Bowdun Offshore Wind Farm, Onshore EIA Report

Volume 1, Chapter 2: The Proposed Development

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2 The Proposed Development

2.1 Introduction

2.1.1 This chapter of the Onshore Environmental Impact Assessment (EIA) Report provides a description of the onshore Infrastructure of the Bowdun Offshore Wind Farm (hereafter referred to as 'the Project'). For ease of reference, the onshore infrastructure of the Project is the works landward of Mean Low Water Springs (MLWS), including the intertidal area and is referred to as the 'Proposed Development'. This Onshore EIA Report accompanies the application to Aberdeenshire Council for Planning Permission in Principle (PPP) for the Proposed Development.

2.1.2 This chapter describes the key components of the Proposed Development, as well as the methods proposed for construction, operation and maintenance and eventual decommissioning. The proposals have been informed by preliminary design information and by the current understanding of the environment in which the Proposed Development will be located. Which have been determined from relevant survey and desk study work along with extensive engagement with stakeholders (statutory and non-statutory) and the community, which has been completed in line with the Onshore Scoping Report (TWP, 2024) and Scoping Opinion (Aberdeenshire Council, 2024) (Volume 2, Appendix 1.1: Scoping Opinion).

2.1.3 Mitigation and enhancement measures to be adopted as part of the Proposed Development are detailed in Volume 2, Appendix 2.1: Schedule of Mitigation.

2.2 Project Design Envelope Approach

2.2.1 The Proposed Development has utilised a Project Design Envelope (PDE) approach to inform this Onshore EIA Report. The PDE approach defines a design envelope and maximum parameters within which the final design will sit. The PDE approach allows for a necessary degree of flexibility where certain details of the development are indicative and yet to be finalised at the time of the application. This is particularly applicable to the PPP application process, and common practice (Planning Advice Note 1/2013, 2017).

2.2.2 The adoption of the approach allows a meaningful EIA to take place by defining a 'Maximum Design Scenario' (MDS) on which to base the identification of likely significant environmental effects The MDS is the scenario that will give rise to the greatest potential impacts, and subsequent effects.

2.2.3 For each of the impacts assessed in the topic-specific Onshore EIA Report Chapters (Volume 1, Chapters 6 to 16), the MDS was identified from the range of potential design options for each parameter in the PDE. For example, where several design options are available, the assessment is based on the option predicted to have the greatest impact. This may be the option with the largest footprint, the greatest height or the largest area of disturbance during construction, depending on the topic under consideration. Therefore, where the MDS has been applied, it can be concluded that the effect will be no greater for any other design scenarios where the parameters are within the MDS.

2.2.4 By identifying the MDS for the predicted impacts, it can be concluded that the effect will be no greater for other design scenarios where the parameters are within the MDS. Further detailed design will be provided at the Matters Specified in Conditions (MSC) stage and will be within this PDE. Therefore, the detailed design will sit within the MDS assessed in the Onshore EIA Report.

2.2.5 The details of the MDS for elements of the PDE are set out in this chapter and specific parameters relevant to the environmental discipline are detailed in the topic chapters.

2.2.6 Where it aids the impact assessment, the PDE is supplemented by indicative detail, for example, a Preliminary Front-End Engineering and Design (Pre-FEED) cable route centreline and indicative Substation platform location has been used to inform the assessments in Chapter 6: Land Use, Agriculture and Public Access and Chapter 13: Noise and Vibration. Indicative details demonstrate how the parameters could evolve into a detailed design for approval at the MSC stage, and approval for these is not sought at this PPP stage, rather consent is sought for the principle of the development within the application boundary.

2.2.7 The initial PDE was developed and presented in the Onshore Scoping Report (TWP, 2024). The Onshore Scoping Report identified an onshore Scoping Boundary within which the Proposed Development would be located. This area has been further refined as part of the iterative EIA process through analysis of environmental survey outputs, technical and engineering studies along with extensive engagement with stakeholders (statutory and non-statutory) and the community and is now presented as the PPP Application Boundary (Figure 2.1 in Annex - Figures). Further information on this process is given in Volume 1, Chapter 5: Site Selection and Reasonable Alternatives Considered.

2.3 Consultation

2.3.1 The overall approach to consultation for the Proposed Development is set out in Volume 1, Chapter 3: EIA Methodology and Chapter 4: Stakeholder Engagement and Consultation. A summary of the issues raised during consultation activities regarding the Proposed Development are presented Table 2.1 together with how these issues have been addressed within this Onshore EIA Report. Further detail is presented within the Pre-Application Consultation (PAC) Report and associated appendices (TWP, 2025) submitted alongside the PPP application.

Table 2.1: Summary of Key Consultation Issues Relevant to the Proposed Development

Date	Consultee and Type of Consultation	Summary of Issue(s) Raised	Response to Issue Raised and/or Where Considered in the Onshore EIA Report
24 October 2024	Aberdeenshire Council, Scoping Response (Ref ENQ/2024/1337) (Aberdeenshire Council, 2024)	The definition of the proposed onshore development and what infrastructure forms part of the development is clear. The overall approach to the EIA is considered acceptable and typical for a development of this type in terms of methodology.	The Proposed Development parameters for all phases of the development are described in this Chapter (The Proposed Development) within Sections 2.5-2.13 and are in line with the requirements of a PPP application. A plan with the proposed PPP Application Boundary has been included in the planning application documentation and relevant plans were provided to Aberdeenshire Council as Shapefiles.

2.4 Design Principles

2.4.1 The design principles at the core of the Project seek to 'best fit' the Proposed Development into the local environment, subject to achieving necessary safety, engineering and electrical design requirements whilst supporting sustainability objectives and biodiversity enhancement. The design principles have regard to the National Planning Framework 4 (NPF4) (Scottish Government, 2023), and as a result the design will also seek to reduce potential significant effects of the Proposed Development on the climate, people, value and place (including biodiversity).

2.4.2 The design principles have shaped and will continue to influence the iterative design of the Proposed Development. Table 2.2 details the design principles that have influenced the Proposed Development through routing and siting decisions; and those which are also considered to be embedded mitigation measures and will be used for developing the detailed design of the Proposed Development at MSC stage. For information on how the design principles were initially developed and utilised in design decisions see Volume 1, Chapter 5: Site Selection and Reasonable Alternatives Considered.

2.4.3 The design principles have been developed into Embedded Mitigation and Additional Mitigation as described within the individual topic chapters in this EIA and in Volume 2, Appendix 2.1: Schedule of Mitigation.

Table 2.2: Design Principles of the Proposed Development and the Stage of Implementation

Design Principle	Key Points	Applicable Phase(s)
Residential Amenity	Cable corridor routing and Substation site selection has been informed by buffer zones from sensitive receptors (see Volume 1, Chapter 5: Site Selection and Reasonable Alternatives Considered). This includes the avoidance of settlements and groupings of houses or buildings as appropriate. This is the case both for the PPP Application Boundary as well as the final Onshore Infrastructure locations, and has been applied at the PPP stage to specifically omit various constraints, including the settlements of Drumlithie and Glenbervie. Generally, the Proposed Development seeks to avoid populated areas, common land, third party interactions, designated recreational resources and land used for defence purposes or land allocated for residential development within the Aberdeenshire Local Development Plan. The Landfall will be carefully designed and constructed in order not to prejudice the amenity value of the coastal path running along the coast south of Gourdon. Care will be taken to minimise disruption and enjoyment of this asset. Good practice construction working arrangements, working hours and general good neighbour arrangements will be adopted during construction to avoid significant effects from any impacts associated with traffic, noise and air emissions within and around local communities. Community liaison will be provided through a dedicated Stakeholder Manager appointed for the purpose of prompt resolution of issues. Noise, dust and effects on visual amenity are specifically addressed through the Onshore EIA Report. Volume 2, Appendix 2.2: Outline Construction Environmental Management Plan (CEMP) and the subsequent detailed CEMP will result in good practice construction working arrangements.	• Scoping • EIA • Detailed Design
Biodiversity	The aim through the siting of the Landfall, Onshore Export Cable Corridor, 400 kV Cable Corridor and Substation has been to avoid impacts on biodiversity and ecology but also that appropriate mitigation and restoration have been developed to enhance the local baseline, ecological connectivity and provide for future management. This can generally be illustrated when reviewing how the EIA Scoping Boundary has reduced in size and been shaped into the PPP Application Boundary to avoid such constraints as far as possible. There is a commitment to “make good” areas temporarily affected by construction of the Proposed Development whether that be the restoration and enhancement of hedgerows or habitats impacted by construction.	• Scoping • EIA • Detailed Design

Design Principle	Key Points	Applicable Phase(s)
	Throughout all aspects of the Proposed Development, as directed through Policy 3 of NPF4, biodiversity enhancement will form a key principle to the detailed design at the MSC stage.	
Road Improvements and Reinstatement	New transport infrastructure to be provided for construction of the Proposed Development would be mostly temporary construction accesses along the PPP Application Boundary. By constructing to an adoptable standard, should such measures implemented for the construction stage be considered to be beneficial by Aberdeenshire Council, they can be adopted as permanent improvements (or removed as appropriate). There is a commitment to "make good" areas temporarily affected by construction of the Proposed Development including to reinstate road carriageways where these are affected by construction activities.	• Scoping • EIA • Detailed Design
Designated Sites, Ancient Woodland, Flood Risk Areas and Peat Soils	Generally, the Proposed Development has been, and will continue to be, designed to avoid designated features, protected sites, habitats, species and sensitive areas of conservation importance, as well as the avoidance of open water, wetlands or land within a flood risk area (generally this would represent land or built form with an annual probability of being flooded of greater than 0.5%). Where practicable the Proposed Development has and will continue to seek to avoid areas of deep peat. Efforts will be made to ensure the avoidance of ancient woodland removal compensatory planting will be carried out where appropriate if this is not possible.	• Scoping • EIA • Detailed Design
Cultural Heritage	The Proposed Development has been, and will continue to be, designed to avoid impacts upon cultural heritage assets including scheduled monuments, historic buildings, designated landscapes (Arbuthnott and Glenbervie). In addition non-designated cultural heritage assets will be avoided where practicable.	• Scoping • EIA • Detailed Design
Land Use, Buildings	Where practicable and appropriate, cable routing will be undertaken along field boundaries and existing linear features, with enhancement steps taken where possible. Site specific restoration will be preferred should there be unavoidable impacts such as the removal of hedgerows or fencing during construction or cable laying, with restoration in situ, using appropriate and sympathetic materials the preferred approach. Where buildings and boundary treatments are to be put in place, sensitive and appropriate material selections will be made in order to ensure that the built form of the development can be appropriately and successfully integrated into the landscape and respects the character and nature of the surrounding area.	• Detailed Design

Design Principle	Key Points	Applicable Phase(s)
Trees and Woodland	The Proposed Development has sought, and will continue to seek, to avoid tree loss and woodland removal. Replanting or compensatory planting will be carried out where appropriate where this is not possible. Indicative areas of woodland retention and planting around the Substation are shown on Plate 2.9. These measures are refined and detailed during the MSC. The Substation Search Area is within an existing commercial forestry plantation at Fetteresso Forest. Discussions have progressed during the planning process and are ongoing with Forestry and Land Scotland (FLS) to inform the design. Felling will be required to accommodate the cable corridors and the construction of the Substation. The indicative design has taken into account management of existing forestry coups, existing haul routes and proposed revisions as a result of SSEN-T Hurlie and Kintore-Tealing OHL proposals with the aim to minimise the loss of forestry and disruption to forestry operations.	• Scoping • EIA • Detailed Design
Infrastructure	The Cable Corridor will cross the A92, the A90 trunk road as well as the main Dundee-Aberdeen railway line. Crossing points locations as part of the final cable corridor design will be agreed with Transport Scotland and Network Rail avoiding disruption to operation and safety of these assets. A detailed Construction Traffic Management Plan (CTMP) will be produced at MSC stage. The Onshore Cable Corridor will cross a number of fuel and gas pipelines, appropriate crossing locations as part of the final cable corridor design and construction methods will be agreed with the relevant operators to avoid impact on the operation and safety of these assets.	• Scoping • EIA • Detailed Design

Management Plans

2.4.4 In order to assist in the implementation of the design principles, an Outline CEMP has been produced in support of the PPP Application, see Volume 2, Technical Appendix 2.2: Outline Construction Environmental Management Plan. The Outline CEMP details the framework from which the detailed CEMP will be developed and agreed at MSC stage to avoid, minimise or mitigate construction effects on the environment. The Outline CEMP details the measures and procedures to be followed during construction as well as detailed environmental management measures. The Outline CEMP also provides an overview of the roles and responsibilities of the appointed contractor during construction.

