Eastern Green Link 4:
Scottish Onshore Scheme

Volume 2: Main Report

Chapter 12: Geology & Ground Conditions

December 2025

Prepared for:

SP Energy Networks
320 St Vincent St
Glasgow, G2 5AD

Prepared by:

AECOM Limited
1 Tanfield
Edinburgh EH3 5DA
United Kingdom

Table of Contents

Tables

Figures

12.

Geology and Ground Conditions

12. Geology and Ground Conditions

12.1 Introduction

This chapter of the EIAR identifies and assesses the potential impacts and likely significant effects of the Scottish Onshore Scheme on geology and ground conditions during construction of the proposed converter station and installation of the underground cables. This includes consideration of impacts and effects resulting from existing sources of land contamination including those associated with historic mining or quarrying activity.

This chapter is supported by the following figures and appendices (**Volume 4**):

- **Figure 12.1 Superficial Geology**
- **Figure 12.2 Bedrock Geology**
- **Figure 12.3 Historic Mining Activity**
- **Figure 12.4 Geology Designations**

This chapter is also supported by the following additional reports which accompany the planning application:

- Eastern Green Link 4: Cable Route, Ground Investigation Report, Mott Macdonald (2025)
- Eastern Green Link 4: Cable Route, Coal Mining Risk Assessment, Mott Macdonald (2025)
- Eastern Green Link 4: Cable Route, Contaminated Land Risk Assessment, Mott Macdonald (2025)
- Eastern Green Link 4: Converter Station, Ground Investigation Report, Mott Macdonald (2025)
- Eastern Green Link 4: Converter Station, Coal Mining Risk Assessment, Mott Macdonald (2025)
- Eastern Green Link 4: Converter Station, Contaminated Land Risk Assessment, Mott Macdonald (2025

Impacts on geology and ground conditions have the potential to result in effects on surface and ground water. This chapter should be read with reference to **Chapter 8 Water Environment and Flood Risk** which considers the impacts and likely significant effects of the Scottish Onshore Scheme on the water environment including surface and groundwater.

12.2 Legislation and Policy

Legislation

Legislation, relevant to this assessment and pertinent to the Scottish Onshore Scheme is outlined in this section (please note that regulations transferring powers from the European Union to the United Kingdom authorities are not listed). Relevant key legislation comprises the following:

- Environmental Protection Act 1990

- Environment Act 1995
- Contaminated Land (Scotland) Regulations 2000 as amended by the Contaminated Land (Scotland) Regulations 2005'
- Environmental Liability (Scotland) Regulations (2009) as amended by the Environmental Liability (Scotland) Regulations 2015
- Pollution Prevention and Control (Scotland) Regulations (2012) as amended by the Pollution Prevention and Control (Scotland) Amendment Regulations 2017
- Environmental Protection (Duty of Care) (Scotland) Regulations (2014)

National Planning Policy

National Planning Framework 4 (NPF 4)

The National Planning Framework 4 (NPF4) sets out the Scottish Government's spatial development principles, regional priorities, national developments and national planning policy, covering six spatial principles which aim to deliver sustainable places, liveable places and productive places. Relevant policies from NPF4 comprise:

- Policy 4 Natural Places. Part C provides protection to designated sites including Sites of Special Scientific Interest (SSSIs) and is relevant to any SSSIs designated in part or in full for geological reasons.
- Policy 5 Soils provides protection to soils in particular soils which are classed ALAgricultural Land (PAL) or peatland and carbon rich soils.
- Policy 11 Energy relates to energy proposals such as the Scottish Onshore Scheme and sets out requirements in relation to project design and mitigation. While none are directly relevant to geology (xii) relates to site restoration which is applicable in the case of the reinstatement of temporary working areas associated with the underground cables.

Local Planning Policy

The Fife Local Development Plan (LDP) was formally adopted in September 2017 and sets out local planning policy for Fife. The relevant Policies to the Scottish Onshore Development Scheme are:

- Policy 1 Development Principles; this comprises three parts with Part B setting out criteria against which development proposals will be assessed. With regard to geology this includes safeguarding against the loss of natural resources
- Policy 13 Natural Environment and Access states that development proposals will only be supported where they protect or enhance natural heritage and access assets including sites designated for geological conservation
- Policy 15 Minerals is largely related to development proposals for mineral extraction which is not relevant to the Scottish Onshore Scheme but the policy also provides protection to mineral resources that are, or may be, of economic or conservation value.

12.3 Consultation

A Scoping Opinion was requested from Fife Council regarding the proposed approach to and scope of the EIA. In its Scoping Opinion, the Council agreed that geology and ground conditions should be scoped into the EIA and provided advice in relation to the specific matters to be addressed. **Table 12-1 Summary of Scoping Opinion (Geology**) below summarises the Council's scoping opinion in relation the assessment of geology and ground conditions and how it has been addressed in the EIAR, or where relevant in the wider planning application.

