Scottish & Southern Electricity Networks

TRANSMISSION

# Annex O - Peat Management Plan

## November 2022

# CRAIG MURRAIL SUBSTATION

## ANNEX O

## PEAT MANAGEMENT PLAN

**NOVEMBER 2022**

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## TABLE OF CONTENTS

# 1 INTRODUCTION

## 1.1 Preparation of the Peat Management Plan

Arcus Consultancy Services Ltd (Arcus) was commissioned by ERM on behalf of SSEN Transmission (the Applicant) to draft a Peat Management Plan (PMP) to support an Environmental Assessment Report (EA Report) for new 275 kV electricity substation and associated infrastructure (hereby known as 'the Project') in the vicinity of the existing Craig Murrail substation (located at National Grid Ref. 187725 691030).

The proposed substation, Temporary Works Area (TWA), Sustainable Urban Drainage System (SUDS) attenuation pond and permanent access tracks located within the red line boundary, as shown in **Appendix A Figure 1** (hereby known as the Proposed Development) will be subject to a Town and Country Planning Application.

This PMP has been prepared to inform Argyle and Bute Council (ABC) and statutory consultees of the estimated peat excavation and re-use potential, proposed peat and soils management methodologies to be employed during construction.

This PMP will ensure the Development constitutes a construction project that complies with good practice in accordance with Scottish Renewables (SR) and Scottish Environment Protection Agency (SEPA) guidance.

The purpose of the PMP is to:

- Define the materials that will be excavated as a result of the Development, focusing specifically, on the excavation of peat;
- Report on detailed investigations into peat depths within the Development;
- Detail proposals for the management of excavated peat and other soils;
- Consider the potential effect of the Project on Ground Water Dependent Ecosystems (GWDTEs);
- Determine volumes of excavated peat at the Development and proposals for re-use or reinstatement using excavated materials; and
- Detail management techniques for handling, storing and depositing peat for reinstatement.

The PMP has been produced in accordance with SR and SEPA guidance on peat excavations and management[1]. It is also intended to be a document that will evolve during the different phases of the project and as such will be subject to continued review to address:

- Requirements to discharge future planning conditions;
- Detailed ground investigations and design development;
- Unforeseen conditions encountered during construction;
- Changes in best practice during the life of the substation; and
- Changes resulting from the construction methods used by the contractor(s).

Whilst this PMP provides a base standard for good practice, where avoidance or further minimisation of risks to the environment can be demonstrated through use of alternative methods or improvements to current practices, the Contractor will implement these wherever possible and will correspond with SEPA and ABC.

## 1.2 The Project

The land which the Project occupies is located approximately 2.5 km northeast of Lochgilphead covering an area of approximately 94 hectares (ha) and is located within the administrative boundary of ABC. The Project extends northeast to southwest, and is

[1] SR and SEPA (2012) Guidance on the Assessment of Peat volumes, Re-use of Excavated Peat and the Minimisation of Waste [Online] Available at: Assessment of peat volumes, reuse of excavated peat and minimisation of waste: guidance - gov.scot (www.gov.scot) (Accessed 24/11/22)

adjacent to existing Forestry Land Scotland (FLS) track associated with Achnabreac Forest, accessed from the A816 near Cairnbarn. The Project is illustrated on **Figure 1: Site Layout Plan**, within **Appendix A** of this PMP.

The topography of land within the red line boundary and immediate vicinity is relatively complex. The elevation ranges from around 110 metres (m) Above Ordnance Survey Datum in the south east (AOD) to around 150 m AOD in the north western sector of the proposed substation.

The land within the red line boundary consists of commercial Sitka Spruce plantations at differing maturity levels and often sporadically placed. There are a number of drainage channels associated with the forestry plantation, including a surface water feature which passes through a culvert beneath a track which dissects the land which the Project occupies from north east to south west; however, there are no recorded watercourses or lochs present within the Project boundary. The Project is generally located in fairly level areas within the boundary.

Available British Geological Survey (BGS)[2] data information on superficial soils much of the Project area not to be mapped, but of the areas mapped Till, Devensian - Diamicton is the predominant soil type. **Figure 2** within **Appendix A** illustrates the 'Superficial Soils' map.

Published bedrock geology mapping information on solid geology indicates that the Project area is predominantly underlain by Sedimentary Crinan Grit Formation – Quartzite. There are also two types of intrusions noted, Dalradian Supergroup – Metagabbro/Metamicrogabbro and Dyke Swarm – Basalt and Microgabbro both igneous intrusions of silica-poor magma. **Figure 3** within **Appendix A** illustrates the 'Solid Geology'.

Published BGS Geosure mapping[3] indicates that no faulting exists on-site with the nearest faulting recorded approximately 4 km to the south-west of the Project, running north-west to south-east.

[2] BGS (2019): http://mapapps.bgs.ac.uk/geologyofbritain/home.html (Accessed 25/03/22)

[3] BGS (2019): https://mapapps2.bgs.ac.uk/geoindex/home.html (Accessed 20/04/22)

# 2 OBJECTIVES

## 2.1 Introduction

### *2.1.1 Background*

Detailed peat survey work and completion of assessments such as Peat Landslide Hazard and Risk Assessment (PLHRA), presented in **Annex P: Peat Landslide Hazard and Risk Assessment** of the EA Report, allows a consistent approach to the management of peat across the Site can be achieved.

The overall objective of the design of the Development has been to minimise the excavation of peat where possible and achieve as close as practicable an overall material balance. This is considered to give the best opportunity to achieve reinstatement or restoration in accordance with good practice and remove the need for waste management controls.

This objective is achieved through:

- Ensuring the characteristics of the Project are understood through extensive peat probing and assessing the Project topography;
- Understand the layout of the Project and how excavations will take place; and
- Calculate the peat volumes using the peat depths and infrastructure areas.