2.4.5 In addition, the following documents will be submitted at MSC stage:

- Noise and Vibration Management Plan
- Dust Management Plan
- Access Plan
- Construction Traffic Management Plan
- Pollution Prevention Plan
- Emergency Incident and Emergency Response Plan
- Flood Evacuation and Response Plan
- Water Quality Monitoring Plan
- Private Water Supply Monitoring Plan
- Site Waste Management Plan
- Felling and Replanting Plan
- Tree Protection Plan
- Landscape Design and Management Plan
- Biodiversity Enhancement Plan
- Species Protection Plan
- Breeding Bird Protection Plan
- Construction Logistics Plan
- Construction Specific Travel Plan

2.4.6 These plans will be produced once the detailed design is available and will be implemented and complied with by the appointed contractor during the construction phase and O&M phase of the Proposed Development, as required.

Landscape and Habitat Management

2.4.7 Site specific restoration will be preferred should there be unavoidable impacts. For example, the removal of hedgerows or trees during construction or cable laying, with restoration in situ. Appropriate enhancement and restoration within

the PPP Application Boundary will be undertaken, where reasonably practicable with details provided at the MSC stage

2.4.8 Where buildings, structures and boundary treatments are to be put in place, sensitive and appropriate material selections will be made in order that the built form of the development can be appropriately and successfully integrated into the landscape and respects the character and nature of the surrounding area.

2.4.9 Landscaping or habitats put in place through the Proposed Development will be appropriately managed thereafter. It is anticipated that the grant of planning permission will come with specific conditions regarding the implementation and upkeep of said landscaping and habitats, including species mix, planting schedules and an appropriate maintenance regime.

2.4.10 At the MSC stage, a Landscape Design and Management Plan and Biodiversity Enhancement Plan will be developed and the above points implemented during construction and O&M phases.

2.5 Proposed Development Overview

Grid Connection

2.5.1 TWP has accepted a connection agreement for a grid connection point within Fetteresso Forest at the proposed Hurlie Substation in Aberdeenshire. The GCP will be a newly constructed 400 kV substation and is the subject of a proposal by Scottish and Southern Electricity Networks Transmission (SSEN-T). A planning application was submitted to Aberdeenshire Council by SSEN-T in December 2024 (ref. APP/2024/1951) for SSEN-Ts proposed 400 kV substation referred to as 'Hurlie Substation'.

2.5.2 The connection infrastructure proposed will ultimately link into the proposed Hurlie Substation to 'connection bays' provided by SSEN-T on the northern boundary of SSEN-Ts new substation.

2.5.3 This project description focuses on the connection infrastructure that will be installed by TWP within the jurisdiction of Aberdeenshire i.e. landward of MLWS namely: Landfall at Benholm; Substation within Fetteresso Forest; Onshore Export Cable Corridor (voltages ranging from 220/275 kV) between the Landfall and Substation; and a 400 kV Cable Corridor providing the onward connection from the Substation to the proposed Hurlie Substation.

Onshore Infrastructure Components

2.5.4 All infrastructure associated with the Proposed Development will be located within the PPP Application Boundary. The PPP approach seeks agreement that, in principle, the Proposed Development can be accepted within the PPP Application Boundary, with the detail and specific locations of the infrastructure to be confirmed at MSC stage.

2.5.5 An overview diagram of the Project, including the Offshore and Onshore Infrastructure, is shown below in Plate 2.1.

2.5.6 The Proposed Development would comprise the following onshore components landward of MLWS:

- Landfall and Transition Joint Bays (TJBs) – The location in which the Offshore Export Cables come ashore and are jointed to the Onshore Export Cables within the TJBs.
- Onshore Export Cable Corridor – The area within which the 220/275 kV Onshore Export Cables will be located; this corridor runs from the Landfall area to the Substation Site.
- Substation – The proposed Substation containing the components for transforming the power supplied from the Project from 220/275 kV up to 400 kV.
- 400 kV Cable Corridor – the area within which the 400 kV Cables will be located providing the onward transmission to the grid; this connects the Substation to the GCP, the proposed Hurlie Substation.
- The temporary ancillary onshore infrastructure required for the construction phase of the Onshore Export Cable Corridor, 400 kV Cable Corridor and the Substation (such as construction compounds and access routes).

2.5.7 The Proposed Development will be constructed in an environmentally sensitive manner. The Proposed Development will meet the requirements of all relevant legislation, codes of practice and standards as identified in the topic chapters of this Onshore EIA Report and will limit the potential adverse effects on the local community and environment as far as reasonably practicable. Key environmental principles and measures during construction of the onshore works are set out in this Chapter. Details of all mitigation measures proposed are provided within Volume 2, Appendix 2.1: Schedule of Mitigation.

2.5.8 An indicative construction programme for the Proposed Development is provided on Plate 2.2.

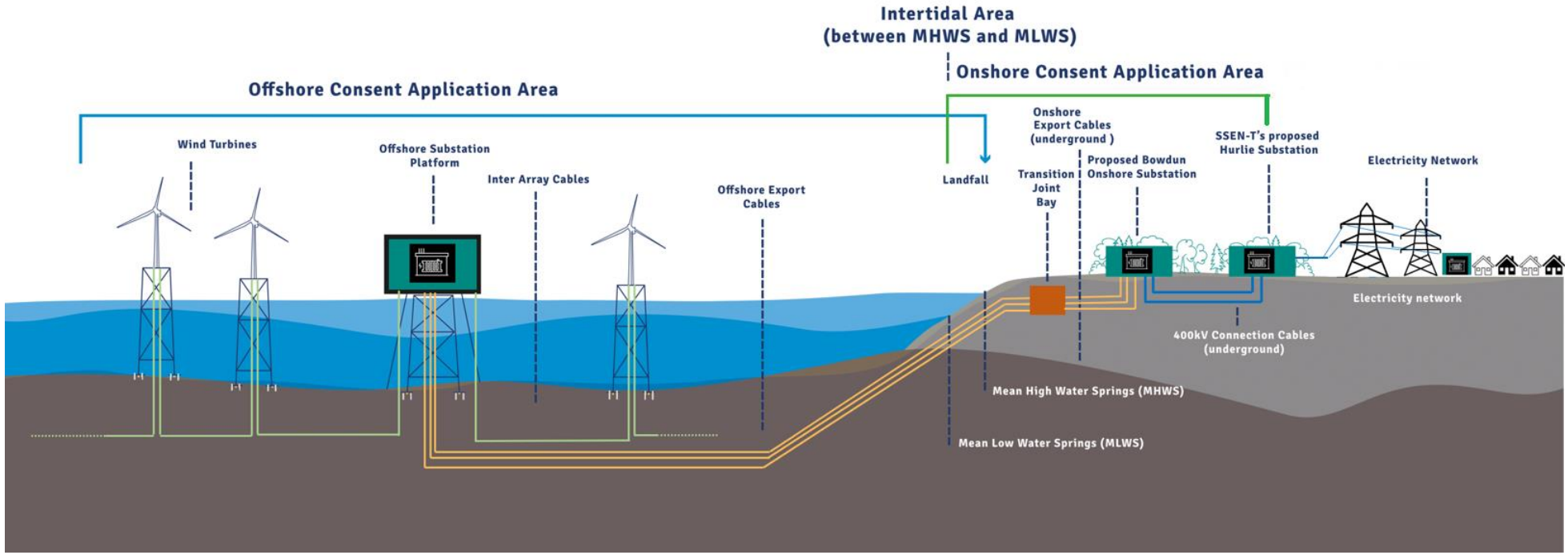

Plate 2.1: Project Components and Interaction with the National Grid

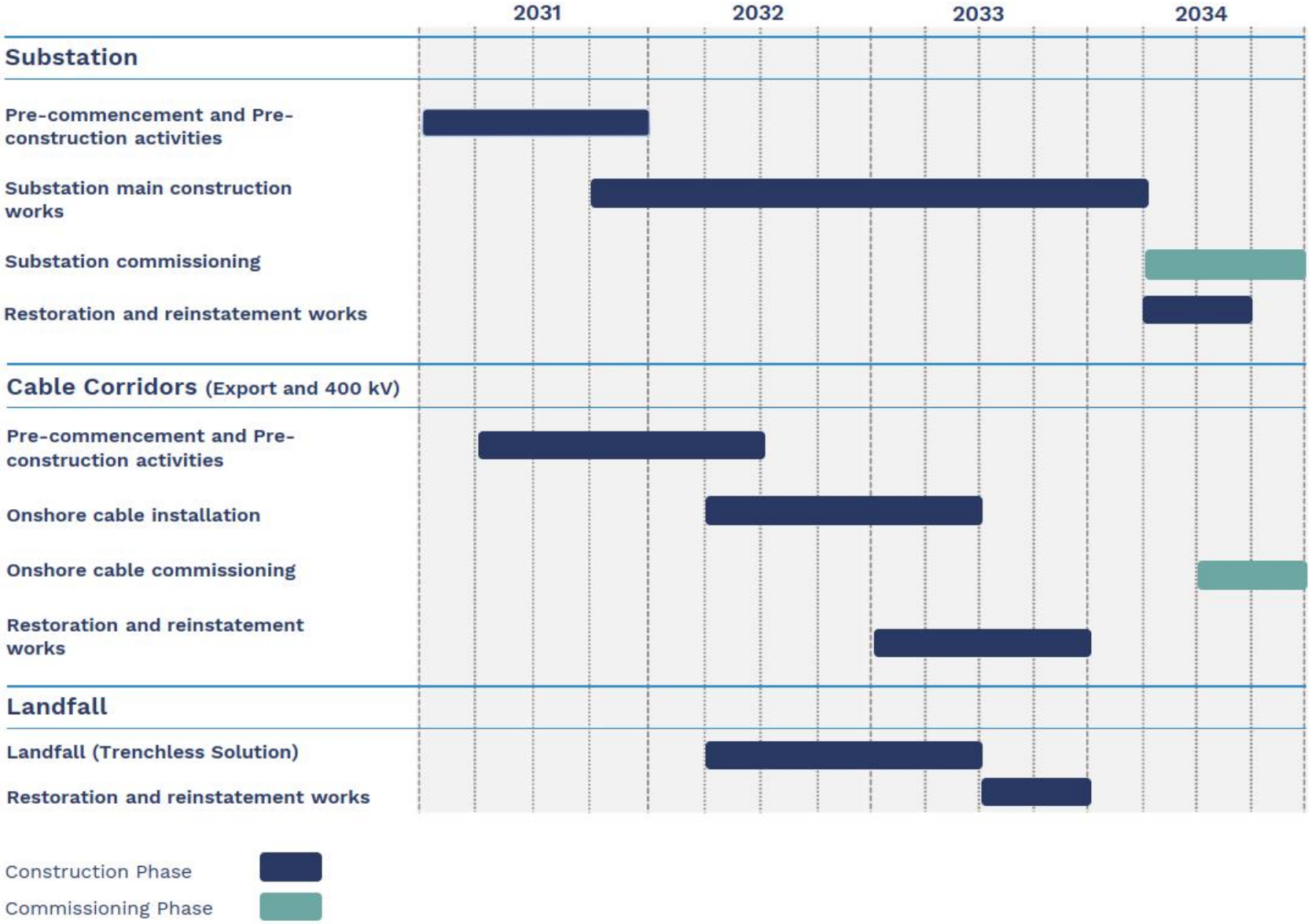

Plate 2.2: Proposed Development Indicative Construction Programme

2.6 Landfall and Transition Joint Bays

2.6.1 As previously noted, the Offshore Export Cables will make Landfall within the coastal area between Gourdon and Benholm in Haughs Bay, located within the region of Aberdeenshire and the community council areas of Benholm & Johnshaven Gourdon, Arbuthnott, Mearns and Stonehaven & District.

2.6.2 The Offshore Export Cables will be brought under the intertidal area using a trenchless technique which will be confirmed at detailed design when pipe material, installation distance and alignment requirements have been determined.