Table 12-1 Summary of Scoping Opinion (Geology)

Consultee	Summary of Response	Action Taken
Fife Council	Requested that information on decommissioning is provided in the EIAR.	Information on the decommissioning is provided in **Chapter 2 Project Description** with further details specific to geology provided in **Section 12.7 Assessment of Effects** of this chapter.
	Agreed that impacts in relation to historic mining activity should be addressed in the EIAR.	Information on historic mining activity is set out in **Section 12.5 Baseline Environment**. Potential impacts to/from the Scottish Onshore Scheme as a result of previous mining activity are assessed in **Section 12.7 Assessment of Effects and 12.9 Residual Effects.** Separate Coal Mining Risk Assessments have also been prepared and accompany the planning application.
	Agreed that impacts to peatland should be scoped into the EIAR.	Information on peatland is set out in **Section 12.5 Baseline Environment** which describes the baseline conditions in the vicinity of the Scottish Onshore Scheme.
	Noted the intent to undertake ground investigations.	A summary of ground investigations undertaken to date is provided in **Section 12.5 Baseline Environment.** Separate Ground Investigation Reports have also been prepared and accompany the planning application.

Consultee	Summary of Response	Action Taken
	Advised the contaminated land issues should be scoped into the EIAR.	Information on potential contaminated land is set out in **Section 12.5 Baseline Environment** and the potential impacts in relation to the Scottish Onshore Scheme assessed in **Section 12.7 Assessment of Effects and 12.9 Residual Effects**.
	Advised that the EIAR should include all aspects of site work that might impact upon the environment, potential pollution risks and identify the principles of preventative measures and mitigation.	The aspects of the Scottish Onshore Scheme are described in **Chapter 2 Project Description** of this EIAR. Consideration is given to potential pollution risks in relation to the water environment including groundwater in **Chapter 8 Water Environment and Flood Risk**.
	Advised that a draft Schedule of Mitigation should be produced identifying pollution prevention and mitigation measures.	A Schedule of Mitigation, which will subsequently inform construction environmental management plans, is contained in **Appendix 15.1 Mitigation Register (Volume 4 Appendices)** of this EIAR.

12.4 Methodology

Study Area

The study area in relation to geology and ground conditions extends from the proposed landfall north of Kinghorn to a new Westfield 400kV Substation (subject to a separate planning application) (i.e. the planning application boundary). In general, geological receptors are limited to the application boundary and its immediate environs. However, there is the potential for some impacts to extend beyond this and affect receptors outside of the boundary, for example impacts resulting from disturbance of contaminated land may propagate beyond the application boundary. For the purpose of the EIA, the study area extends up to 1 km either side the application boundary.

Assessment Scope

The assessment of potential effects on geology and ground conditions includes consideration of impacts on the underlying superficial and bedrock geology, impacts on the environment and human health as result of contamination or the disturbance of existing contaminated soils (if present), impacts resulting from interactions with historic mining and quarrying activity as well as impacts on sites designated for geological conservation purposes.

Baseline Data Collection

Baseline data has been collated from a range of sources comprising:

- Review of British Geological Survey (BGS) Geoindex Onshore viewer (Ref 11.1) to establish solid and superficial geology at and in the vicinity of the Scottish Onshore Scheme;
- Review of the National Soil Map of Scotland (Ref 11.2) to establish soils present at and in the vicinity of the Scottish Onshore Scheme;
- Review of the Mining Remediation Authority viewer (Ref 11.3) to identify historical mining activity at and in the vicinity of the Scottish Onshore Scheme;
- Review of Fife Council's Contaminated Land Register (Ref 11.4) to identify contaminated sites at or in the vicinity of the Scottish Onshore Scheme;
- Review of Fife Council's Historic Land Use and District Landfall map (Ref 11.5) to identify potentially contaminated land at or in the vicinity of the Scottish Onshore Scheme;
- Review of Zetica's Unexploded Ordnance (UXO) online risk map (Ref 11.6) to identify the risk of encountering UXO at or in the vicinity of the Scottish Onshore Scheme;
- Review of available geological borehole data held by the BGS (Ref 11.7) at or in the vicinity of the Scottish Onshore Scheme;
- A review of NatureScot's (formerly Scottish Natural Heritage) Carbon and Peatland map (2016) (Ref 11.8) to identify carbon rich soil, deep peat and priority peatland habitats;
- A review of National Library of Scotland Map Viewer (Ref 11.9) to identify historic mining and quarrying activity at and in the vicinity of the Scottish Onshore Scheme;
- Review of the results of preliminary ground investigations undertaken as part of the identification of the Scottish Onshore Scheme; and
- Review of information held by NatureScot and Fife Council to identify sites designated for geological conservation purposes in the vicinity of the Scottish Onshore Scheme.

Assessment Methodology

Overview

The assessment of likely significant effects on geology and ground conditions has been carried out in general accordance with the most recent edition of the Highways England (National Highways) guidance document Design Manual for Roads and Bridges (DMRB) (Ref 11.10). The potential impacts have been assessed based on guidance in the (DMRB) LA109, Geology and Soils. As there is no specific guidance in relation to electricity transmission infrastructure, DMRB is considered to be the most appropriate methodology for the Scottish Onshore Scheme because it is designed for assessing effects of linear schemes (albeit road schemes).