### *2.1.2 Approach to Minimising Peat Excavation*

The following steps have been taken during the outline design stage of the project to minimise the effect on peat:

- The development of an access track design which avoids deeper peat where practicable or utilises existing tracks; and
- The design and orientation of infrastructure considers local topography, deep peat and other environmental constraints.

At detailed design and construction stage these steps will be supplemented by taking the following measures to minimise disturbance:

- Maximisation of batter angles in cuttings; and
- The use of appropriate construction plant to avoid unnecessary disturbance of the ground surface.

The fundamental principle upon which this PMP is based is that achieving a successful materials strategy is contingent on gaining a thorough understanding of the Project through investigation and developing a design that achieves the materials management objectives. For the Development, this principle is achieved by undertaking significant peat investigation works prior to preparing this PMP, and design evolution that considers the peat recorded.

## 2.2 Aims and Objectives

### *2.2.1 Need for a Peat Management Plan*

This PMP is prepared to demonstrate to the planning authority, SEPA and other consultees that the construction of the Development will progress in a manner that is planned, is in accordance with good practice and achieves the aim of being environmentally sustainable.

The PMP is therefore prepared in accordance with the SR and SEPA guidance. It defines how:

- The Development has been designed so far as practicably possible to reduce the volumes of peat excavated;
- Volumes of peat excavated during the course of the works have been considered in the design; and

- Excavated peat will be managed and reused.

### *2.2.2 Objectives of the Peat Management Plan*

The main objective of the PMP is to outline how any peat expected to be excavated will be managed and re-used during the construction of the Development.

This is achieved through responding to the following objectives:

- Providing a description of the extent and depths of peat at the development and how this was determined;
- Estimation of peat volumes to be excavated and re-used;
- Preliminary classification of excavated materials;
- Consideration of the use of appropriate peat(s);
- Describing how excavated peat will be handled to ensure suitability for re-use;
- Determining if temporary storage of peat will be required during construction and how this will be done to ensure suitability for re-use; and
- Considering the potential volume of peat which may not be suitable for re-use and any requirement for a Site Waste Management Plan (SWMP) for the Development.

The response to these objectives is provided in the following sections.

# 3 PEAT MANAGEMENT

## 3.1 General Peat Classification

Acrotelmic peat is the upper layer of peat consisting of living and partially decayed material with a higher hydraulic conductivity and a variable water table. These deposits are generally found to exist in the upper 0.5 m of peat deposits and is typically suitable for re-instatement because it contains viable plant life to assist in the regeneration of peatland vegetation and carbon sequestration.

Catotelmic peat is variable in characteristics, with decomposition of fibres generally increasing with depth. Water content can be highly variable and affects the structural strength of the material. Suitability for re-use generally depends on fibre and water content. The upper catotelm is commonly deemed as being appropriate for re-use in restoration due to its relatively high fibre content.

Generally, excavated semi fibrous catotelmic peat from the Project will have sufficient structural strength to be able to be used in the lower layers of verge restoration as it will not be 'fluid'.

The catotelmic peat would be capped with a surface layer of actrotelm to re-establish the peat vegetation. If any fluid like wet catotelmic peat is encountered then it would be placed in more appropriate locations such as low-lying sections of the borrow pits or concave deposition areas.

The following assumptions have been made in classifying peat excavated during the construction work:

- Where the total peat depth was found to be less than 0.5 m, this peat material is assumed to be 100% acrotelmic;
- Where the total peat depth is between 0.5 m and 1.0 m, the upper acrotelmic peat is at least 0.5 m deep; and
- Where the total peat depth as found to be greater than 1.0 m, acrotelmic peat is assumed to account for at least 30% of total depth but generally applying minimum of 0.5 m thickness.

Existing topography, environmental constraints and electrical engineers drive the design of the infrastructure with due consideration given to potential construction risk and effects on environmentally sensitive receptors including deep peat, watercourse buffers and any GWDTEs. Further micro-siting post-consent would take place in such a way as to avoid where possible the excavation of deep peat.

## 3.2 Investigations

The existing peat depths across the Project have been determined through a phased survey approach. The survey was initiated to inform the EA and design of the Development while supporting the PLHRA and PMP.

Preliminary peat probing was undertaken as part of the initial site optioneering, which was superseded by phases of detailed peat probing focussing on the Project. The survey comprised a total of 465 probes.

Probing was undertaken across several visits between November 2021 and February 2022. The probe positions for these visits were focussed on the proposed infrastructure including the substation, temporary works area and permanent access tracks. Peat depths were measured along the proposed access tracks at 50 m centres with offsets of 25 m on either side of the centre line where possible, while an intense 10 m grid provided detailed peat information at the proposed substation and a 25m grid was adopted to cover the temporary works area. Furthermore, regarding the Associated Development six pylon positions were covered at 10m spacing to a 25 - 30m distance in all directions to allow for potential

micrositing and proposed temporary access tracks were covered in a similar methodology to the permanent tracks.

The peat depths are illustrated in **Figure 4 Recorded Peat Depths** within **Appendix A** of this PMP.

## 3.3 Summary of Peat Depths

Peat depths ranged from 0m to 4.5m thickness across the Project and were shown as localised or isolated zones, with 104 (22%) probes confirming peat in excess of 2m. These deeper areas of peat are located in the southern portion of the study area with areas of deeper peat also occurring in other areas of the site.

The gradients on the site are relatively low following a gradual slope throughout from the northwest to the southeast.

The recorded peat depths in the vicinity of the first pylon are all on average 0.47m with a maximum depth of 1.0m. The recorded peat depths in the vicinity of the second pylon are deeper, with average depths of 2.72m and maximum depths of 3.5m. The proposed substation is currently located in an area with average peat depths of 1.16m and a maximum depth of 3.1m. The other infrastructure on site (the Temporary and Permanent Tracks and Temporary Works Area) is located in areas that have average peat depths lower than 1.3m, but all of these locations have probes that recorded peat depths of more than 2m with the deepest recorded peat being 4.5m.