2.6.3 Intertidal surveys undertaken in September 2023 identified the presence of conglomerate material at Landfall. Consequently, the construction method proposed for the installation of the Offshore Export Cables will likely be via direct or pre-installed ducts below ground with minimal disturbance; using trenchless techniques such as Horizontal Directional Drilling (HDD) and Pipe Jacking (PJ) methods which are explained in more detail below.

2.6.4 The Offshore Export Cables will be brought into the neighbouring agricultural field adjacent to the A92 where they will be connected to the Onshore Export Cables underground within in TJBs. The TJBs will be located within a temporary construction compound and there will be a permanent access track to the TJBs which will be maintained as an operational track for the lifetime of the Proposed Development.

Design

2.6.5 The Offshore Export Cables are multicore and therefore will be split and jointed to the single core Onshore Export Cables at the TJBs. The Offshore Export Cables will be jointed to the Onshore Export Cables in up to three TJBs. The TJBs will be underground chambers constructed of reinforced concrete for the base, walls and roof, which is backfilled on completion of the jointing process. This provides a secure and stable environment for the cable joints.

2.6.6 Inspection covers associated with the TJBs will be constructed at ground level to allow access should maintenance activities be required. Both the access covers and access track will be constructed at ‘grade’ with no upstanding permanent infrastructure. All underground assets will be installed in line with best practice at the time of construction, with agreement on the minimum burial depth in the relevant land-use types.

2.6.7 The works at the Landfall will require access to the shoreline for construction vehicles and drilling equipment depending on the installation method used; the Landfall works would also be supported by a temporary construction compound (details in Section 2.9). Construction accesses and compounds will be sensitively designed taking into account environmental issues and the EIA findings including local amenity and traffic.

2.6.8 The design parameters for Landfall and Transition Joint Bays are shown in Table 2.3.

Table 2.3: Maximum Design Scenario – Landfall and Transition Joint Bays

Parameters	Maximum Design Scenario
Type of trenchless technique	Pipe Jacking/HDD
Number of TJBs	Up to 3 (one TJB per export cable)
TJB dimensions (m)	20 m length x 4 m width x 4 m depth
Duration of construction	12-15 months

Construction Methods

2.6.9 The Landfall will be constructed under the seabed and shoreline avoiding potential effects on the intertidal area at the Landfall, see Plate 2.3.

2.6.10 The Offshore Export Cables will be pulled from the sea towards the land, through underground ducts and connecting to the Onshore Export Cables at the TJBs. A brief description of the possible techniques which may be utilised pending detailed design and further ground investigations are provided below.

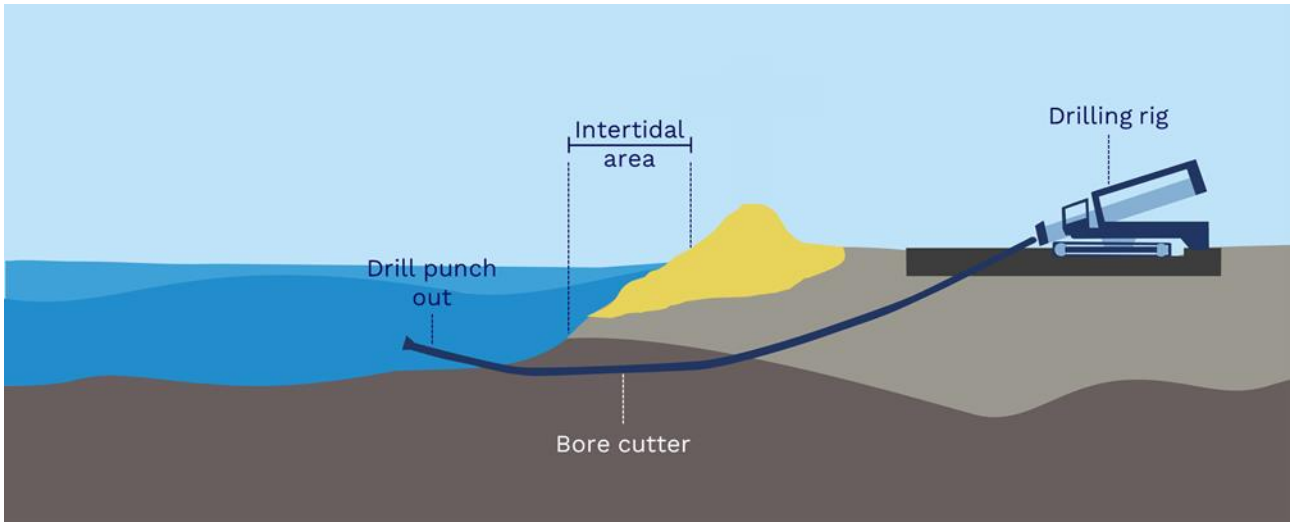

Plate 2.3: Indicative HDD Schematic for Landfall

Horizontal Directional Drilling

2.6.11 Should HDD be the selected method of installation, boreholes would be drilled under the seabed and shoreline and lined with underground ducts to allow the Offshore Export Cables to be pulled through and connected to the Onshore Export Cables at the TJBs.

2.6.12 A separate borehole would be drilled below ground and beneath the seabed surface for each cable circuit. A small pilot borehole would initially be used, which is then enlarged by a cutting tool. A duct would be placed inside the borehole, through which the cable is pulled. This is repeated for each borehole required.

2.6.13 The length of the ducts installed by HDD will be confirmed at detailed design but are expected to be up to 1,200 m and the HDD/ducts would emerge from the seabed offshore at a 'punch-out-point' to be determined in detailed design. No surface cable installation works are proposed between the TJB site, where the HDD would start, and where the ducts would emerge below MLWS (i.e. there will be no construction works in the intertidal zone).

Pipe Jacking/Direct Pipe

2.6.14 Should pipejacking be the selected method of installation, an underground tunnel would be built without digging up the surface using a machine called a Tunnel Boring Machine (TBM). The TBM starts digging from a starting point (called a shaft or pit) and large pipes are then pushed in behind the TBM using powerful hydraulic equipment.

2.6.15 Each pipe is added one at a time. When the pushing equipment reaches its limit, it pulls back, a new pipe is placed, and the process repeats. This continues until the tunnel is finished. Direct pipe installation may also be possible, where a pre-fabricated pipeline is installed simultaneously by the TBM.

2.6.16 Similar to the HDD method, there would be no construction works in the intertidal area, avoiding any potential impacts for pipe jacking/ direct pipe installation.

2.7 Cable Corridors

2.7.1 As noted in Section 2.5, there are two cable corridors included within the Proposed Development, encompassed by the PPP Application Boundary; the Onshore Export Cable Corridor and the 400 kV Cable Corridor. The cables sited within these Cable Corridors will be buried for their entire length; overhead lines are not required for the Proposed Development.

2.7.2 All underground assets will be installed in line with current best practice, with agreement on the minimum burial depth in the relevant land-use types where practicable, for example to allow the ongoing use of the land for agricultural activities. Cables will be installed utilising a combination of open cut methods and trenchless methods as further described in this section.

Onshore Export Cable Corridor

2.7.3 The Onshore Export Cable Corridor is the area within which the 220/275 kV Onshore Export Cables will be located; this runs from the Landfall area to the Substation Site over a distance of approximately 22 km. The final route of the Onshore Export Cable Corridor will be within the PPP Application Boundary and will be detailed in the MSC. An indicative centreline for the Onshore Export Cable Corridor has been considered by some chapters in this EIA, although this is based on the pre-FEED and environmental assessments to date, the full PPP Application Boundary has been treated as the limits of deviation for the corridor, given further design development is ongoing and a full route will not be presented before the MSC stage.

2.7.4 The MDS for the Onshore Export Cables will be up to three circuits buried within a maximum total 50 m construction corridor. The Onshore Export Cables would be buried at an approximate target depth of 1.65 m per trench. The operating voltage of the cables will be 220 kV or 275 kV; this will be confirmed at detailed design. Each cable circuit will consist of three cables laid in a trefoil arrangement, giving a total of up to nine cables. In addition, fibre-optic and/or temperature sensing cables are likely to be required for communications, this is expected to include one fibre-optic cable per circuit.

2.7.5 The temporary working width for the cable corridor with an open cut installation is currently anticipated to be 50 m during construction. The typical permanent width of development in the Onshore Export Cable Corridor is expected to be 35 m.

2.7.6 The maximum design parameters for the Onshore Export Cables are provided in Table 2.4 and an indicative layout of the Onshore Export Cable Corridor is shown in Plate 2.4.

Table 2.4: Maximum Design Scenario – Onshore Export Cables

Parameter	Maximum Design Scenario
Maximum voltage (kV)	220/275
Length of Onshore Export Cable Corridor (km)	22
Maximum number of cable circuits	Up to 3 (Each export circuit comprises three single core unarmoured power cables laid in a trefoil arrangement)
Maximum number of cable trenches	3
Permanent cable corridor width for trenched methods (m)	35
Construction cable corridor width for trenched methods (m)	50
HDDs within Cable Corridor	15
Construction area for HDDs	150 m x 200 m working area

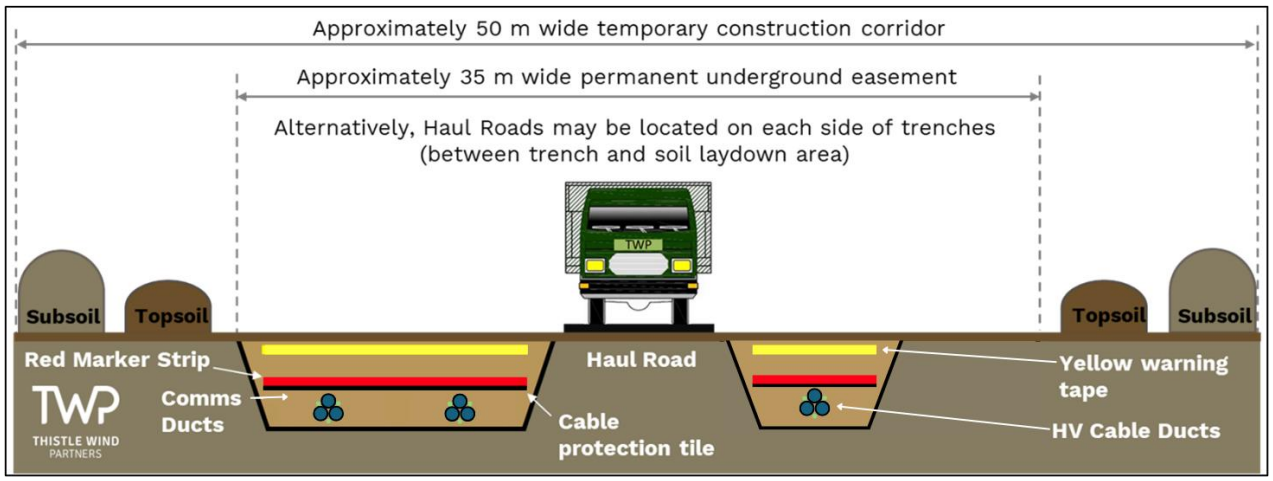

Plate 2.4: Indicative Onshore Export Cable Corridor Cross Section

Cable Joint Bays and Link Boxes

2.7.7 Joint bays and link boxes will be required along the Onshore Export Cable Corridor. Cables will be supplied from the factory on cable drums whose manageable transport dimensions determine the available section length.

2.7.8 Where two cable lengths meet, they will need to be jointed together in a joint bay. Joint bays are typically concrete lined pits, that provide a clean and dry environment for jointing sections of cable together, these areas may be fenced. Land surrounding the joint bays will be fully reinstated. Plate 2.5 provides a schematic of a Cable Joint Bay longitudinal cross section.

