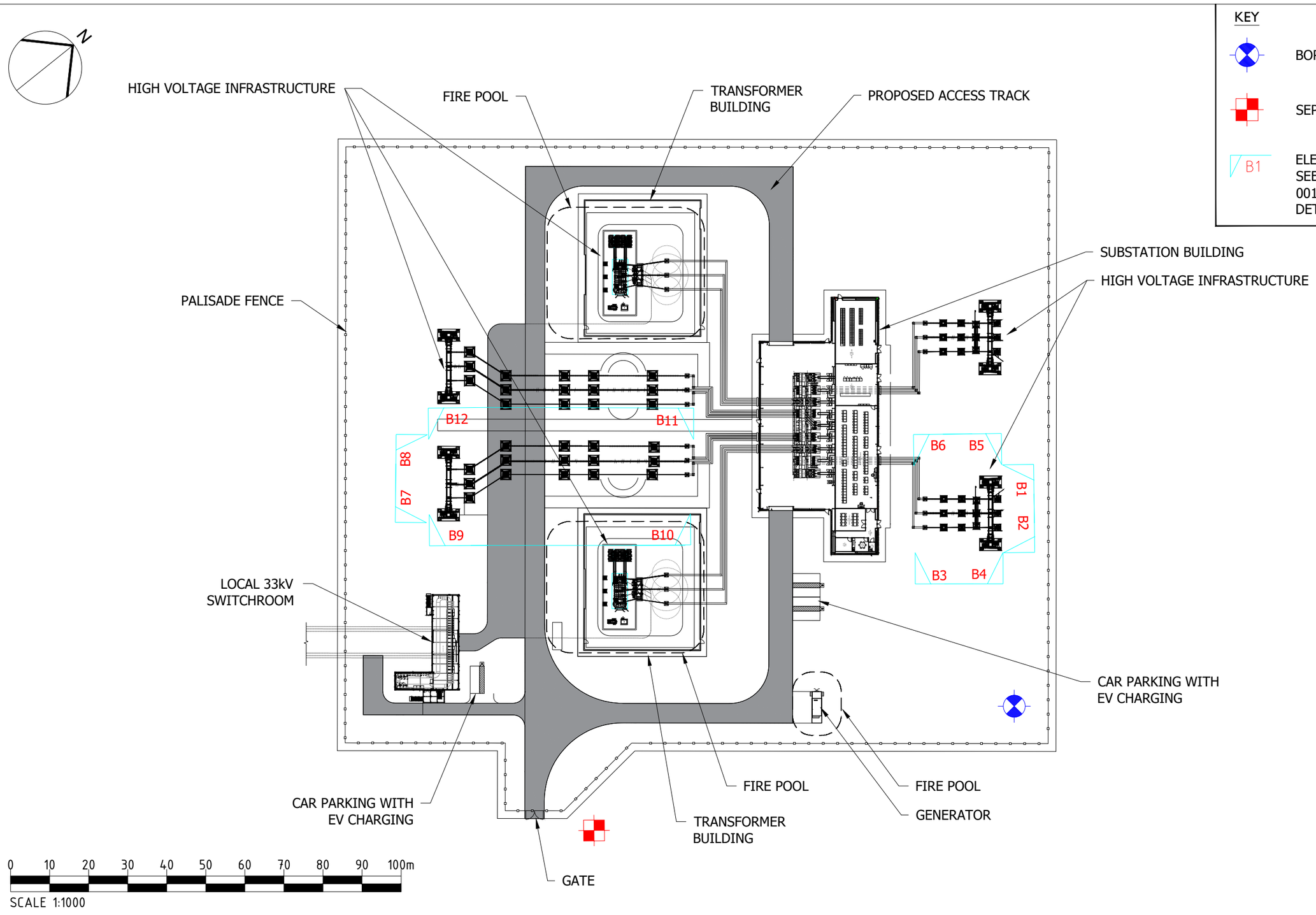
Drawing Number: 4534b-DR-P-0017

Rev: 5

Arcus Consultancy Services
7th Floor
144 West George Street
Glasgow, G2 2HG
Tel: +44 (0)141 221 9997
Fax: +44 (0)141 221 5610
www.arcusconsulting.co.uk

ARCUS

Plot Date : 15 December 2022 17:07:22
File Name :Y:\CAD\4534 ARGYLL SUBSTATIONS\01-WORKING\01_01-DRAWINGS\4534B_CRAIG MURRAIL\TOWN & COUNTRY PLANNING APPLICATION\4534B-DR-P-0017 P5 - - SITE LAYOUT PLAN - FIG 3A



KEY

- BOREHOLE WATER SUPPLY
- SEPTIC TANK
- B1 — ELECTRICAL LAYOUT REF. SEE FIGURE 6 (4534b-DR-P-0011, 0014 & 0015) FOR ELEVATION DETAIL.