**Figure 5 Interpolated Peat Depths** included in **Appendix A** illustrates the peat depths recorded across the Project, the distribution of peat deposits along the proposed tracks and infrastructure.

### *3.3.1 Excavation Calculation*

Peat excavation volumes have been estimated based on the footprint of the site layout (access tracks, turbine hardstandings, and OHL towers) and the recorded peat depths. The total excavation and subtotal by infrastructure are included in **Table 1** below.

In addition, a further 10% of the total volume of excavated material has been applied as contingency bulking factor.

*Table 1: Peat Excavation Volumes Based on Construction Activity*

| Development Component | Estimated Volume of Excavated Peat ($m^3$) | Estimated Volume of Acrotelmic Peat ($m^3$) | Estimated Volume of Catotelmic Peat ($m^3$) |
|---|---|---|---|
| Infrastructure Towers | 316 | 96 | 220 |
| Permanent Tracks | 2,691 | 1,168 | 1,523 |
| Temporary Tracks | 689 | 265 | 424 |
| Temporary Works Area | 28,730 | 11,311 | 17,419 |
| SUDS Attenuation Pond | 3,271 | 1,817 | 1,454 |
| Substation | 34,110 | 14,703 | 19,407 |
| **SUB-TOTAL** | **69,807** | **29,360** | **40,447** |
| **+ 10% contingency Bulking Factor** | **6,981** | **2,936** | **4,045** |
| **TOTAL** | **76,788** | **32,296** | **44,492** |

A detailed assessment of excavated volumes by location is provided in **Appendix B** of this PMP.

### *3.3.2 Peat Reuse Requirements*

The principles of re-instating peat and peaty soils should be adhered to for all elements of the infrastructure, comprising the below:

- Peat and peaty soils will be reinstated on track and infrastructure verges with turves placed on the upper horizons encouraging re-vegetation;
- Reinstatement activities will be overseen by the Ecological Clerk of Works (ECoW) to ensure methods are properly adhered to;
- In the event that quality deep peat is subject to excavation, full reinstatement of the peat is required to prevent loss of the resource;
- Shallow Peat and peaty soils will be reinstated on track and infrastructure verges with turves placed on the upper horizons encouraging re-vegetation;
- All peat, soil and turves excavated from beneath infrastructure (excluding any floating track section) will be re-instated in the vicinity of its original location; and
- Any wet catotelmic peat will be placed at the bottom of any restoration profile, followed by semi fibrous catotelmic peat and then acrotelmic should be placed on top with turves capping the material at surface.

Restoration activities will be overseen by the Ecological Clerk of Works (ECoW) to ensure methods are properly adhered to.

### *3.3.3 Peatland Restoration Potential*

The Peatland Restoration Area (to be formally defined following consent) currently comprises commercial conifer plantation, or areas that have already undergone felling as identified during initial phases of site surveys. Following additional high-level assessment of the regions within and surrounding the Site's RLB, areas at the Site are determined as suitable for peatland restoration. The assessment takes into consideration the following criteria:

- Presence of ecologically significant areas presented by the Phase 1 habitat survey.
- Hydrological influences for instance watercourses, drainage ditches, topography, and ground conditions.
- Depth and area of existing peatland as well as the area required for restoration.

The Peatland Restoration Area will be considered suitable on the following basis:

- Peat depth data indicated that the Peatland Restoration Area comprises peat depths suitable for restoration (greater than 0.5 m);
- Creating Habitats of high ecological value from ecologically insignificant areas of clear-fell;
- Restoration of peatlands will positively contribute to the Scottish Governments Climate Change Plan; and
- Restoration of peatlands will increase the value of the habitats to support rare plants, invertebrates, mammals (including the nationally declining water vole, currently absent from the Site) and birds;

The outline objectives in proposing utilisation of those presently identified is to:

- Ensure residual volumes of excavated peat from the Revised Development are reused in areas where ecological benefits and maintained or increased carbon sequestration can be delivered;
- Promote the re-use of excavated peat materials and avoid their disposal to landfill; and
- Promote use of best practices and guidance to ensure that benefit is made from reusing peat and peaty soils for ecological enhancement.

**Table 2** shows the opportunities for re-use of peat including the demand for acrotelm and catotelm peat. **Table 3** summarises the total peat balance estimated during construction of the Development. Detailed excavation calculations are included in **Appendix B**.

*Table 2: Peat Re-use Volumes Based on Construction Activity*

| Development Area | Total Demand Estimate ($m^3$) | Acrotelm Demand ($m^3$) | Catotelm Demand ($m^3$) | Estimated Reinstatement Thickness (max) where gradient permits (m) | Assumptions |
|---|---|---|---|---|---|
| Infrastructure Towers | 120 | 120 | 0 | Up to 0.5 m | Towers and associated earthworks will be dressed off with up to 0.5 m of peat and peaty soils. |
| Temporary Tracks | 318 | 318 | 0 | Up to 0.5 m | Where new temporary tracks are proposed, peat will be reinstated along verges and associated earthworks with peat up to 0.5 m thick with verges not expected to exceed 3.0 m on either side during construction phase, and reinstated fully post construction of the Associated Development.<br>Average peat depths suggest only acrotelmic peat will need to be reused. |
| Permanent Tracks | 1,401 | 1,401 | 0 | Up to 0.5 m | Where new permanent tracks are proposed, peat will be reinstated along verges and associated earthworks with peat up to 0.5 m thick with verges not expected to exceed 3 m on either side.<br>Average peat depths suggest only acrotelmic peat will need to be reused. |
| Temporary Works Area | 28,730 | 11,311 | 17,419 | Up to 1.3m | It is proposed to fully reinstate the working platform using excavated peat to thicknesses of that encountered |

| Development Area | Total Demand Estimate ($m^3$) | Acrotelm Demand ($m^3$) | Catotelm Demand ($m^3$) | Estimated Reinstatement Thickness (max) where gradient permits (m) | Assumptions |
|---|---|---|---|---|---|
| | | | | | during peat probing, therefore up to 1.3m. |
| SUDS Attenuation Pond | 0 | 0 | 0 | N/A | |
| Substation | 1,020 | 1,020 | 0 | Up to 0.5 m | Substation hardstanding area and associated earthworks will be dressed off with up to 1 m of peat and peaty soils.<br>Average peat depths suggest only acrotelmic peat will need to be reused. |
| **SUB-TOTAL** | **31,589** | **14,170** | **17,419** | | |
| Peat Reuse Peatland Restoration | 45,198 | 18,126 | 27,073 | | Peatland restoration including ditch blocking, damming and furrow filling in felled and proposed felling areas as proposed for the Site. The restoration techniques are discussed in more detail in section 3.3.4 of this PMP. |
| **TOTAL** | **76,787** | **32,296** | **44,492** | | |

