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Bredbury Substation Battery Storage

Land Contamination Report

Pivot Power

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<p>Disclaimer: Please note that this report is based on specific information, instructions, and information from our Client and should not be relied upon by third parties.</p>					

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1 Introduction

1.1 Instruction

ByrneLooby Partners UK Limited (ByrneLooby) was instructed by Pivot Power LLP (the Client) in 2022 to carry out a Phase 1 and Phase 2 Geo-environmental site investigation for the proposed development of a new battery storage facility at a site adjacent to Bredbury National Grid Substation, Stockport Road West, Bredbury, Stockport, SK6 2BS.

1.2 Objectives

The purpose of this report is to present the land contamination assessment aspects of the Phase 1 and 2 investigations of the site. This assessment utilised published information and recorded ground investigation data, in relation to the proposed development of the site. The original Phase 1 and 2 Site Investigation Report prepared by ByrneLooby is presented in Report Ref. K0150-BLP-ENV-R-001, dated July 2022.

This report complies with the relevant principles and requirements of a range of guidance with regards to potentially contaminated land, including but not limited to:

- Part IIA of the Environment Protection Act, 1990;
- Contaminated Land (England) (Amendment) Regulations 2012 and Contaminated Land Statutory Guidance (DEFRA, April 2012);
- National Planning Policy Framework (HCA, February 2019);
- BS5930:2015: “Code of practice for site investigations”;
- BS10175: 2011 +A2:2017 “Investigation of Potentially Contaminated Sites - Code of Practice”;
- The Building Regulations 2010. Part C (HM Government 2013);
- Environment Agency Online Guidance (October 2020): Land Contamination Risk Management Land Contamination (LCRM) (which replaced Report CLR11 (2004) Model Procedures for the Management of Land Contamination);
- Environment Agency (2011) Report GPLC1 “Guiding Principles for Land Contamination”; and,
- Environment Agency (2017) “The Environment Agency’s Approach to Groundwater Protection” November 2017 Version 1.1.

The 'Service Constraints Report Limitations & Planning Requirements' are presented as **Appendix A**, and a description of Environmental Risk Assessment Methodology and Terminology is presented in **Appendix B**.

1.3 Development Proposals

The proposed development involves the construction of a new battery storage facility, adjacent to the existing operational national grid substation, comprising:

- A series of battery storage containers;
- Battery inverters;
- Transformers;
- Switchgear containers;
- A spares container;
- A National Grid incomer;
- Access road and turning head.

Proposed site development plans are presented in **Appendix C**.

It is understood that this development is part of a scheme to develop a national network of Energy Superhubs, which combine grid-scale batteries with high volume power connections to create rapid electric vehicle (EV) charging networks. More information can be found at: www.pivot-power.co.uk/our-projects/bredbury/

1.4 Planning Status & Requirements

The site has been granted planning permission (Ref: DC/082085) by Stockport Metropolitan Borough Council. This was subject to discharge of a planning condition. Planning condition 4 was in relation to the land contamination risk. The condition is as follows:

Condition 4

No development shall take place until an investigation and risk assessment into contamination at the site, in accordance with a scheme to be approved in writing by the local planning authority, has been carried out. The investigation and risk assessment shall include recommendations for remedial action and the development shall not be in operation until these recommendations have been implemented.

1.5 Scope of the Investigation

The scope of the investigation was to assess the land contamination risk with respect to the proposed development and provide advice and recommendation to ensure such risk will be/remain with acceptable levels. The specific activities carried out are as follows:

- Produce a conceptual site model based on the findings of the investigation;
- Carry out an intrusive investigation comprising dynamic sampling probe holes and trial pitting excavations with associated sampling;
- Ground gas and groundwater monitoring;
- Laboratory testing for potential contaminants;
- Assess the general nature and extent of contamination at the site and carry out a contamination risk assessment to determine if the site poses a risk to potential receptors;
- To monitor the ground gas conditions at the site and undertake a ground gas risk assessment; and
- Should the investigation indicate that remediation of contaminants be required, provide recommendations of feasible remedial measures to facilitate development of the site for industrial end use.

1.6 Previous Investigations

This report is based on ByrneLooby's Phase 1 and 2 Site Investigation Report, ref. K0150-BLP-ENV-R-001, dated July 2022. No previous ground investigation (GI) reports have been prepared by ByrneLooby. No third-party reports have been made available by Pivot Power for review, but it is understood that a preliminary land quality risk assessment was prepared by SLR Consulting and submitted with the original application.

2 The Site

2.1 Site Location

The site comprises two parcels of land. Namely, the main development area, and a cable route between Stockport Road West to the north and the development area. The development area at the time of the ground investigation comprised relatively level pasture, and was adjacent to an operational national grid substation (West). The cable route area was used for horse pasture and stables. The site location and approximate boundaries of both parcels of the proposed development are shown in **Figure 2.1, 2.2** and **2.3**.

The preliminary site description is summarised in **Table 2.2** below.

Table 2.1 Site Location

Site Location	
Location	The site was located approximately 1km southwest of Bredbury and 2km Northeast of Stockport town centre (refer to Figure 2.1). The site was situated off an unnamed road accessed to the west by a metal palisade double gate, with the closest named highway being Stockport Road West beyond the north and Northwestern boundary.
Site Access	The site has a locked gated entrance (metal palisade fencing and gate) on an unnamed road approximately 112 m southeast of Stockport Road (refer to Figure 2.2).
Grid Reference	SJ 913 909
Eastings, Northings	391300, 390959
Postcode	SK6 2BS
Site Area	0.91 ha (Approx.)
Site Shape	The site comprised two pieces of land- one of which is approximately square shaped, and another thin rectangular area spanning from the square area to Stockport Road (refer to Figure 3).
Topography	The site elevation is approximately 51m AOD.



Figure 2.1 Site Location Plan

Reproduced from Ordnance Survey 1:50,000 Map with the permission of Ordnance Survey® on behalf of the Controller of Her Majesty's Stationary Office © Crown copyright (2008) All Rights Reserved Licence number 100035365.

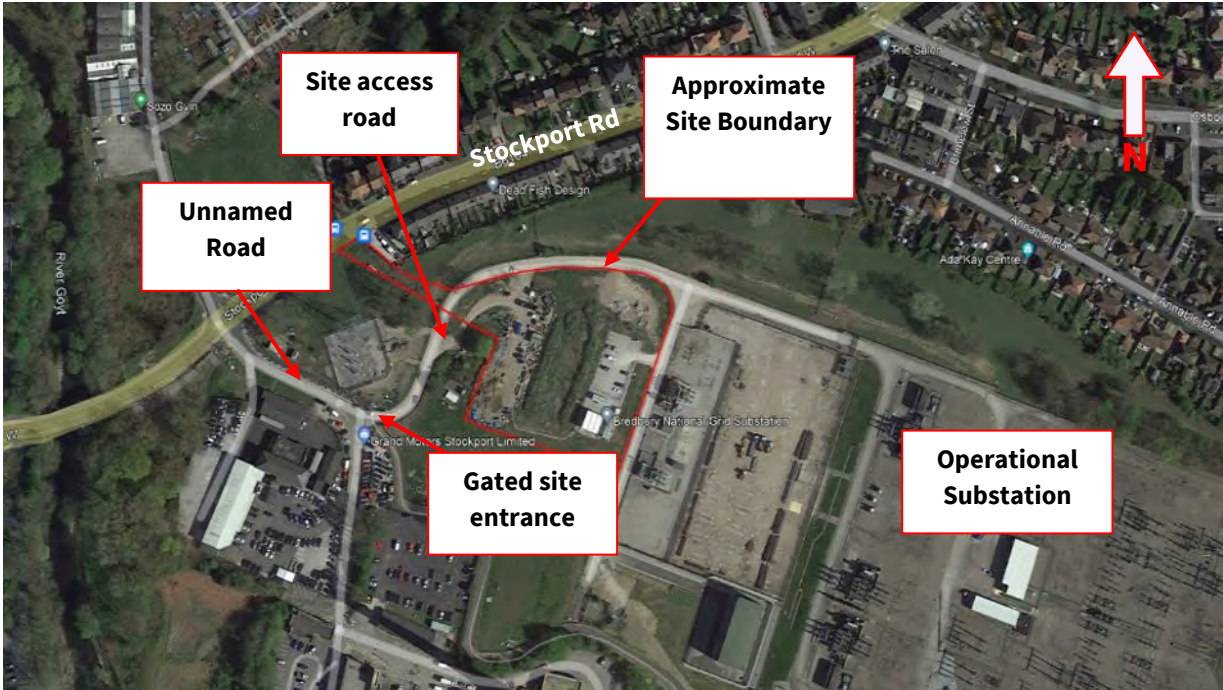


Figure 2.2 Approximate Site Boundary Plan

Reproduced from Google Earth Pro. Imagery date: April 2021. 53°24'53.75" N, 2°07'46.67" E.



Figure 2.3 Approximate Site Boundary Location

Reproduced from Google Earth Pro. Imagery date: April 2021. 53°24'56.29" N, 2°07'57.29" E.



2.2 Groundsure Report

A Groundsure Insights report, reference GS-8604195, dated 17 March 2022, for the site was obtained to deliver detailed and accurate information from authoritative, environmental, and geological datasets which are summarised within this report. The full Groundsure report can be found in **Appendix D**.

2.3 Site Description

A site walkover and pre-commencement survey was undertaken by a representative of ByrneLooby on 21st April 2022. A description of the site and its environs is presented in **Table 2.2**, and pre-commencement photographs are presented in **Appendix E**.

Table 2.2 Site Description and its Environs

Site Description	
Current Use	<p>At the time of the ground investigation, the proposed site comprised 2 No. parcels of land, both of which were poor quality pasture, separated by a single lane concrete track. The smaller parcel of land was associated with a cable run, and the large southern parcel of land was for the proposed development.</p> <p>The development parcel was situated to the south of the track and was surrounded to the north and east by a tree lined timber post and beam fencing, with the southern boundary being open. The western boundary comprised timber fencing and a farm gate in the northern sections, with Heras and metal palisade fencing along the remainder.</p>  <p>Photograph 1: Panoramic photograph of the northern area of the development parcel.</p>  <p>Photograph 2: Panoramic photograph of the southern area of the development parcel.</p> <p>This parcel was predominantly level and raised from the boundaries. There was a slight level change with the southern area of the site being slightly higher than the northern area. The surface coverage comprised poor quality grass, with extensive dock and nettles, and open areas of ground with sand and gravel at surface. There were sporadic areas where remnant building supplies had been left, and generally comprised occasional Heras fencing base plates/feet, broken black electric ducting pipes, and an emergency service cover plate. One service entry cover was noted on site within the southwestern corner, within close vicinity to the sub-station. There was evidence of a potential trial pit within close vicinity to the service cover and may have been excavated to locate services by other parties.</p> <p>Beyond the southern boundary was open pasture, beyond which was the repurposed Pear New Mill and the River Goyt. Beyond the western boundary was a substation and unmanaged area of vegetation with a willow tree immediately beyond the boundary, with pasture, a pylon supporting high voltage electric cables and the Riverside Business Park beyond.</p>

Site Description



Photograph 3: Site access point for the development parcel.