NOTE:

PRE-DEV SITE LEVELS
- 109-123mAOD

POST-DEV SITE LEVELS
- 115mAOD

Plot Date : 13 September 2022 08:24:32
File Name :Y:\CAD\4534 ARGYLL SUBSTATIONS\01-WORKING\01_01-DRAWINGS\4534B_CRAIG MURRAIL\TOWN & COUNTRY PLANNING APPLICATION\4534B-DR-P-0004-P2 - SUBSTATION COMPOUND LAYOUT

Project Title: CRAIG MURRAIL SUBSTATION	Drawing Title: FIGURE 2.3 SUBSTATION COMPOUND LAYOUT & ELECTRICAL SECTION LOCATIONS	Purpose of issue: PLANNING	
Client: Scottish & Southern Electricity Networks TRANSMISSION		Designed: - / Drawn: RC / Checked: RC / Approved: DB	
		Arcus Internal Project No.: 4534	Date: 06/09/22
		Scale @ A3: 1:1000	

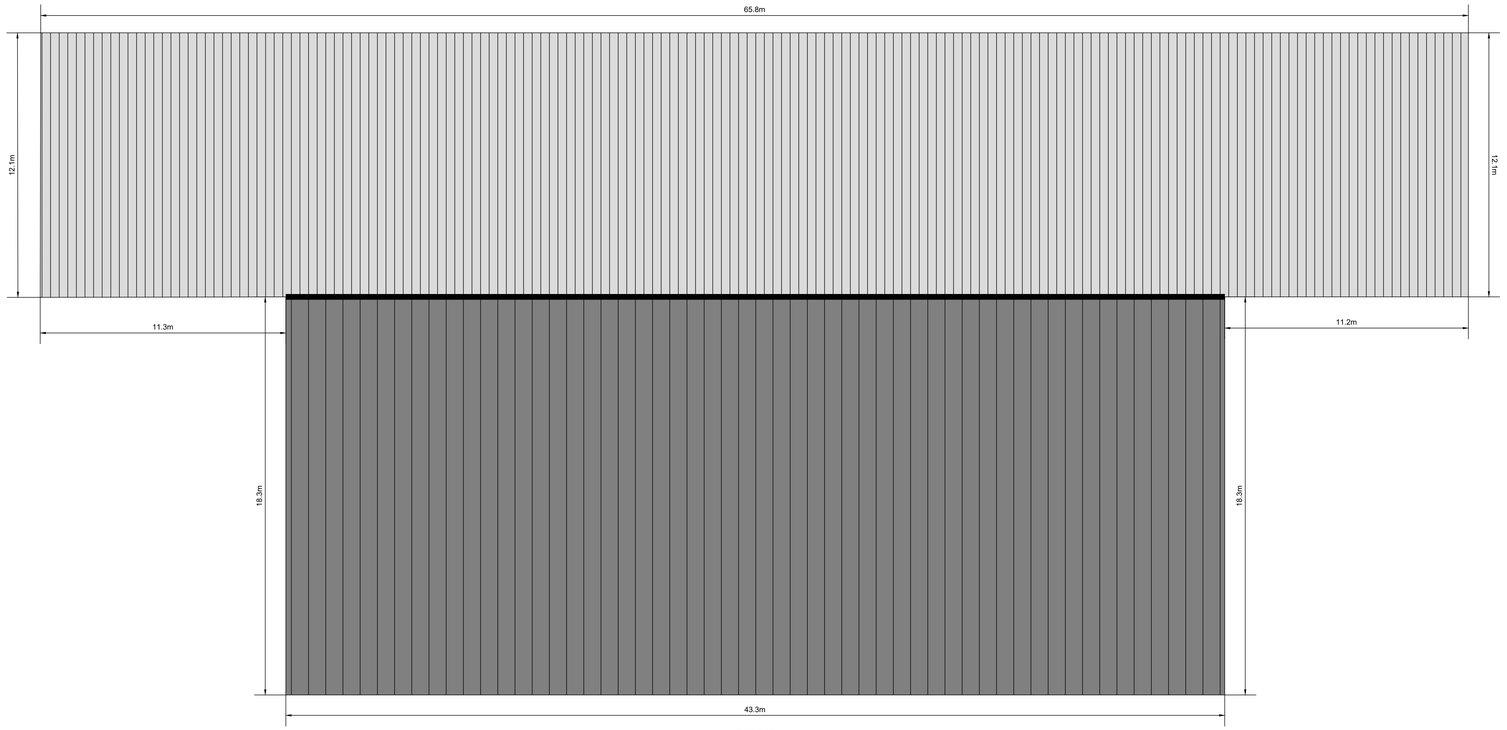
Drawing Number: 4534b-DR-P-0004	Rev: 2

Arcus Consultancy Services
7th Floor
144 West George Street
Glasgow, G2 2HG
Tel: +44 (0)141 221 9997
Fax: +44 (0)141 221 5610
www.arcusconsulting.co.uk