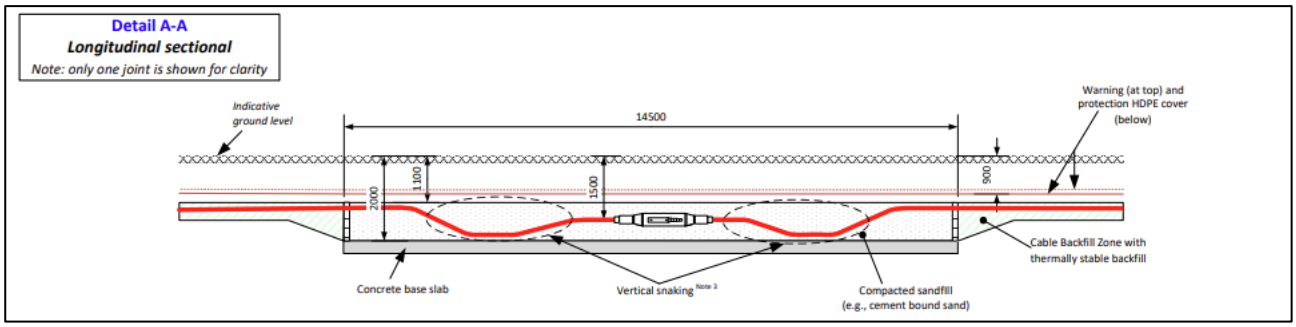

Plate 2.5: Cable Joint Bay Longitudinal Cross Section

2.7.9 The MDS for joint bays and link boxes are detailed in Table 2.5.

Table 2.5: Maximum Design Scenario - Joint Bays and Link Boxes

Parameter	Maximum Design Scenario
Maximum number of link boxes/joint bays	Up to 63 of each
Maximum size of link boxes/joint bays (m)	0.3
Maximum distance between link boxes/joint bays (m)	1500
Minimum distance between link boxes/Joint bays (m)	500

2.7.10 Cable joints will be required approximately every 500 m to 1,500 m along the Onshore Export Cable Corridor. Based on the MDS, this is assumed to be up to 63 joint bays.

2.7.11 Link boxes are smaller pits compared to joint bays, which house connections between the cable shielding, joints for fibre optic cables and other auxiliary equipment.

2.7.12 Link boxes will be situated close to the joint bay locations; these areas may also be fenced. Link boxes will be required approximately every 500 m to 1,500 m along the Onshore Export Cable Corridor. Based on the MDS, this is assumed to be up to 63 link boxes.

2.7.13 Link boxes allow electrical access to the cable sheath for maintenance testing and fault-finding purposes. Therefore, maintenance covers will be required at link box locations, which will be visible during operation. The maintenance covers will be a typical ground level chamber cover to allow access to link boxes.

2.7.14 The key steps during construction of joint bays/link boxes are:

- cutting the cables to be jointed to lengths;
- stripping back the various layers of sheath, screen and insulation;
- preparing the conductor for jointing and then jointing either by a compression ferrule for copper conductor, or by welding for aluminium conductor;
- splicing of fibre optic cable; and
- assembling a prefabricated joint housing around the cables that is then filled with an insulating material such as silicone rubber.

400 kV Cable Corridor

2.7.15 The 400 kV Cable Corridor is the area within which the 400 kV Cables will be located providing the onward transmission to the grid; this connects the

Substation to Hurlie Substation over a distance of approximately 1.3 km. The final route of the Onshore Export Cable Corridor will be within the PPP Application Boundary and will be detailed in the MSC. The exact route will depend on the final layout and the location of the substation bays allocated to the Project within the Hurlie Substation.

2.7.16 The MDS for the 400 kV Cables will be two circuits buried into two cable trenches to an approximate target burial depth of 1.65 m per trench. The operating voltage of the cables will be 400 kV and each cable circuit will consist of three cables laid in a flat or trefoil arrangement, giving a total of up to six cables. As with the 220/275 kV cables, fibre-optic and/or temperature sensing cables are likely to be required for communications and it is expected that these will also be included in the trench.

2.7.17 The temporary working width for the 400 kV Cable Corridor with an open cut installation is currently anticipated to be 35 m during construction. The typical permanent width of development in the 400 kV Cable Corridor is expected to be 15 m. An indicative cross section of the 400 kV Cable Corridor is shown in Plate 2.6. The maximum parameters for the 400 kV Cables are provided in Table 2.6.

Table 2.6: Maximum Design Scenario - 400 kV Cables

Parameter	Maximum Design Scenario
Maximum voltage (kV)	400
Length of 400 kV Cable Corridor (km)	1.3
Maximum number of cable circuits	2 (Each export circuit comprises three single core unarmoured power cables either laid in a flat or trefoil arrangement)
Maximum number of cable trenches	2
Permanent cable corridor width for trenched methods (m)	15.2
Construction cable corridor width for trenched methods (m)	35.2

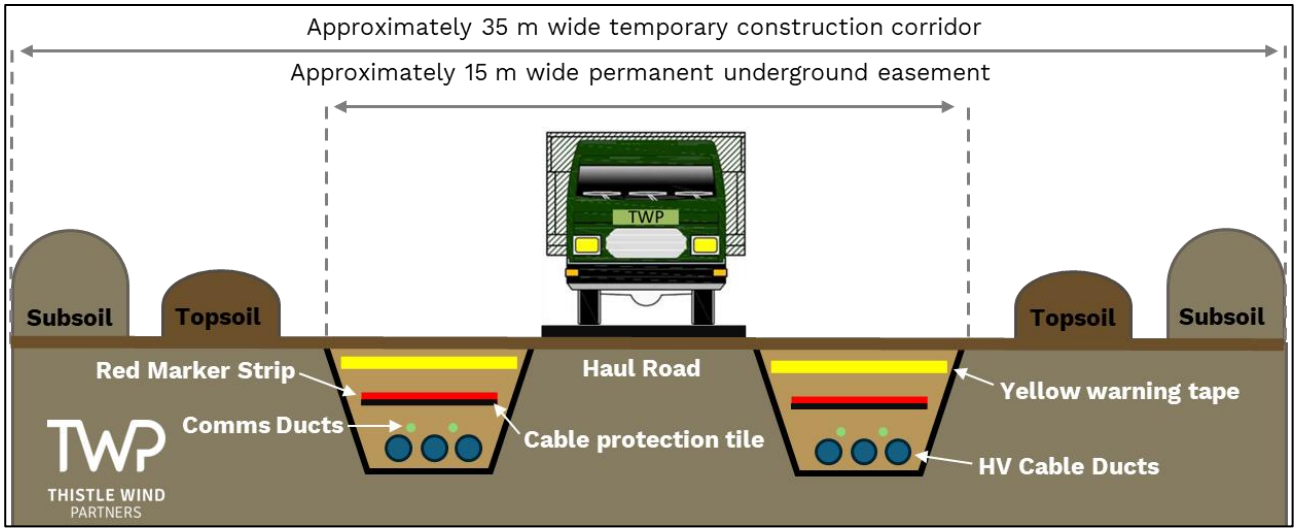

Plate 2.6: Indicative 400 kV Cable Corridor Cross Section

Construction Methods

2.7.18 The majority of the cable route within both Cable Corridors would be installed sequentially by open cut trenching technique. First, the topsoil and subsoil are stripped and stored, the haul routes constructed, and trenches dug. Cables would either be laid direct and then backfilled or installed in ducts. Where cables are installed in ducts, the ducts may be laid in thermal backfill, sealed and the trench reinstated for later cable pull.

2.7.19 Cable jointing and testing will be carried out once full cable installation is complete.

2.7.20 Sequencing may vary between the construction and installation of the Onshore Export Cables and the construction and installation of the 400 kV Cables. The sequencing will be confirmed at the MSC stage, however cable construction and installation of both is anticipated to be undertaken in the following broad sequence:

- completion of pre-construction surveys;
- installation of fencing and signage within the construction areas;
- site clearance and establishment of temporary construction compound(s) (details in Section 2.9), including vegetation clearance and clear-felling where required;
- establish and prepare temporary haul road(s);
- installation of cable ducts and appropriate storage of subsoil and topsoil;
- excavation of joint bays (this may also be undertaken after the ducting is laid and the cable trench is reinstated);
- cable pulling through the pre-installed ducts and then cable jointing;
- placement of stabilised backfill material;
- replacement of subsoil and topsoil;
- reinstatement to previous land use and placement of inspection covers, cable markers and fencing (where required);
- removal of temporary fencing and haul road; and
- (re)planting forestry, trees, landscaping and any biodiversity enhancement measures.

2.7.21 The construction of the Onshore Export Cable and 400 kV Cables is transient in nature and the duration of the works will be spread across the 22 km Onshore Export Cable Corridor and 1.3 km 400 kV Cable Corridor respectively.

2.7.22 The sequential nature of the work means that potential disturbance from construction would be localised as the work progresses along the cable route. Although highly dependent on local conditions, a reasonable assumption for the progression rate of the cable installation is approximately 400 m every 4-6 weeks with HDD locations taking approximately 12 weeks.

2.7.23 During construction of the cable trenches, the topsoil and subsoil will be removed and stored separately within the temporary working width of the Cable Corridor. Cable installation will require a haul road between the working areas along the cable corridors. This will allow for the movement of construction vehicles and the installation of the cable circuits and will also be located within the temporary working width of the Cable Corridor.

2.7.24 Where the cable is installed via open cut methods, this involves the excavation of a trench into which ducts are laid within which the electrical cables are then pulled followed by reinstatement of the land.

2.7.25 Where cable installation requires the use of trenchless installations (e.g. at sensitive locations such as watercourses, road, rail and pipeline crossings), the temporary and permanent area required will be wider. This is due to the cables being installed in ducts that are inserted separately into the ground and therefore are further apart than in a trench arrangement. Similarly, the target burial depth at these locations may be exceeded as a result of trenchless construction techniques. Initial potential trenchless installation locations identified within the PPP Application Boundary are shown in Table 2.8.

2.7.26 A summary of the MDS for construction within the Cable Corridors is detailed in Table 2.7 and an indicative construction programme is provided on Plate 2.2.

Table 2.7: Maximum Design Scenario – Cable Construction within Cable Corridor

Parameter	Maximum Design Scenario
Onshore cable area (temporary) (km^2)	1100
Duration of construction (inclusive of pre-construction and restoration activities) for entire Cable Corridor	33 months

Trenchless Method

2.7.27 Under the MDS, outside the Landfall, HDD has been assessed as the main trenchless method. The construction at HDD locations would involve HDD boreholes drilled under the features to be crossed and lined with ducts to allow the Onshore Export Cables to be pulled through underneath features and below ground, as shown indicatively in Plate 2.7 and Plate 2.8.