Sensitivity

The sensitivity of the receptor reflects the quality of the receptor and its ability to absorb an effect without perceptible change. Descriptions and examples of sensitivity relevant to

geology and ground conditions are presented in **Table 12-2 Criteria to determine the sensitivity of receptors.**

Table 12-2 Criteria to determine the sensitivity of receptors

Sensitivity	Description	Example(s)
High	Very rare and of international importance with no potential for replacement	Geology • UNESCO World Heritage Sites; • Sites of Special Scientific Interest (SSSIs) of international importance; or • Global Geoparks. Contamination • Very high sensitivity land use (e.g. residential).
Medium	Rare and of national importance with little potential for replacement.	Geology • SSSIs; or • National Nature Reserves. Contamination • High sensitivity land use (e.g. public open space).
Low	Of regional importance with limited potential for replacement	Geology • Regionally Important Geological Sites (RIGS) Contamination • Medium sensitivity land use (e.g. commercial).
Negligible	Of local importance / interest with potential for replacement or little/ no local interest.	Geology • Non-designated geological exposures; • No geological exposures; or • Former quarries / mining sites. Contamination • Low sensitivity land use (e.g. highways and rail); or • No sensitive land use existing or proposed.

Magnitude

The magnitude of a potential effect considers the scale of the predicted change to the baseline condition taking into account its duration (i.e. the magnitude may be moderated by the effect being temporary, rather than permanent, short term rather than long term). Descriptions and examples of magnitude relevant to geology are presented in **Table 12-3 Criteria to determine the magnitude of impacts.** It is unlikely that any effects on geology and ground conditions would be beneficial, so the examples of magnitude all relate to adverse effects.

Table 12-3 Criteria to determine the magnitude of impacts

Magnitude	Description	Example(s)
High	Loss of feature/ designation and/ or quality and integrity, severe damage to key characteristics.	Geology • Destruction of features at a protected site; i.e. Sites of Special Scientific Interest (SSSI) of international importance; or Global Geoparks. Contamination • Significant contamination identified; • Contaminant concentrations significantly exceed background levels and relevant screening criteria; • Potential for significant harm to human health; or • Contamination heavily restricts future use of land.
Medium	Partial loss of feature / designation, potentially adversely affecting integrity; partial loss of/damage to key characteristics, features or elements.	Geology • Partial loss of features at a protected site; i.e. SSSIs;, Mineral Safeguarding areas. Contamination • Contaminant concentrations exceed background levels and are in line with limits of relevant screening criteria; • Significant contamination can be present; or • Control/remediation measures are required to reduce risks to human health / make land suitable for intended use.
Low	Minor measurable change in geological feature / designation attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.	Geology • Minor change of features at Geological sites; i.e. Regionally Important Geological Sites or Contamination • Contaminant concentrations are below relevant screening criteria; • Significant contamination is unlikely with a low risk to human health; or • Control measures can be required to minimise risks to human health.
Negligible	Very minor loss or detrimental alteration to one or	Geology

Magnitude	Description	Example(s)
	more characteristics, features or elements of geological feature / designation. Overall integrity of resource not affected.	• Very minor change of features at sites of local importance, i.e. former mining sites or non-designated geological sites. Contamination • Contaminant concentrations substantially below relevant screening criteria; or • No requirements for control measures to reduce risks to human health/make land suitable for intended use.

Significance of Effect

The significance of a specific potential effect is derived from both the sensitivity of the feature and the magnitude of the impact and can be determined using the matrix presented in **Table 12-4 Approach to Assessment of Significance**. Effects can be beneficial, adverse or negligible and their significance Major, Moderate, Minor or Negligible.

Table 12-4 Approach to Assessment of Significance

		Magnitude			
		High	**Medium**	**Low**	**Negligible**
Sensitivity	**High**	Major	Major	Moderate	Negligible / Minor
	Medium	Major	Moderate	Minor	Negligible
	Low	Moderate	Minor	Negligible	Negligible
	Negligible	Negligible / Minor	Negligible	Negligible	Negligible

Any effect predicted to be Negligible or Minor is considered to be 'Not Significant'. Effects assessed as Moderate or Major are considered to be 'Significant'.

12.5 Baseline Environment

The following sections describe the baseline conditions in relation to geology. Where relevant these are described from south to north i.e. from the proposed landfall at Kinghorn along the proposed underground DC cable route to the proposed converter station at Westfield including the proposed underground AC cable route to the new 400kV Westfield Substation.

Superficial Geology

The British Geological Survey (BGS) Onshore GeoIndex mapping (Ref 11.1) indicates that the superficial deposits underlying the Scottish Onshore Scheme (see **Figure 12.1 Superficial Geology**) and wider area are dominated by glacial till. This lithology typically comprises a diamicton type material, consisting of highly variable proportions of clay, silt, sand, gravel, cobbles and boulders of varying shapes and sizes. Between the proposed landfall and converter station sites there are small, localised areas of varying superficial deposits. This includes a small, localised area of lacustrine deposits comprised of clay, silt and sand south of the Grange, areas of alluvium which typically coincide with watercourses including the Tiel

Burn, Dronachy Burn and River Ore as well as areas recorded as peat at Hare Law (also recorded as made ground, see below) and on the northwest of the proposed converter station site extending west to the existing Westfield Substation.

