Appendix B Geo-environmental and Geotechnical Desk Study Report

Scotland England Green Link 1 - English Onshore Scheme

Geo-Environmental and Geotechnical Desk Study
Land at Hawthorn Pit

National Grid Electricity Transmission

18 August 2022

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Quality information

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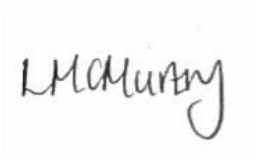			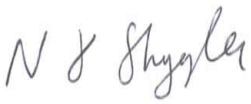
Laura McMurtry Environmental Scientist	Edward Richardson Principal Geo-Environmental Consultant	Iain McBurnie UK&I Remediation Practice Director	Nick Struggles Technical Director

Prepared for:

National Grid Electricity Transmission

Prepared by:

Laura McMurtry
Environmental Scientist
E: laura.mcmurtry@aecom.com

AECOM Limited
AECOM House
179 Moss Lane
Cheshire, Altrincham WA15 8FH
United Kingdom

T: +44(0)1619 278200
aecom.com

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1. Introduction

1.1 Terms of Appointment

On the instructions of National Grid Electricity Transmission (the Client), AECOM Limited (AECOM) has carried out a Phase 1 Geo-environmental & Geotechnical Desk Study of a land parcel at the southern end of the scheme, the former Hawthorn Colliery (the site).

This work has been carried out as part of the wider Scotland England Green Link 1 (SEGL 1) – English Onshore Scheme (EOS). This report should be read in conjunction with the Environmental Assessment Report (EAR) submitted as part of the current planning application for the site, which provides further information of the EOS as well as information around further work and mitigation of potential impacts in relation to geo-environmental issues.

1.2 Background and Proposed Development

The report has been produced on the assumption that the site will be redeveloped to include the erection of a new 400 kilovolt electricity substation, a converter station, and the laying out of replacement public open space on land to the west and south of Jade Business Park. The project is currently going through the planning application process.

1.3 Report Objectives

The primary objectives of this report are to:

- Determine whether potentially contaminative uses have taken place within, or in close proximity to, the site which could have led to the contamination of underlying soils or groundwater; and
- To understand the effects of the geological conditions and site activities on the geotechnical properties for site redevelopment.

This Phase 1 report is prepared to advise on site condition under the requirements of Town and Country Planning Act 1990 (as amended), the National Planning Policy Framework (2021) and considers the potential implications of Part 2A of the Environmental Protection Act 1990 (Part 2A) and the associated Contaminated Land (England) Regulations 2006 and Contaminated Land Statutory Guidance (2012).

This report has been prepared in general accordance with the technical guidance and procedures described in the UK Government guidance Land Contamination: Risk Management (2019) and its predecessor, Model Procedures for the Management of Land Contamination, Contaminated Land Report (CLR) 11 (Department of Food and Rural Affairs (Defra)/Environment Agency, 2004), British Standard (BS) 5930:2015 (as amended) Code of Practice for Site Investigations (BSI), BS:EN 1997 Eurocode 7 – Geotechnical Design (BSI) and BS 10175:2011 (as amended) Investigation of Potentially Contaminated Sites – Code of Practice (BSI), to:

- Describe the geology, hydrogeology and shallow mining potential;
- Describe the environmental setting/ sensitivity and current/ historical land use of the site and surrounding area;
- Describe the findings of a site reconnaissance visit;
- Summarise the history of the site;
- Summarise the underlying geology and hydrogeology;
- Summarise the findings of historical ground investigation work;
- Provide an initial Conceptual Site Model (CSM) for the prevailing ground conditions;
- Using the source-pathway-receptor model present a preliminary qualitative risk assessment of potential land contamination risks to human (chronic), environmental, or controlled water receptors from contamination sources on or in the vicinity of the site, via transport pathways;

- Present a preliminary qualitative evaluation of potential geotechnical issues; and
- The report concludes with a series of recommendations for undertaking further investigative work. The purpose of such is to substantiate the findings of the preliminary risk assessment and thereby refine the CSM.

1.4 Sources of Information

This report has been prepared using a combination of published records (e.g., British Geological Survey (BGS), Environment Agency, Defra), information provided by the Client, and available ground investigation reports (WSP, 2022). These include statutory records and historical mapping supplied within a Groundsure Information, published geological and hydrogeological mapping, historical borehole records, correspondence with the Environmental Health Officer for Durham County Council and observations made during the site reconnaissance.

Specific information sources are referenced throughout the document and a bibliography is included in Section 14 of the report.

2. Site Setting

2.1 Location

The site is located at Hawthorn Pit, Grid Substation, Murton, Durham, DH6 2RP. The site is approximately 800m south of Murton town centre. It is centred on National Grid Reference 438933E, 545631N. A site location plan is provided as **Figure 1**.

2.2 Description and Setting

The site covers an area of approximately 48 hectares and is defined by the red line boundary shown in **Figure 2.**

The site is currently predominantly agricultural land with areas of dense vegetation with two existing substations in the northwest of the site. There are several tracks which transect the site and connect the site to the neighbouring towns (South Hetton and Murton) and Jade Business Park.

Relevant features immediately surrounding the site are summarised in Table 2.1.

Table 2.1. Features Surrounding the Site

Direction	Summary (>500m)
North	The site is bounded immediately by Jade Business Park and agricultural fields, beyond which is Murton town centre (1 km).
South	The site is bounded immediately by a Caravan Storage Compound and agricultural fields, beyond which is South Hetton (200 m) which includes residential properties and Sports Ground (360 m).
East	The site is bounded immediately by agricultural fields, beyond this is a Dairy Farm (450 m) and a Wind Turbine (250 m).
West	The site is immediately bounded by agricultural fields, a former colliery (SW), beyond which is South Hetton (225 m). Coldwell Burn is 740m west.

3. Geological and Environmental Setting

3.1 Introduction

The environmental setting including the topography, geology, hydrogeology, and hydrology are the key factors that influence the way in which contaminants in the soil or groundwater can be transported on or off site, and also the way in which contamination can affect applicable receptors including controlled waters and users of the site.

The environmental setting of the Site has been assessed by making reference to the information sources detailed in Section 1.4.

3.2 Geology and Soils

3.2.1 Published Geology & Exploratory Hole Records

Published geological maps acquired from the Groundsure GIS [1] at 1:10,000 scale and from BGS published mapping [2] at 1:50,000 scale, indicate that the EOS is underlain by the geological succession summarised below in Table 3.1.

Table 3.1. Geological Succession from Published Mapping

Geological Stratum	Stratum	Approximate Location on Site
Made Ground	Artificial Deposits	Majority of the site
Glaciofluvial Deposits – Sand and Gravel	Superficial	Section immediately below existing substation
Alluvium – Gravel, Sand and Silt	Superficial	Section within southwest corner
Till – Diamicton	Superficial	Majority of the site
Ford Formation – Dolostone	Bedrock	Covers the entire site

Source: Groundsure Report Ref: GIS and BGS

The BGS maintains an archive of historical exploratory hole records throughout the UK. AECOM has searched the database and those which are considered to provide useful information on the ground profile at the site are highlighted as part of the extract below. 2 No. boreholes have been referenced in producing this report. Copies of these exploratory hole records are included as Appendix A and relevant information from the records is considered as part of the Preliminary Ground Model in Section 8.

3.2.2 Soils and Soil Chemistry

Information obtained from Soilscapes describes the soils within the vicinity of the site (Soilscape 18) as slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils. Land cover is a mixture arable grassland which drains to local groundwater and rivers, and developed land associated with existing substation.

Natural England reports the Agricultural Land Use Classification to be Grade 3, good to moderate quality agricultural land.

The BGS Soil Chemistry datasets provide indicative information on regional concentrations of five potentially harmful elements (PHEs): arsenic (As), cadmium (Cd), chromium (Cr), nickel (Ni) and lead (Pb) in soil, as presented within the Groundsure Report. Elevated concentrations of these PHEs can exist because of natural geological conditions or possible anthropogenic contamination. The following BGS estimated soil chemistry levels are attributed to the vicinity of the site based on the geometric mean concentrations of available data (presented in Table 3.2).

Table 3.2. Estimated Soil Chemistry

Potentially Harmful Element	Estimated geometric mean concentration (mg/kg)
Arsenic	<15
Cadmium	<1.8
Chromium	60-90
Lead	<100 - 200
Nickel	15-30

Source: Groundsure GIS

3.2.3 Mining and Mineral Extraction

3.2.3.1 Coal Mining

Available online Coal Authority resources [3] indicated that the site is located within a Coal Mining Reporting Area and a Coal Authority 'mining and groundwater constraint B' is in place, signifying that it is 'on the coalfield area' and that 'specific requirements for major development and deep ground works or deep drainage boreholes' are required.

The site is recorded as being predominantly in a low-risk area of coalfield development and within 500 m of recorded surface coal resource areas (Coal Authority Ref: 51002544185001).

Consultant's Coal Mining Reports (CCMRs) were obtained for the site [4]. Key features identified by those reports are summarised below. Copies of the Consultant's Coal Mining Reports are provided as **Appendix B.**

3.2.3.2 Surface Ground Workings

No current Coal Authority managed tips or opencast mines are recorded within 250 m of the site.

The Groundsure data has identified several surface workings on site and within 250 m of the site, these are detailed below:

- Cuttings;
- Refuse Heap;
- Colliery;
- Sludge beds; and
- Unspecified Heaps.

3.2.3.3 Underground Workings

According to Durham Mining Museum online resources [5] and Groundsure Data, there are 2 No. former colliery sites within 250 m:

- South Hetton Colliery (north of South Hetton village): Operated from 1833 to 1982, two shafts, maximum depth approximately 590 m, targeting the Three Quarter, Five Quarter, Main, Maudlin, Low Main, Hutton, Harvey and Busty coal seams; and
- Hawthorn Combined Mine ('Hawthorn Pit', substation/ converter station area, immediately east of South Hetton Colliery): Operated from 1953 to 1983, one shaft, depth approximately 450 m. No information provided on seams targeted.

3.2.3.4 Mine Entries

Three mine entries are recorded within 250 m of the site, as summarised in Table 3.3. These mine entries are classified as '*Development High Risk Areas*' and '*Mine Entry Potential Zones of Influence'*.

Table 3.3: Summary of Mine Entries

Entry type	Coal Authority Reference	Grid Reference	Treatment Description	Location	Associated Colliery
Shaft	438545-001	438095 545299	Reportedly filled and capped at 5 m bgl to British Coal specifications in 1987.	By Conishead Terrace, South Hetton, 400 m south of the working width.	Inferred to be the two shafts at the South Hetton Colliery (1833 – 1982).
Shaft	438545-002	438109 545255	Reportedly filled in 1987 and capped in 1988 both to British Coal specifications at the time.	By Conishead Terrace, South Hetton, 430 m south of the working width.	
Shaft	438545-003/ I-357203	438896 545850	Reportedly sealed with a 13.4 m reinforced concrete cap set on competent strata. The shaft was fitted with a gas vent and is reportedly used by the Coal Authority to monitor mine water levels and gas concentrations. Security works (fencing/ chains/ padlock, I-357203) took place in November 2020.	Approximately 190 m east of the proposed substation.	Inferred to be the shaft at the Hawthorn Combined Mine (1953 – 1983).

The former shaft located approximately 190 m from the proposed substation at Hawthorn Pit (ref 438545-003, above) was observed during a site walkover by AECOM on 28 July 2021. The shaft location was clearly fenced to prevent public access.

3.2.3.5 Coal Mining Remediation

The CCMR (**Appendix B**) state that the site is '*within an area of previous interest. It is close to where the Coal Authority or licensed mine operator has investigated and where necessary remediated:*

- *Mine entries and/or shallow coal mining workings following specific reported hazards;*
- *Issues relating to coal mining subsidence; and*
- *The effects of mine or ground gas emissions following specific reported hazards.'*

3.3 Ground Gas

Ground gas, including methane and carbon dioxide, may be present, associated with the natural strata and Made Ground deposits, where present. Ground gas may also be associated with identified historical landfills as well as historical coal mining.

3.4 Summary of Geotechnical Features

A review of geotechnical features from Groundsure GIS data [1] within the site is presented in Table 3.4**.**

Table 3.4: Summary of Geotechnical Features

Geotechnical Features	Classification	Definition of Classification	Locations
Collapsible Deposits	A	'Deposits with potential to collapse when loaded and saturated are believed not to be present.'	Small section south of substation, around Hawthorn Pit.
	B	'Deposits with potential to collapse when loaded and saturated are unlikely to be present.'	Remainder of the site.
Compressible Deposits	A	'Compressible strata are not thought to occur.'	Small section south of substation, around Hawthorn Pit.
	D	'Compressibility and uneven settlement hazards are probably present. Land use should consider specifically the	Remainder of the site.

Geotechnical Features	Classification	Definition of Classification	Locations
		compressibility and variability of the site.'	
Landslides	B	'Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.'	Whole site.
Ground Dissolution of Soluble Rocks (	B	'Soluble rocks are present within the ground. Few dissolution features are likely to be present. Potential for difficult ground conditions or localised subsidence are at a level where they need not be considered.'	Whole site.
Running Sand	B	'Running sand conditions are unlikely. No identified constraints on land use due to running conditions unless water table rises rapidly.'	Remainder of the site.
	C	'Running sand conditions may be present. Constraints may apply to land uses involving excavation or the addition or removal of water.'	Small section south of substation, around Hawthorn Pit.
Shrink Swell Clays	A	'Ground conditions predominantly non-plastic.'	Small section towards central northern boundary.
	B	'Ground conditions predominantly low plasticity.'	Remainder of the site.

3.5 Radon

Based on information provided in the Groundsure Insight Report, the majority of the site is situated within a lower probability radon area, where less than 1% of homes are estimated to be at or above the action level. There are also two sections within the site boundary (surrounding the existing substation and area for the proposed substation) where the radon level is between 1 – 3%. The report states that no radon protective measures are necessary in the construction of new dwellings or extensions.

3.6 Unexploded Ordnance Potential

Online Zetica Unexploded Ordnance (UXO) risk mapping [6] indicates that the site is classified as 'Low' risk (15 bombs per 1,000 acres, or less). Risk map can be found in **Appendix C.**

3.7 Hydrogeology

3.7.1 Aquifer Classification

Aquifer classification maps on Defra's 'MAGIC' mapping portal [7] and Groundsure GIS data [1] indicate the following aquifer classifications are present underlying the site, as presented in Table 3.5.

Table 3.5 Summary of Aquifer Classifications

Stratum Type	Aquifer Classification	Definition (Environment Agency)	Location
Superficial	Secondary A Aquifer	'permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers'	Corresponding to locations of glaciofluvial and alluvial superficial deposits
	Secondary Undifferentiated	'it has not been possible to attribute either category A or B to a rock type/ superficial. In most cases, this means that the layer in question has previously been designated as both	Corresponding to locations of Glacial Till superficial

Stratum Type	Aquifer Classification	Definition (Environment Agency)	Location
		minor and non-aquifer in different locations due to the variable characteristics of the rock type'	deposits, underlying the majority of the site.
Bedrock	Principal Aquifer	'layers of rock or drift deposits that have high intergranular and/ or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/ or river base flow on a strategic scale'	Underlying the entire site corresponding to Ford Formation dolostones.

3.7.2 Water Framework Directive Groundwater Bodies

The site overlies a single Water Framework Directive (WFD) groundwater body – the Wear Magnesian Limestone. In 2015 (latest available data), this groundwater body was assigned an overall 'Poor' quality rating (biologically 'good' and chemically 'poor').

3.7.3 Groundwater Vulnerability

Both the superficial and bedrock aquifers on site have been classified as productive however, the groundwater vulnerability' of the entire site has been classified as 'Low' as detailed from the Groundsure data. All associated terminology/definitions can be found in this document.

3.7.4 Source Protection Zones

In terms of identifying the risk of contamination from potential polluting activities in a given area to groundwater sources (wells, boreholes, and springs) used for supplying public drinking water, the Environment Agency identifies Source Protection Zones (SPZ). These show the extent of a groundwater source catchment and are divided into three zones, can be found on the Environment Agency section of the gov.uk website.

The site falls within a SPZ3 – Total Catchment northwest of the existing substation and along the southwest boundary of site. A SPZ2 – Outer Protection Zone is situated 500 m northeast of site and 350 m southeast of site.

3.7.5 Licensed Groundwater Abstractions

The DCC Environmental Action Team stated that there were no records of any private water supplies within the site and surrounding area (**Appendix D**).

The EA [8] indicated that there is one licenced groundwater abstraction point for 'Seaton Spring Ltd' for water bottling from the Permian Magnesian Limestone. The licence permits an extraction of up to 40 cubic meters per day. This abstraction is located 2.3 km northeast of the site and is the source protected by the Seaton Bank Top SPZ.

3.8 Hydrology

3.8.1 Surface Water Courses and Drainage

There is one stream which transects the site in the southwest corner.

3.8.2 Water Framework Directive Surface Water Bodies

The site is within the Dalton Beck to North Sea WFD surface water catchment.

There are two WFD Rivers situated within 500 m of the site, this includes Dalton Beck, which is situated at its closest point, approx. 30 m south of site and Pittington Beck from Coalford to Old Durham Beck which is situated approx. 275 m west of site.

Table 3.6 summarises the pertinent surface water quality information available associated with the site.

Table 3.6 Surface Water Quality

Surface Water Feature	GQA (Chemical)	GQA (Ecological)	Distance (m)	Direction	Date
Dalton Beck	Good	Moderate	30 m	South	2016
Pittington Beck from Coalford to Old Durham Beck	Good	Moderate	275 m	West	2016

Source: Groundsure GIS

3.8.3 Licensed Surface Water Abstractions

According to Abstraction Licensing data (accessed July 2021) and provided by the EA, there are no licensed surface water abstractions within the 5 km study area. There is the potential for unlicensed surface water abstractions to be present within the 5 km study area, however no records of unlicensed surface water abstractions are available. Consequently, they are considered to have a low likelihood of providing a public or private water supply due to their limited abstraction volume. As such, they are considered to be of low value.

3.8.4 Risk of Flooding from Surface Water

The indicative floodplain map for the area, published by the EA, shows that the majority of the site is considered to be within a Flood Zone 1, with low risk of flooding according to the indicative floodplain map for the area, published by the EA.

4. Historical & Planned Development

4.1 Historical Ordnance Survey Mapping & Aerial Photographs

Historical Ordnance Survey (OS) maps of the Site and the wider environs were provided in the Groundsure Map Insight Report (scales 1:2,500, 1:10,560 and 1:10,000) and from Google Earth Pro and these are reviewed in this section.