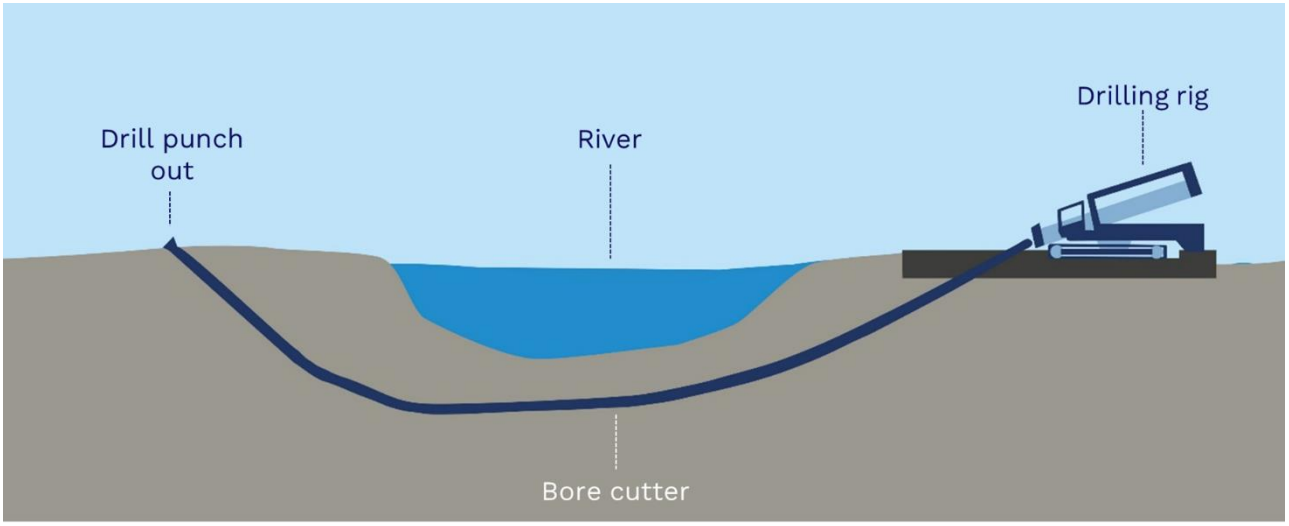

Plate 2.7: Indicative Example of HDD Used to Cross Under a River

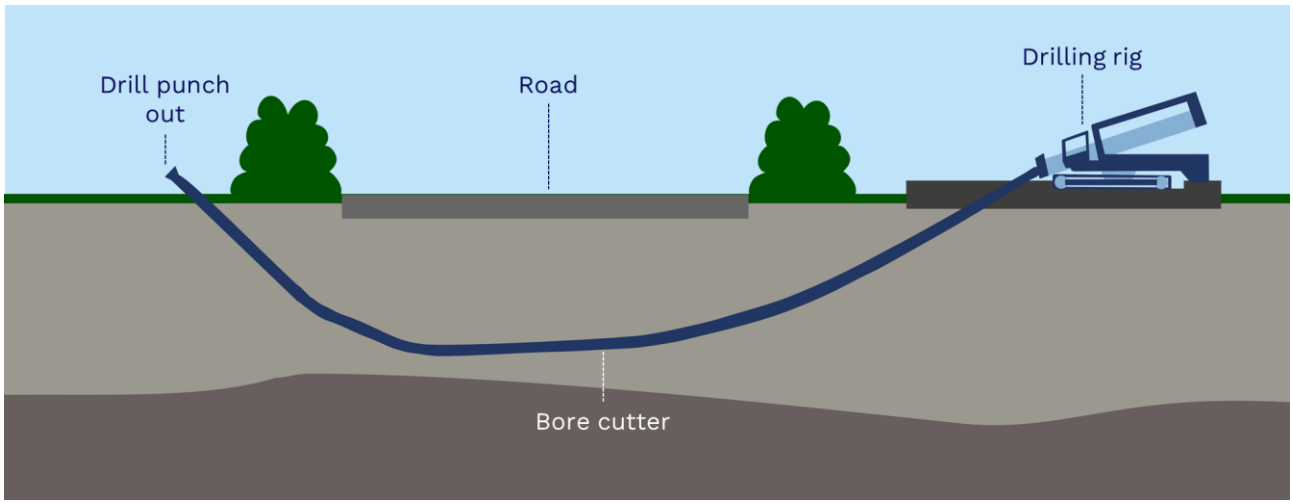

Plate 2.8: Indicative Example of HDD Used to Cross Under a Road

2.7.28 Trenchless methods minimise disturbance to the feature being crossed by the Onshore Export Cables and 400 kV Cables.

2.7.29 The ongoing design of the Proposed Development has given consideration to areas of important ecological features, such as watercourses and specified HDD crossings at such locations. Table 2.8 contains the anticipated locations where trenchless construction methods are proposed as part of the EIA PDE. Where potential multiple installation methods are under consideration this is highlighted.

Table 2.8: Trenchless Crossings identified in EIA PDE

Crossing Reference	Location/Asset Crossed	PDE Installation method
1	Landfall	HDD/Pipejacking/direct pipe installation – subject to detail design
2	A92	HDD
3	Peatie Burn	HDD
4	Bervie Water	HDD
5	B967	HDD
6	National Grid Pipeline Aberdeen to Arbroath Line	HDD
7	National Grid Pipeline St Fergus to Lochside	HDD

Crossing Reference	Location/Asset Crossed	PDE Installation method
8	Shell Pipeline/Fortes Pipeline	HDD
9	Forthie Water	HDD
10	A90	HDD
11	Network Railway Edinburgh to Aberdeen Line/Rolland Road	HDD
12	Glenbervie Road	HDD
13	National Grid Pipeline Aberdeen to Kirriemuir Crossing 1	HDD
14	Carron Water	HDD or open cut subject to detail design
15	National Grid Pipeline Aberdeen to Kirriemuir Crossing 2	HDD
16	Burn of Annamuick	HDD or open cut subject to detail design
17	Burn of Elfhill	HDD
18	Burn of Day and SSEN-T outlet	HDD or open cut subject to detail design and final position of SSEN-T outlet position

2.7.30 Table 2.9 details the MDS for crossings required for the Proposed Development. It is anticipated that there will be a maximum of 18 trenchless crossings required for the Onshore Export Cable Corridor; no HDD crossings are expected within the 400 kV Cable Corridor. Details of the HDD compounds are included in Section 2.9.

Table 2.9: Maximum Design Scenario – HDD Cable Crossings (not including Landfall)

Parameter	Maximum Design Scenario
Dimension of launch pits (m)	70 x 50
Dimension of reception pits (m)	50 x 40
Number of HDD drills per HDD crossing	Up to 9
Number of cable ducts	Up to 9
Diameter of power cable ducts (mm)	350
Maximum length of ducts (m)	120
Depth of ducts below surface (m)	Up to 6

Trenched Method

2.7.31 Trenched or open cut methods of cable installation will involve the excavation of trenches and laying cables, or ducts in preparation of cable installation. Cables are installed in ducts by winching them into the pre-installed ducts.

2.7.32 Trenched methods will be used for the majority of the Onshore Export Cable Corridor and 400 kV Cable Corridor. Table 2.10 details the MDS for the trenches in which the Onshore Export Cables will sit.

Table 2.10: Maximum Design Scenario – Trenched Installation

Parameter	Maximum Design Scenario	
	Onshore Export Cable Corridor	400 kV Cable Corridor
Trench width at top (m)	4.2 per trench	2.7 per trench
Trench width at base (m)	4.0 per trench	2.5 per trench
Trench depth (m)	1.65 per trench	1.65 per trench

Additional Considerations

Road Crossings

2.7.33 Prior to the commencement of construction, a CTMP will be developed by the appointed contractor setting out in detail the steps to be taken and methodologies for crossing or interacting with roadways and accesses.

2.7.34 Where the Cable Corridors cross local roads and private entrances, access to properties and settlements will be retained. Where diversions on the existing road network are readily available, temporary road closures may be undertaken.

2.7.35 Road closures will be phased in order that access is retained to all settlements and properties.

Pipelines

2.7.36 The Proposed Development is an area with significant existing infrastructure including a number of high-pressure gas, fuel and oil pipelines. Early desk-based assessments were undertaken to identify the locations of these pipelines, as well as consultation with the owners and operators of these infrastructure assets, including INEOS, Shell and National Gas Transmission. Details of this consultation can be found in Volume 1, Chapter 4: Stakeholder Engagement and Consultation.

2.7.37 Given the complex nature of crossing such infrastructure, key design considerations included limiting crossing points and proximity of the Cable Corridor to these assets. There is a requirement to ensure the crossings are as close to “at grade” as possible. This restricts the location at which the cable would be able to safely cross the gas pipeline. Trenchless methods are proposed to cross pipelines which is a commonly used technique for such operations. The construction methods in the vicinity of these assets will comply with regulations and deploy best practice measures such that risks of accidents are well within acceptable parameters. Details of crossing locations and designs will be confirmed during the MSC stage, following consultation and agreement with the appropriate stakeholders.

Rail Crossings

2.7.38 The Proposed Development will require a crossing of the Edinburgh to Aberdeen railway line operated by Network Rail. A HDD is proposed to the south of Drumlithie where the railway line is on embankment following initial discussions with Network Rail.

2.7.39 Historic issues and landslides have been taken into account in identifying an appropriate location to cross the railway line avoiding areas that have experienced ground instability in the past.

Watercourse Crossings

2.7.40 The Proposed Development includes the crossing of watercourses, the most prominent of which are proposed to be via HDD, see Table 2.8. Detail of types, methods and locations of crossing will be defined through the MSC stage, but the intention will be to achieve minimal disruption to the watercourses. As such, HDD will be a primary consideration for the most prominent receptors.

2.7.41 In other locations, trenched techniques may be used for the crossing of field drains, ditches and small streams. In these instances, measures will be implemented to protect water quality and flow of which are detailed within the Outline CEMP (Volume 2, Appendix 2.2: Outline Construction Environmental Management Plan).

2.7.42 The crossing techniques to be used for other watercourses will be determined by the final design and described in the MSC. Controlled Activities Regulations (CAR) licensing, which require authorisation from the SEPA for specific activities that could significantly impact the water environment, will be applied for prior to the construction works where required.

Woodland

2.7.43 As part of the site selection process, the design of the Proposed Development has considered the locations of woodland, mature and protected trees (e.g. veteran trees), as well as other ecologically sensitive habitats. This has involved the avoidance of woodland areas, as far as possible (details provided in Volume 1, Chapter 5: Site Selection and Reasonable Alternatives Considered). A Woodland Management Plan will be developed at MSC stage.

2.7.44 A section of the Onshore Cable Corridor, the Substation and the 400 kV Cable Corridor are within Fetteresso Forest, a commercial plantation managed by Forestry and Land Scotland (FLS). As such construction of the Proposed Development will result in the temporary and permanent loss of areas allocated for forestry. However, appropriate replanting would be undertaken post construction to reinstate the land use to forestry such that forestry enterprises, where affected, can continue.

2.7.45 Details of compensatory woodland planting would be provided at the MSC stage and would be undertaken post construction to compensate for the loss of woodland as a result of construction of the Proposed Development to meet the Scottish Government's Control of Woodland Removal Policy (Scottish Forestry, 2025). Further details are provided in Volume 1, Chapter 6: Land Use, Agriculture and Public Access and Volume 2, Technical Appendix 6.1: Forestry and Arboricultural Report of this Onshore EIA Report.

Hedgerows/ Mature Trees or Veteran Trees

2.7.46 Design of the Cable Corridors has sought, and will continue to seek through the MSC, to minimise the impact on mature vegetation both through routing choice and narrowing the route where it crosses important hedgerows or mature trees. However, where hedgerows and trees are affected by cable construction works, they will be removed, except for sections of the route where HDD is proposed. In addition, removal may be required to allow for access and to meet visibility requirements at access points within the construction work areas.

2.7.47 Vegetation clearance will be outside of the bird nesting season so that nesting birds are not disturbed. The Proposed Development will reinstate hedgerows on a 'like for like' basis, where practicable and feasible to do so, which will be undertaken on completion of cabling works. Where appropriate, hedgerow enhancement will be carried out to improve the habitats and increase

biodiversity within the PPP Application Boundary. Details will be provided at MSC and included in the Biodiversity Enhancement Plan.

2.7.48 As stated above, where possible the typical corridor width will be reduced when crossing important hedgerows (as defined by the UK Biodiversity Action Plan (BAP) Priority Habitat classification for hedgerows); mature or veteran trees or where other constraints create a 'pinch point'. The reduced width will be achieved through engineering techniques such as:

- using lower thermal resistivity backfill in the cable trench; and/or
- removing spoil to a storage area further up or down the cable corridor (away from the reduced working width location), thereby negating the need to store spoil adjacent to the trenches.

2.8 Substation

2.8.1 BOWFL has applied to connect the Project to the UK National Grid Electricity Network (the Grid) and has been offered by the National Energy System Operator (NESO), a connection at the proposed Hurlie Substation. As such the grid connection point for the Project is SSEN-T's proposed Hurlie Substation in Fetteresso Forest, approximately 7 km west of Stonehaven. A planning application was submitted to Aberdeenshire Council by SSEN-T in December 2024 (ref: APP/2024/1951).

2.8.2 Before energy from the Project reaches SSEN-T's Hurlie Substation, there is a need to convert from a lower offshore voltage (220kV/275kV) to the 400kV voltage required by the Grid. Transformers are used to change the voltage, and these will be located within a substation compound and switchyard; referred to as the 'Substation'. The following terms are utilised with reference to the 'Substation' in this Onshore EIA Report:

- Substation Search Area: The area (~24 hectares) identified at scoping that the Substation would be located within in proximity to the grid connection point (see Plate 2.9).
- Substation Site: The total area proposed (~19 hectares) for construction of the Substation Switchyard (see Plate 2.9).
- Substation Switchyard: The area proposed (~10 hectares) where the Substation equipment will be housed that is required to transform voltage from low to high by means of electrical transformers (see Plate 2.9).

2.8.3 The Substation will convert the voltage of the electricity supplied through the Onshore Export Cables, to allow a transmission and use of the electricity in the National Grid via the proposed Hurlie Substation and associated Overhead line (OHL). SSEN-T have submitted an application to the Energy Consents Unit (Reference: ECU00005225) under Section 37 of the Electricity Act 1989 for an OHL from Kintore to Tealing which would transmit electricity from the proposed Hurlie Substation and any connections including the Substation.

2.8.4 The Substation Search Area and an indicative Substation Site and platform location is shown on Plate 2.9; this location is within 2 km of the GCP at the

proposed Hurlie Substation in Fetteresso Forest. The 2 km distance is as per Section 14 of the Connection Use of System Code, definition of connection assets (National Grid ESO, 2017).