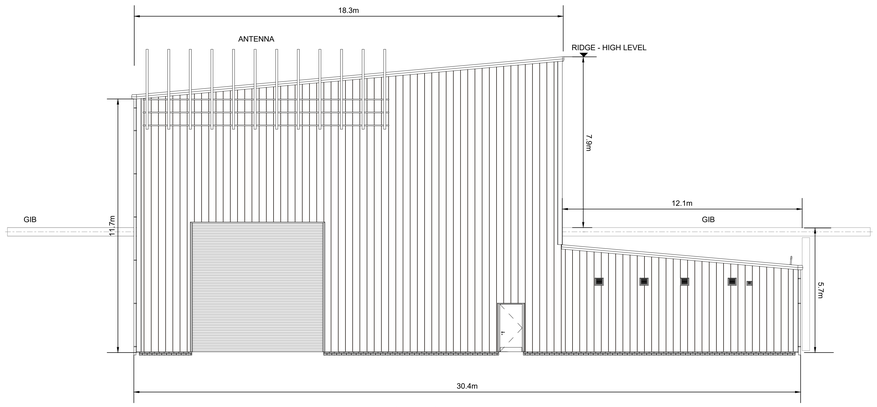
NOTE:

- **STEEL PORTAL FRAMES WITH METAL CLADDING AND ROOF.**
- **AIS BUILDING WOULD BE PAINTED WITH A RECESSIVE COLOUR MID-BROWN, SUCH AS RAL 8008: OLIVE BROWN OR SIMILAR APPROVED (EXAMPLE BELOW).**