Made Ground

The BGS Onshore GeoIndex mapping indicates localised areas of artificial ground are present underlying the Scottish Onshore Scheme and in the wider area (see **Figure 12.1 Superficial Geology**). Small areas are identified as present between the proposed landfall and the A92, however, with the exception of made ground at Muirhead where the proposed underground DC cable route crosses the A92, these are outside of the planning application boundary. North of the A92 larger areas of made ground are present typically coinciding with areas of previous mining activity or infrastructure such as roads or railway lines. The proposed underground DC cable route largely avoids these with the exception of an area of made ground as it routes around Hare Law into the proposed converter station site. A small area of made ground is located on the eastern margin of the proposed converter station site, however, this is outside of the area of permanent development, east of the converter station platform.

Bedrock Geology

The BGS Onshore GeoIndex mapping indicates that the bedrock geology across the Scottish Onshore Scheme is dominated by Carboniferous strata (see **Figure 12.2 Bedrock Geology).** The Scottish Onshore Scheme covers a number of rock formations which belong to the Clackmannan Group, the Strathclyde Group, the Bathgate Group, the Midland Valley Carboniferous to Early Permian Alkaline Basic Sill Suite and the North Britain Late Carboniferous Tholeiitic Suite.

The strata in the southern part of the Scottish Onshore Scheme from the proposed landfall north of Kinghorn to approximately Little Glenniston are predominantly volcanic and typically comprise basaltic tuff and lava flows. Some sedimentary sequences are also noted to be present. The strata underlying the northern part of the Scottish Onshore Scheme from approximately Little Glenniston, south of the A92 extending north to the proposed converter station at Westfield is predominantly sedimentary and typically comprise limestone or cyclic mudstone and siltstone, with sandstones and seatearth bands present within. Locally, the bedrock also includes igneous strata belonging to the sill complexes described as microgabbro, quartz-microgabbro and trace basalt and olivine analcime-microgabbro.

Soils

The National Soil Map of Scotland on the Scotland's Soils map viewer (Ref 11.2) was used to determine the soils present underlying and within the vicinity of the Scottish Onshore Scheme. The underlying soils comprise a mix of brown earths associated with the Darleith Association and noncalcareous gleys associated with Rowanhill Association. Both soil types are present in similar proportions across the Scottish Onshore Scheme. Areas of reinstated soils are also identified coinciding with areas of historic mining activity with relatively large areas present west of Auchterderran and at Hare Law.

NatureScot (formerly Scottish Natural Heritage) produced a Carbon and Peatland map in 2016 (Ref 11.8) which identifies carbon rich soil, deep peat and priority peatland habitats. This map splits the Carbon and Peatland soils into different classes ranging from nationally

important carbon-rich, deep peat and priority peatland habitat to mineral soils and non-soils. The top two classes, 1 and 2, taken together identify nationally-important peat resources. No areas of Class 1 or 2 soils are present within the study area. In relation to the areas at the proposed converter station which are indicated to be peat on the BGS Onshore GeoIndex, the Carbone and Peatland map identifies these as Class 5 (organic soils) at Hare Law and Class 4 (alluvial soils) to the northwest extending to the existing Westfield Substation.

Site History and Potential for Land Contamination

Historic Mining and Quarrying Activity

The Mining Remediation Authority map viewer (Ref 11.3) was reviewed to identify historic mining activity in the vicinity of the Scottish Onshore Scheme (see **Figure 12.3 Historic Mining Activity**). This shows that the majority of the Scottish Onshore Scheme north of the A92 lies within a Development High risk Area. This includes approximately 5 km of the proposed underground DC cable route as well as the proposed converter station site.

The map viewer identifies a number of mine entries within the study area. None are located within the planning application boundary for the Scottish Onshore Scheme, however, are in the immediate vicinity; one at Muirhead south of the A92 and one east of New Farm between the A92 and Fife Circle Railway Line.

The map viewer identifies surface mining activity (i.e. opencast) along the A92 corridor including where it would be crossed by the proposed underground DC cable route as well as a larger area to the north of the Scottish Onshore Scheme. This extends from south of Hare Law northwards to Craigend encompassing parts of the proposed underground DC and AC cable routes and all of the proposed converter station site. These areas are also identified on Mining Remediation Authority map viewer as past and probable shallow underground coal mine workings.

A review of historic mapping held by the National Library of Scotland mapping (Ref 11.9) was undertaken to identify historic mining and quarrying activity at and in the vicinity of the Scottish Onshore Scheme. This confirmed a number of collieries were present from the 17th century until the 20th century. These were largely to the north of the study area and included Dundonald Colliery, Cardenden Colliery, Minto Colliery, Denend Colliery, Cluny Colliery, Lady Helen Collieries and Capledrae Colliery. These were typically located on or to the east of the Scottish Onshore Scheme. Large areas of opencast workings were also recorded in the vicinity of the northern extent of the Scottish Onshore Scheme to the north of the proposed converter station. In addition to historic mining activity, historic quarrying activity also occurred in the vicinity of the Scottish Onshore Scheme with quarries present at Glenniston and Muirhead along the proposed underground DC cable route.

A review of BGS GeoIndex mapping (Ref 11.1) also identifies numerous mines and quarries are present within and adjacent to the Scottish Onshore Scheme, particularly focused in the northern half. Many of these entries appear to be related to the extraction of coal and so relate to the coal mine entries recorded by the Mining Remediation Authority, however, other locations are related to the extraction of other mineral sources, such as limestone and sandstone. All of the mines and quarries recorded are noted to have ceased operations.