2.8.5 The total area for the Substation Site required for construction occupies approximately 19 ha and will include a Sustainable Drainage Systems (SuDS). The Substation will be connected to the national grid via onward connecting 400 kV Cables into the proposed Hurlie Substation.

Design

2.8.6 The Substation will use either Gas Insulated Switchgear (GIS) or Hybrid Insulated Switchgear (HIS) technology. Different from Air Insulated Switchgear (AIS) technology, GIS switchgear uses valves cooled by refrigerant gas rather than the open air. GIS switchgear is housed in switchgear buildings as opposed to being spread across an open site and has a smaller footprint compared to AIS substations. HIS switchgear technology combines gas and air insulated switch gear, allowing for a reduced footprint. The principal differences visually between the technologies is therefore the overall size and presence of buildings. Additionally, the Substation is expected to have an enclosed design to minimise noise disturbance to the surrounding area. Further details on the selection of the Substation Site and the choice of technology to be used are detailed within Volume 1, Chapter 5: Site Selection and Reasonable Alternatives Considered.

2.8.7 The design of the Substation Site will require cut and fill earthworks to create a level construction platform, on which the Substation switchyard will sit (approximately 10 ha). The Substation switchyard will contain the electrical equipment required to convert the transmitted voltage to facilitate the connection to the national grid. During construction the construction area will be fenced off. Once construction is complete the switchyard will require safety fencing and the wider substation area may also be fenced to restrict access to the substation during operation.

2.8.8 The existing forestry tracks with Fetteresso Forest will be utilised for access to the Proposed Development, with bellmouth added to allow access for construction and operation to the Substation. Revisions to the forestry access roads as a result of the proposed Hurlie Substation have been taken into account within the proposed PPP Application Boundary.

2.8.9 The final design of the Substation, including the arrangement and massing of building and external materials, will be developed for later approval at the MSC stage.

2.8.10 The parameters for the Substation are provided below in Table 2.11 which presents the MDS including the number of buildings and area required for the Substation.

Table 2.11: Maximum Design Scenario – Substation

Parameter	Maximum Design Scenario
Number of switchgear/control buildings	3
Maximum height of buildings (m)	15
Permanent footprint of Substation switchyard (m^2)	97,290
Permanent footprint of Substation Site (m^2) including switchgear buildings, transformers, other electrical equipment	190,000

Landscape and Ecological Planting

2.8.11 The Substation will be surrounded by the commercial forestry within Fetteresso Forest, landscape and ecological planting will also be proposed around the Substation in areas felled during construction within the PPP Application Boundary, both as a form of screening and biodiversity enhancement. Full details of the form of this planting as well as mix and orientation will be set out within the MSC submission. An indicative plan has been provided in Plate 2.9.

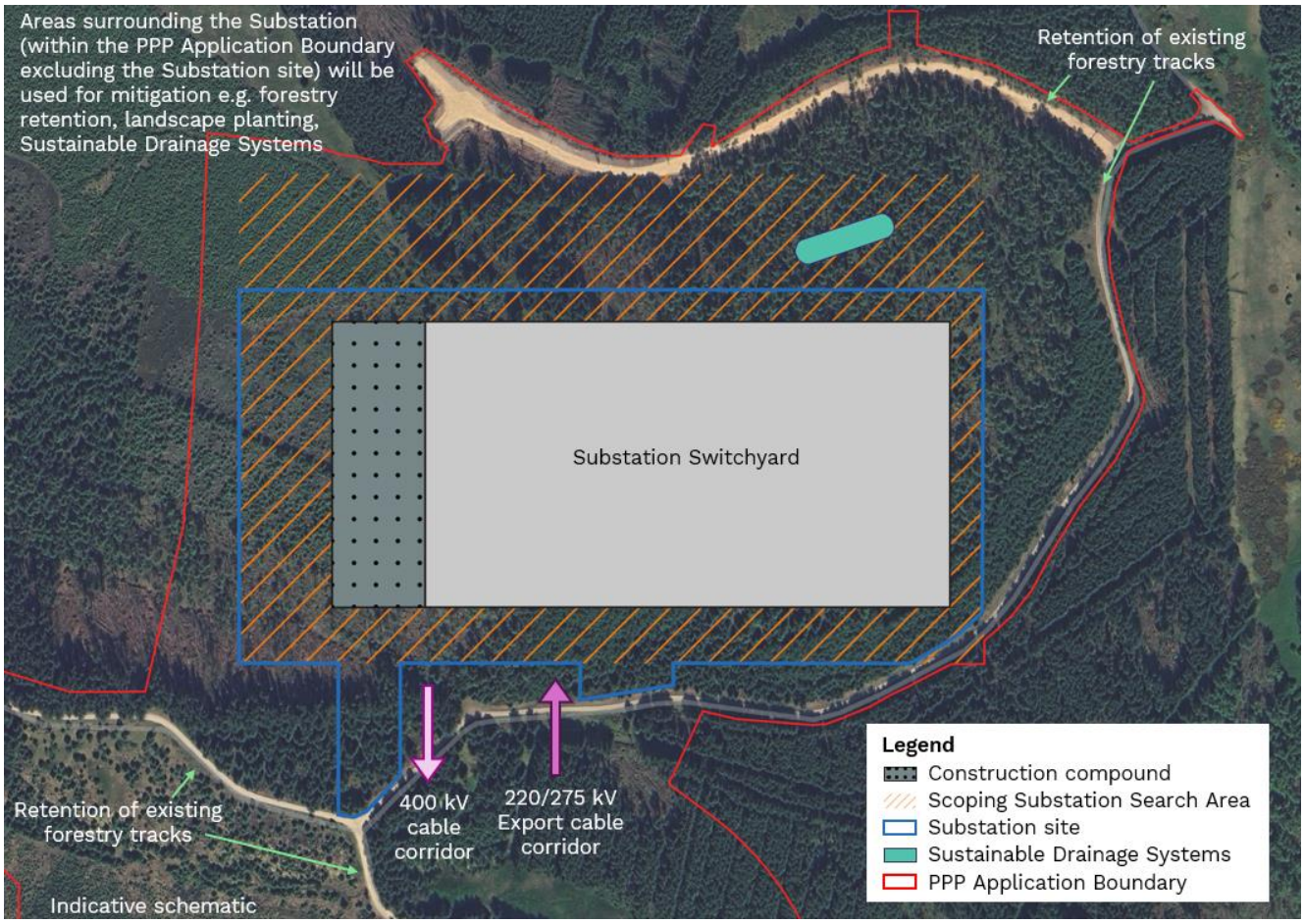

Plate 2.9: Indicative Substation Switchyard, Landscaping, Forestry Retention and Drainage Areas

Noise Mitigation

2.8.12 The majority of noise generating plant will be contained within buildings. The buildings will be constructed with insulated cladding to reduce noise breakout and where required, will be ventilated using forced ventilation with a vertical exhaust. There will be some external plant as necessary. If required, external plant can be fitted with enclosures to meet the required noise limits.

2.8.13 The acoustic measures required for the operation of the Substation will be refined through further studies when the final design and equipment specifications are known. The measures will be designed to meet the relevant thresholds as part of the detailed design process as described in Volume 1, Chapter 13: Noise and Vibration. Noise and vibration specifications will be detailed within the Noise and Vibration Management Plan, which will be developed post-consent.

Construction Methods

2.8.14 The Substation Site will require modification of the existing ground surface and will be modified by 'cut and fill' operations to provide a level platform for the Substation switchyard. The extent of cut and fill required will be determined as the design progresses.

2.8.15 The entire area required for the Substation switchyard platform (see Plate 2.9) will be stripped of all topsoil and subsoil where required (including vegetation and loose rocks where necessary). Where waste and excess material is encountered, it will either be used to level the platform area or be removed if it is unsuitable for reuse. Detail of how waste material is managed will be included in the Outline CEMP and subsequent Site Waste Management Plan (SWMP) at the MSC stage. Once the surface has been cleared, the 'cut and fill' operation will begin.

2.8.16 Soil will be stored and managed in accordance with the Construction Code of Practice for Sustainable Use of Soils on Construction Sites (Department for the Environment, Food and Rural Affairs (Defra, 2009)), SEPA's position Statement on Planning and Soils, or the latest relevant available government guidance. The legislation listed in Defra is not relevant to Scotland, but the guidance is still widely used for construction projects throughout the UK. Suspected or confirmed contaminated soils will be appropriately separated, contained and tested before removal, if required. A Soil Management Plan (SMP) will also be incorporated into the detailed CEMP which will contain soil management measures that will seek to ensure the conservation of soil resources, maintain soil drainage and reinstate soil profiles as near as reasonably practicable to their former condition.

2.8.17 Excavated material will be utilised where possible, provided the grade and composition is suitable for foundations, hardstanding areas and roads. Where there is excess material, it is anticipated that this material will be converted into products of acceptable quality for use across the Proposed Development (e.g. haul roads and compounds), where feasible. If this is not feasible, or if there is further excess following the development of haul roads and compounds, the remainder will be appropriately transported (with appropriate approvals/permits and licensed contractors) to locations in which it can be either re-used or disposed of at a licensed disposal site.

2.8.18 Table 2.12 details the anticipated parameters for the construction of the Substation.

Table 2.12: Maximum Design Scenario – Substation Construction

Parameter	Maximum Design Scenario
Substation temporary construction compound (m^2)	18,400
Duration of construction (inclusive of pre-construction and restoration activities)	45 months

2.9 Temporary Ancillary Onshore Infrastructure

2.9.1 As noted in Section 2.7, the Cable Corridors include the temporary working width for installation of the cables and their permanent location for operation and maintenance through haul routes. However access will be required to the Cable Corridors to allow for the movement of construction vehicles and the installation of the Onshore Export Cable circuits, in addition to other related works such as temporary compounds laydown areas and joint bays. This access will require the construction of temporary and permanent access tracks.

Temporary Construction Compounds

2.9.2 Temporary construction compounds will be required at a number of locations within the PPP Application Boundary to allow for construction of the main elements of the Proposed Development; these will be established early in the construction programme.

2.9.3 The installation works at Landfall will require a temporary construction compound and associated temporary utility services, which will contain all necessary plant and equipment plus parking and welfare facilities required for the Landfall construction works.

2.9.4 Temporary compounds will be required to facilitate the construction of the Substation, 220/275 kV and 400 kV cables. There are currently expected to be a minimum of three temporary construction compounds which will provide offices, welfare facilities, soil and material storage, storage of plant and equipment and parking for construction staff.

2.9.5 The Outline CEMP defines the processes required for storage, haulage and reuse of excavated material. Any excavated soil and rock is required to be reinstated on site either through landscaping or re-profiling works. Reinstatement aims to minimise visual impacts and facilitate habitat and ecological restoration. Any excavated materials will be classified on site to determine their status and identify their reuse in reinstatement works.

2.9.6 A method statement will be produced which will include details on expected volumes, material classifications, storage and reuse procedures for the excavated materials anticipated. Where material is not required for immediate reinstatement, temporary storage may be required. Where possible, excavated material will be stored local to the site of excavation. The proposed storage location will be subject to assessment against known constraints e.g. sensitive habitats and archaeological assets. The Principle Contractor will agree the storage location(s) with the ECoW and Geotechnical Engineer prior to commencement of main phase works. Further information is detailed in Volume 2, Appendix 2.2: Outline Construction Environmental Management Plan.

Table 2.13: Maximum Design Scenario – Construction Compounds

Parameter	Maximum Design Scenario
Dimensions of temporary Substation and Cable compounds	3 at 100m x 100m (1 x Main Compound for Substation 1 x Main Compound for Cable Routing 1 x Potential smaller compound to be identified by the Contactor)
Dimensions of Landfall construction compound (m)	200 m by 150 m
Dimensions of HDD compounds (m)	Launch Pit 70 m by 50 m Receiver Pit 40 m by 50 m

2.10 Pre-Construction Activities and Restoration

Pre-Construction Activities

2.10.1 Prior to the commencement of the onshore construction works, a number of pre-construction surveys and studies may be required to inform the final detailed design, which may include:

- topographic surveys;
- ecological surveys to verify EIA findings and inform protected species mitigation licence(s) that may be required;
- ground investigations (e.g., geotechnical and ground stability surveys);
- soil surveys; and
- drainage surveys.