**Table 3** is presented as a summary of the assessment of peat reinstatement volumes. A detailed assessment is provided in **Appendix B** of this PMP.

The following assumptions have been made in assessing peat re-use:

- New access track sections assume verges and earthworks on both sides of track with widths of approximately 2.5 m based on topography. As the access track edges will have graded slopes, peat depths will vary across the profile to tie into existing ground levels but are generally assumed not to exceed 0.5 m thick;
- Verges along the access tracks could consist of up to 0.5 m thick peat and where possible catotelmic peat will be reinstated along verges in flatter areas;
- No peat will be placed on access track verges where the local topography is steep and/or a watercourse is in close proximity;
- Peat will be laid only to a thickness that maintains hydrological conditions to avoid drying out. Peat will not be used as a thin layer or on steeper non-peat slopes. Low verges and landscaping will be formed to permit surface water to drain off the access tracks;
- Catotelmic soils will only be used if it is suitable for purpose;

- Reinstatement at substation and construction compound assumes a maximum peat depth thickness of that which existed prior to borrow pits works, but anticipated not to exceed 0.5 m and 1.0 m respectively. This will include the re-use of catotelmic peat with overlying acrotelmic peat soils and turves; and
- Peat re-use includes a large portion of peatland restoration.

Excavated peat will be temporarily placed adjacent to where it is excavated where possible. However, where this is not possible, temporary peat storage areas will be utilised, as shown on **Figure 1** included in **Appendix A**. These are low vulnerability areas, out with 50 m buffer of watercourses and where topography permits.

*Table 3: Peat Balance Calculations*

| Peat Description | Total Peat Demand Estimate for Reinstatement (m³) | Total Peat Supply from Excavation (m³) | Surplus (+) or Deficit (-) (m³) |
|---|---|---|---|
| Acrotelm | 32,296 | 32,296 | 0 |
| Catotelm | 44,492 | 44,492 | 0 |
| **Total** | **76,788** | **76,788** | **0** |

**Table 3** demonstrates that there will be balance in excavation and re-use of peat and peaty soils. These volumes should be considered in the context of the total excavated peat during construction. It is likely that balance would be achieved once total excavated peat is established by the appointed Principal Contractor and reinstatement depths are adjusted accordingly.

Notably, due to the peat depths found during surveys and an iterative design process accounting for peat depth data, deep peat has largely been avoided.

### *3.3.4 Peatland Restoration*

For deforested areas and areas proposed for deforestation, furrow filling, ditch blocking and peat dams are likely to be the most suitable restoration techniques.

#### *3.3.4.1 Ditch Blocking and Peat Dams*

In order to achieve the objective of restoring peatlands to an active, healthy state via the prescription of raising water table levels across the restoration areas and obtaining a relatively flat topography, drains will be blocked to reduce water loss and in-filled to create a flat surface on which blanket bog vegetation can re-establish. Peat dams will be installed in forestry furrows within the Peatlands Restoration Areas in accordance with recognised guidance (such as SNH and Yorkshire Peat Partnership (YPP)). Methods outlined below are based on the following assumptions:

- Forestry furrows are no greater than 1.0 m wide and 0.65 m deep;
- The Peatland Restoration Area is situated on a relatively gradual slope.
- Peat dams will be installed in forestry furrows at a density of one every 12 m, where possible. The peat dams will be constructed in accordance with guidance which states that each peat dam will be anchored into the forestry furrow to a width of approximately 0.5 m on each side, and 0.2 m deeper than the base of the furrow; and,
- Wet, structured catotelmic peat will be used to create the peat dam which will be approximately 1.2 m long and approximately 0.5 m higher than the surrounding ground. The use of this peat will aid the formation of a watertight dam; unlikely to be successful achieved by the use of cracked peat. Acrotelmic peat (comprising vegetation and/or a natural seedbank) will be placed on top of each dam to prevent the peat drying out and to aid regeneration of the peat dam. The peat dam will be

constructed higher than the surrounding ground level to allow for any potential peat shrinkage.

#### *3.3.4.2 Furrow Filling*

Plough furrows are designed to collect and transport small volumes of water from the body of the forestry site to the larger drains. Furrows form extensive networks of micro-drainage across the Site. The distance between furrows is generally around 4m, which results in approximately 2.5km/ha of linear reinstatement opportunity. The locations and distance between bunds will be dependent on the topography of the Site, and will be determined following topographic surveys and furrow and ditch surveys. Re-profiling of the furrow edges to a gradient of approximately 35° will be undertaken for approximately 1 m upstream of each peat dam. This is to prevent build-up of water behind the peat dam posing a health and safety risk to wildlife or other. Where areas within the Peatland Restoration Area are not considered suitable for peat dams (such as steep slopes areas or wide ditches), alternative methods may be required. Alternative methods may include re-profiling of the ditch or the use of plastic/wooden grip blocks. Advice should be sought from a suitably qualified drainage specialist in these circumstances.