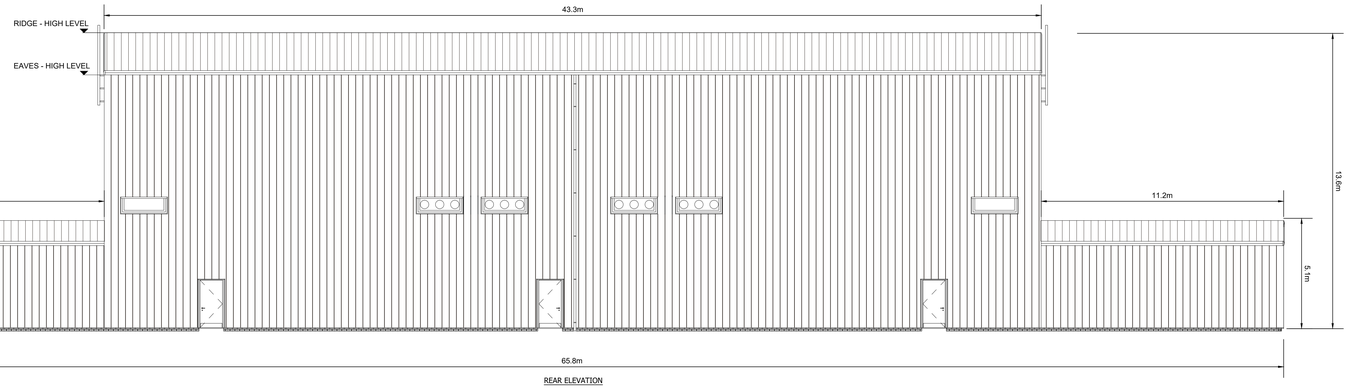
RAL 8008: OLIVE BROWN



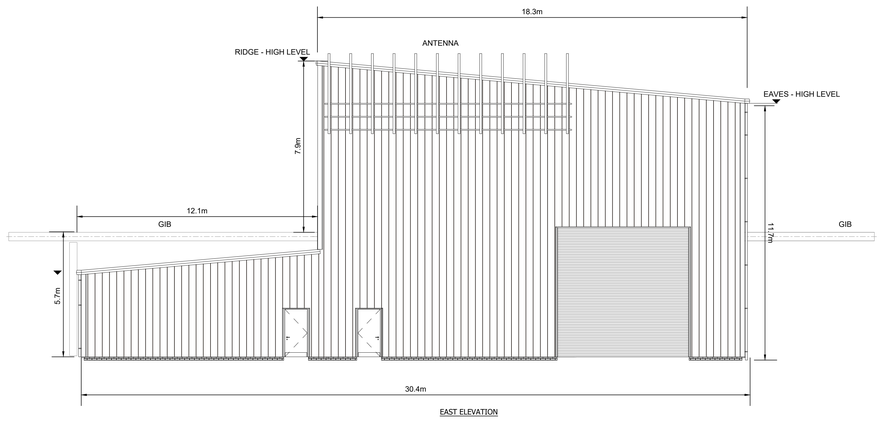
ROOF PLAN



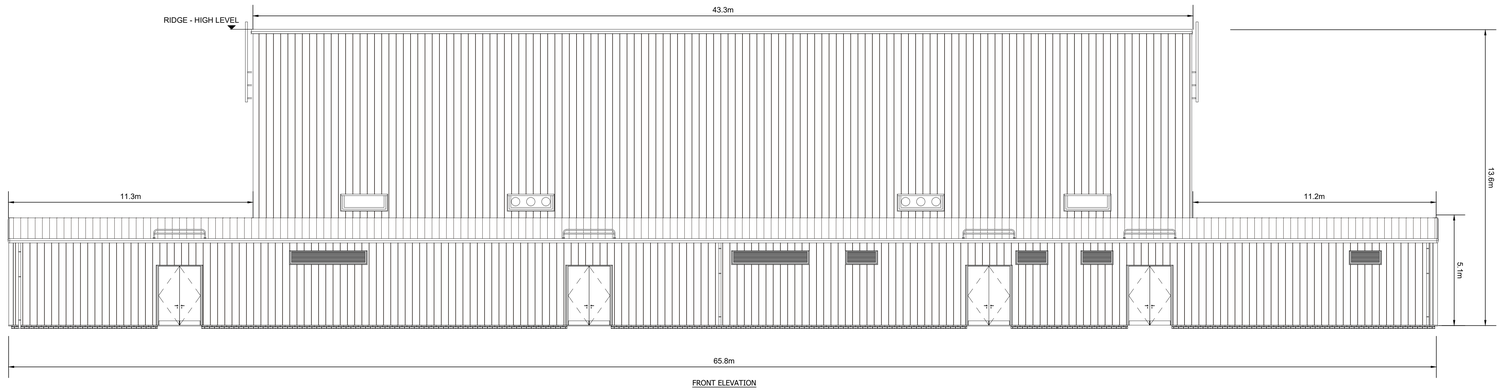
WEST ELEVATION



REAR ELEVATION



EAST ELEVATION



FRONT ELEVATION

SCALE 1:100

Revision Details	By / Check	Date	Suffix

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DOCUMENTATION INCLUDING THE PROJECT HEALTH & SAFETY FILE FOR ANY IDENTIFIED POTENTIAL RISKS.
2. DO NOT SCALE FROM THIS DRAWING, USE ONLY PRINTED DIMENSIONS.

Purpose of issue

PLANNING

THIS DRAWING IS TO BE USED ONLY FOR THE PURPOSE OF ISSUE THAT IT WAS ISSUED FOR AND IS SUBJECT TO AMENDMENT.

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION BOX

Client

Scottish & Southern Electricity Networks
TRANSMISSION

Project Title

CRAIG MURRAIL SUBSTATION

Drawing Title

FIGURE 2.4
SUBSTATION BUILDING ELEVATIONS

Designed	Drawn	Checked	Approved
-	RC	DB	DB

Arcus Internal Project No.: 4534
Scale @ A0: 1:100
Date: 15/09/22

Arcus Consultancy Services
7th Floor
144 West George Street
Glasgow, G2 2HG
Tel: ++44 (0)141 221 9997
Fax: ++44 (0)141 5610
www.arcusconsulting.co.uk

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Drawing Number: 4534b-DR-P-0006
Rev: 2

- Horizontal LOD: Allows towers to be relocated up to 100 m either side of the proposed alignment. A 50 m LOD applies to proposed access tracks.
- Vertical LOD: It is possible that further engineering analysis at the detailed design stage might alter the proposed heights, and therefore would be subject to a vertical limit of deviation, provisionally up to 20% variation based on the tower schedule.

2.6 Construction Works Programme

The construction of the Project will follow the key stages identified below. There will be overlap between the civil construction work and electrical construction, with a total construction programme lasting approximately 30 months.

2.6.1 Phase 1: Enabling Works and Civils Construction

For the Proposed Development, this phase is anticipated to take up to 15 months, and is expected to comprise of the following:

- Two new permanent access tracks within the Proposed Development site, approximately 153 m and 285 m in length, each with a 5 m wide running surface. Works to widen the existing forestry track may also be required to create a 5 m running surface and 20 m service corridor, however the exact locations of upgrades will be confirmed by the Principal Contractor;
- Temporary works drainage (clean and dirty water systems);
- An infiltration basin to receive all surface water runoff generated within the platform area (and runoff from the construction compound). The basin will be constructed during the construction phase and thus provide appropriate storage facility for surface water runoff during excavation and earth works (to capture and reduce suspended solids);
- A TWA containing storage, control building (office and welfare facilities) and septic tank to receive foul drainage from the compound. The septic tank will be emptied by a licenced contractor for off-site disposal at regular intervals dependent upon usage. Anticipated size is 18 m^3 giving an interval between emptying of 45 days;
- Cut and fill engineering works to form a level platform;
- Individual concrete foundation slabs situated within the finalised platform to support essential electrical components, and substation control building;
- Erection of a GIS building and transformer buildings of a steel portal frame design;
- Subsurface platform drainage in the form of suitably sized perforated pipes to drain runoff from internal hardstanding areas and incident rainfall landing on the permeable formations. Suitable gradients for pipe runs will be achieved within the total depth of the formalised platform layers; and
- Filter trench (or similar mechanisms) located parallel to the outside of the platform perimeter access track which will intercept runoff from the track and receive flow from the internal platform drainage before being routed towards the proposed Infiltration Basin via an open swale / pipe or similar.

For the Associated Development, this phase is anticipated to take up to 3 months, and is expected to comprise the installation of the following:

- Creation of a level platform at each tower location through processing of site won materials and import of commercial aggregates, as required;
- Concrete foundations/bases for temporary towers and electrical equipment;
- Dismantling of redundant towers.