Photograph 4: Fence boundary taken from the northern area of the development parcel. The fence had been noted to be impacted by either livestock or trees.

The northern parcel comprised an irregular shaped pasture with a horse. This parcel was to be utilised only as a route for an underground service and not a development per se. This ancillary area of the site was bounded by timber fencing, with the rear yards/garden walls and fencing for buildings for properties fronting Stockport Road West in the north-eastern corner of the site.

The surface of the field comprised undulating, uneven poor quality pasture grass with extensive areas of injurious plants. There were a significant amount of timber pallets and cable drums scattered across the site.

Site Description



Photographs 5 and 6: Photographs taken from the southern boundary of the parcel for the cable run.

Beyond the northern boundary of the cable route parcel was Stockport Road West with residential properties on both sides.

The cable route area is proposed to be laid through a piece of land currently used as horse pasture. Refer to **Photograph 3**.

Existing Buildings & Structures	No structures currently present on either the main development site or the adjacent cable run.
Site Surface/ Vegetation	Both parcels of land comprise poor quality pasture with frequent nettled and brambled areas, separated by a single lane concrete track. Hoof marks associated with the grazing of horses are present across the site surface.
Storage Tanks	Above ground tanks: None present. Below ground tanks: None advised.

Site Description	
Services	<p>Several services are known to underlie the site.</p> <p>No electricity cables directly underlie the site. Two underground electricity cables ran from the terminal compound (approximately 60m west of the western site boundary) and follow the site access road to the main substation.</p> <p>There is a local high pressure gas main present approximately 45m north of the northern site boundary.</p> <p>The plan shows a BT line roughly following the access road just north of the northern site boundary, cutting through the site in the northeast.</p> <p>A fibre cable ran through the site approximately along the southern boundary, a service cover associated with this was located in the southwest of the site.</p> <p>An abandoned water main runs through the site in the northern area of the development parcel, just south of the northern fence line.</p>
Ecology	<p>The site has recently been relevelled and renaturalised from being a former car park, site office. Within the site boundary, it is unlikely there is anything of ecological interest, although existing mature trees are present along and beyond the site boundaries which may require protection during the course of the redevelopment.</p> <p><i>These comments on the ecology are for initial preliminary assessment. They are based on the assessment of personnel who are not trained ecologists and does not constitute a Phase I Habitat Survey or similar.</i></p>

2.4 Site Ownership

It is understood that the site is currently owned by National Grid.

3 Site History and Mapping

3.1 Historical Mapping

Historical Ordnance Survey (OS) mapping for the site area has been obtained and reviewed. These map and plan extracts date from the 1872 OS County Series to the 2022 National Grid OS Plans. Both the large and small-scale maps, provided by Groundsure Insights, are located within **Appendix D**. The key points of the historical development of the site and surrounding area are summarised below.

In accordance with the first edition Ordnance Survey map (**1872**), the site comprised open land within a field (likely pasture) with a track along the northern boundary of the development parcel. The land beyond the boundary was similarly fields with tree lined field drains. Pear Tree Farm was situated beyond the western boundary, with an unnamed road situated in the position of the current Stockport Road West. The River Goyt was situated approximately 170m beyond the southern boundary, with a gravel pit approximately 150m beyond the southwestern boundaries.

There was no significant change to the site or areas beyond the site boundary until **1893** when the gravel pit had been omitted, and **1917** when Pear New Mill (cotton) was shown approximately 100m beyond the southwestern boundary. A commercial structure was present approximately 75m beyond the western boundary on the **1934** map between the mill and Stockport Road West. There was progressive residential development along Stockport Road West for all historical maps.

Pear New Mill is reportedly one of the last cotton spinning mills to be built in England, productive from **1913** and ceasing operation in **1978**.

According to the **1910** historical map, Stockport Road West was a Roman Road.

The commercial building noted in **1934**, was recorded as 'works' on **1960** mapping with electric pylons/posts. Anomalous features were noted halfway between the works and the site boundary, with a bowling green adjacent on the **1960** map.

By **1970**, the historical map indicates that Pear Tree Farm had been omitted and a road had been constructed along the route of the former track with a junction entering the north-eastern corner of the site (only on the **1977** 1:1,250 historical map edition). The site was noted to be part of land occupied by the Central Electricity Generating Board; however, there was no further notation within the site boundary. A pylon (terminal compound) had been constructed on the footprint of part of the former farm, with a large compound area beyond the eastern boundary for the proposed electricity works – noted as substation but anticipated to be a switch farm. An unnamed structure was present adjacent the western boundary. There was no significant change on the **2003** historical map.

According to Google Earth imagery from **2000**, the site was pasture with a large electricity substation beyond the eastern boundary. Between **2013** and **2016**, the development site had been predominantly cleared of vegetation with 2 No. areas of hardstanding in the east and west of the site. The area between the car parks were used for storage of the scraped soils from the

hardstanding. Cabins and containers were present on both areas of car parking, with an area of hardstanding in the north-eastern corner used for material storage (soils). On the **2020** image, the western area of the development had been populated with more stored items, such as pipework, containers, machinery, vehicles etc. The eastern area was used for car parking, with two shipping containers and a small temporary building also present.

As noted within the site description at the time of the ground investigation on 21 April 2022, the 2 No. former compound areas within the eastern and western areas of the development area had been restored to pasture.

4 Environmental Setting

4.1 Data Summary

A summary of the environmental background information (geology, hydrology, hydrogeology, database information, etc.) and regulator consultation information has been tabulated and presented below. The source information for this table is referred to in **Table 4.1** below. The table below represents the base data used to formulate the conceptual ground model.

Table 4.1 Data Summary Environmental Setting and Regulator Contact

Aspect	Data Source	Description
Regional Geology	1:50,000 BGS Sheet 98 (Stockport) (accessed online and within the BGS Geology of Britain app https://www.bgs.ac.uk/map-viewers/geology-of-britain-viewer/ 21/03/2022)	The site is shown to be underlain by superficial River Terrace Deposits (undifferentiated), comprising sand and gravel. Bedrock comprises the Collyhurst Sandstone Formation of Permian Sandstone (aeolian deposits). The Red Rock fault was situated approximately 870m east of the site, striking approximately north northwest and downthrown to the west. A fault situated within the Permian strata was noted approximately 375m east of the site, striking approximately northeast southwest, and was downthrown to the southeast. There were no boreholes situated within 250m of the site boundary in accordance with the Geology of Britain GIS Viewer (British Geological Survey).
Mining and Surface Workings	Groundsure Report-Ref:GS-8604195 (21/03/22) BGS Maps (accessed from http://mapapps.bgs.ac.uk/geologyofbritain/home.html , 21/03/22) & Coal Authority Website (accessed from http://mapapps2.bgs.ac.uk/coalauthority/home.html , 21/03/22) Google Earth Pro historical viewer (accessed 21/03/22)	This site is situated within a Coal Authority Coal Mining Reporting Area; however, the site is situated to the west of the Red Rock Fault which forms a definitive unconformable division between the Carboniferous strata to the east and the Permian (non-coal bearing) strata to the west. The site is not affected by coal mining. There are no natural cavities within 500m of the site. 7 No. surface ground workings were identified by Groundsure within 250m of the site, and all were noted to comprise unspecified pits, refuse heaps, and unspecified ground workings. The closest refuse heap was situated 95m south of the site. Having reviewed the historical maps for the reported refuse heap, it is considered that the feature identified had been wrongly interpreted by the database provider and actually relates to a river terrace for the River Goyt, or cut ground associated with the mill.

		<p>There were 4 No. records for this feature. The next closest refuse heap was noted 236m beyond the southern boundary and was present along the River Goyt. An unspecified pit was noted on the database; however, a review of the historical maps did not identify this feature. The remaining features were noted to comprise mills and unspecified works.</p> <p>A former reservoir was noted approximately 248m south of the site boundary and was recorded as 5 No. entries within the Groundsure report.</p> <p>The site is not considered to be impacted by former surface workings/reservoirs as noted by the Groundsure report and a review of the historical maps.</p> <p>There were no BritPits, underground workings, non-coal mining, mineral planning records, nor mining cavities records within a proximity to the proposed site to be considered a potential risk.</p> <p>The comments regarding Johnson Poole and Bloomer (JPB) mining areas is misleading and the onsite record is considered to refer to the site being situated within an area where a coal mining search is required, rather than to any mining known per se.</p>
<p>Natural Ground Subsidence</p>	<p>Groundsure Report- Ref: GS-8604195 (21/03/22)</p>	<p>Negligible to very low risk of shrink swell clays, running sand, compressible/collapsible deposits have been recorded on site.</p> <p>The potential for ground dissolution of soluble rocks is classified as 'negligible' as soluble rocks are either not thought to be present underlying the site, or not prone to dissolution. Dissolution features are not likely to be present.</p> <p>All data was sourced from the BGS.</p>
<p>Hydrogeology</p>	<p>Groundsure Report- Ref: GS-8604195 (21/03/22) Magic- Land use and groundwater (accessed from https://magic.defra.gov.uk/MagicMap.aspx 11/01/22)</p>	<p>The site lies within a Secondary A Superficial Aquifer with permeable layers capable of supporting water supplies at a local rather than strategic scale (minor aquifers).</p> <p>Below this, the bedrock is classified as a Principal Aquifer, providing a high level of water storage at a strategic scale (major aquifers).</p> <p>The superficial aquifer in the northern half of the site is classified as low vulnerability. The bedrock in the northern half of the site is also classified as low vulnerability.</p> <p>The superficial aquifer in the southern half of the site is classified as medium vulnerability. The bedrock aquifer</p>

		<p>in the southern half of the site is classified as low vulnerability.</p> <p>The soil leaching class in the northern half of the site is classified as ‘intermediate’. The soil leaching class in the southern half of the site is classified as ‘low’.</p> <p>It should be noted that the grid squares for aquifer types are likely to be 1km squares based on the solid geology. The northern assessment is conjectured to be based on Carboniferous aged strata rather than the Permian aged geology underlying the site. The southern appraisal of the aquifer status is most likely to be relevant for the entire site.</p> <p>There is no local information regarding groundwater vulnerability available; however shallow groundwater is considered to be in direct continuity with the River Goyt beyond the southern boundary.</p> <p>There were 15 No. records of groundwater abstractions within 2,000m of the site, the nearest of which is 1,531m west of the site.</p> <p>There was one record of a potable abstraction within 2,000m, located 1,687m southwest of the site, historically used for drinking, cooking, sanitary washing etc. This activity has now ceased.</p> <p>There is a source protection zone 194m south of the site.</p>
<p>Hydrology</p>	<p>Google Earth Pro (accessed 11/01/22)</p> <p>Groundsure Report- Ref: GS-8604195 (21/03/22)</p>	<p>Nearest watercourse – the River Goyt, approximately 264m south of the site. There are 3 No. other records of water features within 250m of the site.</p> <p>The River Goyt is classified as a Water Framework Directive (WFD) waterbody. The site lies within the WFD water body catchment for the River Goyt.</p> <p>There is a WFD Groundwater body present on site, of which has been given an overall rating of ‘poor’ with the chemical and quantitative ratings also both classified as poor.</p>
	<p>Government Flood risk summary for the area around DA12 2QF (accessed at https://check-long-term-flood-risk.service.gov.uk/risk/11/01/22)</p> <p>Groundsure Report- Ref: GS-8604195 (21/03/22)</p>	<p>The site is designated as a medium risk (1% to 3.3% chance) area for surface water flooding along the existing concreted track situated between the proposed development and the route for the cable. The site for proposed development and the cable run are not considered to be prone to surface water flooding. Any drainage present within the unadopted concrete track should be maintained to minimise the potential for back up or flooding by the landowner.</p> <p>The site is at very low risk (less than 0.1% chance) of flooding from rivers and the sea. The Environment Agency is responsible for managing flood risk posed from rivers and sea.</p>