2.10.2 The initial phase of construction works will include pre-commencement works to prepare the land for main construction start which is likely to include but is not limited to:

- road improvements;
- new site accesses and related signals/signage;
- construction drainage;
- fencing, signing and lighting;
- establishing compounds and site accommodation;
- ecological and archaeological mitigation; and
- vegetation clearance and removal as well as clear-felling where required.

Restoration

2.10.3 In terms of above ground features, once the construction and installation work is complete, the haul road(s) will be removed and the ground reinstated to its previous use using stored subsoil and topsoil.

2.10.4 All temporary construction compounds and temporary fencing will be removed, field drainage and/or irrigation will be reinstated, and the land will be restored to its original condition. Where practicable, consideration will be given to early restoration of sections of the Onshore Export Cable works. Joint bays will be completely buried, backfilled, then land above reinstated. The joint bays will not have manhole covers as the structure will be backfilled. Link boxes will be

situated close to joint bays and will be used for testing/maintenance purposes. Thus, these will require a ground level manhole cover for access.

2.11 Operation and Maintenance

2.11.1 The Proposed Development will be designed to operate on a continuous basis throughout the year. Details of the operation and maintenance activities associated with the Proposed Development are presented below.

Landfall

2.11.2 It is not expected that the TJBs at the Landfall will need to be accessed during the operation and maintenance phase. A short permanent access track will form part of the detailed design to allow access into the agricultural field. Link boxes will be provided with inspection covers to allow for access at the Landfall and would be accessed in the event of a cable failure requiring replacement or repair, and for testing purposes.

Onshore Export Cables and 400 kV Cables

2.11.3 The operation and maintenance requirements for the Onshore Export Cables and 400 kV Cables will involve infrequent on-site inspections of the cables and corrective maintenance activities (e.g. repairs due to cable failure). The cables will be continuously monitored remotely. In the event of a cable failure, access to link boxes will be required to identify where along the cable section the fault has occurred. Once detected, a maintenance team will be required to excavate, remove and replace the section of damaged cable along the route.

Substation

2.11.4 The Substation will be unmanned and access is proposed from the existing operational forestry tracks within Fetteresso Forest. Operation and maintenance staff will be required to undertake routine on-site checks, as well as preventative and corrective works on a regular basis. The assumption has been made that there will be one visit to the Substation per month for the operational lifetime (30 years) of the Proposed Development. As part of the general maintenance, there will likely be requirements for replacement or upgrade of components, however, this will be infrequent. In these instances, additional deliveries and vehicles will be required, which may include HGV movements.

2.12 Waste Management

2.12.1 Waste will be generated as a result of the Proposed Development, with most waste expected during the construction and decommissioning phases. Consideration will be given to the types and quantities of waste that will be generated.

2.12.2 Procedures for handling waste materials will be set out in a Site Waste Management Plan (SWMP). A SWMP will be prepared at MSC and appended to the detailed CEMP. It will describe quantities of likely waste type arising from the Proposed Development and how it will be managed (i.e. reuse, recycling, recovery or disposal). The SWMP will also describe the duty of care

requirements and identify potential management facilities in the vicinity of the Proposed Development.

2.12.3 Further details of the effects on soil resources are provided in Volume 1, Chapter 6: Land Use, Agriculture and Public Access. In addition, a Woodland Management Plan will be developed at MSC stage when detailed design of the Onshore Export Cable Corridor is known. The Woodland Management Plan will detail appropriate management measures in line with the waste hierarchy and SEPA Guidance, Management of Forestry Waste (2013).

2.13 Decommissioning

2.13.1 At the end of the operational lifetime, the Project will be decommissioned or repowered.

2.13.2 If decommissioning takes place, it is anticipated that all structures above ground will be completely removed. The decommissioning sequence will generally be the reverse of the construction sequence and involve similar types and numbers of vehicles and equipment.

Onshore Export Cables

2.13.3 It is expected that the Onshore Export Cables and 400 kV Cables will be removed via the TJBS to minimise the environmental disturbance during decommissioning, this will also be subject to specific land agreements with landowners. The structures of the jointing bays and link boxes will be removed only if it is feasible with minimal environmental disturbance, or if their removal is required to return the land to agricultural use. Any waste arising from decommission would be disposed of, recycled or reused in accordance with relevant regulations. A Decommissioning Plan would be agreed with Aberdeenshire Council and key stakeholders as required at the time of decommissioning.

Substation

2.13.4 The components of the Substation have varying life expectancies. Transformers typically have a lifetime of up to 50 years, and the lifespans of some components can be extended beyond this period. Decommissioning of the Substation will be reviewed in discussion with the transmission system operator and appropriate regulators in the light of other existing or proposed future use of the Substation. If complete decommissioning is required, then all electrical infrastructure will be removed and waste arising disposed of in accordance with relevant regulations.

2.13.5 Foundations will be broken up and the site reinstated to its original use or for an alternative use. For the purposes of EIA, decommissioning of the proposed Substation is assumed to be similar to the construction and in reverse sequence.

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Annex - Figures

N

REQUIRED FOR ACCESS

REQUIRED FOR ACCESS

SUBSTATION AREA

REQUIRED FOR ACCESS

CABLE CORRIDOR

REQUIRED FOR ACCESS

REQUIRED FOR ACCESS

REQUIRED FOR ACCESS

REQUIRED FOR ACCESS

CABLE CORRIDOR

LANDFALL AREA

A957

A957

B979

A90

A92

Cowie

Stonehaven

Toddie Brae

Brae of Glenbervie

Brae of Glenfarquhar

Drumlithie

Brae of Kinkell

Auchenblae

Causeywell Brae

Catterline

A90

B966

Moor of Auchendreich

Roadside of Kinneff

Fordoun

B967

Arbuthnott

B967

A92

Inverbervie

A90

Laurencekirk

Gourdon

B9120

Whitewater Moss

Brawleymuir Plantation

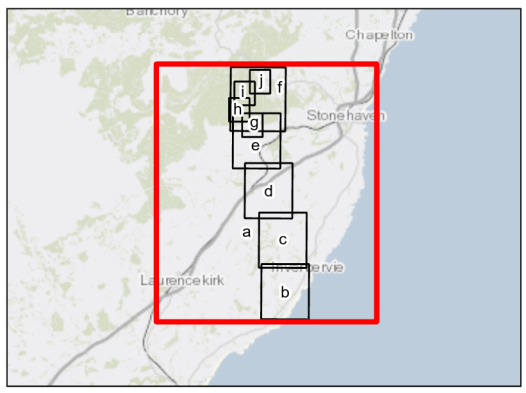
Craighead Plantation

A92

0 7 Km

Legend

PPP Application Boundary



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Project: Bowdun Offshore Wind Farm
Onshore EIA Report

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Figure 2.1a

N

Dendoldrum Farm Cottages

Highfield

Three Wells Farmhouse

Hillside of Dendoldrum

Carling Den

Anniston Farm Cottages

Greenleys View

Dendoldrum Hill

Knox Hill

Hallgreen Mains

East Haremuir

Temple Hill

South Hallgreen

Upper Knox Farm

Shakil Hill

A92

Brae Rd

Haremuir Steading

Burnhead

Lady's Plantation

Gourdon

Moathill

The Coach House

Gourdon Hill or Bikmane Hill

Knoxhill House

North Lodge

Nether Benholm Cottages

Nether Knox Steading

Tullo of Benholm Cottage

Cotter House

Benholm

Burn of Benholm

Beedies Brae

Stone of Benholm

East Walk Plantation

Stone of Benholm Cottage

0 1.5 Km

Legend

PPP Application Boundary

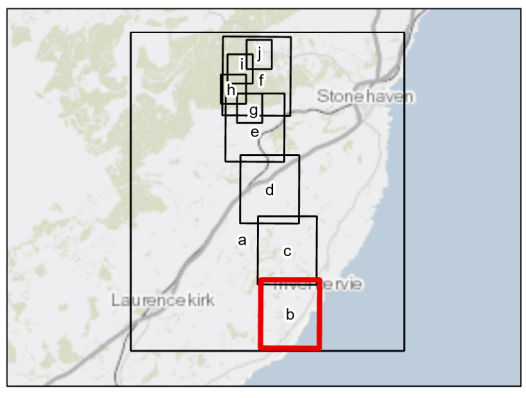

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Figure 2.1b

Beech Cottage
N
ad Cottage
Upper Craighill
Montgoldrum
Mont Goldrum or Camp Hill
Skene Croft
Alpitty Cottage
Plantation of Hillhead
Gobbs
Auchendreich Farm Cottages
Cluseburn Farm Cottage
Auche
Candle Hillock
The Laes Steading
Craighead
B967
Peat Hill
Arbuthnott
Pitcarles Bungalow
Burn of Pitcarles
Gallow Hill
Pitcarles Cottage
Kailbank Wood
Kirkton Wood
B967
Millplough
Millplough Farm
Crossroads Cottages
Denhead
Crow Wood
Kirkton House
Chapelwaird Wood
Kirkton Farm
Allardice
Bervie Water
B967
Riverdale
Birniehill Wood
Banff Croft
Hareden Wood
Bervie Water
Will's Wood
Hareden Burn
Banff
Shepherds Cottage
Allardyce Mill
Pitcarry
ff Wood
Peattie Farm Cottages
Hallgreen Wood
Meir's Den
Peattie Burn
Woodlands Cottages
Banff Burn
Dendoldrum Farm Cottages
0
1.5
Km

Legend

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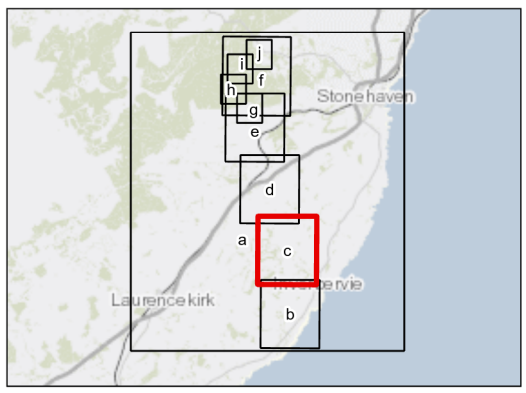

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Figure 2.1c

N

Whitehill Wood
Highland
Blackhill Wood
Forest Avenue
Quarrygate
A90
East Kinmonth
Mid Kinmonth
Clearymuir Farmhouse
West Kinmonth
Hillrise
Broad Wood
Clearymuir
Glenbervie Rd
Drumlithie
Fiddes
Park
Newbigging
Orchard Hill
Rolland Rd
Broombank Cottage
Cairdy
Thriepland
Forthie Water
Nether Pitforthie Cottage
Mondynes
Gyratesmyre Farm
Upper Pitforthie
Benzieshill Cottage
The Counting House
Bridgend Burn
Little Wairds
Farmhouse
Rowanwell House
Wairds of Alpity
Bloomfield
Hill of Gyratesmyre
East Steading
Wairds of Alpity Cottage
Greenden
Nether Craighill
Beech Cottage
Montgoldrum
Upper Craighill

0 1.5 Km

Legend

PPP Application Boundary

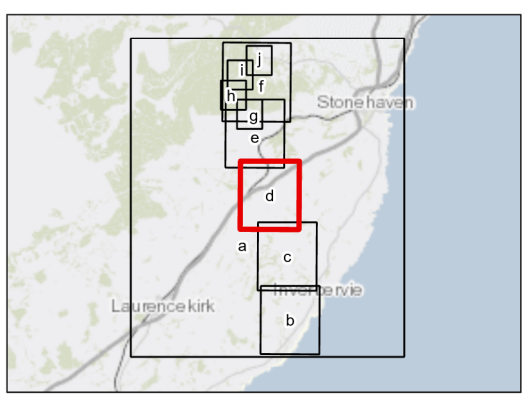

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Figure 2.1d

N

Foggy Moss
Old Moss
Whiting Burn
Elf Hill
Hill of Quithel
ught Hill
es
Burn of Elfhill
Elfstone
Springwood
Elf Hillock
East Town Cottages
Upper Quithel
Burn of Annamuick
Annamuick Cottages
Nether Quithel Cottage
euch
urn
Hillview Cottages
Quithel Cottage
Tannachie Croft
Hill of Tannachie
Carron Water
Gowans
Carmont
Waters Farm
Seafield House
Jacksbank Cottages
Blererno
Mill of Newmill Cottage
Stony Hill
Carmont Cottages
otbank
Springing Greens
Keabog Farm Cottage
Jacksbank Wood
Pitdrichie Cottages
Long Den
Little Bogburn
Inches Cottage
Upper Kinmouth
Lower Foord
Whitehill Wood
Blackhill Wood
Highland
Forest Avenue
Quarrygate
East Kinmonth
month
Clearymuir