The Associated Development is situated within areas of commercial forestry and broadleaved woodland; and in these areas an operational corridor would be required. The width of this corridor would be variable depending on the nature of the woodland, with an average corridor of 85 m required (42.5 m either side of the tower centre line) subject to the Limits of Deviation mentioned previously. In addition, minor vegetation management and felling would be required around the existing access track network for the Project to provide sufficient width. Further Details can be seen in the **Annex J: Forestry Appraisal.**

Foundation types and designs for each tower would be confirmed following detailed geotechnical investigation at each tower position, although it is currently anticipated that most tower foundations are likely to be of a concrete pad and chimney type. Individual tower foundations and associated construction activities would require a working area of approximately 2,500 m^2 (50 m x 50 m) around each individual tower location. The exact dimensions of the working area around each tower will be confirmed following micrositing.

It should be noted that the Associated Development will utilise the same access track and TWA as the Proposed Development, however there will be additional tracks to be constructed to the temporary tower locations for maintenance purposes.

In terms of the overall Project, detailed access proposals would be developed by the Principal Contractor (to be appointed following granting of consent). Similarly, the Principal Contractor would confirm the final location of site compounds post consent.

2.6.2 Phase 2: Electrical Construction

This phase is anticipated to take 18 months for the Proposed Development and would comprise:

- Installation of electrical infrastructure; and
- Commissioning of the substation.

For the Associated Development, the following would take place during this phase:

- Existing OHL network diversion;
- Installation of electrical plant e.g., cable sealing ends and tower. Scaffolding will be required for cable jointing; and
- Removal of temporary OHL diversion.

2.6.3 Phase 3: Commissioning

The Project would be subject to an inspection and snagging process. This allows the Principal Contractor and SSEN Transmission to check that the works have been built to specification and are fit to energise. The Project would also go through a commissioning procedure for the switchgear, communications, and protection controls. The circuits would then be energised.

2.6.4 Phase 4: Reinstatement

Following commissioning of the Project, all temporary construction sites will be reinstated with the exception of an area to be retained for operational purposes. Reinstatement will form part of the contract obligations for the Principal Contractor and will include removal of buildings and materials from the construction compound and revegetation.

2.7 Description of Construction Works

2.7.1 Formation of Substation Platform

Given the slightly sloping topography, cut and fill would be required to create a level substation platform. The proposed finished platform level would be at approximately 115m AOD.

Peat probing surveys undertaken and updated in 2021 confirmed the Proposed Development is located on areas of peat ranging from 0.0 m deep to 3.3 m deep, with an average peat depth across the site of 1.22 m. Given the presence of peat, a Peat Management Plan (PMP) has been prepared and can be seen in **Annex O.**

The substation platform will comprise a balanced cut and fill construction, which will use imported material where the excavated on-site material does not meet the requirements of the SSEN Transmission substation earthworks specification. The final cut and fill design would be based on a detailed ground investigation and site-specific topographic survey to be undertaken by the Principal Contractor once appointed.

2.7.2 Formation of Track

Access track work consists of constructing two permanent access tracks associated with the Proposed Development, construction of temporary access tracks for the Associated Development, and the potential to requirement to upgrade existing forestry tracks.

The new permanent access tracks will be constructed at the beginning of the construction period to enable use during the construction phase. The access tracks would be capable of accommodating the substation equipment deliveries, and other heavy plant and vehicles required for the construction, including cranes and concrete deliveries. All tracks would be constructed to good practice working methods[2,3,4,5,6], with watercourse crossings designed and constructed to comply with legislation set out in The Water Environment (Controlled Activities) (Scotland) Regulations 2011, as amended.

Given the new proposed track route is located on peat of varying depths, the following principles would be applied, which would be developed at the pre-construction stage based on the detailed site investigation work completed prior to construction commencing:

- In areas of shallow or no peat (0 m to 1 m), a 'cut track' design would be utilised, for which any vegetation, topsoil and peat would be stripped to expose a suitable foundation on which to build the track. Surplus excavated soil, together with any vegetation, would be used for landscaping and reinstatement work around the track shoulders following construction. The track would then be constructed by laying and compacting crushed rock to the level required using a combination of tracked excavators and vibratory compacting rollers. Road aggregate will either be sourced from site won "cut" material, on site borrow pits or from an off-site licensed quarry. The volume of aggregate required would be confirmed following detailed ground investigation.
- Where peat depth is greater than 1 m (See **Annex O**: PMP for information on peat depth on-site), a 'floating track' design would generally be used. This would incorporate geotextile material laid onto the surface at a width to suit the road width, which would greatly increase the resistance to prevent the tracks settling into the ground. A layer of crushed stone would then be laid on the geotextile to form the track, which produces a steep stone batter with the edges of the site track raised above the surface. Where ground conditions are found to be saturated, and potentially supporting ground water dependent ecosystems, the track construction would incorporate drainage measures to maintain groundwater flows and levels, such as using perforated pipes wrapped in free draining geotextile membrane incorporated into the floating track.