		<p>The site is not considered to be at risk of flooding from reservoirs in this area. Groundsure reports that there are no records within 50 m of flood risk from rivers and sea, historical flood events, flood defences, areas benefiting from flood defences and flood storage areas.</p> <p>The site is considered to be at moderate risk (based on 1:100yr modelling) of groundwater flooding. The site is underlain by granular strata in continuity with the River Goyt, and hence during times of flooding, groundwater may rise beneath the site, and flood mitigations measures, such as minimum platform levels may be required.</p>
	Drainage Plans	No surface or foul water drainage drawings currently available.
	Buried Culverts	None currently identified.
Radon Potential	<p>Groundsure Report- Ref: GS-8604195 (21/03/22)</p> <p>UK radon checker (accessed from https://www.ukradon.org/information/ukmaps 21/03/22)</p>	<p>The site lies within a maximum radon potential of 1-3%. Less than 1% of properties are affected by Radon within 250 m radius.</p> <p>No radon protection measures are required at this location.</p>
Other Radiation	Historic land use (see Section 5)	There are no reasonable grounds for believing land to be radioactively contaminated (in accordance with 2005 extension of Part IIA of The Environment Protection Act, 1990).
UXO	<p>Zetica Bomb Risk Map (accessed at https://zeticauxo.com/downloads-and-resources/risk-maps/ 21/03/2022)</p>	<p>There is a low risk for unexploded ordinance (UXO) at this site. See Appendix F for full Zetica report.</p> <p>No further action regarding UXO is required for the site.</p>
Other Information	Groundsure Report- Ref: GS-8604195 (21/03/22)	None
Landfill Search	<p>Groundsure Report- Ref: GS-8604195 (21/03/22)</p> <p>https://data.catchmentbasedapproach.org/dataset/historic-landfill-sites/explore (Accessed 17/01/22)</p>	There were two records of historical landfills within 500m of the site, one of which is 170m southwest of the site, and the other 269m west of the site. Both are noted as Warth Meadow. The closest former landfill was noted to be situated between Pear New Mill and the River Goyt. Neither former landfill site was considered to pose a risk to the proposed development site.
Trade Directories	Groundsure Report- Ref: GS-8604195 (21/03/22)	There are 24 recorded current potentially contaminative industrial land uses within 250m of the site, none of which are located on site. These typically comprised

		<p>pylons, the industrial estate beyond the southwestern boundary and the repurposed mill. None of those listed are anticipated to detrimentally impact the proposed development site.</p> <p>There are 13 records of licensed discharges to controlled waters within 500m of the site, all of which are more than 226m away from the site and discharging to the River Goyt and do not impact the proposed development site.</p> <p>There have been no pollution incidents within 250m of the site.</p> <p>There are five records of electricity cables within 500m of the site, three of which are between 12m and 14m north of the site, and two were 43m and 177m east of the site.</p> <p>There are no current or recent gas pipelines, sites determined as contaminated land, Control of Major Accident Hazards (COMAH), regulated explosive sites, hazardous substance storage/usage, historical licenced industrial activities, licenced industrial activities, licenced pollutant releases, radioactive substance authorisations, pollutant releases to surface waters (red list), pollutant release to public sewer, list 1 dangerous substances or pollution inventory substances records within 500 m of the site.</p>
Fuel Stations	Groundsure Report- Ref: GS-8604195 (21/03/22)	There are no recorded current or historical petrol or fuel stations within 500m radius of the site.
Ecology	<p>Sites of Ecological Importance within 2 km radius</p> <p>Magic maps (accessed at https://magic.defra.gov.uk/MagicMap.aspx 11/01/22)</p> <p>Groundsure Report- Ref: GS-8604195 (21/03/22)</p>	<p>There are no Sites of Special Scientific Interest (SSSI), Conserved Wetland Sites (Ramsar Sites), Special Areas of Conservation (SAC), Special Protection Areas (SPA), National Nature Reserves (NNR), Biosphere Reserves, Forest Parks, Marine Conservation Zones, Proposed Ramsar Sites, Possible Special Areas of Conservation (pSAC), Potential Special Protection Areas (pSPA), Nitrate Sensitive Areas, Nitrate Vulnerable Zones, SSSI Impact Risk Zones or SSSI Units within 2000m of the site.</p> <p>The site was located on a 'Green Belt', designated to prevent urban sprawl.</p> <p>There are four records of Local Nature Reserves (LNR) within 2,000m of the site and three Designated Ancient Woodland records within 2000m of the site, all of which were situated on the opposite bank of the River Goyt.</p>
	Invasive Species	There were 45 reported knotweed occurrences within 4 km of SK6 2BS. The location of these are not shown on

	<p>Environet Interactive Map (accessed from https://www.environetuk.com/exposed-japanese-knotweed-heat-map 21/03/22)</p>	<p>the interactive map, hence it is not known how close these actually are to the development site.</p> <p>No Japanese Knotweed was noted during the course of the walkover or ground investigation.</p>
<p>Archaeological and Building Heritage</p>	<p>Magic maps (accessed at https://magic.defra.gov.uk/MagicMap.aspx 21/03/22)</p> <p>Groundsure Report- Ref: GS-8604195 (21/03/22)</p>	<p>No records of World Heritage Sites or Ancient Monuments within a radius of 2 km.</p> <p>Pear New Mill, which is situated approximately 165 m south of the site is classified as a listed building.</p>
<p>Regulator</p>	<p>Stockport Metropolitan Borough Council</p>	<p>Contact with the Council was not made at this stage.</p>
	<p>Environment Agency</p>	<p>Contact with the Environment Agency was not made at this stage.</p>

5 Fieldwork

5.1 General Observations

The fieldwork was carried out on 21st and 22nd April 2022. ByrneLooby personnel were present to supervise all work, describe the ground encountered and carry out in situ testing. A services search was carried out prior to the site work and a CAT and Genny scan performed at the location of each exploratory hole location. Fieldwork procedures were undertaken in accordance with the relevant sections of:

- British Drilling Association “Guidance for Safe Intrusive Activities on contaminated or Potentially Contaminated Land” (2008);
- BS5930:2015 "Code of Practice for Site Investigations"; and,
- BS10175:2011 + A2:2017 “Investigation of potentially contaminated sites – Code of practice.”

The land contamination element of the site investigation comprised the following fieldwork scope:

- 10 No. trial pits using a wheeled hydraulic excavator;
- 9 No. dynamic (window) sample holes with plastic liners;
- Installation of 3 No. gas and groundwater monitoring wells (all 50mm internal diameter HDPE with slotted sections having a 250µm geotextile filter wrap) within window sampling probe holes;
- Sampling and testing of soils;
- Description of the ground encountered in accordance with BS5930:2015 "Code of Practice for Site Investigations"; and,
- Gas and groundwater monitoring.

An Exploratory Hole Location Plan (K0150-BLP-ENV-DWG-001) is presented in **Section 10**. Pre-commencement fieldwork photographs showing the site conditions are found within **Appendix E**.

5.2 Trial Pits

Ten trial pits were excavated using an 8-tonne wheeled excavator, where access permitted, across the site to depths of between 2.0m bgl (TP05) and 3.1m bgl (TP01, TP04 & TP06).

Three of the proposed trial pits (TP02, TP03 & TP11) were aborted due to coverage having been achieved. The client requested pre-proposed positions of exploratory holes, hence the requirement

to acknowledge the omission of these positions. It should be noted that sufficient data had been obtained through the exploratory holes completed to address engineering requirements on site.

The trial pit logs are presented within **Appendix H**.

5.3 Dynamic (Window) Sample Boreholes

Nine dynamic sampling boreholes (WS01 to WS09) were completed using a tracked Dando Competitor rig. These holes were drilled within the footprint of the proposed development and roadways to depths of between 2.45m bgl (WS08) to 5.45m bgl (WS03 & WS06). Seven out of nine boreholes did not reach the target depth of 5.45m bgl, due to refusal (on conjectured cobbles) and/or collapse. All the boreholes were commenced with a hand dug inspection pit to 1.2m bgl.

Standard Penetration Tests (SPTs) were carried out at 1m intervals in the holes in general accordance with BS EN ISO 22476-3:2005. The dynamic sample logs and the SPT Calibration Certificate are presented in **Appendix I**.

5.4 Samples and Sample Containers

Soil samples for chemical analysis each comprised a pair of samples: a clean unused plastic tub for metals and inorganics, and an amber glass jar for organics.

All soil samples for chemical analysis were stored in a cool box, which were then transported via courier to Derwentside Environmental Testing Services (DETS) in County Durham.

5.5 Monitoring

After completion of the fieldwork, three visits were made to the site to carry out monitoring of groundwater levels and ground gas concentrations. Ground gas monitoring was carried out in accordance with BS8576:2013 and comprised measurement of:

- Ground gases using a GasData GFM435 infra-red meter to measure gas flow rate, methane, carbon dioxide, oxygen, carbon monoxide and hydrogen sulphide.
- Groundwater levels were monitored using a dipmeter.

The results of this monitoring are presented in **Appendix J**, together with details of the instrumentation specifications.

6 Ground Conditions

6.1 General

The sequence of the strata encountered during the site investigations generally confirms the anticipated geology as interpreted from the desk study and geological map.

A summary of the general strata encountered across the site is shown in **Table 6.1** below, with more detailed description given in the following sub sections.

Table 6.1 Summary of Strata Encountered

Geological Strata	Generalised Descriptions	Max. Depth Below Ground Level to Base of Strata (m)	Strata Thickness (m)
Topsoil/Made Ground	Soft black sandy gravelly CLAY with abundant rootlets. Gravel was angular to subrounded fine to coarse of brick, concrete, sandstone, and mudstone (Made Ground).	0.00 – 0.80	0.00 – 0.80
	Loose dark brown slightly gravelly slightly clayey silty SAND with frequent roots and rootlets. Gravel was angular to subangular of sandstone of sandstone, siltstone, pottery, tile and glass fragments. Sand was fine to coarse (Made Ground).		
Made Ground	Soft, black sandy gravelly CLAY. Gravel was subangular to rounded fine to coarse of brick, sandstone and mudstone.	0.00 – 2.00	0.00 – 1.30
	Black, gravelly clayey SAND. Gravel was angular to subangular fine to coarse of sandstone, mudstone and brick. Sand was occasionally of ash with rare clinker present.		
	Grey, angular fine to coarse GRAVEL of limestone (MOT Type 2).		
Alluvium	Orangish brown, gravelly clayey SAND with occasional cobbles. Gravel is subangular to rounded fine to coarse sandstone and mudstone. Some very sandy clay pockets.	0.15 - >5.45	Unknown
	Firm blueish grey slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse of sandstone and mudstone.		
	Stiff grey laminated CLAY with silt partings.		