The historical Ordnance Survey (OS) maps obtained with the Groundsure report date between 1885 and 1990.

Table 4.1 presents a summary of the main features present on and within approximately 500 m radius of the Site boundary. AECOM notes that only indicative map scales are provided. Where dates are stated, these refer to the dates of maps on which the features are present, have changed use or are no longer annotated, and do not necessarily refer to the exact dates of existence of a particular feature. Development that may have occurred between map editions is recorded as occurring on the latter published map, hence there are some limitations to the accuracy to the date of development unless supplementary evidence is available:

Table 4.1 Summary of Historical Mapping

Feature	Mapping dates shown	Distance and direction from Site
Cuttings / sidings / railway buildings	1895 - 1990	295 m NE
Electrical substation/ transformer	1969 - 1993	On site
Colliery/ mine and associated ground workings	1856 - 1990	On site
Railway sidings (mineral railway)	1896 - 1975	
Quarry	1940	
Refuse heap	1967 - 1975	
Electrical substation	1976 - 1985	
Tanks (unspecified)	1957 - 1990	
Industrial estate / depots	1967 - 1990	
Sludge Beds	1975 - 1990	On site
Tanks (sewage)	1896	473 m W
	1957 - 1982	257 m NW
Magazine	1986	110 m S
Tanks (various, unspecified)	1969	40 m E
	1956 -1990	70 m E
	1986 - 1989	40 m E
	1957 - 1990	40 m E

Feature	Mapping dates shown	Distance and direction from Site
	1919	115 m S
	1986	140 m SW
	1896	160 m SW
	1969 - 1982	315 m W
	1919 - 1939	325 m W
	1957	327 m W
	1969 - 1982	380 m W
	1857	285 m N

4.2 Planning Authority Records

A search of the Durham County Council Planning Portal has been undertaken. The Planning Portal has returned 2 No. applications registered within 500 m of the site. A summary of the applications can be found in Table 4.2.

Table 4.2 Summary of Planning Applications

Planning Reference	Date	Applicant	Details	Status	Location
DM/22/01663/OUT	Wed 08 Jun 2022	National Grid Electricity Transmission Ltd	Hawthorn Grid Site Murton DH6 2RX Outline planning application for the erection of a new 400 kilovolt electricity substation, a converter station, and the laying out of replacement public open space on land to the west and south of Jade Business Park, with all matters reserved	Pending Consideration	On site
DM/22/00747/FPA	Mon 14 Mar 2022	Harmony Energy	Hawthorn Grid Site Murton DH6 2RX Creation of battery energy storage facility with associated works and access	Pending Consideration	25 m E

5. Review of Historical Reports

5.1 Geo-Environmental Report (WSP, 2022)

National Grid Electricity Transmission Ltd commissioned WSP to undertake a ground investigation for E2DC - Eastern Link Torness to Hawthorn Pit Project which comprised two areas known as Substation A and Convertor Station E. Both of these areas fall within the site's boundary (Substation A immediately south of existing substation in northwest corner and Convertor Station E situated in the southeast corner of site). The report was factual in nature.

5.1.1 Summary

Ground investigations were undertaken at the proposed substation and converter station locations in June – September 2021 as part of the EOS [9].The investigations comprised:

- Four boreholes to up to 43.5 m bgl and 12no. machine-excavated trial pits to up to 2.8 m bgl at the proposed substation location; and
- Five boreholes to up to 45.0 m bgl at the proposed converter station.

The strata encountered during the 2021 investigations generally corresponded to the anticipated geology based on BGS mapping, and comprised:

- Made Ground: At the substation location, between 4.3 m and 10.7 m of Made Ground was recorded at all investigation locations, comprising grey clay with sand, gravel and cobbles of sandstone, mudstone, brick, wood and concrete. Hydrocarbon odours were recorded at four locations/ depths. However, at the converter station, Made Ground was only encountered at one of the five locations, to a depth of 0.8 m bgl and comprising dark brown sandy clay;
- Superficial deposits: Beneath the Made Ground (where present) superficial deposits consistent with Glacial Till (brown, slightly sandy clay), overlying glaciofluvial and/ or alluvial deposits (sand and gravel and grey silty clay) were encountered. The superficial deposits were reported to extend to a depth of 24.2 – 30.2 m bgl (substation location) and 28.7 – 33.7 m bgl (converter station location); and
- Bedrock: Bedrock, comprising weathered, yellowish-brown dolomite of the Ford Formation, containing regular voids up to 40 mm (infilled with calcite), was encountered beneath the superficial deposits to the base of the boreholes at both the substation and converter station locations.

6. Regulated Activities and Statutory Consultation

6.1 Introduction

The key relevant features that characterise the site and surrounding area are summarised in this section, along with an indication of the risk to the land quality of the site.

Information on groundwater and surface water abstractions is detailed in Sections 3.7 and 3.8and is not repeated here.

Generally, any regulated activities within 250 m of the site could, depending upon their nature, represent potential off-site sources of contamination. Whilst a 1 km search area was generally adopted this section places emphasis on those activities present within 250 m.

6.2 Regulated Processes

Table 6.1 summarises information on regulated processes contained in the Groundsure data. The report collates data from a variety of sources including the Environment Agency (EA) and the British Geological Survey (BGS). All data suppliers are referenced in the report.

There were no entries for the following:

- Contaminated Land Entries and Notices
- Prosecutions Relating to Controlled Waters
- Enforcement and Prohibition Notices
- Integrated Pollution Controls
- Integrated Pollution Prevention and Control
- Local Authority Integrated Pollution Prevention and Control
- Local Authority Pollution Prevention and Controls
- Local Authority Pollution Prevention and Control Enforcements
- Prosecutions Relating to Authorised Processes
- Registered Radioactive Substances
- Substantiated Pollution Incident Register
- Water Industry Act Referrals
- Explosive Sites
- Notification of Installations Handling Hazardous Substances (NIHHS)

Table 6.1 Summary of Regulatory Information

Subject	Number present				Details >250 m
	On site	0-250 m	250-500 m	500-1000 m	
Agency & Hydrological					
Licensed Discharge to Controlled Waters	0	2	3	-	• (2 No. entries) Coop House Wood – Sewage Discharge – Water Company – Permit Number 255/1135 (250 m S) • (3 No. entries) HASWELL SSO NO 3, EASINGTON DISTRICT – Sewage Discharge – Water Company – Permit Number 255/E/0643 (350 m W)
Licensed Pollutant Release Part A2 B	0	1	-	-	• Megamix – Historic Consent – Use of Cement (135 m S)
Current or Recent Pollution Incidents	0	4	-	-	• Category 3 (Minor) Land – Diesel (220 m W, February 2003) • Category 3 (Minor) Land and Water – Lubricating Oils (60 m SW, November 2002) • Category 3 (Minor) Water – Crude Sewage (250 m S, March 2003) • Category 2 (Significant) Water – Final Effluent (180 m S, April 2007)

Source: Groundsure GIS

6.3 Current and Historic Landfills

Recorded current and historic landfills identified within 250 m of the site, these have been identified in Table 6.2.

Table 6.2. Summary of Current and Historical Landfills

Landfill Type	Description
EA historic landfill	Approximately 170 m south of site; Site name 'Area Y South of Hetton Miner' (site ref ES 007, P1/8/5/7)'. No further details provided.
Permitted Waste Sites Authorised Landfill (EA)	None identified within 250 m of site.
Waste and Landfill Historic Sites (Groundsure GIS Geo and Enviro Insight)	Immediately bordering site to the south, historic scrapyard (Windermere Road, South Hetton; dates of operation unknown. This land is currently used for caravan storage.

Source: Groundsure GIS

6.4 Industrial Land Use

According to the Groundsure Report, there are no active or inactive contemporary trade directory entries, fuel station entries, Gas Pipelines or Underground Electrical Cables within 250m of the site. There were several recent industrial land uses within 250 m of the site, they have been detailed below in Table 6.3.

Table 6.3 Potentially Contaminative Industrial Land Use on and Within 250m of the Site

Subject	Location	Details
Recent Industrial Land Uses	On-Site	• 12 No. Pylons • 2 No. Substation
	Off-Site	• 1 No. Mine Shaft (Capped) (28 m E) • 12 No. Pylon (410m NW, 300 m N, 125 m N, 140 m S, 55 m S, 25 m S, 269 m S, 214 m S, 110 m S, 70 m E and 60 m N) • 1 No. Scrapyard (5 m N) • 1 No. Industrial Estate (330 m W) • 1 No. Blind Company (370 m W)

Source: Groundsure GIS

6.5 Sensitive Land Uses

The Groundsure Report identifies adjacent sensitive land use based upon factors such as Sites of Special Scientific Interest (SSSI), Environmentally Sensitive Areas, Areas of Outstanding Natural Beauty, World Heritage sites, Nature Reserves, National Parks, Nitrate Sensitivity Areas/Vulnerability Zones, and Special Protection Areas (SPA).

Hesledon Moor West is situated approximately 25 m south of the site boundary and is classified as a SSSI.

Lumley Park Burn from Herrington Burn to R Wear is a Nitrate Vulnerable Zone for Surface Water which lies across the northwest corner of the site.

There is also a Nitrate Vulnerable Zone for Groundwater (G98 Durham) also covers the northwest corner of site and expands further north for approx. 2 km.

7. Site Reconnaissance

A site walkover was not undertaken as part of this report however, a site walkover of areas within the site had been undertaken at a previous date as part of the wider SEGL 1- EOS. Therefore, information and observations have been included where relevant to the site.

A site walkover was undertaken by AECOM on 28 July 2021 for selected areas within the site and surrounding areas which are listed below.

- Areas of historical coal mining at Hawthorn Pit:
  - Bare colliery spoil/ gravel mound is used as a ‘bike park’ as track marks for quad bikes and motor bikes were seen; and
  - In the area around the converter station there were numerous vegetated bunds which are likely to be made from colliery spoil. 438545-003, the location of was observed in the site walkover. The location was labelled as ‘Hawthorn 86’ and was clearly fenced off to prevent public access.
- Unspecified tanks north of the converter station:
  - A mound of rubble (brick and stone) was present near the tank location, not thought to be associated.
- Railway cuttings and unspecified pit at Slingely Hill:
  - No evidence of former railway buildings observed.

Photographs of the site walkover can be found in **Appendix 10B** of Scotland England Green Link 1 – English Onshore Scheme, Environmental Appraisal Report: Volume 2, Chapter 10: Geology and Hydrogeology.

8. Preliminary Ground Model

8.1 Geology

Based on the review of published geological and hydro-geological information, a selection of historical borehole records, the ground conditions within the site are considered to comprise the following sequence presented in Table 8.1. There are 2 No. BGS borehole logs available for the site, these are borehole logs NZ34NE79 (6.95 m bgl) and NZ34NE81 (8.70 m bgl). In addition, 9 No. borehole logs, BHA-01 to BHA-04 and BHE-01 to BHE-05 (434.5 to 45 m bgl), and 12 No. trial pit logs, TP1 – TH12 (2.1 to 2.8 m bgl) are available from the WSP report discussed in Section 5.1.

Table 8.1. Preliminary Ground Model

Geology

Stratum	Typical Description	Anticipated Thickness (m)
Made Ground	Grey clay with varying proportions of sand, gravel, and cobbles, including sandstone, mudstone, brick, wood, concrete.	0.8 – 10.70
Superficial	Firm becoming stiff brown sandy gravelly CLAY with a medium angular limestone and mudstone cobble content.	1.90 – 9.40
	Very dense brown silty fine and medium SAND with rare angular fine flint gravel. Rare pockets (up to 10x5mm) of brown silty clay.	1.5 – 7.85
	Very stiff dark greyish brown gravelly silty CLAY with a low locally medium angular to subrounded mudstone, limestone, and sandstone cobble content.	5.15 – 9.00
Bedrock	Weathered: Extremely weak to very weak highly fractured light yellowish grey SILTSTONE locally disintegrated to tabular fine to coarse gravel sized lithorelicts.	0 – 8.60
	Extremely weak locally very weak light yellowish-brown DOLOMITE with frequent voids (up to 40 mm) with orangish brown calcite infill.	2.70 – 12.00

Source: BGS GeoIndex and WSP Ground Investigation Report, 2022

8.2 Groundwater

There is limited information on groundwater below the site. Groundwater was struck at depths between 1.3 – 5.2 m bgl within historic boreholes drilled as part of the historic report discussed in Section 5.1.

9. Initial Conceptual Site Model

9.1 Introduction

This section is aimed at identifying possible risks, if any, arising from substances used or deposited on-site, or from other sources of land contamination. Both past and current potentially contaminative land uses have been considered. It is based on the proposed site redevelopment which will comprise a new substation and associated development identified in Section 1.2.

9.2 Assessment Framework

The Site, in terms of potential land contamination, will be regulated by the Local Authority (Durham County Council) under the Town and Country Planning Act 1990 (as amended), taking account of the National Planning Policy Framework 2019, with the Environment Agency, Natural England and English Heritage acting as potential statutory consultees.

Environmental liabilities can arise through provisions contained within statutory legislation including Part 2A of the EPA 1990, the Environmental Damage (Prevention and Remediation) Regulations 2009, the Water Resources Act 1991, the Groundwater Regulations 2009, and the Water Act 2003.

Current best practice recommends that the determination of health hazards due to contaminated land is based on the principle of risk assessment, as outlined in the Statutory Guidance to Part 2A (2012) and Land Contamination: Risk Management (LCRM).

The “suitable for use” approach is adopted for the assessment of contaminated land where remedial measures are undertaken where unacceptable risks to human health or the environment are realised taking into account the use (or proposed use) of the land in question and the environmental setting. The proposed end-use for the Site is Commercial / Industrial.

The risk assessment process for environmental contaminants is based on a source-pathway-receptor analysis. These terms can be defined as follows:

- Source: hazardous substance that has the potential to cause adverse impacts; and
- Pathway: route whereby a hazardous substance may come into contact with the receptor: examples include ingestion of contaminated soil and leaching of contaminants from soil into watercourses; and
- Receptor: target that may be affected by contamination: examples include human occupants/ users of site, water resources (surface waters or groundwater), or structures.

For a risk to be present, there must be a relevant/ viable contaminant linkage; i.e., a mechanism whereby a source impacts on a sensitive receptor via a pathway.

The following sections details the Initial Conceptual Site Model (iCSM) which has been developed for the Site with a view to assessing the potential risks/ liabilities and constraints associated with the Site in its current condition prior to any proposed redevelopment. Risks associated with the proposed redevelopment have also been assessed based on a Commercial / Industrial future land use scenario, including any potential sources of contamination, potential receptors and potential contaminant pathways identified during this desk-based assessment.

9.3 Sources of Potential Contamination

9.3.1 On Site

A review of past and present land use at the site has been detailed in section 5.1. Based on the information provided, the following sources of contamination may be found at the site:

- **Made Ground** associated with historic land uses including former Colliery, Sludge beds, Tanks, Quarry, Refuse Heap, Mine and Ground Workings
- **Made Ground** associated with current land uses including Electric Substation and potential fly tipping and constructions wastes.
- **Bulk soil gases**: methane and carbon dioxide generated from made ground, natural deposits.

9.3.2 Off Site

A review of past and present land use surrounding the site has been detailed in section 5.1. Based on the information provided, the following sources of contamination may be found in the surrounding areas of the site:

- **Made Ground** associated to historical land use (Colliery, Mineral Railway, Cuttings, Sidings, Unspecified Tanks, Sewage Tanks)
- **Made Ground** associated with current land use (Scrap Yard, Tanks)

With reference to the DoE Industry Profile for Railway Land. Table 9.1 indicates the potential contaminants that may be associated with the current and historical land use.

Table 9.1 Potential Sources of Contamination

Source Reference	Location	Potential Sources	Associated Contaminants of Potential Concern (CoPC)
S1	On Site	**Made Ground** associated with historic land uses including former Colliery, Sludge beds, Tanks, Quarry, Refuse Heap, Mine and Ground Workings	Heavy metals and inorganics including sulphate, pH, Total Petroleum Hydrocarbon (TPH), Semi Volatile Organic Compounds (SVOCs), Volatile Organic Compounds (VOCs), clinker, ash, asbestos, and Asbestos Containing Materials (ACMs).
S2	On Site	**Made Ground** associated with current land uses including Electric Substation and potential fly tipping and constructions wastes.	Heavy metals and inorganics including sulphate, pH, TPH, Polychlorinated biphenyls (PCBs), SVOCs, VOCs, asbestos, and ACMs.
S3	Off Site	**Made Ground** associated to historical land use (Colliery, Mineral Railway, Cuttings, Sidings, Unspecified Tanks, Sewage Tanks)	Heavy metals and inorganics including sulphate, pH, TPH, SVOCs, VOCs, clinker, ash, asbestos, and ACMs.
S4	Off Site	**Made Ground** associated with current land use (Scrap Yard, Tanks)	Heavy metals and inorganics including sulphate, pH, TPH, SVOCs, VOCs, clinker, ash, , asbestos, and ACMs.
S5	On Site	**Bulk soil gases:** methane and carbon dioxide generated from made ground, natural deposits.	Methane and Carbon Dioxide

9.4 Potential Receptors

Potential receptors associated with the potential development are shown on Table 9.2:

Table 9.2 Potential Receptors

Receptor Reference	Receptor	Description
R1	Human Health: Acute	Future Site Users – Site Visitors and Trespassers
R2	Human Health: Chronic	Future Site Users – Workers
R3	Human Health: Acute	Adjacent site users – Workers at adjacent plants/works and residents
R4	Water Environment: Superficial Aquifers	Secondary Undifferentiated Aquifer – Glacial Till
R5	Water Environment: Superficial Aquifers	Secondary A Aquifer – Glaciofluvial Deposits and Alluvium
R6	Water Environment: Bedrock Aquifers	Principal Aquifer – Ford Formation
R7	Water Environment: Surface waters	Dalton Beck and on site stream
R8	Ecosystems: Flora	Plants, trees, and soft landscaping
R9	Ecosystems: Fauna	Fish or microbial life in the Streams
R10	Buildings & Infrastructure: Concrete	Future proposed services at the site may be impacted by contamination in the ground. In particular, any existing concrete foundations if the groundwater has high sulphate levels.
R11	Buildings & Infrastructure: Structures	Proposed structures may be impacted by accumulations of ground gases.

9.5 Potential Pathways

Potential pathways associated with the proposed development are shown in Table 9.3.