When upgrading the existing forestry track between the A816 and the new substation site, a sacrificial stone layer will be added to the existing road construction, where considered necessary. Road aggregate will either be

[2] Forestry Commission (2011). Forests and Water. UK Forestry Standard Guidelines. Forestry Commission, Edinburgh. i–iv + 1– pp.
[3] Scottish Natural Heritage (2015) Good Practice During Wind Farm Construction, A joint publication by Scottish Renewables, SNH, SEPA, Forestry Commission Scotland and Historic Scotland, 3rd Edition.
[4] CIRIA Publications 2006: Control of Water Pollution from Linear Construction Projects. Site Guide (C649)
[5] Scottish Natural Heritage (2013) Constructed Tracks in the Scottish Uplands, 2nd Edition
[6] Forestry Commission Scotland and Scottish Natural Heritage (2010) Floating Roads on Peat

sourced from site won “cut” material or from an off-site licensed quarry. The volume of rock aggregate required would be confirmed following detailed ground investigation.

2.7.3 Construction Compound/Facilities

The main TWA would be located north of the Proposed Development site with two smaller areas along the access road to the south west (as shown in **Figure 1.1**). The TWA would provide storage for materials and welfare facilities for both the Proposed Development and the Associated Development. The construction compound would include storage cabins, waste disposal skips, toilet units with washing facilities, a changing / drying room, a mess cabin, a parking area and a small storage area.

2.7.4 Tower Foundations

Different approaches to forming foundations may be used, subject to ground conditions at each temporary tower location. These would/are likely to comprise:

- spread type e.g. concrete pad and chimney;
- rock anchor; or
- piled type e.g. driven concrete, tube, and micro pile; or augered.

Foundation types and designs for each tower would be confirmed following detailed geotechnical investigation at each tower position, although it is currently anticipated that most tower foundations are likely to be of a concrete pad and chimney type.

Dimensions of each foundation would be confirmed following micrositing. For the purposes of this assessment however it has been assumed that each foundation would be buried to depths estimated up to 2.5 m below ground level (bgl) although extending up to 4 m depth where ground conditions require. They would extend over an area suitable to deliver the loading characteristics required (which would be a function of the underlying ground conditions and the weight of the structures to be supported). Piled foundations may be required where low strength ground conditions exist, particularly where peat is encountered at over 1 m depth.

For the purposes of the EA it has been assumed that individual tower foundations and associated construction activities would require a working area of approximately 2500 m^2 (50 m x 50 m) around each individual tower location. The exact dimensions of the working area around each tower would/will be confirmed following micrositing.

Where encountered, top soil (including peat) would be stripped from the tower working area to allow installation of tower erection pad(s) as necessary to accommodate construction plant as per the Soil Management GEMP provided in **Annex A**. Concrete would/is likely to be brought to site ready-mixed with no requirement for concrete batching at individual tower locations. Once the concrete has been cast and set, the excavation would be backfilled, using the original excavated material where possible. The Working with Concrete GEMP provided in **Annex A** will inform concrete works.

It is anticipated that formation of each tower foundation would take approximately four weeks.

2.7.5 OHL Construction

Temporary tower construction can commence two weeks after the foundations have been cast, subject to weather conditions and concrete curing rates. Tower steelwork would be delivered to each tower construction site either as individual steel members or as prefabricated panels, depending on the method of installation and the available access.

Each tower would be assembled on site into panels by a team of up to eight people. The lower tower panels may be erected using a telehandler, but upper panels would normally be erected into position using an all-terrain crane. Where access is not available for a crane, a derrick would be used. Most towers would be assembled within about

five days each and erected by crane in one to two days depending on weather conditions and tower type. Large angle or terminal towers, or towers within restricted sites may take longer.

2.7.6 Conductor Stringing

The conductor would be delivered to site on wooden drums in pre-determined pulling section lengths. Typical drum lengths for conductors are up to a maximum 2,400 m (approximate weight of 4 tonnes) but would depend on the specific length of section to be strung.

Prior to stringing the conductors, temporary protection measures, (e.g. netted scaffolds) would be erected across public roads and existing access tracks.

Conductor stringing equipment including winches, tensioners and ancillary equipment would be set out at either end of pre-selected sections of the OHL. Pilot wires would be pulled through the section to be strung. These would be hung in blocks (wheels) at each suspension tower in the section and connected to a winch and tensioner at the respective end of the section. The winch, in conjunction with the tensioner would be used to pull the pilot wires which would be connected to the conductor at the tensioner end. The conductor would be pulled via the pilot wires through the section and under controlled tension to avoid contact with the ground and any under-running obstacles including protection scaffolds. Once the conductor has been strung between the ends of the section it would then be tensioned to provide the necessary sag and then permanently clamped at each tower.

Dependent on terrain or site constraints pilot wires can be pulled through either with the use of all-terrain vehicles, tractors, or helicopters.

2.7.7 Construction and Contracting Strategy

The Project would be constructed by an experienced construction contractor with a proven track record working on similar projects in accordance with UK and international standards in respect of quality, health, safety and environmental management.