6.2 Ground Surface

The ground surface on the development site comprised poor quality pasture with frequent nettled and brambled areas with variable thickness of topsoil.

Although the topsoil appeared natural and comprised scraped material which had been re-laid following the restoration of the site after use as a compound area, this is still considered Made Ground and not natural. The former topsoil would have lost a significant proportion of its organic profile and is anticipated to have been compacted, and intermixed with underlying superficial strata and potentially incidental waste while the site was in use as a compound. Two main lithologies were encountered:

- Soft, black, sandy gravelly CLAY with abundant rootlets. Gravel was angular to subrounded fine to coarse of brick, concrete, sandstone and mudstone; and
- Loose, dark brown, slightly gravelly slightly clayey silty SAND with frequent roots and rootlets. Gravel was angular to subangular of sandstone of sandstone, siltstone, pottery, tile and glass fragments. Sand was fine to coarse.

This was consistently found across site with a thickness of between 0.10m and 0.30m, except from WS05 which was 0.50m in thickness, and WS09 which was 0.80m thick. Topsoil was not encountered in WS04 and TP09, instead, Made Ground directly underlain the ground surface in these locations. These strata are considered to comprise Made Ground similar to topsoil.

6.3 Anthropogenic Materials

Topsoil encountered across the site contained anthropogenic materials considered to be Made Ground similar to topsoil (see **Section 6.2** above for full descriptions). Made Ground was present across the site either at ground surface or underlying the Made Ground soils similar to topsoil.

Made Ground was encountered to depths of 1.30 m bgl, variably ranging in thickness from 0.15m to 1.30m. There was no Made Ground encountered in WS05, WS07, TP07 and TP12, other than the Made Ground similar to topsoil. Generally, it is assumed that the Made Ground is most likely to contain the majority of the contaminants which may be present; however, due to the anticipated permeability of the granular alluvium, vertical migration of mobile hydrocarbon compounds are anticipated.

This varied across site but generally consisted of three main lithologies:

- Soft, black, sandy gravelly CLAY. Gravel was subangular to rounded fine to coarse of brick, sandstone and mudstone.
- Black, gravelly clayey SAND. Gravel was angular to subangular fine to coarse of sandstone, mudstone and brick. Sand was occasionally of ash. Rare clinker present.
- Grey angular fine to coarse GRAVEL of limestone (MOT Type 2).

A 0.10 m thick layer of asphalt was found in TP10 at a depth of 0.40m bgl. A black polyethene pipe was encountered in TP13 at 1.30m bgl. A concrete flag (50cm X 50cm) was excavated from SA01.

No visual or olfactory evidence of contamination was noted during the fieldwork other than the presence of ash and clinker (which can be a source of heavy metals, sulphates, PAHs etc) within Made Ground.

6.4 Natural Deposits (Superficial)

Alluvium was encountered in all exploratory holes across the site, either directly below the Made Ground or the Made Ground similar to topsoil. This was observed at depths of between 0.15m and 5.45m bgl. The depth of the base of the superficial deposits is unknown however can be deduced as more than 5.45m bgl.

This varied greatly across site, but has been summarised into three main lithologies:

- Orangish brown, gravelly clayey SAND with occasional cobbles. Gravel was subangular to rounded fine to coarse sandstone and mudstone. Some very sandy clay pockets.
- Firm, blueish grey, slightly gravelly CLAY. Gravel was subangular to subrounded fine to coarse of sandstone and mudstone.
- Stiff grey laminated CLAY with silt partings.

6.5 Natural Deposits (Bedrock)

Bedrock was not encountered during the investigation.

6.6 Groundwater

Table 6.2 – Groundwater Strikes

Location	Depth of strike (m)	Depth to water after 20mins (m)
WS02	3.80	Not Changed
WS03	4.00	Not Changed
TP01	2.70	2.05
TP04	3.00	3.10

Table 6.3 – Summary of Groundwater Monitoring

Location	Date	Well Details		Groundwater	
		Standpipe Diameter (mm)	Depth to Base (m bgl)	Water Depth (m bgl)	Water Sample Taken?
WS04	28/04/2022	50	2.90	Dry	N
	12/05/2022		2.89	Dry	N
	27/05/2022		2.89	Dry	N
WS06	28/04/2022		3.90	3.19	N
	12/05/2022		3.91	3.27	N
	27/05/2022		3.91	3.28	N
WS09	28/04/2022		1.94	Dry	N
	12/05/2022		1.95	Dry	N
	27/05/2022		1.93	Dry	N

6.7 Surface Water

No surface water was currently present on site.

7 Laboratory Testing

7.1 Chemical Laboratory Testing

The samples were submitted to Derwentside Environmental Testing Services (DETS) who are UKAS accredited in accordance with ISO17025 and are also MCERTS accredited for soil analysis in accordance with the Environment Agency's scheme. The laboratory carries out Quality Assurance and Quality Control in accordance with BS ISO 17025 and participate in external laboratory comparison and quality control schemes. Details of the accreditation and the methods of analysis are provided on the relevant test reports.

The selection of samples for laboratory testing and analytes to be determined were made based on the Phase 1 assessment, the excavation records, and other observations during the investigations. The sample selection rationale was as follows:

- To gain a good coverage across the site and of the various material types and strata encountered;
- To characterise samples which had visual or olfactory evidence of contamination;
- To characterise samples from the interface of permeable and less permeable horizons within the ground;
- To characterise soils samples located at groundwater level; and,
- To characterise the groundwater.

The selected soil samples were tested for a range of typical contamination indicators including specific tests for contaminants suspected as being present from the desk study and from observations made on site. Tests were also performed which were used to support the modelling of contaminant transport and impacts (e.g. TOC) and for waste classification purposes. There was not sufficient groundwater encountered during the course of the investigation for analysis.

Each of the soil samples were analysed for the 'total' concentration of a suite of potential contaminants.

10 No. samples were analysed for the ByrneLooby standard chemical suite and comprised:

- **Metals and semi metals** (arsenic, barium, boron (water soluble), cadmium, chromium (total and Cr (vi)), cyanide, copper, lead, mercury, nickel, selenium, vanadium and zinc);
- **Organic compounds** (phenols (mono), USEPA 16 priority PAH compounds, and total organic carbon); and
- **Concrete Requirements** (pH, sulphate (water soluble and total), ammonia, chloride and nitrate).

8 No. samples of topsoil and Made Ground were screened for asbestos.

The results of the laboratory analysis are presented in **Appendix L**.

8 Generic Quantitative Risk Assessment

8.1 Introduction

The assessment of contamination has been carried out in accordance with the overall guidance presented in Land Contamination: Risk Management (LCRM) using the procedures as indicated in **Appendix B**.

A two staged Generic risk assessment process was completed. Initially the Risk Estimation stage, where the measured contaminant concentrations are compared to the relevant published GACs or C4SLs/S4ULs, was completed to determine if a risk evaluation stage is required. Risk Evaluation comprises an authoritative review of the findings with other pertinent information, in cases where the C4SLs or GACs are exceeded, in order to consider if exceedance may be acceptable in the particular circumstances.

The aspects of risk from substances in the ground considered are as follows:

- Human Health;
- Plant Life;
- Pollution of Controlled Waters;
- Water Supply Pipes;
- Below Ground Concrete; and,
- Ground Gases.

8.2 Assessment for the Protection of Human Health

The Generic Qualitative Risk Assessment (GQRA) is based on a soil with a Soil Organic Matter of 1.0% was carried in accordance with the methodology for assessing soil samples set out in **Appendix B** based on a commercial/industrial end use. A full record of the chemical test results is presented in **Appendix K** and a screening summary of this chemical analysis of soils is presented in **Appendix L**.

8.2.1 Exceedances

The results of the samples analysed were screened against Generic Assessment Criteria (GAC) for Human Health Risk Assessment (LQM/CIEH) for commercial/industrial end-use, sandy soil with 1% SOM and pH 7.0.

The soil samples analysed were assessed to be compliant with the relevant screening criteria (no exceedances). No mitigation measures are required to address contamination on site.

8.2.2 Asbestos

Asbestos can be present in soil as fragments of bulk Asbestos Containing Materials (ACMs) (e.g., asbestos cement sheeting) and also as discrete asbestos fibres within the soil matrix. This investigation has carried out assessments to determine whether both bulk fragments of asbestos and discrete fibres were present in the soil at the site. The asbestos assessment commenced on site with inspection of the Made Ground by our site staff for the presence of obvious bulk ACMs. During the fieldwork no suspected ACMs were identified. The laboratory analysis confirmed that asbestos fibres through screening were not present in the tested soil samples.

8.2.3 Risks to Human Health (Construction Phase)

During the construction works there could be a potential risk from dust to on-site workers and people occupying adjacent properties. Appropriate risk assessments should be carried out by the contractor to allow appropriate controls for the mitigation of risk to health of construction workers to be put in place. This risk can be controlled to within acceptable limits by:

- Control of dust generation (see below);
- Workers wearing suitable Personal Protective Equipment (PPE);
- Having adequate site hygiene facilities allowing staff to keep a good level of personal hygiene;
- All groundworkers should have been trained in asbestos awareness and should keep a look out for this being encountered during excavations. The earthworks contractor should have a contingency plan in place before any works commence in case the presence of asbestos is suspected in groundworks;
- Only permitting smoking or eating on site in appropriate pre-designated areas.

Given the proximity of River Goyt to the south of the site, residential receptors nearby to the north and northeast, industrial receptors directly to the east and nearby to the south and west, in addition to construction workers on site; control of fugitive dust will be a priority. As a minimum it is anticipated the works will be undertaken in accordance with BRE best practise guidance and that the following measures will be introduced to assist with control of dust generation:

- Access roads and stockpiles should be regularly damped down with water;
- All vehicles entering and leaving the site during the construction period should pass through a wheel wash facility;
- Vehicles used to transport materials and aggregates should be enclosed or tarpaulined;
- Local roads should be regularly cleaned;
- Vehicle movements and speed should be kept to a minimum within the site;

- Dust generating equipment (e.g., mobile crushing and screening equipment) should be located to minimise potential nuisance impacts to receptors as far as practicable; and,
- Minimising drop heights of all loading and unloading activities that involve the transfer of soils and demolition materials.

Entry into all below ground excavations should be carried out in accordance with The Confined Spaces Regulations (1997) and The Management of Health and Safety Regulations (1999).

It is recommended that the appointed Contractor consult with the Local Authority Air Quality Officer to determine whether a programme of particulate and nuisance dust monitoring is required for the duration of the works.

8.3 Risk to Plant Life

The concentrations of the phytotoxic metals (arsenic, copper, chromium, nickel and zinc) have the potential to be harmful to plants. However, all the measured concentrations of these metals are lower than the guideline values for the protection of plants as presented in the MAFF document “Code of Good agricultural practice for the protection of soil” (1998). Therefore, there is no risk to plants at the site due to phytotoxicity should any be planted in the ground as part of the proposed development.

The results of the phytotoxic screening are presented in **Table 8.1** below.