Table 9.3 Potential Pathways

Pathway Reference	Receptor	Description
P1	Human Health / Fauna: People (Human Health) and animals (Fauna)	Direct Pathway: Direct contact, dermal absorption, or ingestion of soil.
P2	Human Health / Fauna: People (Human Health) and animals (Fauna)	Indirect Pathway: Inhalation of soil particulates derived from soils.
P3	Human Health / Fauna: People (Human Health) and animals (Fauna)	Indirect Pathway: Inhalation of soil vapour derived from soils
P4	Human Health / Fauna: People (Human Health) and animals (Fauna)	Indirect Pathway: Migration of hazardous gases/vapours via permeable strata into confined spaces (asphyxiation/ explosion)
P5	Water Environment: Groundwater	Indirect Pathway: Leaching of chemicals and vertical migration via permeable unsaturated strata to shallow and/ or deep groundwater
P6	Water Environment: Groundwater	Indirect Pathway: Lateral migration of impacted shallow groundwater off-site towards Dalton Beck
P7	Water Environment: Groundwater	Indirect Pathway: Vertical migration of impacted shallow groundwater to the deeper Principal aquifer.
P8	Water Environment: Groundwater	Indirect Pathway: Lateral migration of impacted deeper groundwater present in the Principal aquifer towards the off-site surface water receptor Dalton Beck
P9	Ecosystems: Flora*	Direct Pathway: Direct contact with contaminated soils
P10	Ecosystems: Flora*	Indirect Pathway: Uptake via root system
P11	Ecosystems: Flora*	Indirect Pathway: Migration of hazardous gases/vapours via permeable strata

Pathway Reference	Receptor	Description
P12	Ecosystems: Fauna	Leachate/ groundwater entering surface waters
P13	Buildings & Infrastructure: Concrete	Direct Pathway: Direct contact of buried concrete with contaminated soils (i.e., hydrocarbons) and aggressive ground conditions (pH and sulphate).
P14	Buildings & Infrastructure: Structures	Indirect Pathway: Migration of hazardous gases/vapours via permeable strata into enclosed spaces and service/utility trenches

*It is noted that consideration of this pathway is non-statutory under Part 2A legislation, and that fauna post redevelopment is likely to be non-sensitive, predominantly comprising landscaped areas.

10. Environmental Risk Assessment

10.1 Risk Assessment Principles

Current best practice recommends that the determination of hazards due to contaminated land is based on the principle of risk assessment, as outlined in the Environment Agency guidance on LCRM.

For a risk to be present, there must be a viable contaminant linkage; i.e., a mechanism whereby a source impacts on a sensitive receptor via a pathway.

Assessments of risks associated with each of these contaminant linkages are discussed in the following sections.

Using criteria broadly based on those presented in the National House Building Council/Environment Agency/Chartered Institute of Environmental Health publication R&D 66 (NHBC/EA/CIEH, 2008), the magnitude of the risk associated with potential contamination at the Site has been assessed. To do this an estimate is made of:

- The magnitude of the potential consequence (i.e., severity);
- The magnitude of probability (i.e., likelihood).

The severity of the risk is classified according to the criteria in Table 10.1.

10.2 Risk Assessment Framework

Table 10.1 Description of Severity of Risk

Term	Description
Severe	• Highly elevated concentrations likely to result in significant harm to human health. • Catastrophic damage to crops, buildings or property (e.g., by explosion). • Equivalent to EA Category 1 pollution incident including persistent and/or extensive effects of water quality. • Major damage to aquatic or other ecosystems.
Medium	• Elevated concentrations which could result in significant harm to human health. • Significant damage to crops, buildings or property (e.g., damage to building rendering it unsafe). • Equivalent to EA Category 2 pollution incident including significant effect on water quality. • Significant damage to aquatic or other ecosystems.
Mild	• Exposure to human health unlikely to lead to significant harm. • Minor damage to crops, buildings or property (e.g., surface spalling to concrete). • Equivalent to EA Category 3 pollution incident including minimal or short-lived effect on water quality. • Minor or short-lived damage to aquatic or other ecosystems.
Minor	• No measurable effect on humans. • Repairable effects of damage to buildings, structures, and services. • Equivalent to insubstantial pollution incident with no observed effect on water quality of ecosystems.

The probability of the risk occurring is classified according to the criteria in Table 10.2.

Table 10.2 Likelihood of Risk Occurrence

Likelihood	Explanation
High	Contaminant linkage may be present that appears very likely in the short-term and risk is almost certain to occur in the long term, or there is evidence of harm to the receptor.
Likely	Contaminant linkage may be present, and it is probable that the risk will occur over the long term.
Low	Contaminant linkage may be present and there is a possibility of the risk occurring, although there is no certainty that it will do so.
Unlikely	Contaminant linkage may be present but the circumstances under which harm would occur even in the long-term are improbable.

An overall evaluation of the level of risk is gained from a comparison of the severity and probability, as shown in Table 10.3.

Table 10.3 Risk based on Comparison of Likelihood and Severity

Likelihood	Severity			
	SEVERE	**MEDIUM**	**MILD**	**MINOR**
HIGH	Very High	High	Moderate	Low
LIKELY	High	Moderate	Moderate/Low	Low
LOW	Moderate	Moderate/Low	Low	Very Low
UNLIKELY	Moderate/Low	Low	Very Low	Very Low

10.3 LCRM Assessment of Risk

In 2019, the UK government issued new guidance on the evaluation and management of contaminated land, *LCRM*. Current contaminated land guidance in LCRM [10] categorises risk at Stage 1 Tier 1 (i.e., PRA) as follows:

- Acceptable;
- Unacceptable.

However, no framework for assessing the risk has been published to accompany the guidance, so the CIEH & NHBC R&D 66 assessment framework constitutes best practice in this regard. To align the risk rankings in Section 10.2 with the LCRM rankings and with the Part 2A definitions, the following matrix has been utilised. This conversion is demonstrated in Table 10.4 below:

Table 10.4 Conversion to LCRM Risk Categories

	Acceptable	Unacceptable
Very Low		
Low		
Moderate/Low		
Moderate*		
High		
Very High		

* *This risk category spans both acceptable and unacceptable. This is intentional as it is this risk band that tends to have the greatest level of uncertainty associated with it. Acceptability will be dependent on site-specific circumstances and level of confidence in the available evidence*
For a risk to be unacceptable, the contaminant linkage should be associated with at least a "medium" severity as defined in Table A4.3 in Annex 4 of R&D66 and the probability should (in the majority of cases) be at least "likely" as defined in Table A4.4 of R&D66

These risk categories represent the level of risk as it is currently understood from the information available at this time.

10.4 Preliminary Risk Assessment

An iCSM illustrating plausible contaminant linkages has been formulated for this site. The qualitative preliminary risk assessment of the possible linkages of the above sources (S1 to S5), transport pathways (P1 to P14) and receptors (R1 to R11) are provided in the Table 10.5.

The level of risk is determined based on the current condition of the Site (i.e., the effects of mitigation measures are not included).

The preliminary risk assessment undertaken with in this section does not consider acute linkages for construction and maintenance workers. AECOM anticipates that these acute linkages will be managed by appropriate health and safety measures as outlined in Section 10.5.

Table 10.5 Potential Sources, Pathways and Receptors

Source	*Pathway*	*Receptor*	*Potential Severity*	*Likelihood of Occurrence*	*Potential Risk (R&D 66)*	*Potential Risk (LCRM)*	*Linkage Reference*	*Justification*
Contaminants of Potential Concern (CoPC) related to past and present land use on site and off site (S1 – S4)	P1: Direct Contact, dermal absorption, or ingestion of soil.	**Onsite Receptors -** R1: Future Site Users – Visitors and Trespassers	Medium	Low	Moderate / Low	Acceptable	(S1-S4)-P1-R1	Based on historical land use and previous GI observations from WSP it is indicated that there is the potential for CoPC to be present in the Made Ground recorded on site. The severity to future workers and visitors is considered medium and the likelihood is considered likely. However, it is expected that the site when redeveloped will consist of mostly hardstanding and any areas of soft landscaping will comprise clean backfill, mitigating any potential risk allowing this linkage to be deemed acceptable.
		R2: Future Site Users – Workers/Maintenance	Medium	Likely	Moderate	Acceptable	(S1-S4)-P1-R2	
		Offsite Receptors R3: Adjacent Site Users – Workers/Residents	Medium	Unlikely	Low	Acceptable	(S1-S4)-P1-R3	There are residential properties approx. 250 m west of site, a business park immediately north and a Scrap Yard approx. 150m south of site. The likelihood of direct contact or ingestion of contaminated soil is considered to be unlikely to adjacent site users. Further ground investigation may be required to determine CoPC concentrations in soil from historical uses.
	P2: Inhalation of soil particulates derived from soils.	**Onsite Receptors -** R1: Future Site Users – Visitors and Trespassers	Medium	Low	Moderate / Low	Acceptable	(S1-S4)-P2-R1	Based on historical land use and previous GI observations from WSP it is indicated that there is the potential for CoPC to be present in the Made Ground recorded on site. The severity to future workers is considered medium and the likelihood is considered likely. However, risks can be mitigated by the replacement of soils in these areas with clean backfill as part of the redevelopment if CoPCs are found to be present.
		R2: Future Site Users – Workers/Maintenance	Medium	Likely	Moderate	Acceptable	(S1-S4)-P2-R2	
	P3: Inhalation of soil vapour derived from soils	**Onsite Receptors -** R1: Future Site Users – Visitors and Trespassers	Medium	Low	Moderate / Low	Acceptable	(S1-S4)-P3-R1	A potential linkage exists where soils are exposed at the surface e.g., in areas of soft landscaping. Risks can be mitigated by the replacement of soils in these areas with clean backfill as part of the redevelopment. In addition, migration of soil vapour or ground gases (if present) via permeable strata into buildings may also occur.
		R2: Future Site Users – Workers/Maintenance	Medium	Likely	Moderate	Acceptable	(S1-S4)-P3-R2	

Source	Pathway	Receptor	Potential Severity	Likelihood of Occurrence	Potential Risk (R&D 66)	Potential Risk (LCRM)	Linkage Reference	Justification
Contaminants of Potential Concern (CoPC) related to past and present land use on site and off site (S1 – S4)		**Offsite Receptors** R3: Adjacent Site Users – Workers/Residents	Medium	Unlikely	Low	Acceptable	(S1-S4)-P3-R3	There are residential properties approx. 250 m west of site, a business park immediately north and a Scrap Yard approx. 150m south of site. The likelihood of inhalation of soils vapour from workers and visitors at adjacent sites is unlikely due to the distance from site.
	P5: Leaching of chemicals and vertical migration via permeable unsaturated strata to shallow and/or deep groundwater.	R4: Secondary Undifferentiated Aquifer – Glacial Till	Mild	Likely	Moderate / Low	Acceptable	(S1-S4)-P5-R4	Leaching of contaminants from unsaturated soils may occur in areas of soft landscaping into shallow groundwater. WSP GI (2022) reported groundwater strikes ranging between 1.3 – 5.2 m bgl. The majority of the site is underlain at shallow depth by low permeability Glacial Till which would typically reduce the potential for vertical migration between shallow groundwater and the bedrock (Principal) aquifer as the superficial undifferentiated aquifer is thought to have negligible significance for water supply and/or river base flow. However, the Glaciofluvial and Alluvium deposits (Secondary A Aquifer) which comprise mostly of sand, silt and gravels rather than clay meaning there is a higher likelihood of groundwater leaching through to the bedrock aquifer.
		R5: Secondary A Aquifer – Glaciofluvial Deposits and Alluvium	Medium	Likely	Moderate	Acceptable	(S1-S4)-P5-R5	
		R6: Principal Aquifer (Bedrock) – Ford Formation	Medium	Likely	Moderate	Acceptable	(S1-S4)-P5-R6	
	P6: Lateral migration of impacted shallow groundwater off-site towards Dalton Beck to North Sea River	R7: Dalton Beck	Medium	Likely	Moderate	Acceptable	(S1-S4)-P6-R5	Most of the site is underlain at shallow depth by low permeability Glacial Till which as a superficial undifferentiated aquifer, is thought to have negligible significance for water supply and/or river base flow. However, due to the close proximity of the Dalton Beck and pockets of Alluvium and Glaciofluvial deposits (Superficial A Aquifer), there is the risk that water within the Made Ground can reach the Alluvium and Glaciofluvial deposits and migrate into the river.
	P7: Vertical migration of impacted shallow groundwater to the deeper Principal aquifer.	R4: Secondary Undifferentiated Aquifer – Glacial Till	Medium	Likely	Moderate	Acceptable	(S1-S4)-P7-R4	Vertical migration of impacted shallow groundwater into the deeper groundwater and principal aquifer has the potential to occur. WSP GI (2022) reported the range in top of depth for bedrock was between 28.70 – 33.70 m bgl. Most of the site is underlain at shallow depth by low permeability Glacial Till which would typically reduce the potential for vertical migration between shallow groundwater and the bedrock
		R5: Secondary A Aquifer – Glaciofluvial Deposits and Alluvium	Medium	Likely	Moderate	Acceptable	(S1-S4)-P7-R5	

Source	Pathway	Receptor	Potential Severity	Likelihood of Occurrence	Potential Risk (R&D 66)	Potential Risk (LCRM)	Linkage Reference	Justification
Contaminants of Potential Concern (CoPC) related to past and present land use on site and off site (S1 – S4)		R6: Principal Aquifer (Bedrock) – Ford Formation	Medium	Low	Moderate / Low	Acceptable	(S1-S4)-P7-R6	(Principal) aquifer as the superficial undifferentiated aquifer is thought to have negligible significance for water supply and/or river base flow. However, there are pockets of Glaciofluvial and Alluvium deposits (Secondary A Aquifer) which comprise mostly of sand, silt and gravels rather than clay meaning there is a higher likelihood of groundwater leaching through to the bedrock aquifer. The site also falls within a SPZ3 – Total Catchment and the nearest abstraction point is listed as 2.3 km northeast of the site. There are also two SPZ2- Outer Protection Zone 500 m north and 350 m southeast of site. There are two nitrate vulnerable zones which encroach site, Lumley Park Burn for surface water and G98 Durham for groundwater are also classified as sensitive receptors.
	P8: Lateral migration of impacted deeper groundwater present in the Principal aquifer towards the off-site surface water receptor the Dalton Beck	R7: Dalton Beck	Medium	Likely	Moderate	Acceptable	(S1-S4)-P8-R7	Most of the site is underlain at shallow depth by low permeability Glacial Till which as a superficial undifferentiated aquifer, is thought to have negligible significance for water supply and/or river base flow. However, due to the close proximity of the Dalton Beck (30 m south) and pockets of Alluvium and Glaciofluvial deposits (Superficial A Aquifer), there is the risk that water within the Made Ground can reach the Alluvium and Glaciofluvial deposits and migrate into the river. There are two nitrate vulnerable zones which encroach site, Lumley Park Burn for surface water and G98 Durham for groundwater are also classified as sensitive receptors.
	P9: Ecosystems: Flora - Direct contact with contaminated soils	R8: Plants, trees, and landscaping	Mild	Low	Low	Acceptable	(S1-S4)-P9-R8	Direct contact or uptake by plant roots may occur in areas of soft landscaping, however risks can be mitigated by the replacement of soils in these areas with clean backfill as part of the redevelopment. In addition, although lateral migration of impacted shallow groundwater to surface water (and therefore to flora and fauna within these waters) may occur, this is likely to be inhibited by the presence of low permeability superficial deposits (Glacial Till).
	P10: Ecosystems: Flora - Uptake via root system	R8: Plants, trees, and landscaping	Mild	Low	Low	Acceptable	(S1-S4)-P10-R8	

Source	*Pathway*	*Receptor*	*Potential Severity*	*Likelihood of Occurrence*	*Potential Risk (R&D 66)*	*Potential Risk (LCRM)*	*Linkage Reference*	*Justification*
Contaminants of Potential Concern (CoPC) related to past and present land use on site and off site (S1 – S4)	P12: Leachate/ groundwater entering surface waters	R9: Fish or microbial life in on-site stream and Dalton Beck	Mild	Likely	Moderate / Low	Acceptable	(S1-S4)-P12-R9	Lateral migration of impacted shallow groundwater to surface water (and therefore to flora and fauna within these waters) may occur.
	P13: Direct contact of buried concrete with contaminated soils (i.e., hydrocarbons) and aggressive ground conditions (pH and sulphate)	R10: Future proposed services at the site may be impacted by contamination in the ground. In particular, any existing concrete foundations if the groundwater has high sulphate levels	Medium	Low	Moderate / Low	Acceptable	(S1-S4)-P13-R10	Direct contact of underground concrete, services including water supply pipes and membranes may occur where shallow soil and/or groundwater contamination is present. Risks can be mitigated by the replacement of soils in these areas with clean backfill or use of sulphate resistant concrete as part of the redevelopment.
S5: Bulk Ground Gases	P4: Migration of hazardous gases/vapours via permeable strata into confined spaces	**Onsite Receptors -** R1: Future Site Users – Visitors and Trespassers	Medium	Low	Moderate / Low	Acceptable	S5-P4-R1	Based on historical land use and previous GI observations from WSP it is indicated that there is the potential for CoPC to be present in the Made Ground recorded on site. There is the potential for any soil vapours or gases generated in Made Ground at the site to accumulate within future above / below ground structures associated with the proposed development. Soil vapours may also be mobilised during construction activities including excavation of soils. Whilst buildings are on site (existing substation and proposed substation) and any other future buildings as part of proposed development there is the potential for vapours to accumulate in enclosed or confined spaces. In addition, there is the potential for vapours to migrate beneath neighbouring properties (Business Park) through granular Made Ground.
		R2: Future Site Users – Workers/Maintenance	Medium	Low	Moderate / Low	Acceptable	S5-P4-R2	
		Offsite Receptors R3: Adjacent Site Users – Workers/Residents	Medium	Low	Moderate / Low	Acceptable	S5-P4-R3	Although there is the potential for vapours and ground gases to migrate beneath neighbouring buildings (Business Park) through granular Made Ground, historical CoPC are likely to have attenuated in the distance between site and off-site workers and therefore it is unlikely that volumes of soil vapour

Source	Pathway	Receptor	Potential Severity	Likelihood of Occurrence	Potential Risk (R&D 66)	Potential Risk (LCRM)	Linkage Reference	Justification
								/ ground gases significant enough to pose a risk to offsite receptors shall be mobilised. Soil vapours may be mobilised during construction activities including excavation of soils. Mobilisation of those soil vapours / ground gases released onsite, if any, is considered more likely to migrate upwards dispersing within the atmosphere. However, further investigation may be required to determine the soil vapour and ground gas risk.
S5: Bulk Ground Gases	P11: Migration of hazardous gases/vapours via permeable strata.	R8: Plants, trees, and landscaping	Medium	Low	Moderate / Low	Acceptable	S5-P11-R8	Hesledon Moor West (25 m south of site) is classified as a SSSI. Given, the potential Made Ground and fill materials associated with the former activities the presence of Phyto-toxic contaminants cannot be discounted in certain areas of the site. As above there is the potential for Made Ground to be present across areas of the site which has the potential of generating ground gas/vapour. Further ground investigation is recommended to refine this risk.
	P15: Migration of hazardous gases/vapours via permeable strata into enclosed spaces and service/utility trenches	R11: Proposed structures may be impacted by accumulations of ground gases.	Medium	Low	Moderate / Low	Acceptable	S5-P15-R11	The composition of Made Ground and shallow superficial deposits is currently unknown, as is the Characteristic Situation for ground gas risk. Therefore, there is a potential risk to property, buildings, structures, or services. For future development, the appropriate specification of materials should be used in gas/ damp protective membranes to mitigate potential risks.