Mineral Resources

A review of the various mineral resource data layers available in the BGS GeoIndex mapping (Ref 11.1) was undertaken to understand the potential mineral resources within the vicinity of the Scottish Onshore Scheme. The mineral occurrences layer identifies potential significant mineral occurrences within the UK. It identifies that barium may be east of the proposed underground DC cable route, east of Auchtertool and Newbigging and that iron may be present east of the proposed underground DC cable route southwest of Dundonald.

Other resources recorded within the study area include extensive shallow coal (typically underlying the northern parts of the Scottish Onshore Scheme), oil shale (underlying and adjacent to the proposed underground DC cable route between Kilrie and Lambert's Mill), silica sand (recorded underlying the southeastern part of the proposed converter station site), limestone veins (in localised areas recorded extending across the Scottish Onshore Scheme), brick clay (typically underlying the northern parts of the Scottish Onshore Scheme) and shallow igneous rock (predominantly located in the southern part of the Scottish Onshore Scheme).

Coal Mining Risk Assessment

Coal Mining Risk Assessments have been undertaken of the proposed underground DC cable route and the proposed converter station site. Separate risk assessment reports accompany the planning application, however, are briefly summarised here for completeness.

Proposed Underground DC Cable Route

The Coal Mining Risk Assessment (converter station) provides an overview of historic mining activity and identifies and assesses the risks to the proposed underground DC cable route from coal mining legacy.

Review of historical maps indicates historic mining and quarrying activity within the vicinity of, and extending below, the proposed underground DC cable route. This includes a number of collieries and associated pits, and quarries.

The Risk Assessment identifies and assesses three Risk Areas as follows:

- Risk Area 1 – extending from Muirhead south of the A92 north across the River Ore;
- Risk Area 2 – extending from north of the River Ore to Pitcairn; and
- Risk Area 3 – extending from the south/southeast of Hare Law to Torres Loan.

Based on the available information, the assessment concludes that there is an elevated surface stability risk within Risk Area 1. The surface stability risk in Risks Areas 2 and 3 is considered to be low as there is a lack of evidence of shallow underground coal mining in these areas. In Risk Areas 2 and 3 there are residual risks associated with the settlement or consolidation of backfill material as a result of temporary loading during installation of underground DC cables.

Proposed Converter Station Site

The Coal Mining Risk Assessment (converter station) provides an overview of historic mining activity and identifies and assesses the risks to the proposed converter station from coal mining legacy.

Review of historical maps indicates that while there was mining activity in the vicinity of the proposed converter station site with the nearest being Capledrae Colliery, it was primarily farmland until the 1960s when the Westfield opencast coal mine extended southwards. From around 2006 satellite imagery shows coal mining activity has ceased and the site is restored.

Based on the available information, the assessment concludes that there is a low risk to the proposed converter station as a result of historic coal mining activities, however, it does identify residual risks associated with the settlement or consolidation of backfill material in the area for former opencast mining activity.

Fife Council Historical Land Use Information

Fife Council's Historical Land Use and District Landfill map viewer (Ref. 11. 5) includes former land use and landfill records across the Scottish Onshore Scheme. This mapping indicates the following areas are present at and in the vicinity of the Scottish Onshore Scheme:

- North Mire refuse site (including unknown filled ground) which lies approximately 160m west of the proposed underground DC cable route where it crosses the A921 using trenchless methods.
- Historic quarry site between Broadleys and Piteadie House which is crossed by the proposed underground DC cable route.
- Former factory site including sawmill at Lambert's Mill approximately 160m south of the proposed underground DC cable route.
- Balbarton Landfill occupying a relatively large area south of the B925. The landfill, which was used for disposal of municipal waste appears to have last accepted waste in the 1990s. The landfill site lies approximately 50m north of the proposed underground DC cable route separated by the Tiel Burn.
- Former railway line to the north of the B925 which is crossed by the proposed underground DC cable route to the east of New Cottoun.
- Former quarry and cement production at Little Glenniston approximately 200m west of the proposed underground DC cable route.
- Landfill and quarry at Muirhead south of the A92. This lies to the west of the proposed underground DC cable route where it crosses the A92, however, a temporary compound is located at the landfill site known as Powguild Farm.
- Records relating to former coal mining activity at Dundonald Plantation north of the A92. This lies to the immediate east of the proposed underground DC cable route.
- Unknown filled ground to the west of proposed underground DC cable route between Spittal Wood and the Fife Circle Railway line.
- Records relating to refuse disposal and mining/quarrying activity including former minerals railway line in the vicinity of Brighills Farm to the west and east of the B981. The proposed underground DC cable route crosses this area using trenchless methods and intersects these recorded sites.

- Former refuse disposal and quarry activity to the north and southwest of Pitcairn approximately 50-100m north and west of the proposed underground DC cable route respectively.
- Records identifying a heap comprised of unknown constituents at Hare Law which is understood to have been formed as part of the reinstatement of former mining activity. This lies to the north of the proposed underground DC cable route.
- Unknown filled ground between Hare Law and Woodend to be crossed by the proposed underground DC cable route as it reaches the proposed converter station site.
- Westfield opencast site to the north of the B9097, north of the proposed converter station site.