Table 8.1 Phytotoxic Risk of Made Ground

Determinand	Number Samples	of	Trigger Value* (mg/kg)	Results Exceeding Trigger Concentration (mg/kg)	Exceeds Tier 1 Screening (Y/N)
Arsenic	10		250	-	N
Copper	10		200	-	N
Chromium	10		400	-	N
Nickel	10		110	-	N
Zinc	10		300	-	N
*Trigger value from MAFF “Code of Good agricultural practice for the protection of soil” October 1998 at average pH 7.0					

Detriment to plant life is hard to quantify as many of the GACs are based on agricultural crop yields rather than serious harm or death of a species. The developer is required to adopt appropriate measures to mitigate against silt and fines entering existing drainage and the River Goyt.

8.4 Assessment for the Protection of Controlled Waters

There were no elements or compounds encountered on site which may potentially pose a risk to controlled waters, other than where entrained fines and silt are allowed to leave the site in surface water and impact surface waters which considering the distance is unlikely to occur.

8.5 Water Supply Pipe Material Assessment

To connect the site to the UK network for potable water supply, the United Utilities ‘Supplementary guidance for the selection of water pipes in land potentially affected by contamination’ requires completion. This is downloadable from the United Utilities website:

<https://www.unitedutilities.com/globalassets/documents/builders--developers-docs/risk-assesment-for-water-pipes.pdf/download>

Table 1 of this guidance contains the Pipe selection risk assessment summary (PSRAS). It should be noted that there was no requirement to analysis for VOC, SVOC or TPH compounds during this investigation due to the former land use and strata encountered. Section 3 of the guidance requires completion specifically regarding this. ByrneLooby anticipate that standard PE potable water supply pipework will be required should there be a requirement to have a potable water connection on site.

8.6 Permanent Ground Gasses

A preliminary investigation of ground gas conditions was completed to assess the potential risk of gas ingress to enclosed spaces on the site. Although the spaces are not expected to be occupied, the potential risk of flammable conditions were required to be assessed.

Guidance on the assessment of ground gases has been published by CIRIA (Report No. C665, 2007).

The document introduces the concept of the Gas Screening Value (GSV) as a means of assessing potential risk. It was considered prudent to undertake a nominal number of 2 No. visits due to the low amount of organic content noted during the course of the ground investigation. Should unusual ground gas results be encountered, the proposed investigation was to be extended accordingly.

The Gas Screening Value is calculated directly from borehole monitoring data and is defined as follows:

$$\text{GSV (l/hr)} = \text{Gas well concentration (\% v/v)} \times \text{Gas well flow rate (l/hr)}$$

The concept of the GSV underpins the risk assessment process outlined in CIRIA C665, with a higher GSV indicating a higher degree of risk to an enclosed space receptor. The GSV approach not only considers the hazard associated with the concentration and quantity of gas present, but also the potential for this gas to migrate (i.e. the flow rate from the borehole is indicative of a pressure gradient existing, and a measure of the likelihood of ground gas migration by advective flow). Based

on the GSV principle, the CIRIA document contains a risk classification that categorises the level of risk based on the calculated GSV value as presented in **Table 8.2**.

Table 8.2 Summary of CIRIA C665 Risk Classification Rankings

Characteristic Situation	Risk Classification	GSV (CH4 or CO2) / l/hr
1	Very low	<0.07
2	Low	<0.7
3	Moderate	<3.5
4	Moderate to high	<15
5	High	<70
6	Very high	>70

8.6.1 Measured Gas Concentrations

Two rounds of gas monitoring carried were out by ByrneLooby in the three gas monitoring wells (WS04, WS06 and WS09) with atmospheric conditions varying from 1,010 to 1,019 mbar during April and May 2022. The highest VOC, flow rates, methane and carbon dioxide concentrations, together with the lowest oxygen levels (i.e., a combination of the worst-case temporal conditions recorded) from the monitoring visits are summarised in **Table 8.3** below:

Table 8.3 Summary of Ground Gas Monitoring

Borehole	Response Zone (m bgl)	Contamination Evidence	No. of Gas Monitoring Occasions	Steady State Flow (l/hr)	Methane (%v/v) - Max	Carbon Dioxide (%v/v) - Max	Oxygen (% v/v) - Min	Carbon Monoxide (ppm)	Hydrogen sulphide (ppm)	Water Level (m bgl)	Atmospheric pressure readings mb
WS04	1.0-3.0	None	2	0.0	0.0	5.6	15.5	0.0	0.0	Dry	1010 - 1019
WS06	1.0-2.0	None	2	0.0	0.0	6.9	12.3	0.0	0.0	3.19 - 3.28	1011 - 1019
WS09	1.0-4.0	None	2	0.2	0.0	4.6	15.4	0.0	0.0	Dry	1011 - 1018

8.6.2 Ground Gas Assessment

Background information relating to the origin and production of landfill gases are presented in **Appendix M**. Current guidance on the assessment of ground gases is presented in **Appendix M**. In accordance with this approach and the measured ground gas levels, it is considered that the worst-case temporal conditions may not have been measured during the monitoring period. Due to the lack of organic content on site, and no off-site sources having been identified, these concentrations are anticipated to be comparable to low pressure periods. The gas flow rates measured across the whole of the site during the monitoring visits was less than the instrument detection limit of 0.1 l/hr, apart from WS09 on 12th May 2022 (1011 mbar), where the flow was measured as 0.2 l/hr. From Table 8.5 of CIRIA C665, the worst-case Characteristic Situation for the two areas of the site are outlined in **Table 8.4**.

Table 8.4 Characteristic Gas Situations

Borehole Number	Steady State Flow	CH ₄			CO ₂		
	l/h	% v/v	GSV (l/hr)	Characteristic Situation	% v/v	GSV (l/hr)	Characteristic Situation
WS04	0.0	0	0.00	Very Low	5.6	0.00	Very Low
WS06	0.2	0	0.00	Very Low	6.9	0.01	Very Low
WS09	0.0	0	0.00	Very Low	4.6	0.00	Very Low

The maximum gas concentration data and peak flow rates have been used to derive the GSVs.

The use of maximum concentration data and peak flow provides a worst-case GSV as required by CIRIA C665 and is considered suitably conservative for a preliminary stage of assessment. The use of stabilised conditions and ‘reasonable worst-case’ is discussed in BS 84851 and is considered to provide a more realistic assessment of risk where a larger dataset is available.

The results of the GSV assessment indicated the risk level to be very low due to negligible flow conditions. Based on this data, there is no requirement for gas protection measures to the enclosed structures on site. However, based on the maximum CO₂ concentrations at WS04 and WS06 being detected above 5%v/v, an increase to Characteristic Situation 2 (Low risk) should be considered in these areas of the site should the proposed enclosed spaces be intended to be occupied.

It is important to recognise that the GSV is a guideline value and not an absolute threshold.

¹ British Standard BS 8485:2015+A1:2019, *Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings*

8.7 Conceptual Site Model

The site investigation revealed the following general downward succession:

- Site surface: Low quality pasture with brambled and nettled areas.
- Made Ground similar to topsoil (0.10m to 0.80m thick) present in 18 of 20 No. exploratory holes.
- Made Ground (0.15m to 1.30m thick), present in 16 of 20 No. exploratory holes.
- Alluvium and River Terrace Gravels: Thickness unknown but estimated as more than 4.45m.

The results of site investigation and laboratory analysis indicates that there are low concentrations of potential contaminants at the site and there are no potential off-site sources that will affect the development. Therefore, there is a negligible risk to:

- I. Human health;
- II. Controlled waters;
- III. Property (existing or proposed) including buildings, crops, livestock, pets, woodland and service lines and pipes;
- IV. Adjoining land;
- V. Ecological systems; and,
- VI. Archaeological sites and ancient monuments.

No specific precautions are required with respect to ground gases, hydrocarbon compounds or the potential risk from radon for the development. Protection measures will also not be required due to the potential risk from radon. All below ground concrete should be designed to meet the requirements of ACEC Class AC-1s.

No risk to human health had been identified within the assessment of the chemical analysis from samples obtained from site.

The updated contamination potential at the site has been assessed using the contaminant-pathway-receptor linkage approach. Following the site investigation, the plausible contaminant sources identified in **Table 8.5** have been updated or confirmed as follows:

Table 8.5 Summary of main CSM links and hazard assessment

Potentially Contaminating Activity	Potential Contaminant	Area of Interest	Potential Risk and/or liability for future land use	Hazard Assessment	Mitigation/ Investigation
<p>Onsite Made Ground</p>	<p>Ground gases (carbon dioxide, methane, hydrogen sulphide, oxygen, carbon monoxide).</p> <p>Metals and various hydrocarbons associated with possible spills from stored/parked vehicles and machinery on site., in addition to any other substances that may be stored within drums/containers historically.</p>	<p>Within areas of Made Ground particularly in the east and west of the site (and also deeper natural peat deposits).</p> <p>Within areas of Made Ground, particularly in the east and west of the site.</p>	<p>Gas: Low</p> <p>Once commissioned, the facility will have several enclosed spaces that are to be occupied from time to time, therefore ground gas ingress must be considered.</p> <p>Soil contaminants: Low</p> <p>Potential for dust inhalation/ingestion and dermal contact to construction workers (short term) as they may have direct contact with potentially impacted soil and groundwater.</p> <p>Risk to future site workers no higher than current.</p> <p>If impacted soils are present, there is a potential risk of vertical migration of contaminants into shallow groundwater and then lateral migration within shallow ground water to different areas on (and off) site.</p> <p>Vertical migration to deep groundwater (Superficial Secondary A Aquifer and Principal Bedrock Aquifer) must also be considered.</p> <p>There is a potentially viable overland migration pathway for surface run off, which could be elevated by potential flash flooding events for example.</p>	<p>Very Low</p>	<p>It was anticipated that a significant thickness of Made Ground could underlie the site of the proposed development.</p> <p>The Phase 2 confirmed that a thickness of Made Ground up to 1.30 m was making up the site. This generally comprised black sandy gravelly CLAY or black clayey SAND, overlain by grey angular fine to coarse GRAVEL (MOT Type 2) in some areas.</p> <p>The material passed all relevant screening criteria for Commercial and Industrial uses.</p> <p>Construction workers should employ appropriate PPE and standard site safety measures during construction.</p> <p>Due to the proposed development of the site, hardstanding will reduce the potential exposure to any possible in-ground contamination despite none being identified during the Phase 2 ground investigation.</p> <p>Given the low permeability stiff clay found at the base of the deeper boreholes and trial pits, and the distance to the nearest surface water feature, ByrneLooby does not consider the site to pose a significant risk to controlled water receptors.</p>

Potentially Contaminating Activity	Potential Contaminant	Area of Interest	Potential Risk and/or liability for future land use	Hazard Assessment	Mitigation/ Investigation
Adjacent Electrical Substation	Polychlorinated Biphenyls (PCBs,) and fuels/chemicals / oils used in the installations.	Area directly east of the site.	Very Low Highly unlikely for these low mobility contaminants to be transported within groundwater. Negligible risk considered to be pose risk to workers during and after construction by ingestion/inhalation and dermal contact.	Very Low	The material sampled at the site passed all relevant screening criteria for Commercial and Industrial uses. No evidence of contaminants potentially associated with the nearby Electrical Substation were observed during the Phase 2. Standard PPE required for construction site.
Industrial Products and Second Hand Vehicle Sales and Parts	Hydrocarbons (TPH, PAH), Volatile Organic Compounds (VOCs), oils and heavy metals/phytotoxic elements.	Spillages and leakages from industrial units and garages between 167m and 185m southwest of the site boundary.	Very Low Unlikely for the site to be impacted due to hydraulic gradient anticipated to be towards the southwest and away from the site, towards the River Goyt.	Very Low	The material sampled at the site passed all relevant screening criteria for Commercial and Industrial uses. No evidence of contaminants potentially associated with nearby industries were observed during the Phase 2 or detected during testing. There is also a significant distance between the site and the potentially contaminative industry. Not considered to impact the proposed site.