10.5 Potential Acute Risk to Future Construction Workers & Off-Site Receptors.

AECOM understands that the proposed development works will be undertaken in compliance with Construction Design and Management (CDM) 2015 regulations, and an Outline Construction Environmental Plan (CEMP) has been provided as part of the current EAR.

Prior to work commencing, a health and safety risk assessment should be carried out by the appointed Principal Contractor / developed in accordance with current health and safety regulations. This assessment should cover potential risks to construction staff, permanent site staff and the local population. Based on the findings of this risk assessment, appropriate mitigation measures should be implemented during the construction period.

The greatest potential for generation of dust will be during the Site works and therefore dust generation should be kept to a minimum in accordance with general best practice, as outlined in, for example, 'Environmental Good Practice on Site', CIRIA Publication C692 to reduce this risk.

The risk to construction workers during the excavation and construction phases in terms of potential exposure to high concentrations of contaminants is considered to be low given the historic and current land uses identified at the Site. Should gross contamination be identified during the construction phase, then this may pose a potential acute risk to construction works. It is likely to be able to be effectively managed through good health and safety practices and protocols. Adoption of appropriate dust suppression techniques would also mitigate the degree of potential particulate migration off-site

11. Review of Geotechnical Risk and Preliminary Engineering Assessment

11.1 Geotechnical Risk

A preliminary geotechnical risk register is given in **Appendix E** which describes the main ground related hazards on the site (excluding ground contamination) and mitigation measures which may be implemented to eliminate or reduce the risk by means for further investigation or during the design.

The most significant risks are:

1. Any existing made ground or alluvium in its current state is unlikely to provide a suitable founding stratum for structural foundations or pavement.
2. The presence of weak and compressible soils such as soft clay, alluvium or made ground poses a risk of excessive total or differential settlement of foundations.
3. Unsuitable ground for pavement construction.
4. High, perched, or variable ground water levels which may impact earthworks, causing instability in excavations and temporary works.
5. Unknown/unrecorded buried structures.
6. Striking underground services during ground investigation or construction.
7. Unsuitable ground for sustainable drainage designs.
8. Chemically aggressive ground conditions.

To mitigate these risks, it is recommended that:

1. The extent of and potentially highly variable thickness of Made Ground, weak and compressible materials, or soils, should be assessed during a ground investigation and foundations should be placed on a suitable bearing stratum below any Made Ground or weak and compressible soil. It may require excavation and replacement, or treatment for new hardstanding areas.
2. The ground conditions should be accurately characterised below structures by a ground investigation. A variety of foundations may be required to support the design loads including shallow spread and deep piles.
3. For pavement design, the proposed sub-grade level for the access roads and car park should be confirmed prior to construction. Any soft ground or unsuitable materials could be excavated out and replaced with engineering fill, before starting any pavement construction works.
4. An investigation into the groundwater levels including seasonal variation is recommended prior to commencement of any detailed earthworks or foundation design. If required, the use of special measures to control groundwater.
5. Establish site procedures to be undertaken in the event underground services are encountered, including risk assessment and method statement. Ensure any existing services are identified and fully traced prior to commencement of GI and construction works. Utilities diversion.
6. Striking underground services during ground investigation or construction. Carrying out PAS128 surveys or using cable avoidance tools prior to breaking ground.
7. Chemical testing of soil to BRE requirements.
8. Undertake soakaway tests to BRE 365 requirements to ascertain drainage design.

11.2 Preliminary Engineering Assessment

The limited information provided to AECOM by the Client at this stage means that the engineering assessment cannot be properly determined. At present, the design implies that the site will be covered with hardstanding and redeveloped as a manufacturing hub relating to activities at the port.

11.3 Foundations

For light to moderate loads, the ground conditions are expected to be suitable for the use of traditional spread foundations founded within the formation. Piled foundations may be considered for structures located in close proximity to existing trees or for more heavily loaded structures.

It may be anticipated that traditional spread foundations, will be subject to the following conditions.

In general, foundations should be located within natural ground beneath any fill, Made Ground and below the depth of effect of variations due to vegetation, seasonal and climatic change.

Similarly, footings should be taken deeper than the minimum depth specified, where structures are located within influencing distance of any existing or future trees. In these circumstances reference should be made to Chapter 4.2 of NHBC's Standards (2011).

The construction of both bored and driven piles would be technically feasible at this site. However, due to the close proximity to other buildings, it is considered that driven piles are unlikely to be acceptable from an environmental/nuisance point of view.

Piles may encounter claystone bands and pockets of groundwater within the superficial geology (Tidal Flat deposits) and an allowance should be made for chiselling or other means to remove obstructions.

11.4 Excavations

Shallow excavations for foundations and drainage are anticipated to be stable in the short term / locally unstable. Close or continuous support will be required for any manned entry to excavations.

Shallow groundwater may be encountered and may require groundwater control during excavation. Detailed information regarding the groundwater regime will be available following the ground investigation and subsequent monitoring.

11.5 Soakaways

The ground conditions are unlikely to be suitable for the use of pit soakaways. Therefore, surface water run-off should be directed to main drainage subject to appropriate consent to discharge.

11.6 Pavements

The development for the site involves road and vehicle parking for various uses and loadings. A ground investigation will be required to determine foundations for the pavement design. It is anticipated as a minimum local improvement will be required for heavier loading/trafficking in areas of made ground or natural soft deposits to stop settlement of new pavements, this will however be confirmed through ground investigation.

12. Conclusions

The following is a summary of the review of the information sources listed in Section 1.3.

The site is located at Hawthorn Pit, Grid Substation, Murton, Durham, DH6 2RP. The site is approximately 800m south of Murton town centre. It is centred on National Grid Reference 438933E, 545631N. The site covers an area of approximately 48 hectares.

The site is currently predominantly agricultural land with areas of dense vegetation with an existing substation in the northwest corner. There are several tracks which transect the site and connect it to the neighbouring towns (South Hetton and Murton) and Jade Business Park.

The anticipated geology is Made Ground up to a potential depth 10.25 m bgl, underlain by superficial geology comprising Glacial Till (Superficial Undifferentiated Aquifer) and Glaciofluvial and Alluvium deposits (Secondary A Aquifer). The bedrock geology at the site is the Ford Formation (Principal Aquifer).

The site is within a SPZ3 – Total Catchment area within the site, the closest known abstraction is 2.3 km northeast of site. There is a number of small ponds on site and a small stream. The closest WFD river to site is Dalton Beck, which flows to the North Sea, is situated approx. 30 m south of site.

Based on a review of historical maps 1885-1990, the site and surrounding areas have been subject to several highly industrial activities. Previous historical activities on site and within 250 m include a colliery, mineral railway, cuttings and sidings, mine shafts, sludge beds, tanks, quarry and refuse heap. Therefore, the risk of encountering ground contamination is high as significant contaminative land uses have been identified on the site or around it.

Ground Gas may be present on site, due to the anticipated presence of Made Ground across the site and due to historical land use, such as refuse heaps, mining and other colliery activities. Further detailed assessment should be undertaken.

The site is situated within a lower probability radon area, where less than 1% of homes are estimated to be at or above the action level. The report states that no radon protective measures are necessary in the construction of new dwellings or extensions.

Potential geotechnical hazards include the following: significant quantities of Made Ground and Glacial Till which are unsuitable founding stratum for foundations, weak and compressible soils, unsuitable ground for pavements, potential high perched variable groundwater, unknown buried structures, striking of underground services and chemically aggressive ground conditions.

The potential risks that have been identified have been assessed by the preliminary risk assessment as being very low to moderate with the majority being Moderate / Low risk. These risks should be regularly monitored and received regular attention.

13. Recommendations

Once the layout and nature of the development is finalised a ground investigation will be required to inform the detailed design of the site.

The geo-environmental investigation should be designed with due consideration of the requirements of BS 10175:2011.

The geotechnical elements of the investigation should be designed with consideration of BS EN 1997-1:2004, BS EN 1997-2:2007 (Eurocode 7: Geotechnical Design – Parts 1 and 2) and BS 5930:1999.

In summary, key objectives to be addressed by the investigation include:

- Confirmation of the ground (and groundwater) conditions and validation of the CSM.
- Chemical status of Made Ground and natural soils for the purpose of risk assessment to human health, groundwater and for preliminary waste classification.
- Chemical status of groundwater to determine risks to controlled waters.
- Ground gas monitoring to determine the potential risks to the proposed development and surrounding properties.
- Identification of geotechnical design parameters for earthworks and preliminary foundation design; and
- Confirmation of infiltration characteristics.

It is recommended that the ground investigation be designed in accordance with the UK Specification for Ground Investigation. In brief, the outline scope of works is anticipated to include

- Mechanical excavation of trial pits and drilling of windowless boreholes to prove the presence and thickness of made ground and shallow ground conditions.
- Drilling of cable percussion boreholes to bedrock, particularly in the proposed areas of built development and other infrastructure.
- Rotary drilling to extend some of the cable percussion boreholes into bedrock,
- Installation of ground gas / groundwater monitoring wells,
- Programme of gas/groundwater monitoring
- Geotechnical and geo-environmental laboratory testing.

The findings of the preliminary ground investigation should be interpreted and summarised within a ground investigation report which will cover the following topics:

- A summary of the site/site history/walkover survey (carried over, and developed from this Desk Study Report);
- An evaluation of the field and laboratory testing results included in the Ground Investigation Contractor's Factual Report; Development of the ground models for the sites, including the groundwater regime. Geological cross sections should be produced, as required;
- Derivation of basic geotechnical parameters for the various geological materials encountered at the sites;
- Where possible, provide calculations based upon geotechnical parameters assessed during the ground investigation to inform outline design
- An interpretation of the geo-environmental aspects of the investigation including;
  - A generic quantitative human health risk assessment defined as a stage 2 assessment in LCRM;
  - A generic quantitative risk assessment to controlled waters in line with the processes outlined in LCRM and the guidance in Section J of The Environment Agency's approach to groundwater protection document;
  - A ground gas risk assessment in accordance with British Standard 8485: 2015 Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings; and

- Assessment of the geotechnical and geo-environmental risks associated with the proposed development in relation to the Conceptual Site Model produced in the Phase report.
- Provide preliminary advice on the potential disposal classification of arisings should surplus arisings be generated for disposal, based on the ground investigation data;

This report will thereby present a refinement of the Conceptual Site Model and Geotechnical Risk Assessment, provide outline foundation options, and further inform optioneering and design of the proposed development.

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Figures

GIS: ER Checked: AG Approved: MW

Croup Hill

N

Coop House Wood

Woodlands

PW

Football Ground

Cricket Ground

HAWTHORN COTTAGES

BEVIN SQ

PO

WEST LANE

WINDERMERE ROAD

A182

0 0.25 0.5 km

Coordinate System: British National Grid

Scale @ A3 1:5,000

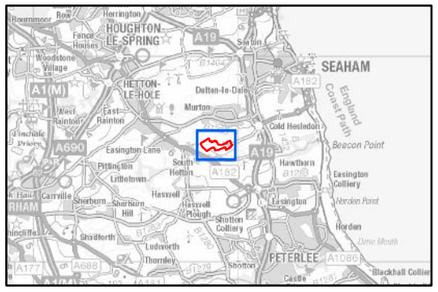
nationalgrid

PROJECT

Scotland England Green Link 1

KEY

Planning Application Boundary



TITLE

Figure 1
Site Location Plan

REFERENCE

SEGL1_T_DS_1_v1_20220822

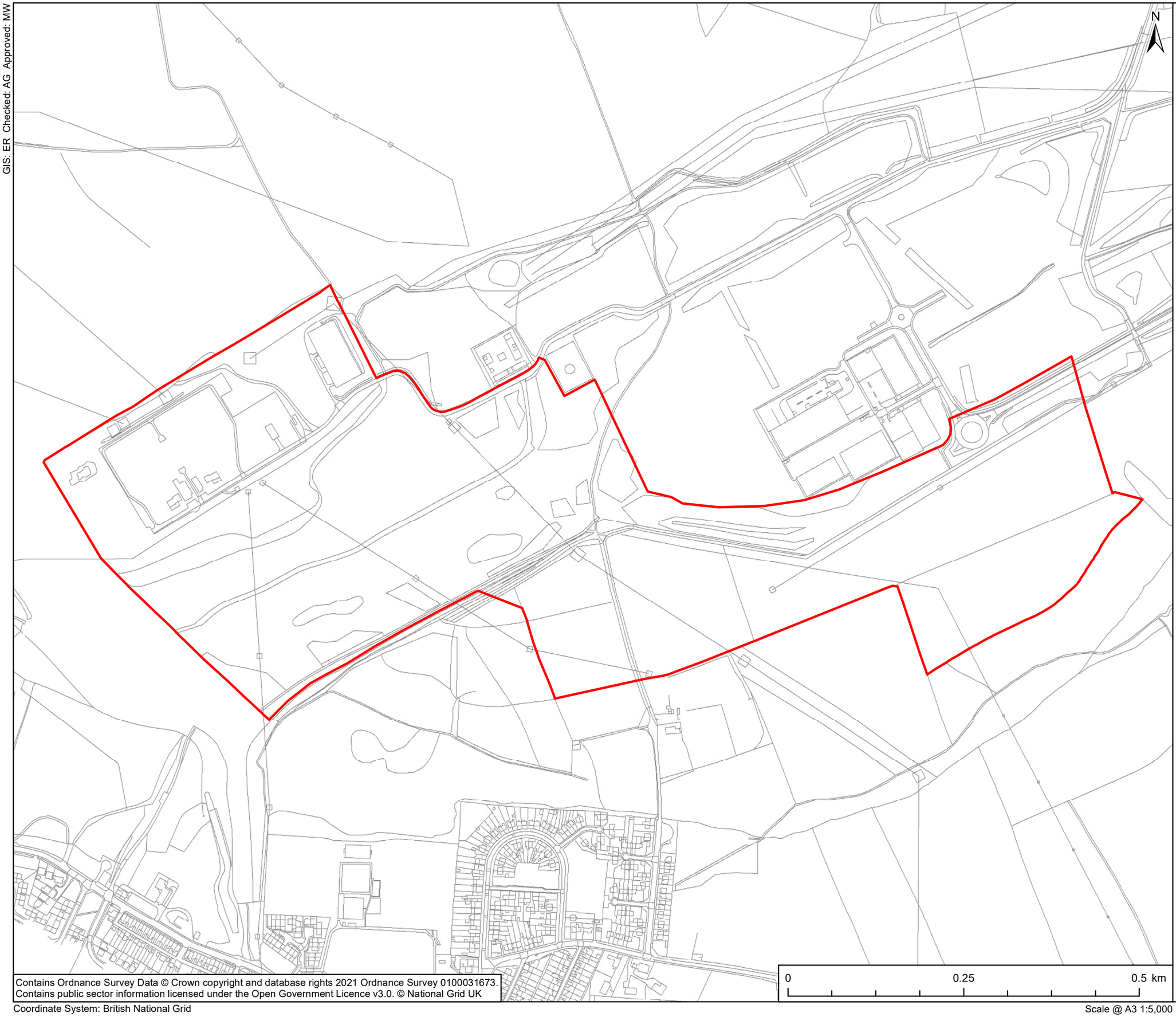
SHEET NUMBER

1 of 1

DATE

22/08/2022

GIS: ER Checked: AG Approved: MW



Coordinate System: British National Grid

Scale @ A3 1:5,000

nationalgrid

PROJECT

Scotland England Green Link 1

KEY

Planning Application Boundary

TITLE

Figure 2
Red Line Boundary Plan

REFERENCE

SEGL1_T_DS_2_v1_20220822

SHEET NUMBER

1 of 1

DATE

22/08/2022

Appendix A BGS Borehole Logs

NZ35SE NE179 BOREHOLE LOG — BOREHOLE NO. 76

DIAM. 150mm

WATER for first 0.3m only.

Key	
U.100 Sample	▯
U.100 No recovery	▯ NR
Bulk sample	O
Jar sample	o

DATE	DEPTH OF BORING	DEPTH OF CASING	DEPTH TO WATER	STRATA DESCRIPTION	STRATA CHANGE (m) DEPTH	STRATA CHANGE (m) O.D.	S.P.T. BLOWS	DEPTH	SAMPLE TYPE
21.2.74						113.40			
		0.30	Wet	SANDY CLAY with STONES.					
		0.40	Dry	Firm. Orange brown and grey. Much F.M.gravel initially, with traces of organic matter and coal. Becoming almost friable towards centre of stratum.					
	1.50	1.00						1.50 to 1.95	▯
	2.50	2.00			2.50	110.90		2.50	o
	3.00	2.50						3.00 to 3.45	▯
					3.20	110.20			
				SILTY CLAY with STONES. Firm to stiff. Dark grey brown. Mainly F.M. gravel but some C. gravel with pockets of light brown sandy clay at 4.0m (Boulder Clay)					
	4.00	4.00						4.00	o
								4.50 to 4.95	▯ NR
	5.00	4.00							
							90	5.15 to 5.45	X o
	6.00	4.00						6.00 to 6.45	▯ NR
	6.50	4.00							
21.2.74	6.95	4.00	Dry		6.95	106.35	63	6.65 to 6.95	X o
				END OF BOREHOLE.					

NZ34NE/8[illegible]

BOREHOLE NO. 78
DIAM. 150mm

WATER was not encountered.