Potential Contaminants of Concern

Based on historic and current land use and taking account of Department of Industry Profiles, sources of contamination and potential contaminants of concern are present in the vicinity of the Scottish Onshore Scheme include those identified in **Table 12-5 Potential Contaminants of Concern.**

Table 12-5 Potential Contaminants of Concern

Source of Contamination	Contaminants of Concern
Existing and former railway land to be crossed by the proposed underground DC cable route	Hydrocarbons including diesel, lubricating oils and paraffin, polychlorinated biphenyls (PCB), solvents, ethylene glycol, polycyclic aromatic hydrocarbons (PAH) from creosote, herbicides, metals including metal fines and ferrous residues, phenols, sulphates and asbestos containing materials
Historic landfills and tips in the vicinity of the Scottish Onshore Scheme including a former refuse tip north of Kinghorn/west of the proposed underground DC cable route and landfill at Balbarton in the vicinity of the proposed underground cable route	Leachates and landfill gas (other contaminants may be present subject to the nature of waste received).
Made ground and infilled ground associated with historic mining and quarrying works and related activities in the vicinity of the Scottish Onshore Scheme	Metals, hydrocarbons, polycyclic aromatic hydrocarbons (PAH), volatile organic compounds (VOC), semi-volatile organic compounds (SVOC), asbestos, ash and organic materials
Contaminated soil and groundwater associated with historic coal mining activity along the proposed underground DC cable route and at the proposed converter station.	Metals, hydrocarbons, polycyclic aromatic hydrocarbons (PAH), volatile organic compounds (VOC), semi-volatile organic compounds (SVOC), asbestos, polychlorinated biphenyls (PCB)

Source of Contamination	Contaminants of Concern
Ground gas associated with infilled opencast and made ground deposits in the vicinity of the Scottish Onshore Scheme	Methane, carbon dioxide, hydrogen sulphide, carbon monoxide.
Contaminants potentially present at the existing Westfield Substation	Metals including heavy metals, polychlorinated biphenyls (PCB), TPH, transformer oil and polycyclic aromatic hydrocarbons (PAH)

Ground Gas

Ground gas including methane and carbon dioxide may be present associated with the natural strata and made ground deposits underlying the Scottish Onshore Scheme. Ground gas may also be associated with recorded landfills and other infilled land including historic coal mining or quarrying site. The results of ground investigation at the proposed converter station site have assigned the site as BS 8485:2015+A1:2019 Characteristic Situation (CS) 3. Buildings at the proposed converter station site should therefore include sufficient gas protection measures.

Radon

The UK Health Security Agency's UK Radon Map was reviewed to determine potential radon risks at and in the vicinity of the Scottish Onshore Scheme. This indicates that the Scottish Onshore Scheme is located within an area where less than 1% of homes are above the action level for radon gas. As a result, no radon protection measures are required.

Preliminary Ground Investigations

Ground investigations have been undertaken to inform the development of the Scottish Onshore Scheme. This includes targeted ground investigation along the proposed underground DC cable route (including proposed trenchless crossing locations) and at the proposed converter station. Separate ground investigation reports accompany the planning application. These largely confirm that the ground conditions are consistent with desk-based information. With regard to peat, the ground investigations, confirmed that buried peat is present in localised areas interspersed with other superficial deposits i.e. peat is not present in the form of blanket bog but is present in localised areas where it presents largely as amorphous peat.

Contaminated land risk assessments informed by the preliminary ground investigations have been undertaken for the proposed underground DC cable route and proposed converter station site with separate reports accompanying the Application.

Geology Designations

There are a number of sites designated for geological conservation purposes within the vicinity of the Scottish Onshore Scheme. These are listed in **Table 12-6 Designated Site relating to geology** below and are shown on **Figure 12-4 Geology Designations**.