The risk assessments have concluded that **no remediation measures** are required to address risks to any potential receptors.

9 Conclusions and Recommendations

9.1 Ground Profile

The site investigation revealed the following general downward succession:

- Site surface: Mostly low-quality pasture.
- Topsoil/Made Ground (0.0 to 0.8 m thick): Soft black sandy gravelly CLAY and Loose dark brown slight gravelly slightly clayey silty SAND.
- Made Ground (0.0 – 1.3 m thick): Soft black sandy gravelly CLAY, Black gravelly clayey SAND and grey angular GRAVEL (MOT Type 2).
- Alluvium (up to more than 5.15 m thick): Variable across site. Orangish brown gravelly clayey SAND, firm blueish grey slightly gravelly CLAY and stiff grey laminated CLAY.
- Groundwater: Encountered between 2.70 m and 4.00 m, mainly in the northern half of the site.

9.2 Environmental Risk Assessment

In order to make a more detailed assessment of the potential hazards, a Phase 2 intrusive investigation was carried out to develop a more comprehensive conceptual ground model of the site. This detailed the characteristic ground conditions and elements of the surrounding environment and has assisted with identifying the potential contaminants of concern, the potential receptors of the contamination and the potential pathways between them.

The results of the risk assessments indicate that there is no significant source of contaminants present at the site so there is a negligible risk to all receptors including humans, controlled waters and ecological receptors. No specific precautions are required with respect to ground gases for the development.

Any excavated materials to be removed from site should be tested to ensure safe and legal disposal.

The risk assessments have concluded that no remediation measures are required to address risks to any potential receptors. However, if unexpected contamination is encountered, a contaminated land specialist should be consulted and the environmental risk assessment revisited.

9.3 Health and Safety

As outlined within the HSE publication “Successful Health and Safety Management – HSG65” this report should inform your development of safe systems of work and information as an input into the safety management system. The contents of this report may be used to supplement the contents of the Health and Safety File as required under the Construction Design and Management

(CDM) Regulations 2015. All risk control measures should be in accordance with the guidelines laid down within the Management of Health and Safety at Work Regulations 1999.

In accordance with the Construction Design and Management (CDM) Regulations 2015, ByrneLooby has acted in the role of Principal Contractor and as Principal Designer for the works as described in this report. With issue of this report, ByrneLooby has discharged and completed all contractual and legal requirements for these positions, and we have no further involvement with the project.

10 Drawings

List of drawings

- K0150-BLP-ENV-DWG-001 – Exploratory Hole Location Plan

Appendix A – Service Constraints Report Limitations & Planning Requirements

Service Constraints, Report Limitations & Planning Requirements

This consultancy contract, report, and the site investigation (together comprise the "Services") were compiled and carried out by ByrneLooby Partners UK Limited (ByrneLooby) for the client named at the front of the report (the "client") on the basis of a defined programme and scope of works and the terms of a contract between ByrneLooby and the "client." The Services were performed by ByrneLooby with all reasonable skill and care ordinarily exercised by a reasonable environmental consultant at the time the Services were performed. Further, and in particular, the Services were performed by ByrneLooby taking into account the limits of the scope of works required by the client, the prevailing site conditions, the time scale involved and the resources, including financial and manpower resources, agreed between ByrneLooby and the client. ByrneLooby Partners UK Limited cannot accept responsibility to any parties whatsoever, following the issue of this report, for any matters arising which may be considered out with the agreed scope of works.

Other than that, expressly contained in the above paragraph, ByrneLooby provides no other representation or warranty whether express or implied, is made in relation to the Services. Unless otherwise agreed this report has been prepared exclusively for the use and reliance of the client in accordance with generally accepted consulting practices and for the intended purposes as stated in the agreement under which this work was completed. This report may not be relied upon, or transferred to, by any other party without the written agreement of a Director of ByrneLooby. If a third party relies on this report, it does so wholly at its own and sole risk and ByrneLooby disclaims any liability to such parties.

It is ByrneLooby's understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was a significant factor in determining the scope and level of the Services. Should the purpose for which the report is used, or the proposed use of the site change, this report may no longer be valid and any further use of, or reliance upon the report in those circumstances by the client without ByrneLooby's review and advice shall be at the client's sole and own risk.

The information contained in this report is protected by disclosure under Part 3 of the Environmental Information Regulations 2004 pursuant to the provisions of Regulation 12(5) without the consent in writing of a Director of ByrneLooby Partners UK Limited.

The report has been prepared at the date shown on the front page and should be read in light of any subsequent changes in legislation, statutory requirements, and industry practices. Ground conditions can also change over time and further investigations, or assessment should be made if there is any significant delay in acting on the findings of this report. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of ByrneLooby. In the absence of such written advice of ByrneLooby, reliance on the report in the future shall be at the client's own and sole risk. Should ByrneLooby be requested to review the report in the future, ByrneLooby shall be entitled to additional payment at the then existing rate, or such other terms as may be agreed between ByrneLooby and the client.

The observations and conclusions described in this report are based solely upon the Services that were provided pursuant to the agreement between the client and ByrneLooby. ByrneLooby has not performed any observations, investigations, studies or testing not specifically set out or mentioned within this report. ByrneLooby is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the Services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this report, ByrneLooby did not seek to evaluate the presence on or off the site of electromagnetic fields or materials in buildings (i.e., materials inside or as part of the building fabric) such as asbestos, lead paint, radioactive or hazardous materials.

The Services are based upon ByrneLooby's observations of existing physical conditions at the site gained from a walkover survey of the site together with ByrneLooby's interpretation of information including documentation, obtained from third parties and from the client on the history and usage of the site. The findings and recommendations contained in this report are based in part upon information provided by third parties, and whilst ByrneLooby Partners UK Limited have no reason to doubt the accuracy and that it has been provided in full from those it was requested from, the items relied on have not been verified. No responsibility can be accepted for errors within third party items presented in this report. Further ByrneLooby was not authorised and did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the Services. ByrneLooby is not liable for any inaccurate information or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to ByrneLooby and including the doing of any independent investigation of the information provided to ByrneLooby save as otherwise provided in the terms of the contract between the client and ByrneLooby.

Where field investigations have been carried out these have been restricted to a level of detail required to achieve the stated objectives of the work. Ground conditions can also be variable and as investigation excavations only allow examination of the ground at discrete locations. The potential exists for ground conditions to be encountered which are different to those considered in this report. The extent of the limited area depends on the soil and groundwater conditions, together with the position of any current structures and underground facilities and natural and other activities on site. In addition, chemical analysis was carried out for a limited number of parameters [as stipulated in the contract between the client and ByrneLooby based on an understanding of the available operational and historical information, and it should not be inferred that other chemical species are not present.

The groundwater conditions entered on the exploratory hole records are those observed at the time of investigation. The normal speed of investigation usually does not permit the recording of an equilibrium water level for any one water strike. Moreover, groundwater levels are subject to seasonal variation or changes in local drainage conditions and higher groundwater levels may occur at other times of the year than were recorded during this investigation.

Any site drawing(s) provided in this report is (are) not meant to be an accurate base plan but is (are) used to present the general relative locations of features on, and surrounding, the site.

Throughout the report the term 'geotechnical' is used to describe aspects relating to the physical nature of the site (such as foundation requirements) and the term 'geo-environmental' is used to describe aspects relating to ground-related environmental issues (such as potential

contamination). However, it should be appreciated that this is an integrated investigation, and these two main aspects are inter-related. The geo-environmental sections are written in broad agreement with BS 10175:2011+A2 2017. For the geotechnical aspects of the report, the general requirements of Eurocode 7 (BS EN 1997-2:2007) are to produce a Ground Investigation Report (GIR) which shall form part of the Geotechnical Design Report (GDR). The geotechnical section of this report is intended to fulfil the general requirements of the GIR as outlined in BS EN 1997-2, Section 6. The GIR contains the factual information including geological features and relevant data, and a geotechnical evaluation of the information stating the assumptions made in the interpretation of the test results. This report shall not be considered as being a GDR.

Planning Requirements

The National Planning Policy Framework (NPPF, 2019) emphasises the presumption in favour of sustainable development. Paragraph 11, which defines the presumption in favour of sustainable development, has two similar clauses which related to potentially contaminated land and sensitive receptors:

11) Plans and decisions should apply a presumption in favour of sustainable development.

For **plan-making** this means that:

b) strategic policies should, as a minimum, provide for objectively assessed needs for housing and other uses, as well as any needs that cannot be met within neighbouring areas, unless:

i) the application of policies in this Framework that protect areas or assets of particular importance provides a strong reason for restricting the overall scale, type or distribution of development in the plan area;

For **decision-taking** this means:

d) where there are no relevant development plan policies, or the policies which are most important for determining the application are out-of-date, granting permission unless:

ii) the application of policies in this Framework that protect areas or assets of particular importance provides a clear reason for refusing the development proposed

In accordance with the NPPF, areas or assets of particular importance are defined as:

Habitats sites (and those sites listed in paragraph 176 – potential Special Protection Areas and Possible Areas of Conservation; listed or proposed Ramsar sites; and sites identified, or required, as compensatory measures for adverse effects on habitats sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites) and/or designated as Sites of Special Scientific Interest; land designated as Green Belt, Local Green Space, an Area of Outstanding Natural Beauty, a National Park (or within the Broads Authority) or defined as Heritage Coast; irreplaceable habitats; designated heritage assets (and other heritage assets of archaeological interest referred to in footnote 63 (Non-

designated heritage assets of archaeological interest, which are demonstrably of equivalent significance to scheduled monuments, should be considered subject to the policies for designated heritage assets.); and areas at risk of flooding or coastal change.

Paragraph 118 states that planning policies and decisions should:

- *give substantial weight to the value of using suitable brownfield land within settlements for homes and other identified needs, and support appropriate opportunities to remediate despoiled, degraded, derelict, contaminated or unstable land;*

Paragraph 170 clarifies that enhancing the natural environment includes:

Planning policies and decisions should contribute to and enhance the natural and local environment by:

- *protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);*
- *recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;*
- *maintaining the character of the undeveloped coast, while improving public access to it where appropriate;*
- *minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;*
- *preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and*
- *remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.*

Paragraph 180 of NPPF states that planning policies and decisions should ensure the following:

- *Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development.*

Paragraph 178 of NPPF states that planning policies and decisions for developments should also ensure that:

- a) *a site is suitable for its proposed use taking account of ground conditions and any risks arising from land instability and contamination. This includes risks arising from natural hazards or former activities such as mining, and any proposals for mitigation including land remediation (as well as potential impacts on the natural environment arising from that remediation);*
- b) *after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990; and*
- c) *adequate site investigation information, prepared by a competent person, is available to inform these assessments.*

Paragraph 179 states that where a site is affected by contamination or land stability issues, responsibility for securing a safe development rest with the developer and/or landowner.