The contract to construct the Project would be a design and build contract based on the pre-consent designs included in this EA. This procedure allows the final design to take account of any consent conditions. It also allows the contractor to adapt design and construction proposals to address specific issues relating to actual ground conditions and limitations found onsite, as well as allowing for advances in technology and construction methodology.

2.7.8 Construction Employment

The number of construction workers employed on-site would vary throughout the different phases of construction works. Employment of construction staff will be the responsibility of the Principal Contractor but SSEN Transmission encourages the Principal Contractor to make use of suitable labour and resources from areas local to the location of the works. There will be multiple contractors working on sites across Argyll and so it will be difficult to give an accurate figure with regard to the number of workers that will be required per site. The peak number of workers is likely to occur during the final phase of civil engineering works and commencement of the electrical equipment installation where these phases overlap.

2.7.9 Hours of Work

Construction activities would in general be undertaken during daytime periods. This would involve work between approximately 07:00 to 19:00 on week days and 07:00 to 18:00 on Saturdays. Construction works will only take place during these agreed hours and in planning the works, our contractors will look to minimise the impact of construction noise on neighbours and the public. There may be times that construction works require to take place outwith these agreed hours due to time critical activities, this would only be done with the prior agreement of ABC. Works outwith of daylight hours requiring illumination would be undertaken in accordance with relevant guidance to avoid light spill.

The Principal Contractor will develop a construction noise management plan as part of the Construction Environmental Management Plan (CEMP).

2.7.10 Construction Traffic and Plant

Access to the Project during construction and operation would be via the A816 and then existing forestry track to the site.

It is anticipated that Heavy Goods Vehicles (HGVs) and Light Goods Vehicles (LGVs) will access the site on a daily basis throughout the duration of the construction period to deliver materials and construction plant such as excavators, dump trucks, cranes and deliveries of machinery and scaffolding. All materials would be delivered to the construction compound. The transformers will be delivered by a small number of abnormal indivisible loads.

Further details of the anticipated volume and type of construction traffic are provided within **Chapter 9: Transport Appraisal**. A Traffic Management Plan (TMP) will be developed by SSEN Transmission, which will be agreed with the ABC Roads team in advance of construction, as part of the CEMP. The CEMP will include traffic management measures to ensure that the Project will not have an unacceptable impact on the public road network or nearby road users.

It is unlikely that construction lighting would be required during summer months. Should lighting be required in the winter, these would either be mobile or fixed temporary lighting. Any lighting would be located and directed to avoid impacts to sensitive receptors.

2.8 Construction Environmental Management

The Applicant adopts a consistent approach to the construction of all developments. It is standard practice that, following receipt of approval for development, a CEMP is prepared by the Applicant's Principal Contractor. This would be provided as part of a condition to any planning consent. The key objective of the CEMP is to ensure that commitments to mitigate environmental impacts that may arise during construction are delivered. Compliance with the CEMP will be required as part of the Principal Contractor's contract terms.

The CEMP will include the following General Environmental Management Plans (GEMPs):

- Oil Storage and Refuelling
- Soil Management
- Working in or Near Water
- Working in sensitive habitats
- Working with concrete
- Watercourse crossings
- Waste Management
- Contaminated Land
- Private Water Supplies
- Forestry
- Dust Management
- Biosecurity (on land)
- Restoration
- Bad weather

The CEMP will also include development-specific plans developed by the Applicant, including Species Protection Plans (SPPs), as well as the Stage 1 Peat Management Plan prepared in accordance with the requirements of the 'Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste', Scottish Renewables and SEPA, Version 1, January 2012. Outline Species Protection Plans (bird, bat, red squirrel, otter, pine marten, badger, wildcat) are provided in **Annex H** and the outline PMP is provided in **Annex O** of this EA. The PMP sets out the general principles for the management and re-use of excavated peat.

A Construction Site Licence would be required and obtained in accordance with the Controlled Activity Regulations (CAR) from SEPA prior to any construction works commencing on-site. The Licence would specify the control measures that would be used at the Project to safeguard the water environment.

2.8.1 Forestry

The Project is located within a region of felled plantation forest; however, some felling will be required to remove immature trees which have recolonised the area, as well as any remaining mature trees. Further details of the long-term effect of the Project on forestry and woodland are provided in **Annex J: Forestry Assessment.** It is possible that some localised felling and pruning will be required along the existing access road. This will be confirmed by the principal contractor and will be subject to mitigation identified in this EA.

2.8.2 Surface Water Drainage Proposals

It is proposed that the impermeable areas within the Proposed Development will be connected to an attenuation pond to the south of the Site via a piped filter drain system. The pond will enable surface water to be intercepted in accordance with existing topography and flow routes from west to east at the location of the Development. For further information on surface water drainage see **Annex K: Drainage Strategy and Drainage Plans**.