Key	
U.100 Sample	▯
U.100 No recovery	▯
Bulk sample	O
Jar sample	O

DATE	DEPTH OF BORING	DEPTH OF CASING	DEPTH TO WATER	STRATA DESCRIPTION	STRATA CHANGE (m) DEPTH	STRATA CHANGE (m) O.D.	S.P.T. BLOWS	DEPTH	SAMPLE TYPE
22.2.74				TOP and SUB SOIL.		125.00			
					0.40	124.60			
				SANDY CLAY with STONES. Firm. Orangy brown and grey initially, becoming darker grey brown. Much cobble size down gravel. The clay is very sandy in parts, much less so in others. At base, possibly boulder size grey and orange sandstone broken into cobble size fragments by the chisel. (Boulder clay - possibly re-deposited initially)					
	1.50	1.00						1.50 to 1.95	▯
	2.50	2.00						2.50	O
	3.00	2.50						3.00 to 3.45	▯
	4.00	3.00						4.00	O
	4.50	3.50						4.50 to 4.95	▯
	6.00	4.95						6.00 to 6.45	▯
	7.50	4.95						7.50 to 7.95	▯
22.2.74	7.95	4.95	Dry						
23.2.74	7.95	4.95	Dry						
				Sandstone fragments				8.50 to 8.70	O
23.2.74	8.70	4.95	Dry		8.70	116.30			
				END OF BOREHOLE.					

Appendix B Consultants Coal Mining Risk Report

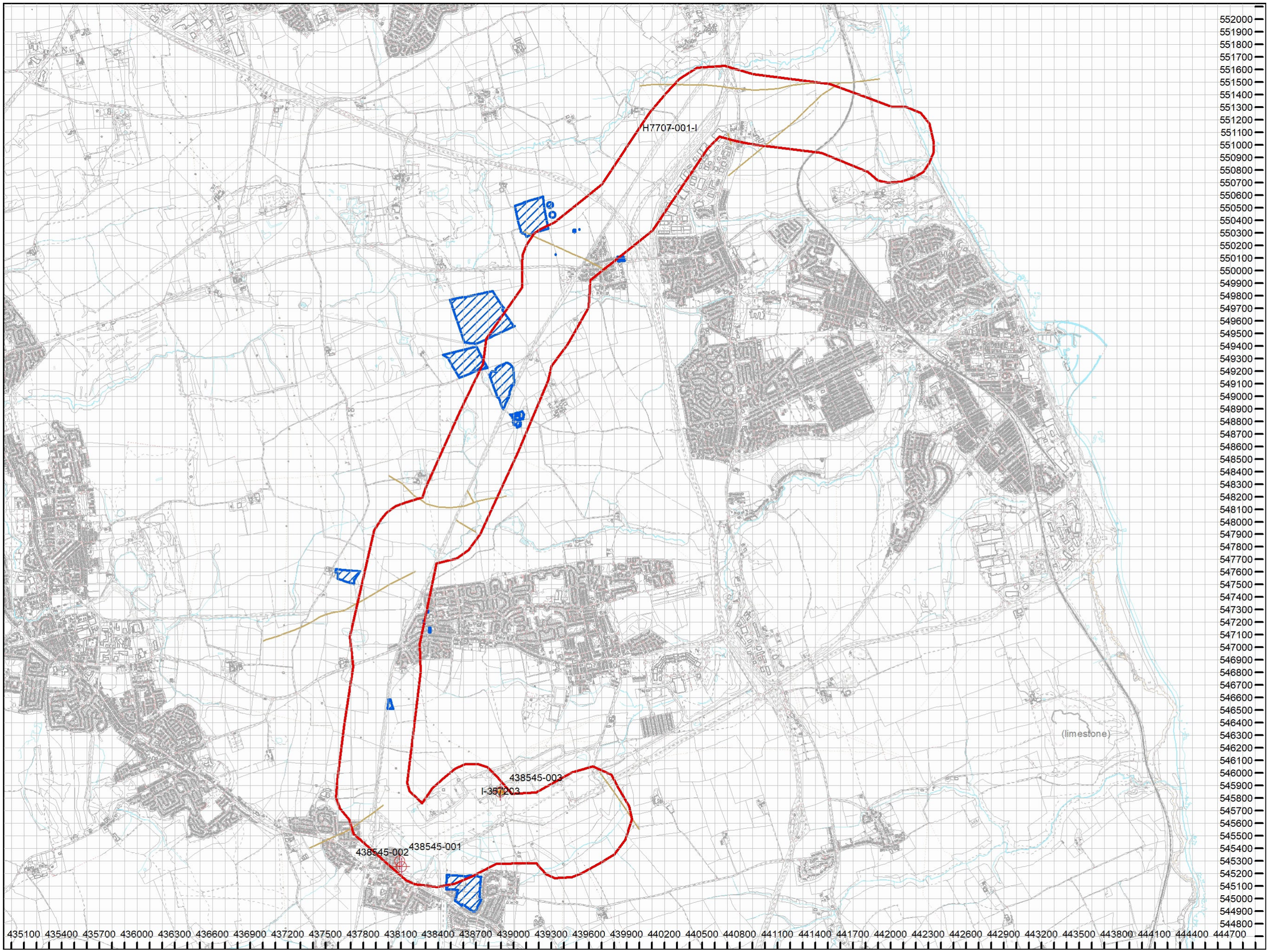
The Coal Authority

Summary of findings

The map highlights any specific surface or subsurface features within or near to the boundary of the site.

Key

- Approximate position of the enquiry boundary shown
- Disused mine shaft
- Geological faults
- Remediated sites
- Mine gas remedial works
- Coal claim



How to contact us
0345 762 6848 (UK)
+44 (0)1623 637 000 (International)
www.groundstability.com

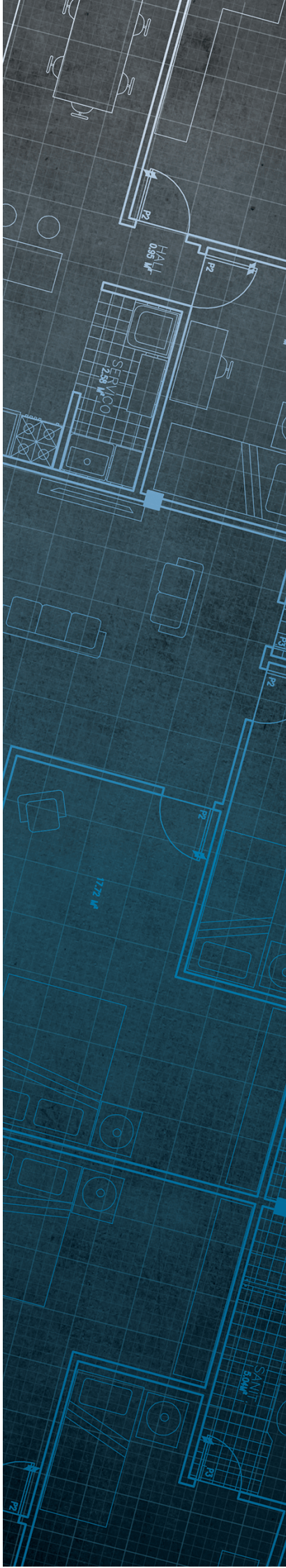
The Coal Authority

Consultants

Coal Mining Report

438769 548901
Durham

Date of enquiry:	**12 May 2021**
Date enquiry received:	**12 May 2021**
Issue date:	**22 June 2021**
Our reference:	**51002544185001**
Your reference:	**GSIP-2021-11001**



Consultants

Coal Mining Report

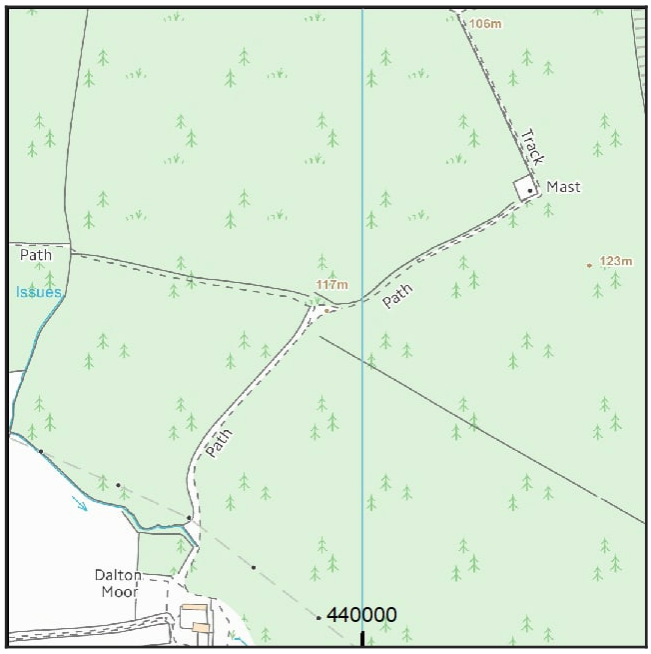
This report is based on and limited to the records held by the Coal Authority at the time the report was produced.

Client name

GROUNDSURE LIMITED

Enquiry address

438769 548901
Durham



Approximate position of property

How to contact us

0345 762 6848 (UK)
+44 (0)1623 637 000 (International)

200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

www.groundstability.com

@coalauthority
/company/the-coal-authority
/thecoalauthority
/thecoalauthority

Section 1 – Mining activity and geology

Past underground mining

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
unnamed	HIGH MAIN	Coal	3F2G	183	Beneath Property	2.8	North-East	100	1979
unnamed	HIGH MAIN	Coal	3F2J	195	South-East	2.4	North-East	100	1948
SOUTH HETTON	HIGH MAIN	Coal	7PYU	197	South-West	2.1	North-East	124	1979
MURTON	HIGH MAIN	Coal	3F2B	201	Beneath Property	2.4	North-East	130	1986
MURTON	HIGH MAIN	Coal	3F2C	202	Beneath Property	1.6	North-East	130	1984
unnamed	HIGH MAIN	Coal	3F28	202	West	2.3	North-East	124	1982
unnamed	HIGH MAIN	Coal	3F1Z	203	South	2.7	East	150	1949
MURTON	RYHOPE FIVE QUARTERS	Coal	5P3V	205	Beneath Property	3.7	South	110	1988
unnamed	RYHOPE FIVE QUARTERS	Coal	3HTO	206	South-East	2.2	North-East	80	1953
unnamed	HIGH MAIN	Coal	7PYV	211	Beneath Property	0.0	East	100	1991
MURTON	HIGH MAIN	Coal	E104	212	Beneath Property	1.6	North-West	220	1990
unnamed	HIGH MAIN	Coal	3F2R	214	Beneath Property	5.4	East	200	1985
MURTON	HIGH MAIN	Coal	104	215	Beneath Property	2.0	North-East	150	1991
unnamed	HIGH MAIN	Coal	3F2I	216	Beneath Property	3.0	East	100	1953
unnamed	RYHOPE FIVE QUARTERS	Coal	3HQE	217	Beneath Property	1.1	North-East	100	1986
MURTON	RYHOPE FIVE QUARTERS	Coal	3HBT	218	Beneath Property	1.2	North-East	110	1986
unnamed	HIGH MAIN	Coal	3F2H	218	Beneath Property	3.0	North-East	100	1952
unnamed	HIGH MAIN	Coal	3F2A	219	West	2.0	North-East	137	1987
MURTON	HIGH MAIN	Coal	E101	219	West	2.1	North-East	230	1987
MURTON	HIGH MAIN	Coal	5OWC	220	Beneath Property	2.9	North-East	250	1987

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
unnamed	RYHOPE FIVE QUARTERS	Coal	3HBF	220	North-West	2.3	North-East	110	1987
unnamed	YARD	Coal	3PGS	220	South-West	8.5	East	190	1900
MURTON	RYHOPE FIVE QUARTERS	Coal	5OWF	221	Beneath Property	0.9	South-East	90	1989
MURTON	RYHOPE FIVE QUARTERS	Coal	3HCF	221	Beneath Property	2.6	North	110	1982
unnamed	RYHOPE FIVE QUARTERS	Coal	3HRO	221	Beneath Property	0.3	North-East	100	1982
unnamed	RYHOPE FIVE QUARTERS	Coal	3HRE	221	Beneath Property	2.1	East	80	1950
MURTON	RYHOPE FIVE QUARTERS	Coal	5OWI	222	Beneath Property	0.9	South-East	100	1987
MURTON	RYHOPE FIVE QUARTERS	Coal	3HCI	223	Beneath Property	0.8	South-East	90	1987
MURTON	HIGH MAIN	Coal	90	229	Beneath Property	2.9	North-East	150	1991
MURTON	RYHOPE FIVE QUARTERS	Coal	3HCT	229	Beneath Property	2.2	East	90	1988
unnamed	HIGH MAIN	Coal	3F2S	229	Beneath Property	3.6	East	200	1982
MURTON	HIGH MAIN	Coal	E90	230	Beneath Property	2.8	East	166	1991
unnamed	RYHOPE FIVE QUARTERS	Coal	MURT	234	Beneath Property	1.7	East	140	1982
unnamed	HIGH MAIN	Coal	3F2D	235	Beneath Property	2.2	North-East	180	1987
unnamed	HIGH MAIN	Coal	3F2F	237	Beneath Property	2.8	North-East	160	1986
unnamed	YARD	Coal	3PGT	238	South	2.6	East	190	1913
unnamed	HIGH MAIN	Coal	3F2L	241	Beneath Property	4.4	North-East	140	1968
unnamed	YARD	Coal	3F9K	244	South-West	33.4	South-East	120	1920
unnamed	YARD	Coal	3PJ8	247	Beneath Property	3.4	North-East	192	1918
unnamed	HIGH MAIN	Coal	3F2Q	249	Beneath Property	3.9	North-East	200	1984
unnamed	YARD	Coal	3PJ9	251	Beneath Property	2.2	North-East	192	1882
unnamed	YARD	Coal	3PGV	251	South	3.2	North-East	140	1917

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
unnamed	YARD	Coal	3F89	253	Beneath Property	1.6	North-East	183	1971
unnamed	HIGH MAIN	Coal	E90	256	Beneath Property	3.3	North-East	170	1991
unnamed	HIGH MAIN	Coal	3F2K	256	South-East	4.2	East	140	1968
unnamed	HIGH MAIN	Coal	3F2Y	260	Beneath Property	3.3	North-East	170	1985
unnamed	YARD	Coal	3F8A	263	Beneath Property	2.6	North-East	183	1934
VANE TEMPEST	RYHOPE FIVE QUARTERS	Coal	C10	264	Beneath Property	3.5	North-East	150	1989
unnamed	HIGH MAIN	Coal	7PY7	268	Beneath Property	3.3	North-East	170	1985
unnamed	YARD	Coal	3F8C	268	Beneath Property	3.0	North-East	183	1900
unnamed	HIGH MAIN	Coal	3F2M	270	Beneath Property	4.6	North-East	140	1947
unnamed	YARD	Coal	3F8E	272	Beneath Property	3.0	North-East	183	1900
unnamed	YARD	Coal	3PJ7	272	Beneath Property	2.4	North-East	192	1878
MURTON	HIGH MAIN	Coal	5ZYA	273	East	5.9	North-East	150	1968
unnamed	HIGH MAIN	Coal	3HR1	274	Beneath Property	0.7	North-East	200	1962
VANE TEMPEST	RYHOPE FIVE QUARTERS	Coal	C10	276	Beneath Property	5.1	South-East	100	1989
unnamed	HIGH MAIN	Coal	3F2P	276	Beneath Property	5.5	North-East	140	1947
unnamed	YARD	Coal	3F8D	277	Beneath Property	3.0	North-East	183	1900
unnamed	HIGH MAIN	Coal	3HPF	279	Beneath Property	2.1	East	190	1977
unnamed	HIGH MAIN	Coal	3F2O	282	North-East	5.3	North-East	140	1957
unnamed	HIGH MAIN	Coal	3F2N	283	Beneath Property	5.3	North-East	140	1957
unnamed	HIGH MAIN	Coal	3F2X	284	North-East	2.3	East	150	1945
unnamed	YARD	Coal	3F88	285	Beneath Property	2.7	North-East	203	1947
unnamed	LOW MAIN	Coal	3PJV	285	Beneath Property	2.4	East	60	1940
unnamed	LOW MAIN	Coal	3PN6	285	South	2.5	North-East	94	1924
unnamed	HIGH MAIN	Coal	3HRF	286	Beneath Property	0.4	South	190	1976
unnamed	HIGH MAIN	Coal	3HLF	289	Beneath Property	2.9	North-East	210	1966

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
unnamed	LOW MAIN	Coal	3PNC	289	South	0.5	East	61	1942
unnamed	HIGH MAIN	Coal	3HPT	290	Beneath Property	0.3	North	190	1976
unnamed	HIGH MAIN	Coal	3HQT	290	Beneath Property	2.7	South-East	190	1976
unnamed	HIGH MAIN	Coal	3F32	290	South-East	1.6	East	190	1964
unnamed	LOW MAIN	Coal	3PN7	290	South-West	0.5	East	61	1939
unnamed	HIGH MAIN	Coal	3HML	291	Beneath Property	2.0	North-East	190	1960
unnamed	HIGH MAIN	Coal	3HNI	291	Beneath Property	1.5	North-East	190	1900
unnamed	LOW MAIN	Coal	3PKZ	292	Beneath Property	1.5	North-East	112	1939
unnamed	LOW MAIN	Coal	3PPX	292	Beneath Property	2.1	North-East	193	1908
unnamed	YARD	Coal	3F8H	292	Beneath Property	2.6	North-East	183	1900
unnamed	LOW MAIN	Coal	3PKW	293	Beneath Property	2.7	North-West	60	1900
unnamed	HIGH MAIN	Coal	3F2W	293	North-East	2.9	North-East	150	1945
unnamed	HIGH MAIN	Coal	3HP1	295	Beneath Property	1.2	North	200	1967
unnamed	LOW MAIN	Coal	3PKY	296	Beneath Property	1.2	East	120	1938
unnamed	HIGH MAIN	Coal	3HLT	296	Beneath Property	0.9	South-East	190	1900
unnamed	LOW MAIN	Coal	3PJU	296	Beneath Property	0.0	East	60	1900
unnamed	HIGH MAIN	Coal	3HOT	296	North-West	1.2	North-East	200	1971
MURTON	HIGH MAIN	Coal	5ZYI	297	North-East	2.5	North-East	150	1952
unnamed	LOW MAIN	Coal	3PKX	298	Beneath Property	2.3	South-East	60	1938
unnamed	HIGH MAIN	Coal	3F31	299	South-East	2.7	North-East	190	1964
unnamed	HUTTON	Coal	3PPX	302	Beneath Property	2.1	North-East	193	1908
MURTON	HIGH MAIN	Coal	E87	305	North-West	4.6	North-East	200	1991
unnamed	LOW MAIN	Coal	3PPW	306	Beneath Property	2.0	North-East	193	1900
MURTON	HIGH MAIN	Coal	E86	306	North-West	4.6	North-East	226	1990
MURTON	HIGH MAIN	Coal	87	307	North-West	0.0	East	200	1990
MURTON	HIGH MAIN	Coal	86	307	North-West	0.0	East	200	1990