Table 12-6 Designated Site relating to geology

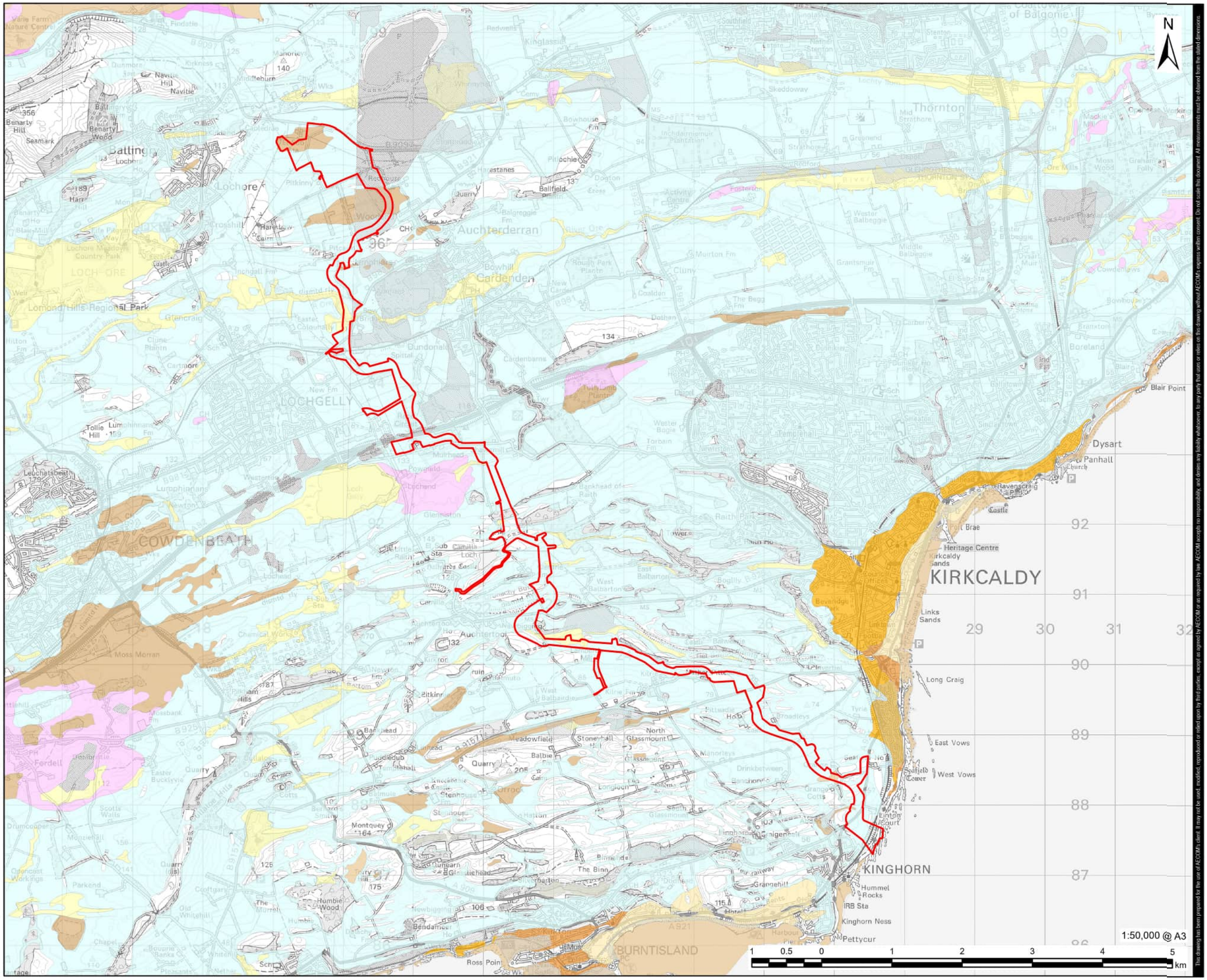
Name & Designation	Features	Location
Firth of Forth Site of Special Scientific Interest (SSSI)	Geological: Carboniferous, igneous petrology & palaeontology	Crossed by the Scottish Onshore Scheme (at landfall)
Invertiel Quarry SSSI & GCR	Geological: Lower Carboniferous	Located approximately 1km north/northeast of the Scottish Onshore Scheme (proposed underground DC cable route). Due to the distance from the Scottish Onshore Scheme this site would not be significantly affected.
Kinghorn Coast GCR	Geological: Dinantian of Scotland	Crossed by the Scottish Onshore Scheme (at landfall)
Burntisland to Kinghorn Coast GCR	Geological: Carboniferous-Permian Igneous	Crossed by the Scottish Onshore Scheme (at landfall)
Abden GCR	Geological: Carboniferous fossil fish	Crossed by the Scottish Onshore Scheme (at landfall)

Future Baseline

It is not expected that the future baseline, with respect to geology and ground conditions, would change significantly. The underlying superficial and drift geology would be expected to remain the same. Areas of historic mining activity and/or contamination would be expected to remain the same or be remediated by others, however, such changes would be highly localised and relate to other developments or activities. This assumes that any future development or activities undertaken within the study area would be permitted or controlled in accordance with current contaminated land legislation.

Revision: 1 Drawn:MLS Checked:LC Approved: VD Date: 2025-11-27

Filename: \\eu.aecomnet.com\euprojectvol\UKNCL2-IE\Environmental Group Management\GIS Management\SPEN OTNR\02_Maps\Eastern Link 4\EIA Report\EGL4_EIA_Ch12_Geology.aprx



AECOM

PROJECT

Eastern Green Link 4

CLIENT

SP Energy Networks

CONSULTANT

AECOM Limited
One Trinity Gardens
Newcastle
NE1 2HF
www.aecom.com

LEGEND

🟥 Planning Application Boundary

BGS 1:50k Artificial ground

▨ Made Ground (Undivided)

▩ Infilled Ground

BGS 1:50k Superficial deposits

🟨 Alluvium

🟦 Till, Devensian

🟪 Glaciofluvial Deposits

🟫 Peat

NOTES

Drift geology and artificial ground features legend is limited to the Planning Application Boundary
Contains Ordnance Survey Data © Crown copyright and database rights 2025
Contains British Geological Survey materials © UKRI 2025