This report has been prepared and authorised by staff that are competent as defined in the NPPF.

Unexploded Ordnance

Clients have a legal duty under the CDM 2015 Regulations to provide designers and contractors with project-specific health and safety information needed to identify hazards and risks. This includes the possibility of unexploded ordnance (UXO) being encountered on the site. Further details are given in CIRIA Report C681 (Stone et al 2009). A non-UXO specialist screening exercise has been carried out for the site by considering any evidence of UK defence activities on or near the site evident from the gathered desk study information and the unexploded aerial delivered bomb (UXB) regional risk maps produced by Zetica. Other data sources are available, but as a first stage screening exercise the freely available Zetica maps have been used. The level of risk stated is that determined by Zetica, a company experience in the desk study, field investigation and clearance of UXO/UXB.

Appendix B – Environmental Risk Assessment Methodology & Terminology

Environmental Risk Assessment Methodology & Terminology

LEGISLATION OVERVIEW

This report includes hazard identification and environmental risk assessment in line with the risk-based methods referred to in relevant UK legislation and guidance. Government environmental policy is based upon a “suitable for use approach,” which is relevant to both the current use of land and also to any proposed future use. The contaminated land regime is the statutory regime for remediation of contaminated land that causes an unacceptable level of risk and is set out in Part 2A of the Environmental Protection Act 1990 (“EPA 1990”). The main objective of introducing the Part IIA regime is to provide an improved system for the identification and remediation of land where contamination is causing unacceptable risks to human health, or the wider environment given the current use and circumstances of the land. Part IIA provides a statutory definition of contaminated land under Section 78A(2) as:

“any land which appears to the Local Authority in whose area it is situated to be in such a condition, by reason of substances in, on, or under the land, that:

- a) Significant harm is being caused or there is a significant possibility of such harm being caused;
- or
- b) Pollution of controlled waters is being, or is likely to be, caused.”

In order to assist in establishing if there is a “significant possibility of significant harm” there must be a “contaminant linkage” for potential harm to exist. That means there must be a source(s) of contamination, sensitive receptors present and a connection or pathway between the two. This combination of contaminant-pathway-receptor is termed a “contaminant linkage or CPR linkage.”

Part IIA of The Environmental Protection Act 1990 is supported by a substantial quantity of guidance and other Regulations. Key implementing legislation of the Part 2A regime includes the Contaminated Land (England) Regulations 2006 (SI 2006/1380) as amended by the overarching legislation for the contaminated land regime, which implements the provisions of Part IIA of the Environmental Protection Act 1990 (as inserted by section 57 of the Environment Act 1995), came into force on 14th July 2000 together with recent amended regulations: Contaminated Land (England) (Amendment) Regulations 2012 (SI 2012/263). Revised Contaminated Land Statutory Guidance was published by DEFRA in April 2012. Part IIA defines the duties of Local Authorities in dealing with it. Part IIA places contaminated land responsibility as a part of planning and redevelopment process rather than Local Authority direct action except in situations of very high pollution risk.

In the planning process guidance is provided by National Planning Policy Framework (NPPF) of July 2018 which requires that a site which has been developed shall not be capable of being determined “contaminated land” under Part IIA. In practice, Planning Authorities require sites being developed to have a lower level of risk post development than the higher level of risk that is required in order to determine a site as being contaminated in accordance with Part IIA. This is to ensure that there is a suitable zone of safety below the level for Part IIA determination and prevent

recently developed sites becoming reclassified as contaminated land if there are future legislative or technical changes (e.g., a substance is subsequently found to be more toxic than previously assessed this increases its hazard).

The criteria for assessing concentrations of contaminants and hence determining whether a site represents a hazard are based on a range of techniques, models and guidance. Within this context it is relevant to note that Government objectives are:

- a) to identify and remove unacceptable risks to human health and the environment;
- b) to seek to bring damaged land back into beneficial use;
- c) to seek to ensure that the cost burdens faced by individuals, companies and society as a whole are proportionate, manageable and economically sustainable.

These three objectives underlie the "suitable for use" approach to risk management and remediation of contaminated land. The "suitable for use" approach focuses on the risks caused by land contamination. The approach recognises that the risks presented by any given level of contamination will vary greatly according to the use of the land and a wide range of other factors, such as the underlying geology of the site. Risks therefore should be assessed on a site-by-site basis.

The "suitable for use" approach then consists of three elements:

- a) ensuring that land is suitable for its current use - in other words, identifying any land where contamination is causing unacceptable risks to human health and the environment, assessed on the basis of the current use and circumstances of the land, and returning such land to a condition where such risks no longer arise ("remediating" the land); the contaminated land regime provides the regulatory mechanisms to achieve this;
- b) ensuring that land is made suitable for any new use, as planning permission is given for that new use - in other words, assessing the potential risks from contamination, on the basis of the proposed future use and circumstances, before official permission is given for the development and, where necessary to avoid unacceptable risks to human health and the environment, remediating the land before the new use commences; this is the role of the town and country planning and building control regimes; and
- c) limiting requirements for remediation to the work necessary to prevent unacceptable risks to human health or the environment in relation to the current use or future use of the land for which planning permission is being sought - in other words, recognising that the risks from contaminated land can be satisfactorily assessed only in the context of specific uses of the land (whether current or proposed), and that any attempt to guess what might be needed at some time in the future for other uses is likely to result either in premature work (thereby running the risk of distorting social, economic and environmental priorities) or in unnecessary work (thereby wasting resources).

The mere presence of contaminants does not therefore necessarily warrant action, and consideration must be given to the scale of risk involved for the use that the site has and will have in the future.

OVERALL METHODOLOGY

The work presented in this report has been carried out in general accordance with recognised best practice as detailed in guidance documents such as in the EA online guidance: Land Contamination: Risk Management (LCRM) (Environment Agency, 2020), and BS10175:2011+A2 2017. Important aspects of the risk assessment process are transparency and justification. The particular rationale behind the risk assessments presented is given in this appendix.

The first stage of a two-staged investigation and assessment of a site is the Preliminary Investigation (BS 10175:2011), often referred to as the Phase 1 Study, comprising desk study and walk-over survey, which culminates in the Preliminary Risk Assessment. A preliminary conceptual site model (CSM) is developed which identifies potential geotechnical and geo-environmental hazards and the qualitative degree of risk associated with them. From the geo-environmental perspective, the Hazard Identification process uses professional judgement to evaluate all the hazards in terms of potential contaminant linkages (of contaminant source-pathway-receptor). Potential contaminant linkages are potentially unacceptable risks in terms of the current contaminated land regime legal framework and require either remediation or further assessment. These are normally addressed via intrusive ground investigation and generic risk assessment.

The second stage is the Ground Investigation, Generic Risk Assessment and Geotechnical Interpretation. This represents the further assessment mentioned above. The scope of the Ground Investigation is based on the findings of the Preliminary Risk Assessment and is designed to reduce uncertainty in the geotechnical and geo-environmental hazard identification. The Ground Investigation comprises fieldwork, laboratory testing and usually also on-site monitoring. The Ground Investigation may include the Exploratory, Main and Supplementary Investigations described in BS 10175:2011+A2 2017. The results of the Ground Investigation reduces uncertainty in the geotechnical and geo-environmental risks. Depending on the findings more detailed investigations or assessments may be required.

PRELIMINARY RISK ASSESSMENT

Current practice recommends that the determination of potential liabilities that could arise from land contamination be carried out using the process of risk assessment, whereby “risk” is defined as:

- “(a) The probability, or frequency, or occurrence of a defined hazard; and
- (b) The magnitude (including the seriousness) of the consequences.”

The UK’s approach to the assessment of environmental risk is set out in by the Department of the Environment Transport and the Regions (2000) publication “A Guide to Risk Assessment and Risk Management for Environmental Protection” (also called Greenleaves II). This established an iterative, systematic staged process which comprises:

- a) Hazard identification;
- b) Hazard assessment;
- c) Risk estimation;
- d) Risk evaluation;
- e) Risk assessment;

At each stage during the development process, the above steps are repeated as more detailed information becomes available for the site.

For an environmental risk to be present, all three of the following elements must be present:

- Source/Contaminant: hazardous substance that has the potential to cause adverse impacts;
- Receptor: target that may be affected by contamination: examples include human occupants/users of site, water resources (rivers or groundwater), or structures;
- Pathway: a viable route whereby a hazardous substance may come into contact with the receptor.

The absence of one or more of each component (contaminant, pathway, receptor) would prevent a contaminant linkage being established and there would be no significant environmental risk.

The identification of potential contaminant linkages is based on a Conceptual Model of the site, which is subject to continual refinement as additional data becomes available. As part of a Preliminary Risk Assessment (Desk Study and site walk over) a Preliminary Conceptual Site Model (PCSM) is formed. Based on the PCSM, potential contaminant linkages can be assessed. If the PCSM and hazard assessment indicate that a contaminant linkage is not of significance then no further assessment or action is required for this linkage. For each significant and potential linkage, a risk assessment is carried out. The linkages which potentially pose significant risks may require a variety of responses ranging from immediate remedial action or risk management or, more commonly, further investigation and risk assessment. This next stage is termed a Phase II Main Site Investigation and should provide additional data to allow refinement of the Conceptual Site Model and assess the level of risk from each contaminant linkage.

Definition of Risk Assessment Terminology

CIRIA Report C552, Contaminated Land Risk Assessment A Guide to Good Practice, 2001 sets out a methodology for estimating risk. The methodology for risk evaluation is a qualitative method for interpreting the output for the risk estimation stage of the assessment. It involves the classification of the:

- Magnitude of the potential consequence (severity) of risk occurring.
- Magnitude of the probability (likelihood) of the risk occurring.

The classification of consequence and probability are set out in table B1 and B2 below:

Table B1 Classification of Consequence

Classification	Definition	Examples
Severe (Sv)	Short term (acute) risk to human health likely to result in “significant harm” as defined by the Environment protection Act 1990, Part IIA. Short term risk of pollution of controlled waters. Catastrophic damage to buildings / property. A short-term risk to a particular ecosystem, or organism forming part of such ecosystem	High concentrations of cyanide on the surface of an informal recreation area Major spillage of contaminants from site into controlled water. Explosion causing building collapse (can also equate to a short-term human health risk if buildings are occupied.)
Medium (Md)	Chronic damage to Human Health (“significant harm”). Pollution of controlled waters. A significant change in a particular ecosystem, organism forming part such ecosystem.	Concentrations of contaminants from site exceeding generic or site-specific screening criteria. Leaching of contaminants into a major or minor aquifer. Death of species within a designated nature reserve.
Mild (Mi)	Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures, and services. Damage to sensitive buildings / structures / services or the environment.	Pollution of non-classified groundwater. Damage to building, rendering it unsafe to occupy (e.g., foundation damage resulting in instability)
Minor (Mr)	Harm, although not necessarily significant harm, which may result in a financial loss, or expenditure to resolve. Non-permanent health effects to human health (easily prevented by measures such as protective clothing etc). Easily repairable effects of damage to buildings, structures, and services.	The presence of contaminants at such concentrations that protective equipment is required during site work. The loss of plants in a landscaping scheme. Discolouration of concrete.