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
unnamed	LOW MAIN	Coal	3PL1	308	Beneath Property	2.0	North-East	140	1925
unnamed	LOW MAIN	Coal	3PL2	308	Beneath Property	2.0	North-East	112	1925
unnamed	LOW MAIN	Coal	3PL0	308	Beneath Property	3.4	South	112	1917
unnamed	MAUDLIN	Coal	3F1B	308	West	4.3	North-East	114	1956
EPPLETON	LOW MAIN	Coal	3PKC	309	West	5.0	North-East	76	1960
unnamed	YARD	Coal	3F8B	311	Beneath Property	2.8	North-East	183	1934
HETTON LYONS	YARD	Coal	3F8M	311	Beneath Property	2.8	East	183	1908
unnamed	YARD	Coal	3F86	312	Beneath Property	2.8	North-East	203	1947
unnamed	HUTTON	Coal	3PPW	314	Beneath Property	2.0	North-East	193	1900
unnamed	HUTTON	Coal	3PRT	314	South	2.5	North-East	200	1924
unnamed	LOW MAIN	Coal	3PN5	314	South	2.8	North-East	94	1917
SEAHAM	YARD	Coal	3SNF	315	Beneath Property	3.4	North-East	198	1914
unnamed	LOW MAIN	Coal	3PKV	316	Beneath Property	2.4	North	60	1941
EPPLETON	YARD	Coal	3HQD	316	Beneath Property	2.6	East	200	1908
unnamed	HUTTON	Coal	3PRR	316	South-West	2.9	North-East	200	1924
HASWELL	HUTTON	Coal	3PRP	318	South-West	2.8	North-East	200	1935
VANE TEMPEST	RYHOPE FIVE QUARTERS	Coal	C06	319	Beneath Property	5.2	East	150	1992
EPPLETON	LOW MAIN	Coal	3NWS	319	North-West	4.1	North-East	163	1951
VANE TEMPEST	RYHOPE FIVE QUARTERS	Coal	54ZH	320	Beneath Property	3.4	East	110	1983
unnamed	LOW MAIN	Coal	3PKF	320	Beneath Property	5.1	North-East	120	1940
EPPLETON	LOW MAIN	Coal	3PKD	322	West	43.5	South	104	1963
EPPLETON	LOW MAIN	Coal	3NXO	322	Beneath Property	3.1	North	163	1957
MURTON	YARD	Coal	53QE	323	East	2.9	North-East	210	1900
VANE TEMPEST	RYHOPE FIVE QUARTERS	Coal	54PI	325	Beneath Property	3.9	North-East	100	1986

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
VANE TEMPEST	RYHOPE FIVE QUARTERS	Coal	C05	325	Beneath Property	3.5	East	100	1986
MURTON	LOW MAIN	Coal	3PKE	325	Beneath Property	4.8	North-East	130	1939
MURTON	YARD	Coal	3HTD	325	Beneath Property	1.5	North-East	183	1908
MURTON	LOW MAIN	Coal	3PKL	325	East	4.7	North-East	110	1940
VANE TEMPEST	RYHOPE FIVE QUARTERS	Coal	560E	326	Beneath Property	2.9	East	100	1983
unnamed	HUTTON	Coal	3PQ7	327	Beneath Property	1.9	North-East	142	1924
unnamed	MAUDLIN	Coal	3F1C	327	West	4.0	North-East	114	1957
unnamed	HUTTON	Coal	7OFE	328	Beneath Property	2.9	East	142	1925
SEAHAM	YARD	Coal	3SNT	328	Beneath Property	2.5	East	198	1900
unnamed	HUTTON	Coal	7OFF	328	South-East	2.9	East	142	1925
unnamed	HUTTON	Coal	3PRS	328	South	2.5	North-East	200	1924
unnamed	LOW MAIN	Coal	3PKI	329	West	4.6	East	361	1966
unnamed	LOW MAIN	Coal	3PL5	331	Beneath Property	3.5	North-East	132	1940
unnamed	HUTTON	Coal	3PQ8	331	Beneath Property	2.1	East	142	1925
unnamed	LOW MAIN	Coal	3PL6	332	Beneath Property	3.7	North-East	132	1940
VANE TEMPEST	RYHOPE FIVE QUARTERS	Coal	568D	332	East	2.8	East	100	1985
unnamed	HUTTON	Coal	3PRU	332	South-East	2.5	North-East	200	1924
unnamed	HIGH MAIN	Coal	3HRT	333	Beneath Property	9.5	East	200	1976
unnamed	HUTTON	Coal	3PRV	333	South	1.8	East	200	1924
unnamed	LOW MAIN	Coal	3PL7	334	Beneath Property	3.1	North-East	132	1939
unnamed	MAUDLIN	Coal	3F1D	335	Beneath Property	4.7	East	252	1966
unnamed	LOW MAIN	Coal	3PKJ	335	Beneath Property	3.1	East	223	1959
MURTON	YARD	Coal	53QG	335	East	2.0	East	210	1900
unnamed	MAUDLIN	Coal	3HC7	336	Beneath Property	5.3	North-East	168	1931

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
VANE TEMPEST	RYHOPE FIVE QUARTERS	Coal	561E	336	East	3.9	East	100	1983
MURTON	YARD	Coal	53QF	337	North-East	2.8	North-East	210	1900
SEAHAM	YARD	Coal	3SPF	338	Beneath Property	0.9	East	180	1910
unnamed	HUTTON	Coal	3PPX	338	Beneath Property	3.7	North-East	157	1908
SEAHAM	YARD	Coal	3SPT	338	Beneath Property	0.9	East	180	1900
MURTON	HUTTON	Coal	3PQ2	339	Beneath Property	2.8	North-East	137	1936
unnamed	HUTTON	Coal	7OFD	340	Beneath Property	2.9	East	142	1924
unnamed	MAUDLIN	Coal	3HQK	341	Beneath Property	5.5	North-East	163	1948
unnamed	MAUDLIN	Coal	3HOY	341	North-West	3.9	North-East	130	1967
unnamed	HIGH MAIN	Coal	3QOT	341	North-West	3.7	North-East	210	1981
SEAHAM	YARD	Coal	3SQ1	342	West	0.6	East	180	1900
unnamed	HIGH MAIN	Coal	56DT	345	Beneath Property	3.2	North-East	200	1984
EPPLETON	LOW MAIN	Coal	3PKG	345	Beneath Property	3.9	East	361	1966
unnamed	LOW MAIN	Coal	3PKH	345	Beneath Property	4.9	North-East	190	1959
unnamed	RYHOPE FIVE QUARTERS	Coal	54OI	346	Beneath Property	2.9	East	100	1986
SEAHAM	YARD	Coal	3S0T	346	South-East	0.0	East	198	1900
MURTON	YARD	Coal	53QN	346	North-East	1.1	East	180	1900
EPPLETON	YARD	Coal	3HTR	347	Beneath Property	1.8	North-East	198	1908
SEAHAM	YARD	Coal	3SOF	347	Beneath Property	2.6	East	198	1900
SEAHAM	YARD	Coal	3SO1	348	South-East	5.2	East	198	1900
EPPLETON	LOW MAIN	Coal	3PL3	349	Beneath Property	3.3	North-East	206	1960
MURTON	YARD	Coal	3F8L	349	South-East	3.2	East	183	1902
VANE TEMPEST	RYHOPE FIVE QUARTERS	Coal	56BD	351	Beneath Property	6.1	North	100	1980
unnamed	HIGH MAIN	Coal	3QOW	351	North-West	4.4	South-East	200	1976
EPPLETON	MAUDLIN	Coal	3HBZ	351	Beneath Property	1.7	East	173	1911

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
unnamed	HIGH MAIN	Coal	3QOX	352	Beneath Property	3.5	South-East	200	1976
MURTON	LOW MAIN	Coal	3PKT	352	Beneath Property	4.0	East	110	1943
SOUTH HETTON	HUTTON	Coal	3PQ5	352	Beneath Property	2.9	North-East	142	1923
SEAHAM	MAUDLIN	Coal	3HGL	353	Beneath Property	1.6	South	220	1961
unnamed	HUTTON	Coal	3PQ0	353	Beneath Property	2.7	North-East	193	1900
unnamed	LOW MAIN	Coal	3PL4	354	Beneath Property	2.0	North-East	259	1960
VANE TEMPEST	RYHOPE FIVE QUARTERS	Coal	569D	354	North	3.7	North-East	110	1985
unnamed	HIGH MAIN	Coal	56EM	355	Beneath Property	69.7	North-East	100	1942
MURTON	LOW MAIN	Coal	3PKP	356	North-East	11.0	West	110	1943
unnamed	MAUDLIN	Coal	3HQ6	357	North-West	2.5	East	163	1913
MURTON	HUTTON	Coal	3PQC	358	Beneath Property	2.8	North-East	213	1900
SEAHAM	MAUDLIN	Coal	3HFZ	359	Beneath Property	1.3	East	208	1960
unnamed	MAUDLIN	Coal	3HBL	359	Beneath Property	2.7	South-East	163	1953
unnamed	HUTTON	Coal	3PPT	362	Beneath Property	2.7	North-East	157	1900
unnamed	HIGH MAIN	Coal	3QOV	362	North-West	2.0	South-East	200	1977
MURTON	HUTTON	Coal	3PQ6	363	Beneath Property	3.6	North-East	142	1900
unnamed	MAUDLIN	Coal	3HPY	365	North-West	3.3	North-East	155	1942
VANE TEMPEST	RYHOPE FIVE QUARTERS	Coal	567D	366	Beneath Property	2.4	North-East	100	1980
unnamed	HIGH MAIN	Coal	3HS1	367	Beneath Property	23.0	South-East	200	1976
unnamed	HIGH MAIN	Coal	3QOU	367	North-West	1.9	South-East	200	1977
unnamed	MAUDLIN	Coal	3F1F	368	Beneath Property	0.0	East	180	1908
unnamed	MAUDLIN	Coal	3F1G	368	Beneath Property	0.0	East	180	1908
unnamed	LOW MAIN	Coal	3PKU	371	North-East	4.0	North-East	102	1934
unnamed	LOW MAIN	Coal	3PLC	372	South-East	1.7	North-East	76	1947
unnamed	MAUDLIN	Coal	3F1E	373	Beneath Property	0.0	East	180	1908

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
MURTON	LOW MAIN	Coal	5ZRK	374	East	1.0	East	120	1935
unnamed	HIGH MAIN	Coal	56DN	375	Beneath Property	4.0	East	100	1900
EPPLETON	HUTTON	Coal	3SVI	377	Beneath Property	2.0	North-East	147	1900
unnamed	MAUDLIN	Coal	3HFL	378	Beneath Property	2.9	East	211	1960
unnamed	MAUDLIN	Coal	3HGZ	378	Beneath Property	3.8	South-East	190	1900
unnamed	HIGH MAIN	Coal	3HSF	379	Beneath Property	4.8	North-East	200	1976
EPPLETON	MAUDLIN	Coal	3HEL	379	Beneath Property	2.0	North-East	267	1929
SEAHAM	YARD	Coal	3SQF	379	Beneath Property	10.5	North-East	180	1900
SEAHAM	YARD	Coal	56PI	380	Beneath Property	2.1	South-East	120	1957
MURTON	MAUDLIN	Coal	3HCZ	380	Beneath Property	2.8	East	180	1900
SEAHAM	HUTTON	Coal	3SXI	381	Beneath Property	4.4	South	107	1900
unnamed	HUTTON	Coal	3STW	382	Beneath Property	2.4	East	157	1908
MURTON	LOW MAIN	Coal	5ZRL	382	East	1.1	East	120	1933
MURTON	LOW MAIN	Coal	5ZRM	384	North-East	1.1	East	120	1933
MURTON	LOW MAIN	Coal	5ZRU	384	North-East	1.7	North-East	120	1932
unnamed	BUSTY	Coal	3EZ5	386	West	3.0	North-East	140	1965
unnamed	BUSTY	Coal	3EZ4	386	South-West	2.6	North-East	140	1965
unnamed	BUSTY	Coal	3EZ3	386	West	1.9	East	130	1970
unnamed	HIGH MAIN	Coal	56DM	387	Beneath Property	3.4	South-East	200	1975
unnamed	MAUDLIN	Coal	3HEZ	387	Beneath Property	1.9	North-East	208	1900
unnamed	HIGH MAIN	Coal	56DH	388	Beneath Property	2.0	North-East	100	1973
unnamed	HARVEY	Coal	3F4A	388	Beneath Property	3.2	North-East	69	1961
EPPLETON	HUTTON	Coal	3PQB	388	Beneath Property	3.4	North	213	1900
unnamed	HARVEY	Coal	3F3D	388	South	3.0	East	70	1965
unnamed	HARVEY	Coal	3F47	389	Beneath Property	1.9	North-East	69	1962
unnamed	HIGH MAIN	Coal	56EL	389	Beneath Property	4.8	East	170	1900

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
unnamed	HIGH MAIN	Coal	56DI	390	Beneath Property	2.6	East	100	1958
unnamed	BUSTY	Coal	3EZ6	392	Beneath Property	0.5	East	140	1966
unnamed	MAUDLIN	Coal	3HDL	393	Beneath Property	1.0	North-East	180	1946
unnamed	HARVEY	Coal	3F48	394	Beneath Property	7.9	North-East	76	1964
unnamed	HARVEY	Coal	3F46	394	South-West	2.9	North-East	76	1964
unnamed	HIGH MAIN	Coal	56DR	394	North	4.8	East	160	1962
SEAHAM	LOW MAIN	Coal	53Z7	394	South-East	0.0	East	140	1921
MURTON	HUTTON	Coal	3PQE	395	Beneath Property	2.7	North-East	213	1900
SEAHAM	MAUDLIN	Coal	3HDZ	395	Beneath Property	1.6	East	180	1900
unnamed	HIGH MAIN	Coal	56DL	396	Beneath Property	4.1	East	150	1974
SEAHAM	YARD	Coal	56PA	397	Beneath Property	3.0	East	160	1954
unnamed	HARVEY	Coal	3F3E	397	South	2.9	East	70	1965
SEAHAM	HUTTON	Coal	3SWW	398	Beneath Property	2.2	North-East	114	1900
unnamed	MAUDLIN	Coal	3HCL	398	South-East	1.5	North-East	180	1931
SEAHAM	YARD	Coal	3SRT	399	Beneath Property	4.3	North-East	210	1961
unnamed	MAUDLIN	Coal	55PW	399	South-East	2.7	North-East	190	1921
unnamed	HARVEY	Coal	3F4H	400	Beneath Property	3.3	East	58	1961
unnamed	MAUDLIN	Coal	55PX	400	South-East	3.6	North-East	100	1900
unnamed	HIGH MAIN	Coal	56DK	401	Beneath Property	3.3	East	180	1982
unnamed	BUSTY	Coal	3EZ8	402	Beneath Property	1.7	North	100	1969
MURTON	HUTTON	Coal	3SW4	403	Beneath Property	1.9	North-East	147	1900
unnamed	HARVEY	Coal	3F49	405	Beneath Property	3.1	East	81	1963
unnamed	MAUDLIN	Coal	3HE7	405	South-East	3.6	East	180	1954
unnamed	BUSTY	Coal	3EZE	406	Beneath Property	2.2	North-East	130	1965
unnamed	BUSTY	Coal	3EZJ	407	Beneath Property	2.6	North-East	130	1970
MURTON	HUTTON	Coal	5ZTV	408	East	1.7	South-East	140	1900

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
unnamed	HARVEY	Coal	3F44	408	West	2.2	North-East	70	1975
unnamed	HIGH MAIN	Coal	56DP	410	Beneath Property	3.5	North-East	170	1952
unnamed	HIGH MAIN	Coal	56DO	410	South-East	1.3	North-East	100	1972
unnamed	BUSTY	Coal	3F00	413	Beneath Property	0.8	West	100	1968
MURTON	HUTTON	Coal	5ZYZ	413	North-East	2.2	North-East	210	1900
unnamed	HARVEY	Coal	3F3F	413	South-East	4.3	East	90	1964
SEAHAM	YARD	Coal	3K1A	413	North-West	1.8	East	220	1959
unnamed	BUSTY	Coal	3EZG	414	Beneath Property	1.3	North-East	130	1968
unnamed	HUTTON	Coal	3PQ4	414	North-East	2.2	East	137	1936
unnamed	BUSTY	Coal	3EZF	415	Beneath Property	0.4	North-West	130	1957
MURTON	HUTTON	Coal	5ZYY	415	North-East	2.6	East	210	1900
unnamed	HARVEY	Coal	3F4B	418	North	3.8	East	51	1936
unnamed	HARVEY	Coal	3F4M	420	Beneath Property	3.8	North-East	56	1936
EPPLETON	HUTTON	Coal	3SWI	420	Beneath Property	2.3	North-East	157	1908
unnamed	HARVEY	Coal	3F45	421	Beneath Property	4.1	North-East	70	1976
unnamed	HIGH MAIN	Coal	56DS	421	North	5.3	East	100	1900
unnamed	BUSTY	Coal	3EZI	422	Beneath Property	3.7	North	130	1967
unnamed	BUSTY	Coal	3EZH	423	Beneath Property	3.6	North-East	130	1970
unnamed	HARVEY	Coal	3F4C	423	Beneath Property	5.6	North-East	66	1936
SEAHAM	YARD	Coal	3K1B	426	Beneath Property	4.0	South-East	230	1959
unnamed	HARVEY	Coal	3F4D	427	Beneath Property	3.3	North-East	66	1955
unnamed	MAUDLIN	Coal	55PY	427	Beneath Property	3.2	North-East	150	1900
unnamed	HARVEY	Coal	3F4R	428	Beneath Property	11.4	North-East	84	1975
unnamed	BUSTY	Coal	3EZX	429	Beneath Property	1.7	North-East	170	1971
unnamed	HUTTON	Coal	53MK	429	South-East	2.9	North-East	142	1900
unnamed	HIGH MAIN	Coal	55EK	430	North	3.0	East	100	1900