### *3.3.5 Handling and Storage of Peat*

It will be necessary for the Principal Contractor to prescribe methods and timing involved in excavating, handling and storing peat for use in reinstatement. The Principal Contractor will be responsible for appointing a chartered geotechnical engineer who will monitor any potential stability risks. Construction methods will be based on the following principles:

- The surface layer of peat (acrotelm) and vegetation will be stripped separately from the catotelmic peat. This will typically be an excavation depth of up to 0.5 m;
- Acrotelmic material will be stored separately from catotelmic material;
- Careful handling is required to retain any existing structure and integrity of the excavated materials and thereby maximise the potential for excavated material to be re-used;
- Less humified catotelmic peat which maintains its structure upon excavation should be kept separate from any highly humified amorphous or wet catotelmic peat;
- Acrotelmic material will be replaced as intact as possible once construction progresses/as it is complete;
- To minimise handling and transportation of peat, acrotelmic and catotelmic will be replaced, as far as is reasonably practicable, in the locality from which it was removed. Acrotelmic material is to be placed on the surface of reinstatement areas;
- Temporary storage of peat will be minimised, with reinstatement occurring as early as possible during the construction works;
- Suitable areas should be sited in locations with lower ecological value, low stability risk and at a suitable distance from water courses;
- Reinstatement will, in all instances, be undertaken at the earliest opportunity to minimise storage of turves and other materials;
- Managing the construction work as much as possible to avoid periods when peat materials are likely to be wetter (i.e., high rainfall events);
- Temporary storage and replacement of any peat excavated from the borrow pit should occur adjacent to and within the source pit; and
- Transport of peat on-site from excavation to temporary storage and restoration Site should be minimised.

Indicative temporary peat storage areas are illustrated on **Figure 1** within **Appendix A** of this PMP.

### *3.3.6 Waste Management Plan Requirements*

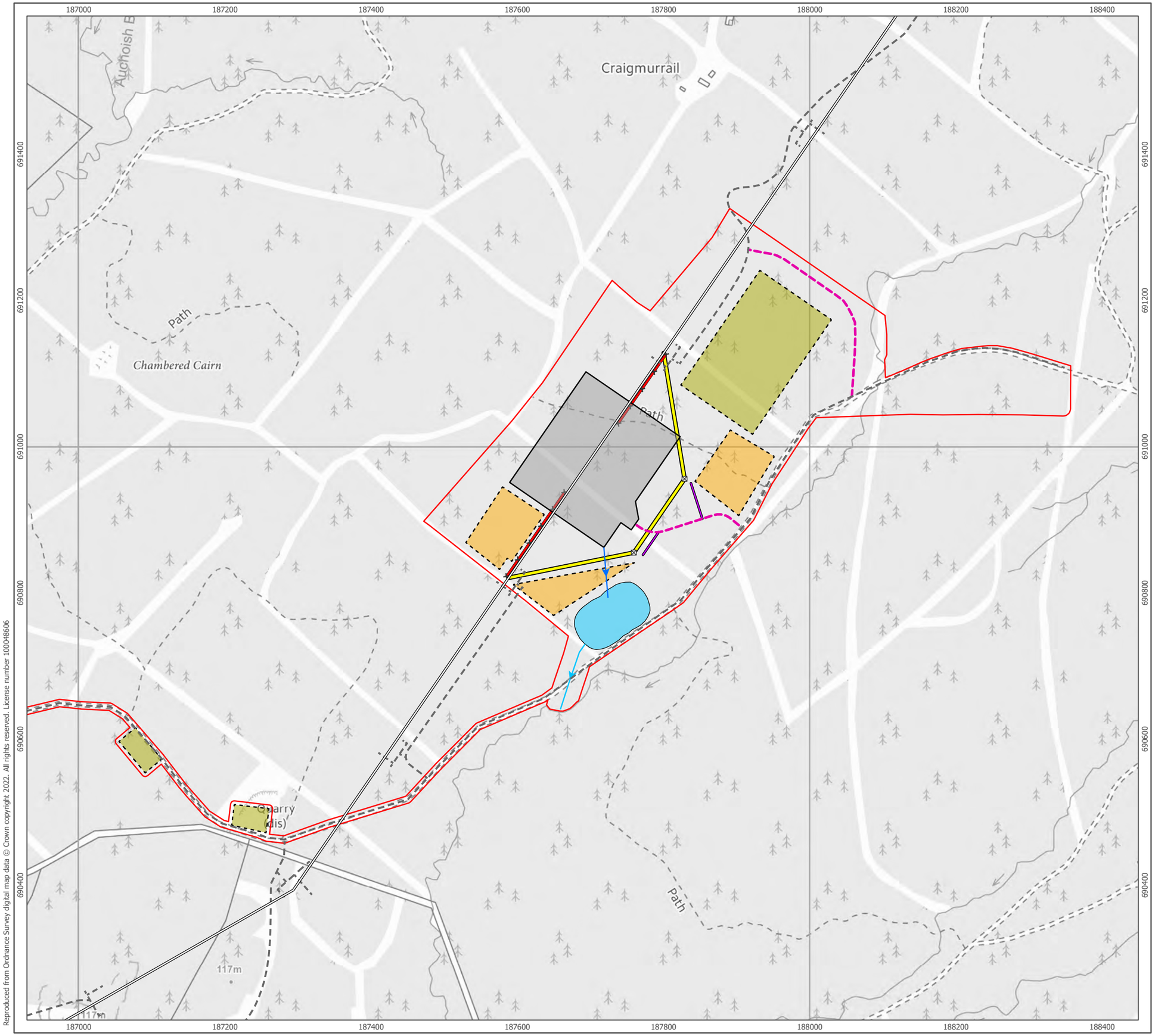
Based on the calculations carried out, the total peat volumes excavated will be fully incorporated into the re-instatement works, therefore is unlikely to require a waste management licence.