ISSUE PURPOSE

EIA REPORT

PROJECT NUMBER

60707131

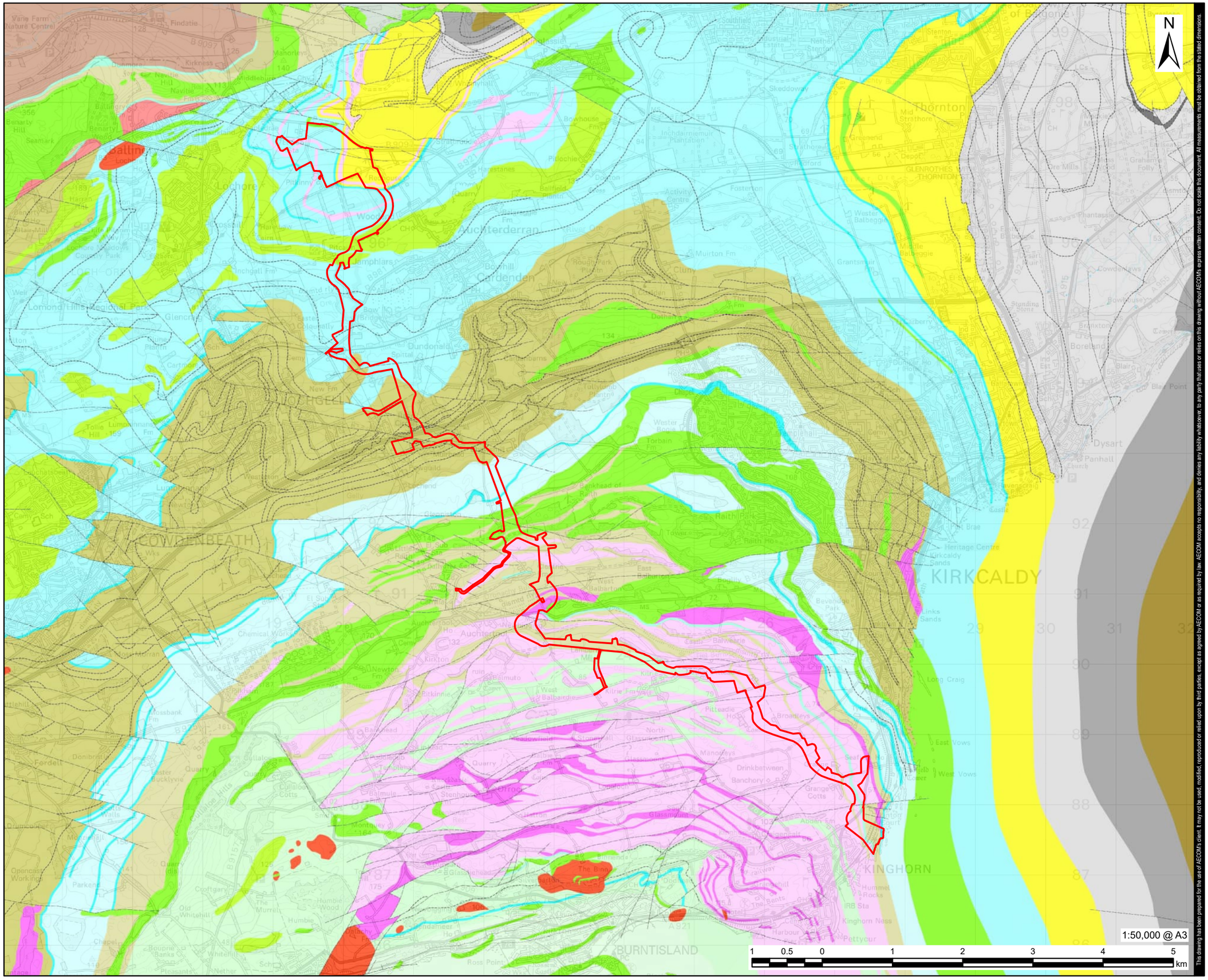
FIGURE TITLE

Superficial Geology

FIGURE NUMBER

Figure 12.1

Revision: 1 Drawn: LC Checked: MLS Approved: VD Date: 2025-09-09



AECOM

PROJECT

Eastern Green Link 4

CLIENT

SP Energy Networks

CONSULTANT

AECOM Limited
One Trinity Gardens
Newcastle
NE1 2HF
www.aecom.com

LEGEND

- Planning Application Boundary

BGS 1:50k Linear features

- Fault_Inferred
- Coal Seam Inferred

BGS 1:50k Bedrock

- Upper Limestone formation Sedimentary Rock Cycles
- Upper Limestone Formation Lava Basaltic
- Castlecary Limestone
- Passage Formation Sedimentary Rock Cycles
- Passage Formation Lava Basaltic
- Hawkcraig Point Sill
- Limestone Coal Formation Sedimentary Rock Cycles
- Blackhall Limestone
- Dinantian to Westphalian Sills of Lothians and Fife
- Pathead Formation Sedimentary Rock Cycles
- Kinghorn Volcanic Formation Basaltic Tuff and Basaltic Lava
- Kinghorn Volcanic Formation Tuff Basaltic
- St Monans White Limestone
- Sandy Craig Foramtion Sedimentary Rock Cycles
- Hurlet Limestone

NOTES

Bedrock geology and linear features legend limited to the Planning Application Boundary

ISSUE PURPOSE

EIA REPORT

PROJECT NUMBER

60707131

FIGURE TITLE

Bedrock Geology

FIGURE NUMBER

Figure 12.2

Filename: C:\Users\lemonsmithm\Documents\SPEN OTNR\02_Maps\Eastern Link 4\EIA Report\EGL4_EIA_Ch12_Geology.aprx