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
unnamed	BUSTY	Coal	3EZN	430	West	2.6	East	120	1954
unnamed	BUSTY	Coal	3EZW	431	Beneath Property	2.4	North-East	110	1975
unnamed	BUSTY	Coal	3EZY	431	Beneath Property	0.7	North-East	110	1975
unnamed	BUSTY	Coal	3F02	431	Beneath Property	2.6	North-East	90	1975
RYHOPE	MAUDLIN	Coal	3I24	431	North-West	4.4	North-East	190	1900
unnamed	BUSTY	Coal	3F03	432	Beneath Property	2.4	North-East	100	1971
SEAHAM	YARD	Coal	3SQT	432	Beneath Property	3.7	South-East	210	1958
EPPLETON	HARVEY	Coal	3RLM	432	North-West	3.8	North-East	90	1977
SEAHAM	MAUDLIN	Coal	3HH7	433	Beneath Property	1.8	East	170	1920
SEAHAM	HUTTON	Coal	3SVW	433	Beneath Property	1.8	North-East	140	1900
unnamed	HARVEY	Coal	3F4E	434	Beneath Property	4.7	East	74	1956
MURTON	HARVEY	Coal	53PE	434	East	3.8	East	80	1958
SEAHAM	YARD	Coal	56P7	436	Beneath Property	5.3	East	190	1954
unnamed	HIGH MAIN	Coal	56EI	437	Beneath Property	3.0	East	180	1942
unnamed	HIGH MAIN	Coal	56DQ	437	Beneath Property	3.5	North-East	100	1900
unnamed	HIGH MAIN	Coal	56EJ	438	Beneath Property	2.6	East	100	1900
unnamed	HARVEY	Coal	3F4G	439	Beneath Property	4.6	North-East	76	1955
unnamed	MAUDLIN	Coal	55Q5	439	North	2.7	North-East	100	1900
unnamed	BUSTY	Coal	3EZS	440	West	2.7	North-East	130	1980
unnamed	HARVEY	Coal	3F4F	440	North-East	4.7	East	74	1950
unnamed	BUSTY	Coal	3F04	442	Beneath Property	2.8	East	100	1974
unnamed	MAUDLIN	Coal	55Q2	442	Beneath Property	3.4	East	160	1910
SEAHAM	YARD	Coal	56P8	443	Beneath Property	8.1	East	190	1960
SEAHAM	YARD	Coal	56P9	443	Beneath Property	3.2	North-East	210	1906
unnamed	MAUDLIN	Coal	55Q4	443	Beneath Property	2.7	North-East	220	1900
SEAHAM	LOW MAIN	Coal	53ZU	444	Beneath Property	2.4	East	180	1971

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
EPPLETON	HARVEY	Coal	3RU8	445	Beneath Property	0.8	East	69	1987
unnamed	HARVEY	Coal	3F4N	445	North	2.1	North-East	91	1928
EPPLETON	HARVEY	Coal	3RRM	446	Beneath Property	1.7	North-East	73	1981
EPPLETON	HARVEY	Coal	3RS8	447	Beneath Property	2.6	South-West	71	1986
SEAHAM	YARD	Coal	56PC	447	Beneath Property	6.0	North-East	130	1939
unnamed	HUTTON	Coal	53MO	448	Beneath Property	3.3	East	119	1954
SEAHAM	YARD	Coal	56PG	449	Beneath Property	5.1	East	120	1937
SEAHAM	YARD	Coal	56PH	449	Beneath Property	1.7	West	120	1937
unnamed	BUSTY	Coal	3HN2	449	West	2.8	North-East	153	1946
unnamed	MAUDLIN	Coal	3HHL	451	Beneath Property	4.9	East	170	1900
unnamed	BUSTY	Coal	3HL2	452	North-West	1.7	North-East	127	1978
unnamed	BUSTY	Coal	3EZT	453	Beneath Property	3.1	North-East	130	1979
unnamed	BUSTY	Coal	3EZU	453	Beneath Property	2.1	North-East	130	1978
SEAHAM	YARD	Coal	56PD	453	Beneath Property	4.2	North-East	160	1945
unnamed	HUTTON	Coal	55O1	453	Beneath Property	3.3	East	94	1941
unnamed	MAUDLIN	Coal	55Q3	453	Beneath Property	3.1	East	100	1900
SEAHAM	MAUDLIN	Coal	3I23	454	Beneath Property	3.3	South-East	190	1902
VANE TEMPEST	YARD	Coal	56PE	454	North	6.1	East	100	1975
unnamed	BUSTY	Coal	3F01	454	East	2.9	East	90	1973
unnamed	MAUDLIN	Coal	55Q0	455	Beneath Property	2.6	East	100	1900
MURTON	HARVEY	Coal	53PG	455	East	2.6	South-West	80	1956
unnamed	HARVEY	Coal	3F4Q	456	North-East	2.3	North-East	74	1949
MURTON	HARVEY	Coal	53PJ	457	North-East	1.5	East	90	1906
EPPLETON	HARVEY	Coal	3RT8	458	North-West	1.5	North-East	84	1977
MURTON	HARVEY	Coal	53PF	458	East	1.2	East	80	1953
EPPLETON	HARVEY	Coal	3RQM	458	North-West	1.0	North-East	91	1978

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
MURTON	HARVEY	Coal	53PH	458	North-East	0.5	East	80	1953
MURTON	HARVEY	Coal	53PL	458	North-East	1.7	East	90	1906
unnamed	HARVEY	Coal	3F4P	459	North-East	0.0	East	89	1953
EPPLETON	HARVEY	Coal	3RR8	460	Beneath Property	1.6	North-East	81	1979
MURTON	HARVEY	Coal	53PK	460	North-East	1.5	East	90	1953
SEAHAM	HUTTON	Coal	3SXW	462	Beneath Property	2.7	North-East	107	1949
unnamed	BRASS THILL	Coal	56C8	462	North	3.2	North-East	70	1955
unnamed	BUSTY	Coal	3F05	463	Beneath Property	3.9	North-East	140	1979
unnamed	BUSTY	Coal	3HLG	464	Beneath Property	2.7	North	142	1983
unnamed	HUTTON	Coal	3QNL	466	Beneath Property	0.2	East	107	1932
EPPLETON	HARVEY	Coal	3RUM	468	Beneath Property	1.3	East	79	1985
unnamed	BUSTY	Coal	3HIH	468	Beneath Property	8.1	East	137	1983
unnamed	HUTTON	Coal	3QMZ	468	North-West	3.2	East	102	1924
unnamed	MAUDLIN	Coal	55PI	469	South	5.4	South-East	150	1900
VANE TEMPEST	YARD	Coal	56PF	471	Beneath Property	3.4	East	100	1968
unnamed	BUSTY	Coal	3HI3	471	Beneath Property	2.1	North-East	155	1956
unnamed	HUTTON	Coal	5504	471	North	2.2	North-East	100	1900
unnamed	BUSTY	Coal	3F06	472	Beneath Property	4.1	North-East	140	1982
unnamed	BUSTY	Coal	3HJV	472	Beneath Property	0.9	North-East	190	1975
unnamed	BUSTY	Coal	3HHH	472	North-West	2.3	North-East	155	1954
unnamed	BUSTY	Coal	3HLU	472	North-West	1.3	North-West	142	1955
unnamed	BUSTY	Coal	3HK3	473	Beneath Property	0.9	North-East	211	1972
SEAHAM	LOW MAIN	Coal	53ZR	474	Beneath Property	2.9	East	170	1971
unnamed	BUSTY	Coal	3HM2	474	North-West	4.2	East	155	1956
unnamed	LOW MAIN	Coal	56QR	475	South-East	4.3	South-East	130	1942
unnamed	HUTTON	Coal	5503	477	Beneath Property	2.2	North-East	107	1929

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
unnamed	BUSTY	Coal	3HJ3	478	Beneath Property	0.7	East	216	1985
unnamed	BUSTY	Coal	3HHV	478	Beneath Property	1.3	South-West	155	1956
SEAHAM	LOW MAIN	Coal	53ZQ	478	South	5.1	East	120	1965
unnamed	HUTTON	Coal	3QN7	480	Beneath Property	3.9	East	107	1931
unnamed	YARD	Coal	56QW	483	Beneath Property	2.2	East	130	1966
unnamed	BUSTY	Coal	3HGV	483	North-West	0.9	N/A	199	1963
VANE TEMPEST	YARD	Coal	56QX	485	North	2.3	East	90	1970
unnamed	BUSTY	Coal	3HH3	485	North-West	2.0	North-East	155	1958
unnamed	BUSTY	Coal	3HLH	487	Beneath Property	1.3	South-East	262	1969
unnamed	MAUDLIN	Coal	55PZ	487	South	3.2	North-East	100	1900
unnamed	BUSTY	Coal	3HKV	489	North-West	1.8	North-East	211	1963
unnamed	BUSTY	Coal	3HIV	490	Beneath Property	2.0	North-West	216	1985
SEAHAM	LOW MAIN	Coal	53ZS	490	Beneath Property	2.6	East	170	1972
unnamed	BUSTY	Coal	3HJH	491	Beneath Property	2.4	North-East	208	1985
SEAHAM	LOW MAIN	Coal	53ZT	492	Beneath Property	3.4	North-East	170	1974
unnamed	LOW MAIN	Coal	53ZV	492	South	6.4	East	120	1900
unnamed	BUSTY	Coal	3HL3	494	Beneath Property	1.4	East	210	1973
SEAHAM	LOW MAIN	Coal	53ZW	496	Beneath Property	4.0	North-East	170	1975
unnamed	HARVEY	Coal	56R0	500	Beneath Property	2.0	East	86	1942
unnamed	BUSTY	Coal	3HKH	504	Beneath Property	1.0	North-East	188	1968
unnamed	HUTTON	Coal	53MS	508	Beneath Property	3.2	East	100	1900
unnamed	MAUDLIN	Coal	55PJ	512	Beneath Property	4.3	East	160	1910
unnamed	HUTTON	Coal	55P6	512	Beneath Property	3.9	East	147	1900
unnamed	HARVEY	Coal	3GSO	517	North-West	2.7	North	165	1955
unnamed	HARVEY	Coal	56R7	518	North-West	3.7	North-East	96	1955
unnamed	HUTTON	Coal	53MR	520	Beneath Property	4.9	North-East	102	1900

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
unnamed	HARVEY	Coal	56R5	522	North-West	3.7	North-East	89	1951
unnamed	HUTTON	Coal	5502	523	Beneath Property	3.8	East	100	1900
unnamed	HUTTON	Coal	53MQ	526	Beneath Property	3.2	East	100	1900
unnamed	HARVEY	Coal	56R4	533	North	3.4	East	86	1939
unnamed	HUTTON	Coal	55O0	536	Beneath Property	3.3	East	100	1900
unnamed	HARVEY	Coal	56R3	541	North	1.7	East	86	1939
unnamed	HUTTON	Coal	55P4	542	Beneath Property	4.5	East	147	1900
unnamed	HARVEY	Coal	56R2	542	North	2.0	North-East	86	1938
unnamed	HARVEY	Coal	56R1	546	North	3.4	North	86	1940
unnamed	HUTTON	Coal	55P7	559	Beneath Property	1.8	North-East	140	1900
unnamed	BUSTY	Coal	55S9	578	North	1.4	East	100	1959
unnamed	BUSTY	Coal	55S8	595	North	0.8	East	97	1955

Probable unrecorded shallow workings

None.

Spine roadways at shallow depth

Distance to spine roadway (m)	Direction to spine roadway
Within	N/A
Within	N/A

Mine entries

Entry type	Reference	Grid reference	Treatment description	Mineral	Conveyancing details
Shaft	438545-001	438095 545299	this entry was filled and capped at 5m b.g.l to former British Coal specifications in 1987.	Coal	
Shaft	438545-002	438109 545255	this entry was filled in 1987 and capped in 1988 both to former British Coal specifications.	Coal	
Shaft	438545-003	438896 545850	This void shaft was sealed with a 13.4m reinforced concrete cap set on competent strata. The shaft is fitted with a gas vent and currently being used by the Coal Authority to monitor mine water levels and gas concentrations. I-357203 works took place in November 2020 replacing full bar timber gate, addition of heavy duty chains / padlocks. Local treets were removed close to the shaft-pallasade fencing repaired.	Coal	

Abandoned mine plan catalogue numbers

The following abandoned mine plan catalogue numbers intersect with some, or all, of the enquiry boundary:

D683	16046	D1532
D1224	D1518	D561
D966	9431	D1520

Our records show we have more plans than those shown above which could affect the enquiry boundary.

Please contact us on 0345 762 6848 to determine the exact abandoned mine plans you require based on your needs.

Outcrops

No outcrops recorded.

Geological faults, fissures and breaklines

Please refer to the 'Summary of findings' map (on separate sheet) for details of any geological faults, fissures or breaklines either within or intersecting the enquiry boundary.

Faults under or close to the property recorded.

Opencast mines

None recorded within 500 metres of the enquiry boundary.

Coal Authority managed tips

None recorded within 500 metres of the enquiry boundary.

Section 2 – Investigative or remedial activity

Please refer to the 'Summary of findings' map (on separate sheet) for details of any activity within the area of the site boundary.

Site investigations

None recorded within 50 metres of the enquiry boundary.

Remediated sites

Distance to site remediation (m)	Direction
Within	N/A
Within	N/A
Within	N/A
Within	N/A

See Section 4 for further information.

Coal mining subsidence

A damage notice or claim for alleged subsidence damage was made in September 2018 for SEYMOURS FIELD, WEST OF SEATON, SUNDERLAND, COUNTY DURHAM. However, the claim was rejected.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

A damage notice or claim for alleged subsidence damage was made in October 2016 for PILL BOX FIELD, WEST HOUSE FARM, BURDON VILLAGE, SUNDERLAND, TYNE & WEAR. The claim was settled by repairs to the value of £700.00.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

A damage notice or claim for alleged subsidence damage was made in January 2013 for FIELD OS 4823, SEATON, SEAHAM, COUNTY DURHAM. The claim was settled by repairs to the value of £2,761.82.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

A damage notice or claim for alleged subsidence damage was made in January 2013 for PACIFIC HALL FARM, SEATON, SEAHAM, COUNTY DURHAM SR7 0NR. The claim was settled by repairs to the value of £1,000.00.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

A damage notice or claim for alleged subsidence damage was made in October 2012 for HAVERLEY HOUSE FARM, SEATON, SEAHAM, COUNTY DURHAM SR7 0NQ. However, the claim was rejected.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

A damage notice or claim for alleged subsidence damage was made in May 2002 for ARABLE FARM LAND E437997, N546535 ADJACENT TO PUBLIC FOOTPATH, MERTON, COUNTY DURHAM. However, the claim was rejected.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

A damage notice or claim for alleged subsidence damage was made in March 2001 for WELFARE GROUND FRONT STREET, SOUTH HETTON, DURHAM, COUNTY DURHAM. However, the claim was rejected.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

A damage notice or claim for alleged subsidence damage was made in July 2000 for FIELD OS 8912 HAVERLEY HOUSE FARM, SEATON, SEAHAM, COUNTY DURHAM. However, the claim was rejected.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

A damage notice or claim for alleged subsidence damage was made in July 2000 for LAND OS 6229 HAVERLEY HOUSE FARM, SEATON, SEAHAM, COUNTY DURHAM. However, the claim was rejected.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

A damage notice or claim for alleged subsidence damage was made in August 1999 for FIELD NUMBER 6229 LAND AT SEATON MOOR HOUSE, SEATON, SEAHAM, COUNTY DURHAM. However, the claim was rejected.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

A damage notice or claim for alleged subsidence damage was made in October 1998 for HAVERLEY HOUSE FARM, SEATON, SEAHAM, COUNTY DURHAM, SR7 0NQ. However, the claim was rejected.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

A damage notice or claim for alleged subsidence damage was made in April 1997 for LYNGROVE SEATON LANE, SEAHAM, CO DURHAM, SR7 0LP. However, the claim was rejected.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

A damage notice or claim for alleged subsidence damage was made in October 1996 for LAND AT SEATON HAVERLEY HOUSE FARM, SEATON, SEAHAM, CO DURHAM. The claim was settled by a compensation payment totalling £27,773.42.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

A damage notice or claim for alleged subsidence damage was made in August 1996 for 30 STATION ESTATE SOUTH, MURTON, SEAHAM, COUNTY DURHAM, SR7 9SW. However, the claim was rejected.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

A damage notice or claim for alleged subsidence damage was made in October 1995 for 35 STATION ESTATE NORTH, MURTON, SEAHAM, COUNTY DURHAM, SR7 9SN. The claim was settled by repairs to the value of £1,586.56.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

There are a further 4 claim(s) within 50 metres of the property boundary that do not match the property address. These are shown on the enquiry boundary plot.

The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

If further subsidence damage claims information is required, please visit www.groundstability.com.

See Section 4 for further information.

Mine gas

Distance to gas incident/remediation (m)	Direction
Within	N/A

See Section 4 for further information.

Mine water treatment schemes

None recorded within 500 metres of the enquiry boundary.

Section 3 – Licensing and future mining activity

Future underground mining
None recorded.

Coal mining licensing

Status	Licence type	Distance (m)	Direction
Future	Underground Coal Gasification	Within	N/A

See Section 4 for further information.

Court orders
None recorded.

Section 46 notices
No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.

Withdrawal of support notices
The property is in an area where notices to withdraw support were given in 1946, 1948, 1949 and 1959.

The property is not in an area where a notice has been given under section 41 of the Coal Industry Act 1994, cancelling the entitlement to withdraw support.

Payments to owners of former copyhold land
The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

Section 4 – Further information

The following potential risks have been identified and as part of your risk assessment should be investigated further.

Development advice

The site is within an area of historical coal mining activity. Should you require advice and/or support on understanding the mining legacy, its risks to your development or what next steps you need to take, please contact us.

Remediated sites

The site is within an area of previous interest. It is close to where the Coal Authority has investigated and where necessary remediated mine entries and/or shallow coal mine workings following specific reported hazards.

The site requires further investigation and may influence your risk assessment. We recommend that you order the Coal Authority **Surface Hazards Incident Report**, which will include more information about the hazard.

Coal mining subsidence

The site is within an area of previous interest. It is close to where the Coal Authority or licensed mine operator has investigated and where necessary remediated issues relating to coal mining subsidence.

The site requires further investigation and may influence your risk assessment. We recommend that you order the appropriate **Coal Authority Subsidence Claims Report**, which will include more information about the hazard.

Mine gas remedial works

The site is within an area of previous interest. It is close to where the Coal Authority has investigated and subsequently remediated the effects of mine or ground gas emissions following specific reported hazards.