# 4 CONCLUSIONS

The following conclusions are drawn regarding the management of peat and excavated materials within the Development:

- As a result of the peat excavation and re-use estimates, it is demonstrated that all excavated peat can be suitably re-used on-site;
- Excavated peat will be used for the reinstatement of access track verges, cut and fill embankment slopes, reinstatement of turbine hardstandings and the reinstatement of compound areas;
- The estimates of excavated peat provided in this PMP are likely to be higher than actual peat excavation volumes as micro-siting during construction (if required) will allow for the avoidance of localised pockets of deeper peat;
- Sufficient methods have been defined to ensure that peat can be sensitively handled and stored on-site to allow for effective re-use; and
- No waste licence is required for the construction work.

## APPENDIX A - FIGURES



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- Existing Inveraray to Crossaig Overhead Line
- Existing Access Track

Proposed Development:

- Town & Country Planning Boundary
- Proposed Permanent Access Track
- SUDs Inlet Pipeline
- SUDs Outfall Pipeline
- Proposed Substation Temporary Works Area
- Proposed Substation Layout
- SUDs Pond
- Temporary Peat Storage Area

Associated Development:

- Proposed Tower Location
- OHL Downleads
- Temporary Access Track
- Temporary OHL Diversion

1:5,000 Scale @ A3

0 100 200 M

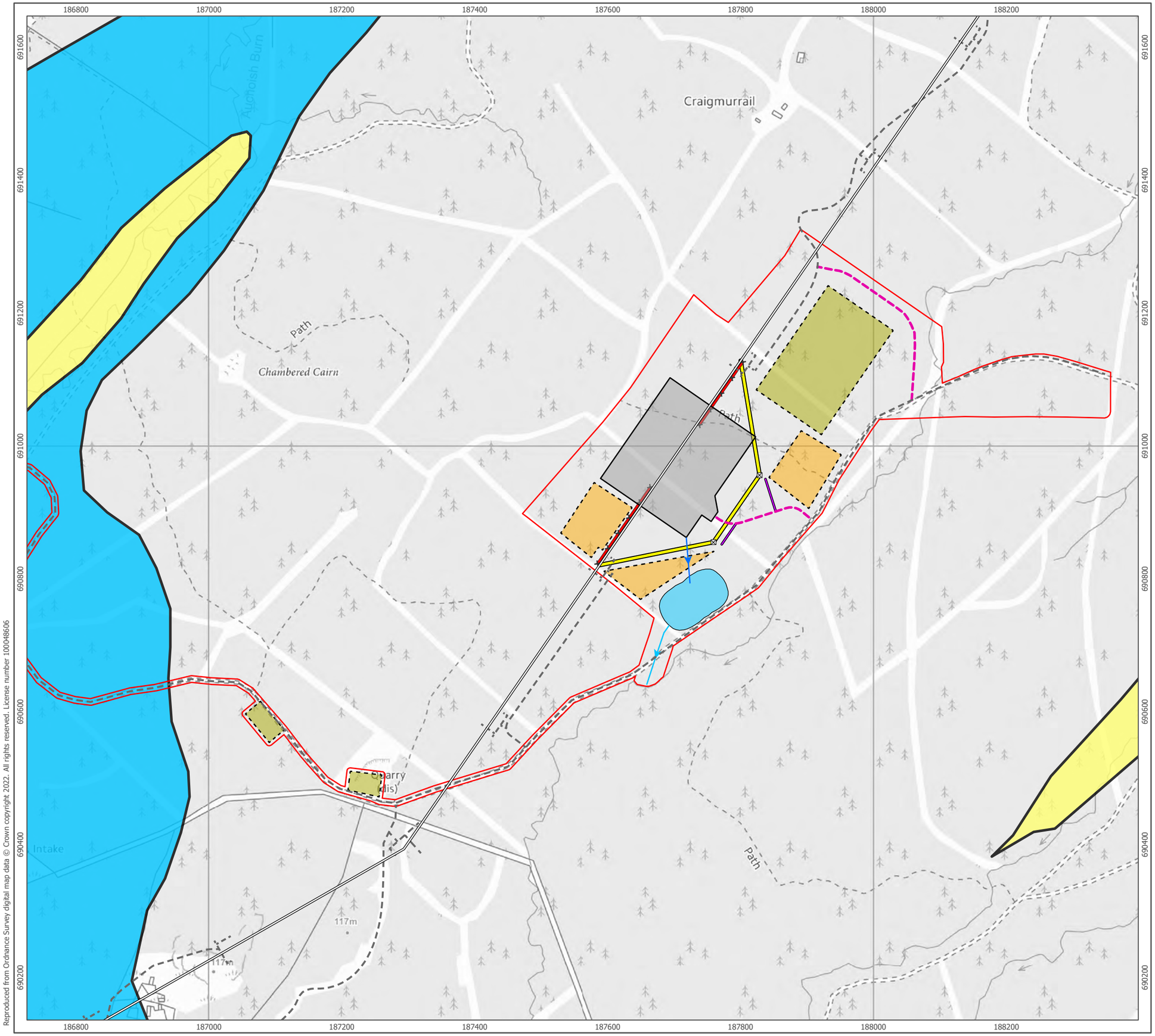
NORTH

| | |
|---|---|
| Produced By: BM | Ref: 4534-REP-015 |
| Checked By: DB | Date: 28/11/2022 |

**Site Layout Plan**
Figure O.1

**Craig Murrail**
**Annex O:**
**Peat Management Plan**

Y:\Arcus\GIS-CAD\GIS\Engineering\Projects\4534 Argyll Substations\4534 Craig Murrial Reports.aprx\4534-REP-015 Fig01 Site Layout Plan



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- Existing Inveraray to Crossaig Overhead Line
- Existing Access Track

Proposed Development:

- Town & Country Planning Boundary
- Proposed Permanent Access Track
- SUDs Inlet Pipeline
- SUDs Outfall Pipeline
- Proposed Substation Temporary Works Area
- Proposed Substation Layout
- SUDs Pond
- Temporary Peat Storage Area

Associated Development:

- Proposed Tower Location
- OHL Downleads
- Temporary Access Track
- Temporary OHL Diversion