0 1.5 Km

Legend

PPP Application Boundary

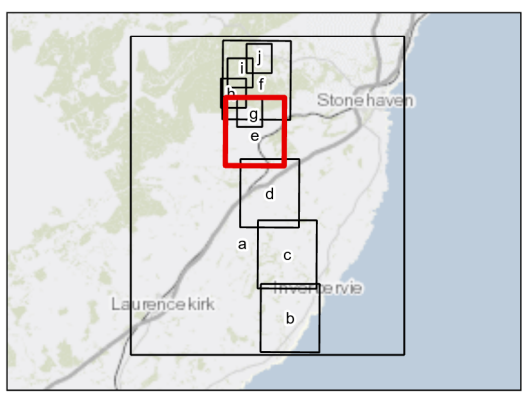

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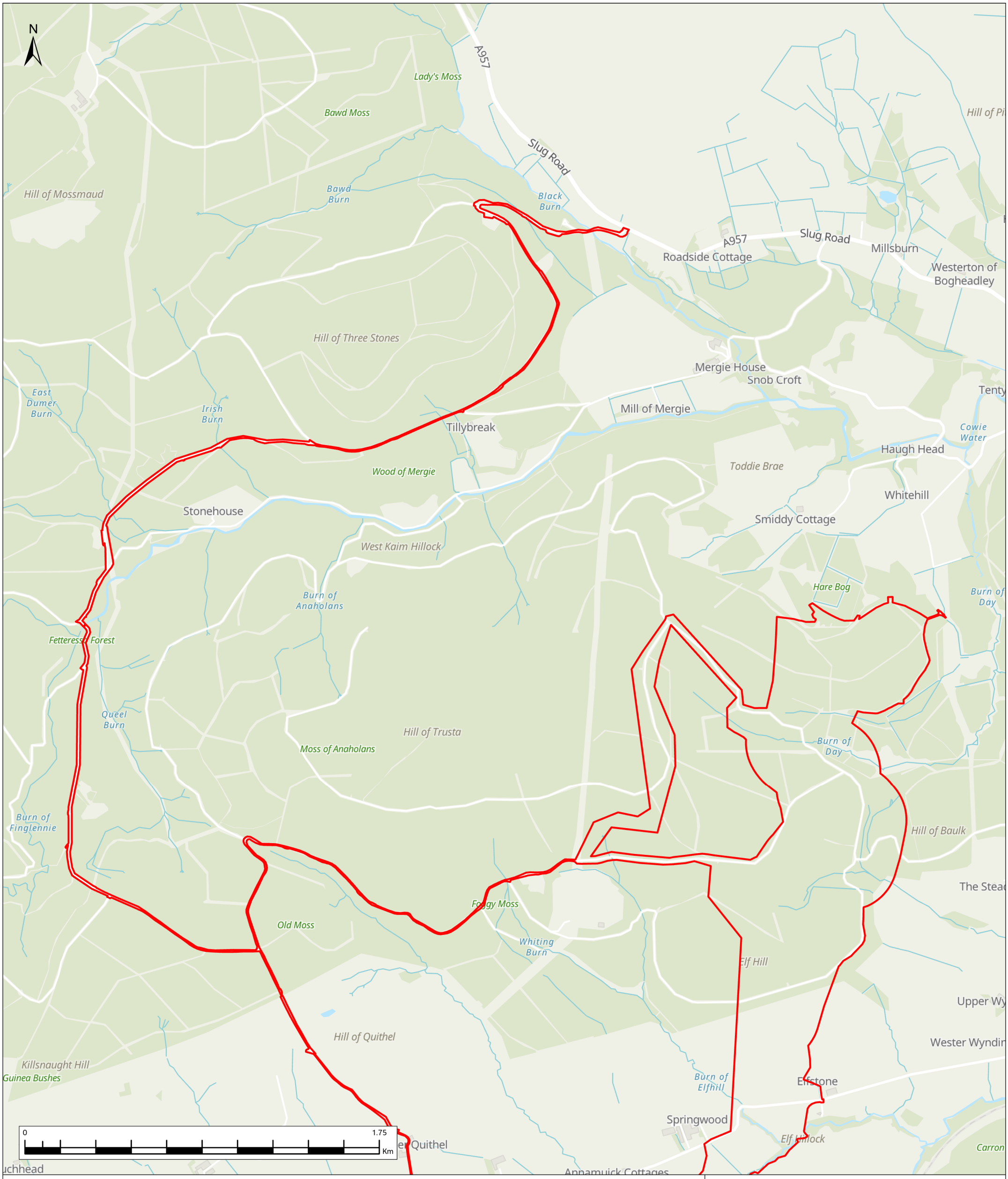
Figure 2.1e



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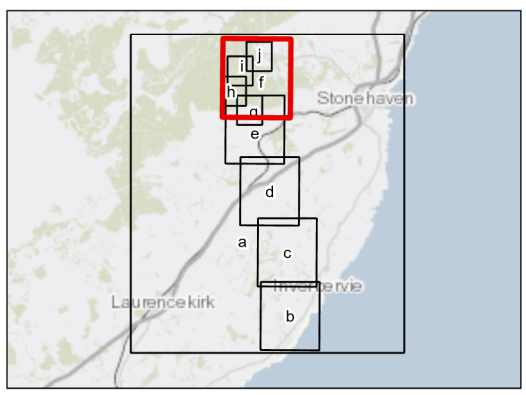

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Figure 2.1f

N

Old Moss

Foggy Moss

Whiting Burn

Hill of Quithel

Upper Quithel

Burn of Annamuick

Town Cottages

Nether Quithel Cottage

Hillview Cottages

Killer Burn

Quithel Cottage

Tannachie Croft

Hill of Tannachie

0 0.65 Km

Legend

PPP Application Boundary

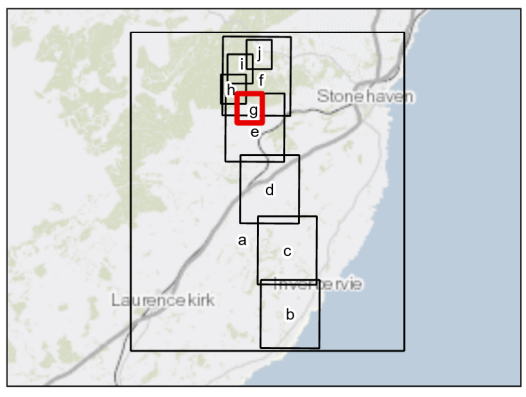

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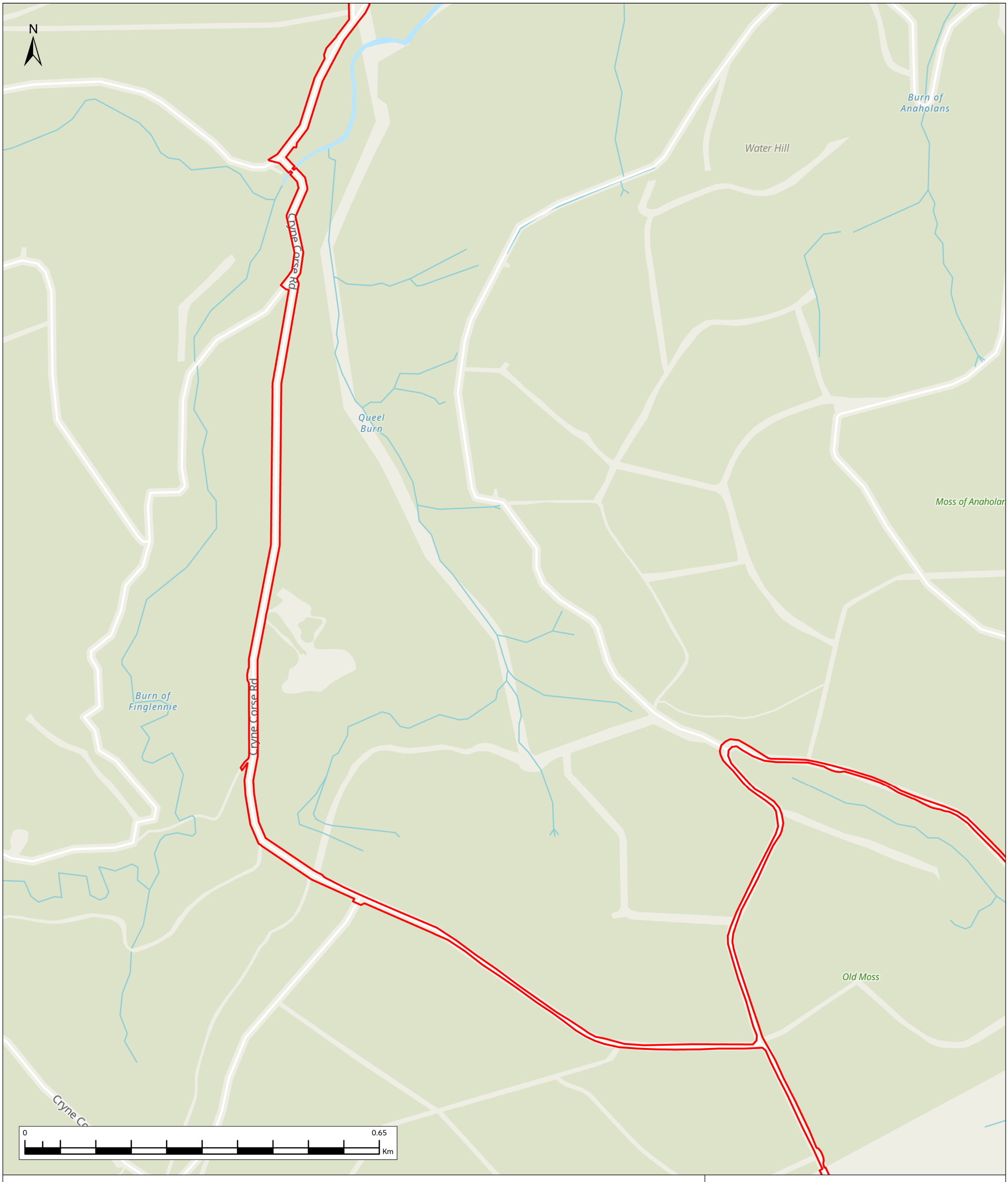
Figure 2.1g



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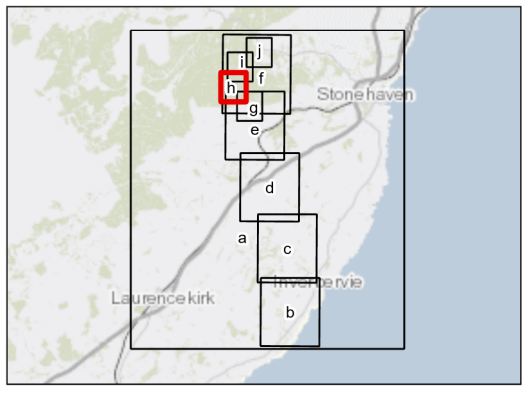

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Figure 2.1h

N

Hill of Three Stones

Irish Burn

Wood of Mergie

Stonehouse

West Kaim Hillock

Burn of Anaholans

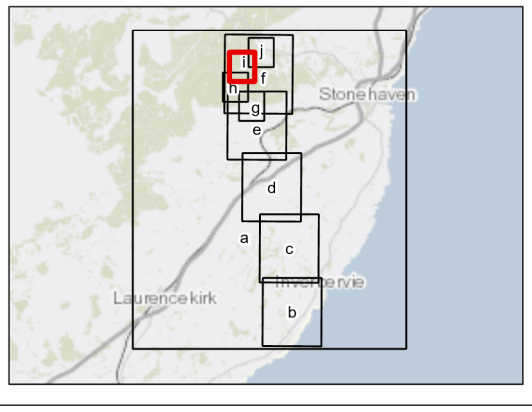
Water Hill

Cruine Corse Rd

0 0.65 Km

Legend

PPP Application Boundary



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Aconnex Number	Drawing Status
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Figure 2.1i

N

Lady's Moss

A957

Slug Road

Slug Road

Black Burn

A957

Slug Road

Roadside Cottage

ree Stones

Merg

Tillybreak

Mill of Mergie

0 0.65 Km

Legend

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Figure 2.1j