2.8.3 Watercourse Crossings

Possible watercourse crossing upgrades, including the upgrade to the existing culverted watercourse, may be required on the access track from the public road during the construction of the Project. As above, watercourse crossings would be designed and constructed to comply with legislation set out in The Water Environment (Controlled Activities) (Scotland) Regulations 2011[7], as amended. These measures would be carried out in line with the Water Construction Management Plan (WCEMP), as outlined in **Annex N**.

2.8.4 Private Water Supplies

A PWSRA has been undertaken for the Project. The PWSRA identified all PWS within a 2 km radius of the Project and confirms the location of source water supplies. **Annex M** informs the risk assessment of the effects of the Project on the private water supply, source water and associated distribution infrastructure. Where new access tracks or upgrades to existing tracks are required, within 100 m of supplies, mitigation measures are proposed. Potential effects and mitigation measures are discussed in detail within **Chapter 6: Hydrology, Hydrogeology and Geology Appraisal** and associated technical appendices.

2.9 Operational Phase

2.9.1 Life of the Project

It is anticipated that the Project will be operational for 45 years.

2.9.2 Operational Activities and Employment

The Proposed Development would not be staffed on a full-time basis. Operations would be controlled remotely from the network operation centre in Perth. Maintenance activities would be managed from the Applicant's Highlands and Islands depot in Inverness.

2.9.3 Operation and Maintenance Programme

Once operational, it is likely that monthly site visits would be made by maintenance personnel to undertake routine checks and operational switching. More specialist works, such as maintenance repairs or environmental management, may be subcontracted to specialists as required.

[7] Scottish Government. URL: https://www.legislation.gov.uk/ssi/2011/209/contents/made

Planned maintenance is completed approximately once every four to six years on each circuit. This work would last for approximately one week. During this time up to four or five LGV site vehicles may access the Proposed Development site per day and this may include a small crane. Further limited maintenance would be required for the Associated Development.

The O&M manual would ensure an environmental management / maintenance programme is in place to prevent any adverse impacts on the environment during operation and will confirm the frequency of maintenance visits etc.

Measures to be included in the O&M manual would include (but not be limited to) the following:

- Inspection / maintenance of site infrastructure including bunds, oil / water interceptor and SUDS facilities;
- Inspection / maintenance of oil filled / Non SF6 insulated electrical equipment; and
- Landscape maintenance.

The O&M manual would be developed by the Applicant and Principal Contractor for handover to the SSEN Transmission O&M team.

2.9.4 Waste Management

During operation, it is anticipated that very small volumes of waste would be produced. Waste generation would be limited to wastewater from maintenance only arising in the control building from visiting contractors, and from routine maintenance activities. Waste generated during routine operations and maintenance would not be stored on-site and would be removed at the time by SSEN Transmission staff/contractors, under the appropriate waste carrier's licence.

2.9.5 Emissions to Air / Land / Water

Emissions to water would be limited to rainwater run-off and discharge from the foul sewage treatment system. Foul sewage and rainwater run-off will be managed in accordance with the drainage management system.

Routine emissions to land and air are not anticipated.

2.9.6 Operational Noise

Noise emissions generated by the Proposed Development would originate primarily from transformers in the form of low-frequency tonal noise in the range of 63Hz to 2kHz. There would be limited noise generated from the Associated Development once operational.

2.9.7 Substation Lighting

Lighting would be restricted to times when the Project is being accessed after dark. A complete floodlighting scheme would be designed to achieve a maintained average of 6 lux illumination throughout the HV substation compound. The maintained minimum point illumination would be 2.5 lux.

2.9.8 Electrical and Magnetic Fields (EMFs)

The UK Health Protection Agency (HPA) is the government body responsible for policy and guidance on Electric and Magnetic Fields (EMF)[8]. Exposure guidelines have been developed by the International Commission on Non-Ionising Radiation Protection (ICNRIRP) to ensure protection of human health in different situations, occupational exposure and public exposure, which have been adopted by the HPA for application in the UK.

Whilst substation equipment is known to generate EMFs, these have been observed to drop away to background levels quickly with distance from source. In addition, EMF generated by substation infrastructure has been

[8] Health Protection Agency. URL: http://www.hpa.org.uk/Topics/Radiation/UnderstandingRadiation/UnderstandingRadiationTopics/ElectromagneticFields/ElectricAndMagneticFields/ExposureGuidelinesForElectricAndMagneticFields/

consistently recorded to be lower than that associated with incoming/outgoing overhead line or underground cables associated with the substation[9].

All EMF generating infrastructure is located at least 100 m from the Project. It is therefore anticipated that EMF would be at, or close to background levels at the Project. No significant EMF emissions are therefore expected and the Project will adhere to the relevant regulations and guidance for EMF limits.

2.10 Decommissioning Phase

Should the substation be decommissioned the Proposed Development site would be restored as follows:

- The substation infrastructure would be removed;
- Where removal of the infrastructure such as substation foundations would result in more damage than leaving them in place, they would be left in-situ; and
- Disturbed ground would be reinstated.

Full details of the decommissioning plan would be agreed with the appropriate authorities and the landowners prior to any decommissioning works commencing.

[9] http://www.emfs.info/Sources+of+EMFs/Substations/National+Grid+substations/