Superficial Soils

- Alluvium
- Till, Devensian
- Superficial Soils Not Mapped

1:5,500 Scale @ A3

0 100 200 m

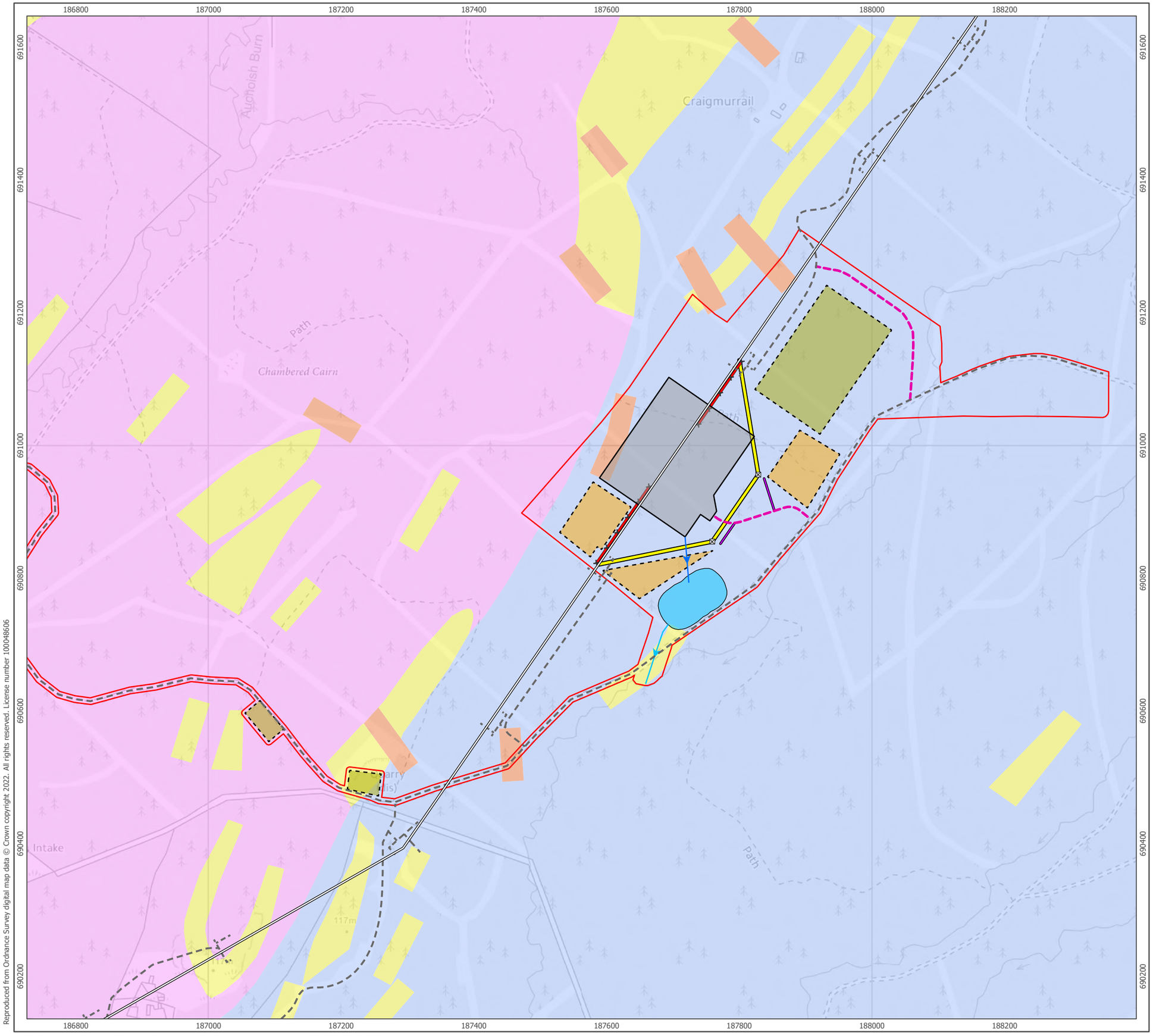
NORTH

| | |
|---|---|
| Produced By: BM | Ref: 4534-REP-059 |
| Checked By: DB | Date: 11/28/2022 |

**Superficial Soils**
Figure O.2

**Craig Murrail**
**Annex O:**
**Peat Management Plan**

Y:\GIS\Engineering\Projects\4534 Argyll Substations\4534 Craig Murrial Reports.aprx\4534-REP-059 Fig02 Superficial Soils






Scottish & Southern Electricity Networks

TRANSMISSION

ARCUS

- Existing Inveraray to Crossaig Overhead Line
- Existing Access Track

Proposed Development:

- Town & Country Planning Boundary
- Proposed Permanent Access Track
- SUDs Inlet Pipeline
- SUDs Outfall Pipeline
- Proposed Substation Temporary Works Area
- Proposed Substation Layout
- SUDs Pond
- Temporary Peat Storage Area

Associated Development:

- Proposed Tower Location
- OHL Downleads
- Temporary Access Track
- Temporary OHL Diversion

Solid Geology

- Ardrishaig Phyllite Formation
- Crinan Grit Formation
- Dalradian Supergroup
- Mull Dyke-Swarm

1:5,500 Scale @ A3

0 100 200 m

NORTH

| | |
|---|---|
| Produced By: BM | Ref: 4534-REP-060 |
| Checked By: DB | Date: 11/28/2022 |

**Solid Geology**
Figure O.3

**Craig Murrail**
**Annex O:**
**Peat Management Plan**

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Scottish & Southern Electricity Networks

TRANSMISSION

ARCUS

- Existing Inveraray to Crossaig Overhead Line
- Existing Access Track

Proposed Development:

- Town & Country Planning Boundary
- Proposed Permanent Access Track
- SUDs Inlet Pipeline
- SUDs Outfall Pipeline
- Proposed Substation Temporary Works Area
- Proposed Substation Layout
- SUDs Pond
- Temporary Peat Storage Area