The site requires further investigation and may influence your risk assessment. We recommend that you order the **Coal Authority Mine Gas Emission Report**, which will include more information about the hazard.

Coal mining licensing

The report has highlighted that the site is close to a Coal Authority license area for coal mining operations. Please contact us if you require further information.

For further information on specific site or ground investigations in relation to any issues raised in Section 4, please call us on 0345 762 6848 or email us at groundstability@coal.gov.uk.

Section 5 – Data definitions

The datasets used in this report have limitations and assumptions within their results. For more guidance on the data and the results specific to the enquiry boundary, please **call us on 0345 762 6848** or **email us at groundstability@coal.gov.uk.**

Past underground coal mining

Details of all recorded underground mining relative to the enquiry boundary. Only past underground workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination, will be included.

Probable unrecorded shallow workings

Areas where the Coal Authority believes there to be unrecorded coal workings that exist at or close to the surface (less than 30 metres deep).

Spine roadways at shallow depth

Connecting roadways either, working to working, or, surface to working, both in-seam and cross measures that exist at or close to the surface (less than 30 metres deep), either within or within 10 metres of the enquiry boundary.

Mine entries

Details of any shaft or adit either within, or within 100 metres of the enquiry boundary including approximate location, brief treatment details where known, the mineral worked from the mine entry and conveyance details where the mine entry has previously been sold by the Authority or its predecessors British Coal or the National Coal Board.

Abandoned mine plan catalogue numbers

Plan numbers extracted from the abandoned mines catalogue containing details of coal and other mineral abandonment plans deposited via the Mines Inspectorate in accordance with the Coal Mines Regulation Act and Metalliferous Mines Regulation Act 1872. A maximum of 9 plan extents that intersect with the enquiry boundary will be included. This does not infer that the workings and/or mine entries shown on the abandonment plan will be relevant to the site/property boundary.

Outcrops

Details of seam outcrops will be included where the enquiry boundary intersects with a conjectured or actual seam outcrop location (derived by either the British Geological Survey or the Coal Authority) or intersects with a defined 50 metres buffer on the coal (dip) side of the outcrop. An indication of whether the Coal Authority believes the seam to be of sufficient thickness and/or quality to have been worked will also be included.

Geological faults, fissures and breaklines

Geological disturbances or fractures in the bedrock. Surface fault lines (British Geological Survey derived data) and fissures and breaklines (Coal Authority derived data) intersecting with the enquiry boundary will be included. In some circumstances faults, fissures or breaklines have been known to contribute to surface subsidence damage as a consequence of underground coal mining.

Opencast mines
Opencast coal sites from which coal has been removed in the past by opencast (surface) methods and where the enquiry boundary is within 500 metres of either the licence area, site boundary, excavation area (high wall) or coaling area.

Coal Authority managed tips
Locations of disused colliery tip sites owned and managed by the Coal Authority, located within 500 metres of the enquiry boundary.

Site investigations
Details of site investigations within 50 metres of the enquiry boundary where the Coal Authority has received information relating to coal mining risk investigation and/or remediation by third parties.

Remediated sites
Sites where the Coal Authority has undertaken remedial works either within or within 50 metres of the enquiry boundary following report of a hazard relating to coal mining under the Coal Authority's Emergency Surface Hazard Call Out procedures.

Coal mining subsidence
Details of alleged coal mining subsidence claims made since 31 October 1994 either within or within 50 metres of the enquiry boundary. Where the claim relates to the enquiry boundary confirmation of whether the claim was accepted, rejected or whether liability is still being determined will be given. Where the claim has been discharged, whether this was by repair, payment of compensation or a combination of both, the value of the claim, where known, will also be given.

Details of any current 'Stop Notice' deferring remedial works or repairs affecting the property/site, and if so the date of the notice.

Details of any request made to execute preventative works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991. If yes, whether any person withheld consent or failed to comply with any request to execute preventative works.

Mine gas
Reports of alleged mine gas emissions received by the Coal Authority, either within or within 500 metres of the enquiry boundary that subsequently required investigation and action by the Coal Authority to mitigate the effects of the mine gas emission.

Mine water treatment schemes
Locations where the Coal Authority has constructed or operates assets that remove pollutants from mine water prior to the treated mine water being discharged into the receiving water body.

These schemes are part of the UK's strategy to meet the requirements of the Water Framework Directive. Schemes fall into 2 basic categories: Remedial – mitigating the impact of existing pollution or Preventative – preventing a future pollution incident.

Mine water treatment schemes generally consist of one or more primary settlement lagoons and one or more reed beds for secondary treatment. A small number are more specialised process treatment plants.

Future underground mining
Details of all planned underground mining relative to the enquiry boundary. Only those future workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination will be included.

Coal mining licensing
Details of all licenses issued by the Coal Authority either within or within 200 metres of the enquiry boundary in relation to the under taking of surface coal mining, underground coal mining or underground coal gasification.

Court orders
Orders in respect of the working of coal under the Mines (Working Facilities and Support) Acts of 1923 and 1966 or any statutory modification or amendment thereof.

Section 46 notices
Notice of proposals relating to underground coal mining operations that have been given under section 46 of the Coal Mining Subsidence Act 1991.

Withdrawal of support notices
Published notices of entitlement to withdraw support and the date of the notice. Details of any revocation notice withdrawing the entitlement to withdraw support given under Section 41 of the Coal Industry Act 1994.

Payment to owners of former copyhold land
Relevant notices which may affect the property and any subsequent notice of retained interests in coal and coal mines, acceptance or rejection notices and whether any compensation has been paid to a claimant.

Appendix C Zetica Unexploded Bomb Map

UNEXPLODED BOMB RISK MAP

SITE LOCATION

Map Centre: 439189,545476

LEGEND

- **High:** Areas indicated as having a bombing density of 50 bombs per 1000acre or higher.
- **Moderate:** Areas indicated as having a bombing density of 15 to 49 bombs per 1000acre.
- **Low:** Areas indicated as having 15 bombs per 1000acre or less.

miltary	**industry**	**UXO find**
transport	**dock**	**Luftwaffe targets**
utilities	**Bombing decoy**	**other**

How to use your Unexploded Bomb (UXB) risk map?

The map indicates the potential for Unexploded Bombs (UXB) to be present as a result of World War Two (WWII) bombing.

You can incorporate the map into your preliminary risk assessment* for potential Unexploded Ordnance (UXO) for a site. Using this map, you can make an informed decision as to whether more in-depth detailed risk assessment* is necessary.

What do I do if my site is in a moderate or high risk area?

Generally, we recommend that a detailed UXO desk study and risk assessment is undertaken for sites in a moderate or high UXB risk area.

Similarly, if your site is near to a designated Luftwaffe target or bombing decoy then additional detailed research is recommended.

More often than not, this further detailed research will conclude that the potential for a significant UXO hazard to be present on your site is actually low.

Never plan site work or undertake a risk assessment using these maps alone. More detail is required, particularly where there may be a source of UXO from other military operations which are not reflected on these maps.

If my site is in a low risk area, do I need to do anything?

If both the map and other research confirms that there is a low potential for UXO to be present on your site then, subject to your own comfort and risk tolerance, works can proceed with no special precautions.

A low risk really means that there is no greater probability of encountering UXO than anywhere else in the UK.

If you are unsure whether other sources of UXO may be present, you can ask for one of our **pre-desk study assessments (PDSA)**

If I have any questions, who do I contact?

tel: **+44 (0) 1993 886682**

email: **uxo@zetica.com**

web: **www.zeticauxo.com**

The information in this UXB risk map is derived from a number of sources and should be used in conjunction with the accompanying notes on our website: **(https://zeticauxo.com/downloads-and-resources/risk-maps/)**

It is important to note that this map is not a UXO risk assessment and should not be reported as such when reproduced.

*Preliminary and detailed UXO risk assessments are advocated as good practice by industry guidance such as CIRIA C681 'Unexploded Ordnance (UXO), a guide for the construction industry'.

Appendix D Council Correspondence

Contact: Julie Purser
Direct tel: 03000 268037
Email: inforights@durham.gov.uk
Our ref: 2764997

Date: 12/08/21

Dear Ms Cooke

Environmental Information Regulations 2004

Please accept our apologies for the delay.

You requested:
I am contacting you on behalf of National Grid 'Scotland England Green Link 1 - English Onshore Scheme' (SEGL1) in relation to obtaining data based on the below questions. National Grid SEGL1 is a proposed scheme in which 10km of underground HVDC cables are proposed to be installed in County Durham from the landfall at Seaham to a converter station at Hawthorn Pit.
May we please submit an 'Environmental Information Regulations' (EIR) request for the following information within the search area shown on the attached file:

1 - Records of pollution incidents, spills, accidents or other regulatory actions.

2 - Records of any sites which feature Part A(2) or Part B Processes regulated by East Riding of Yorkshire Council under the Environmental Permitting Regulations 2018.

3 - Any information on proposed future changes to industrial/agricultural land use, such as planning applications.

4 - Any information on previous ground investigations and or known remediation schemes (relating to soil and groundwater) that have taken place.

5 - The grid reference location, type of source, an estimate of the average daily volume of water supplied in cubic meters and the type of premises supplied for any Regulation 9 or Regulation 10 (as per the Private Water Supplies Regulations 2016) private water supplies for which you hold records .

Resources
Durham County Council, County Hall, Durham DH1 5UF
Main Telephone 03000 26 0000

Text Messaging Service 07797 870 192- your message must start with the word: INFO

In addition to this, may you please provide any other public and known abstraction points or wells.
6 - Any information relating to geo-environmental data relating to RIGS (regionally important geological sites) and quarrying/mining sites.

7 - Any information relating to water quality, both surface and groundwater, in regard to any physical/chemical data as per the WFD/RBMP and any historic/current monitoring locations within the search area within the attached PDF.

8 - Information relating to natural background contamination e.g. naturally occurring elevated concentrations of metals in soils, areas of known ground gas production and radon.

9 - Any information on licensed waste operations or historic landfill sites (either operated by the Local Authority or other historical landfills).

10 - Any information relating to remedial activities located at Hawthorn Pit Colliery.

Our response:

Please accept our apologies for the delay.

Response to Question 1:

Our Community Protection (CP) have checked our databases and can find no incidents recorded within the proposed development area. As such, Regulation 12(4) of the EIR applies in relation to this question in that there is an exception to the duty to disclose information when information is not held.

Response to question 2:

Community Protection have checked our records and there are no Part A2 or Part B permitted sites located within the area in question. (As pointed out previously, the request refers to sites regulated by the East Riding of Yorkshire, not Durham County Council (DCC), but we are for now assuming that you actually mean DCC)

Response to question 3:

Under Regulation 6(1)(b) of the EIR this information is publically available and easily accessible. All planning applications can be found via the following website link address:

http://www.durham.gov.uk/article/8276/View-and-comment-on-current-planning- applications

Response to question 5:

Durham County Council, Environment Action Team, deal with private water supplies used as drinking water for human consumption. Therefore, our records only relate to such abstractions. Therefore, we cannot comment on any other types of abstractions which may exist.

Please note that the information provided reflects the information held by Durham County Council, Environment Action Team, on the location of private water supplies and does not preclude the presence of other private water supplies, springs or other water abstraction points in the area that have not been notified to us. The Council makes no representations as to the accuracy of this information and shall not be liable to you or any other party for any losses or damages whatsoever or howsoever arising in connection with the use of this information.

Community Protection can find no record of any Private Water Supplies within the area in question. The applicant may wish to check with Northumbrian Water regarding any other extraction points that may exist and also regarding their question on water quality.

Response to questions 4, 8, 9 and 10:

Under Regulation 8 of the EIR there is a charge for this information. You can request this information from the following website link address:

http://www.durham.gov.uk/article/3820/Contaminated-land

Radon information is available at the following: https://www.ukradon.org/

Resources
Durham County Council, County Hall, Durham DH1 5UF
Main Telephone 03000 26 0000

Text Messaging Service 07797 870 192- your message must start with the word: INFO

Attached:
Appendix - Report prepared by Newcastle University for DCC titled: Normal Background Levels for County Durham. This report was produced for DCC to use for our Part 2A assessment with Newcastle University.

Durham NBC Values – attached.

Response to questions 6 and 7:

Under Regulation 12(4)(a) of the EIR, we do not hold this information. You may wish to redirect these questions to the Coal Authority or the Environment Agency.

Please note: You will find some of the information contained in Appendix 1 has been redacted. This has been done in accordance with Regulation 12(3) and 13(1) in that the information constitutes personal information. Under these Regulations, personal information is exempt from release where disclosure would breach any of the Data Protection Principles. In this case Principle 1 - 'lawful, fair and transparent', in that the individual concerned would not expect their personal details to be put into the public domain in this way.
This exception is absolute, therefore not subject to a public interest test.

Please quote the reference number 2764997 in any future communications.

If you are dissatisfied with the handling of your request, you have the right to ask for an internal review. Please put your grounds for an appeal in writing and email us back explaining which internal review applies.

- Late (you want us to explain why the response was late or has not yet been provided)
- Disagree with exemption (wrong exemption, or applied incorrectly)
- Disagree with the public interest test (Explain in detail why you believe the public interest test favours disclosure.)
- Request is incomplete, information is missing (indicate what is missing), information is inaccurate Information is not what was requested.

Internal review requests should be submitted within two months of the date of receipt of the response to your original letter and should be addressed to inforights@durham.gov.uk

If you are still dissatisfied with the Council's response after the internal review you have a right of appeal to the Information Commissioner at:

The Information Commissioner's Office
Wycliffe House
Water Lane
Wilmslow
Cheshire SK9 5AF.
Telephone: 01625 545 700
Website: www.ico.gov.uk

I will now close your request as of this date.

Yours sincerely

Julie Purser
Freedom of Information and Data Protection Officer

Appendix E Geotechnical Risk Register

A Geotechnical Risk Register has been compiled to show the degree of risk attached to various ground related aspects of the proposed scheme. The purpose of the register is to produce an assessment of the risk to the project posed by site specific ground related problems and identify suitable mitigation measures to control the risk to an acceptable level. The risk register should be developed and refined as the geotechnical design and assessment progresses such that the register will allow management of the geotechnical risks.

The degree of risk (R) is determined by combining an assessment of the likelihood (L) of the hazard with an assessment of the severity (S) of the hazard. The scale against which the likelihood and severity are measured, and the resulting degree of risk determined is presented below. Table 16.1 presents the risk register for the proposed scheme.

Table E.1: Classification of Probability and Impact

Likelihood (L)		Severity (S)	
Very Likely	5	Very High	5
Likely	4	High	4
Probable	3	Medium	3
Unlikely	2	Low	2
Negligible	1	Very Low	1

Table E.2: Risk Matrix

Likelihood	5	5	10	15	20	25
	4	4	8	12	16	20
	3	3	6	9	12	15
	2	2	4	6	8	10
	1	1	2	3	4	5
		1	2	3	4	5
		Severity				

Table E.3: Classification of Risk Rating

Risk rating	Response
Intolerable	Unacceptable
Substantial	Early Attention
Tolerable	Regular Attention
Trivial	Monitor

Table E.4 Geotechnical Risk Register

Identified Geotechnical Hazard	Location	Cause	Risk before Control			Consequence	Mitigation Measures	Risk after Control		
			L	S	RR (LxS)			L	S	RR (LxS)
Any existing made ground in its current state is unlikely to provide a suitable founding stratum for structural foundations or pavement.	Site	Made Ground and Silt-rich soils present at site.	2	3	6	Deleterious effects on buried concrete/piles; Pavement Heave	The extent of and potentially highly variable thickness of Made Ground, weak and compressible materials, or soils, should be assessed during a ground investigation and foundations should be placed on a suitable bearing stratum below any Made Ground or weak and compressible soil. It may require excavation and replacement, or treatment for new hardstanding areas.	1	3	3
The presence of weak and compressible soils such as soft clay, or made ground poses a risk of excessive total or differential settlement of foundations.	Site	Ground Investigation Works; Site construction works, site clearance and site set-up (compound, haul roads etc.)	4	4	16	Deleterious effects on buried concrete/piles; Pavement Heave	The ground conditions should be accurately characterised below structures by a ground investigation. A variety of foundations may be required to support the design loads including shallow spread and deep piles.	2	4	8
Unsuitable ground for pavement construction.	Site	Ground Investigation Works; Site construction works, site clearance and site set-up (compound, haul roads etc.)	4	4	16	Deleterious effects on buried concrete/piles; Pavement Heave.	For pavement design, the proposed sub-grade level for the access roads and car park should be confirmed prior to construction. Any soft ground or unsuitable materials could be excavated out and replaced with engineering fill, before starting any pavement construction works.	2	4	8
High, perched, or variable ground water levels which may impact earthworks, causing instability in excavations and temporary works.	Site	Made Ground and Silt-rich soils present at site.	2	3	6	Unsuitable ground, excavation collapse and flooding.	An investigation into the groundwater levels including seasonal variation is recommended prior to commencement of any detailed earthworks or foundation design. If required, the use of special measures to control groundwater.	1	3	3
Unknown/ unrecorded buried structures.	Site	Ground Investigation Works; Site construction works, site clearance and site set-up (compound, haul roads etc.)	4	4	16	Increased cost and delay to divert or lower services; H&S impact during any excavations during Ground Investigation or construction; Relocation of ground investigation or site area to avoid overhead services; Scheme design alterations to avoid overhead/underground services.	Establish site procedures to be undertaken in the event underground services are encountered, including risk assessment and method statement. Ensure any existing services are identified and fully traced prior to commencement of GI and construction works. Utilities diversion.	2	4	8

Identified Geotechnical Hazard	Location	Cause	Risk before Control			Consequence	Mitigation Measures	Risk after Control		
			L	S	RR (LxS)			L	S	RR (LxS)
Striking underground services during ground investigation or construction.	Site	Ground Investigation Works; Site construction works, site clearance and site set-up (compound, haul roads etc.)	4	4	16	Increased cost and delay to divert or lower services; H&S impact during any excavations during Ground Investigation or construction; Relocation of ground investigation or site area to avoid overhead services; Scheme design alterations to avoid overhead/underground services.	Striking underground services during ground investigation or construction. Carrying out PAS128 surveys or using cable avoidance tools prior to breaking ground.	2	4	8
Chemically aggressive ground conditions.	Site	Superficial and bedrock geology potentially sulphide/sulphate bearing stratum;	4	3	12	Deleterious effects on buried concrete/piles; Pavement Heave.	Chemical testing of soil to BRE requirements.	1	3	3