Associated Development:

- Proposed Tower Location
- OHL Downleads
- Temporary Access Track
- Temporary OHL Diversion

Recorded Peat Depths (m)

- 0.01 - 0.50
- 0.51 - 1.00
- 1.01 - 1.50
- 1.51 - 2.00
- 2.01 - 2.50
- 2.51 - 3.00
- 3.01 - 3.50
- 3.51 - 4.00
- 4.01 - 4.50

1:5,000 Scale @ A3

0 100 200 M

NORTH

| | |
|---|---|
| Produced By: BM | Ref: 4534-REP-016 |
| Checked By: DB | Date: 28/11/2022 |

**Recorded Peat Depths**
Figure O.4

**Craig Murrail**
**Annex O:**
**Peat Management Plan**

Y:\Arcus\GIS-CAD\GIS\Engineering\Projects\4534 Argyll Substations\4534 Craig Murrial Reports.aprx\4534-REP-016 Fig04 Recorded Peat Depths


Scottish & Southern Electricity Networks

TRANSMISSION

ARCUS

- Existing Inveraray to Crossaig Overhead Line
- Existing Access Track

Proposed Development:

- Town & Country Planning Boundary
- Proposed Permanent Access Track
- SUDs Inlet Pipeline
- SUDs Outfall Pipeline
- Proposed Substation Temporary Works Area
- Proposed Substation Layout
- SUDs Pond
- Temporary Peat Storage Area

Associated Development:

- Proposed Tower Location
- OHL Downleads
- Temporary Access Track
- Temporary OHL Diversion

Interpolated Peat Depths (m)

- 0.00 - 0.50
- 0.51 - 1.00
- 1.01 - 1.50
- 1.51 - 2.00
- 2.01 - 2.50
- 2.51 - 3.00
- 3.01 - 3.50
- 3.51 - 4.00
- 4.01 - 4.50
- Peat Probe Location

1:5,000 Scale @ A3

0 100 200 M

NORTH

| | |
|---|---|
| Produced By: BM | Ref: 4534-REP-017 |
| Checked By: DB | Date: 28/11/2022 |

**Interpolated Peat Depths**
Figure O.5

**Craig Murrail**
**Annex O:**
**Peat Management Plan**



Y:\Arcus\GIS-CAD\GIS\Engineering\Projects\4534 Argyll Substations\4534 Craig Murrial Reports.aprx\4534-REP-017 Fig05 Interpolated Peat Depths

## APPENDIX B - EARTHWORKS VOLUMES AND CALCULATIONS

# 4534 - Argyll Substations 'Craig Murrail' - Peat Excavation and Re-Use Calculations

| Infrastructure | Total Area | Average Peat Depth | Peat Cut Volume | Total Acrotelm Excavation Est. | Total Catotelm Excavation Est. | Areas of Reinstament | Total Peat Re-use Est. | Total Acrotelm Re-use Est. | Total Catotelm Re-use Est. |
|---|---|---|---|---|---|---|---|---|---|
| **Pylons** | | | | | | | | | |
| P1 | 100 | 0.46 | 46 | 46 | 0 | 120 | 60 | 60 | 0 |
| P2 | 100 | 2.7 | 270 | 50 | 220 | 120 | 60 | 60 | 0 |
| **SUB-TOTAL** | **200** | | **316** | **96** | **220** | **240** | **120** | **120** | **0** |
| | | | | | | | | | |
| **Permananent Tracks** | | | | | | | | | |
| Track North of Temp Construction Area | 1420 | 1.25 | 1775 | 710 | 1065 | 1704 | 852 | 852 | 0 |
| Track to SS | 915 | 1 | 915 | 458 | 458 | 1098 | 549 | 549 | 0 |
| | | | **2690** | **1168** | **1523** | **2802** | **1401** | **1401** | **0** |
| **Temporaray Tracks** | | | | | | | | | |
| Temporary Track to Pylons (P1/P2) | 530 | 1.3 | 689 | 265 | 424 | 636 | 318 | 318 | 0 |
| **SUB-TOTAL** | **1445** | | **689** | **265** | **424** | **636** | **318** | **318** | **0** |
| | | | | | | | | | |
| **Temporary Works Area** | | | | | | | | | |
| Temporary Works Area (Two previsouly disturbed Ares) | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Temporary Works Area | 22622 | 1.27 | 28730 | 11311 | 17419 | 22622 | 28730 | 11311 | 17419 |
| **SUB-TOTAL** | **0** | | **28730** | **11311** | **17419** | **22622** | **28730** | **11311** | **17419** |
| | | | | | | | | | |
| **SUDS** | | | | | | | | | |
| SUDS | 3634 | 3 | 3271 | 1817 | 1454 | 0 | 0 | 0 | 0 |
| **SUB-TOTAL** | **3634** | | **3271** | **1817** | **1454** | **0** | **0** | **0** | **0** |
| | | | | | | | | | |
| **Substation** | | | | | | | | | |
| Substation Compound | 29405 | 1.16 | 34110 | 14703 | 19407 | 2040 | 1020 | 1020 | 0 |
| **SUB-TOTAL** | **29405** | | **34110** | **14703** | **19407** | **2040** | **1020** | **1020** | **0** |
| **TOTAL Excavation Volume** | | | **69805** | **29359** | **40446** | **28340** | **31589** | **14170** | **17419** |
| **. +10% contingency for Bullking** | | | **6981** | **2936** | **4045** | | | | |
| **TOTAL** | | | **76786** | **32295** | **44491** | | | | |
| | | | | | | | | | |
| **Peat Re-use in Habitat Management Plan** | | | | | | | 45197 | 18125 | 27072 |
| **SUB-TOTAL** | | | | | | | 45197 | 18125 | 27072 |
| **TOTAL PEAT EXCAVATION and REUSE** | | | **76786** | **32295** | **44491** | | **76786** | **32295** | **44491** |

0 0 0