The classification of consequence does not take into account the probability of the consequence being realised. Therefore there may be more than one consequence for a particular pollutant linkage. Both a severe and medium classification can result in death. Severe relates to short term (acute) risk while medium relates to long term (chronic) risk. Mild relates to significant harm but to

less sensitive receptors. Minor classification relates to harm which is not significant but could have a financial cost.

Table B2 Classification of Probability

Classification	Definition
High likelihood (Hi)	There is a pollutant linkage and an event that either appears very likely in the short term and almost inevitable in the long term, or there is evidence at the receptor or harm or pollution.
Likely (Li)	There is a pollutant linkage, and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.
Low likelihood (Lw)	There is a pollutant linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place and is less likely in the short term.
Unlikely (Ul)	There is a pollutant linkage, but circumstances are such that it is improbable that an event would occur even in the very long term.

The classification gives a guide as to the severity and consequence of identified risk when compared with other risk presented on the site. It should be noted that if a risk is identified it cannot be classified as “no risk” but as “very low risk”. Differing stakeholders may have a different view on the acceptability of a risk.

Once the consequence and probability have been classified these can be compared using a matrix (**Table B3**) to identify an overall risk category. These categories and the actions required are categorised in **Table B4**.

Table B3 Risk Evaluation Matrix

		Consequence			
		Severe (Sv)	Medium (Md)	Mild (Mi)	Minor (Mr)
Probability	High likelihood (Hi)	Very High Risk (VH)	High Risk (H)	Moderate Risk (M)	Mod/Low Risk (M/L)
	Likely (Li)	High Risk (H)	Moderate Risk (M)	Mod/Low Risk (M/L)	Low Risk (L)
	Low likelihood (Lw)	Moderate Risk (M)	Mod/Low Risk (M/L)	Low Risk (L)	Very Low Risk (VL)
	Unlikely (Ul)	Mod/Low Risk (M/L)	Low Risk (L)	Very Low Risk (VL)	Very Low Risk (VL)

Table B4 Risk Categorisations

<p>Very High Risk (VH)</p>	<p>There is a high probability that severe harm could arise to a designated receptor from an identified hazard, OR there is evidence that severe harm to a designated receptor is currently happening. This risk, if realised, is likely to result in a substantial liability. Urgent investigation (if not undertaken already) and remediation are likely to be required.</p>
<p>High Risk (H)</p>	<p>Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation (if not undertaken already) is required and remedial works may be necessary in the short term and are likely over the longer-term.</p>
<p>Moderate Risk (M)</p>	<p>It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild. Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer-term.</p>
<p>Low Risk (L)</p>	<p>It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.</p>
<p>Very Low Risk (VL)</p>	<p>There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe.</p>

GENERIC QIANTITATIVE RISK ASSESSMENT

In the following sections the current UK guidance on risks to the following receptors are discussed: human health, plant life and controlled waters

Human Health

The overall methodology for assessing the risk to human health from potential contaminants in soil is set out in the Environment Agency's guidance "Using Soil Guideline Values" SC050021/SGV Introduction, March 2009 and using the CLEA 1.06 model software (and CLEA 1.071 for nickel). The generic assessment criteria are in accordance with the following:

- Science Report SC050021/SR2: Human health toxicological assessment of contaminants in soil;
- Science Report SC050021/SR3: Updated technical background to the CLEA model;
- Science Report SC050021/SR4: CLEA Software (Version 1.071, 2014) & Handbook;
- Toxicological reports and SGV technical notes;
- Toxicological data published by LQM/CIEH (2009) and CL:AIRE/EIC/AGS (2009);
- DEFRA Development of Category 4 Screening Levels for assessment of land affected by contamination - SP1010 (December 2013);
- LQM/CIEH Suitable 4 Use Levels (S4ULs) for Human Health Risk Assessment; and,
- Toxicology review published by the European Food Safety Authority for nickel (2015).

In March 2014 six 'proposed' Category 4 Screening Levels (pC4SL) were issued by Defra. These screening values are considered to be within Category 4 as defined in the Contaminated Land Statutory Guidance and indicate safe levels for new developments passing through the planning system. The SGV for lead has been withdrawn, and the pC4SL for lead has been derived using current best practice. In January 2015 LQM/CIEH published S4ULs for 89 contaminants in accordance with the C4SL methodology.

Note that groundwater contamination may pose a risk to human health but that there are no relevant generic assessment criteria available for comparison. ByrneLooby has derived our own assessment criteria for this.

Phytotoxic Risks

Generic assessment of phytotoxicity is by comparison with guideline values presented in the British Standard for Topsoil and the MAFF document "Code of Good agricultural practice for the protection of soil", October 1998. This is in accordance with LCRM's reference to DEFRA notice CLAN 4/04.

Controlled Waters

Risks to controlled waters (groundwater and surface waters) from contaminants are assessed in accordance with the EA documents "The Environment Agency's Approach to Groundwater Protection" (2017) and Remedial Targets Methodology (RTM, 2006). Pollutant inputs from

contaminated land sites are considered as passive inputs under the European Water Framework Directive (2000/60/EC) (WFD) and its daughter Directives, and as such are regulated under the Environment Agency's 'limit' pollution objective. Acceptable water quality targets (WQT) are defined for protection of human health (based on Drinking Water Standards (DWS)) and for protection of aquatic ecosystems (Environmental Quality Standards (EQS)). The risk posed to controlled waters from total soil concentrations cannot be directly assessed. The risk is assessed either by comparison of results of leachate tests carried out on soil samples, or from the direct testing of samples of groundwater to screening criteria. Leachate testing generally forms a conservative assessment and is not appropriate for organic contaminants.

CURRENT GUIDANCE ON INTERPRETATION OF CHEMICAL ANALYSIS OF SOILS

Contaminated land is defined under law through Part IIA of the Environmental Protection Act 1990, implemented through Section 57 of the Environment Act 1995. This supports a 'suitable for use' based approach to the risk assessment of potentially contaminated land. The site-specific risk assessment is based upon assessment of plausible contaminant linkages, referred to as the contaminant-pathway- receptor model, based upon the current or proposed use of the site.

Before undertaking a risk assessment, a conceptual site model is devised in order to identify the potential contaminants, pathways and receptors. The individual contaminants, pathways and receptors then need to be further investigated in order to refine the initial assessment and risk assessment undertaken.

In March 2002, the Department for Environment, Food and Rural Affairs (DEFRA) and the Environment Agency published the Contaminated Land Exposure Assessment (CLEA) Model and a series of related reports. These were designed to provide a scientifically based framework for the assessment of chronic risks to human health from contaminated land. These reports (CLR7-10) together with associated "SGV" documents were withdrawn and the following documents have been published as revised guidance to the CLEA assessment:

- Environment Agency : 2008: Using Soil Guideline Values SC050021/SGV Introduction, March 2008.
- Environment Agency : 2008: Science Report SC050021/SR2: Human health toxicological assessment of contaminants in soil.
- Environment Agency : 2008: Science Report SC050021/SR3: Updated technical background to the CLEA model.
- Environment Agency : 2008 : Compilation of Data for Priority Organic Contaminants for Derivation of Soil Guideline Values Science report SC050021/SR7
- Environment Agency : Science Report SC050021/SR4: CLEA Software (Version 1.071, 2015) & Handbook.
- DEFRA Development of Category 4 Screening Levels for assessment of land affected by contamination - SP1010 (December 2013).
- LQM/CIEH Suitable 4 Use Levels for Human Health Risk Assessment.

Additional guidance on statistical assessment replacing CLR 7 is partly provided in:

- CL:AIRE: 2009: Guidance on Comparing Data With a Critical Concentration

A different approach to the statistical appraisal of data is required depending on whether the assessment of risk is to assess whether land is Contaminated Land in accordance with regulations, or whether the assessment is to assess whether the site is suitable for new development in according with Planning guidance. This is discussed further in CL:AIRE: 2009 "Guidance on Comparing Data With a Critical Concentration".

The introduction of the Contaminated Land (England) (Amendment) Regulations 2012 and Contaminated Land Statutory Guidance (DEFRA, 2012) reassessed the CLEA Model and the derived SGVs (and associated GACs calculated using the model). This re-assessment concluded that the SGVs/GACs were conservative screening criteria for determining the suitability of soil with regard to the risk to human health under the planning regime and defined a new upper limit for planning purposes which is the boundary between the new Category 3 and 4. In March and September 2014 DEFRA issued guidance on these new Category 4 Screening Levels (C4SL) and these are discussed further below.

Soil Guideline Values

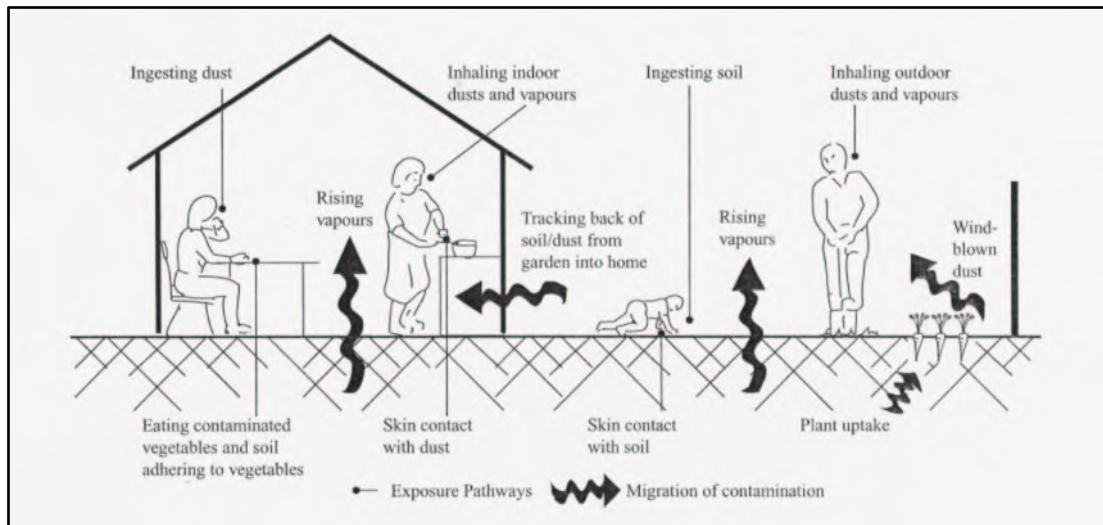
A program for the derivation of SGVs based on the above guidance is provided by the Environment Agency and is entitled “CLEA Software Version 1.06”. These reports, together with supporting toxicology reviews (“Tox” or Supplementary Information Reports) for individual substances (which will be gradually updated), Soil Guideline Value Reports and other guidance referred to in the above documents, provide guidance and the scientific basis for assessing the risk to human health from potential contaminants. Soil Guideline Value Reports (SGV Reports) have been published for a number of contaminants and these are published on the Environment Agency website. Eventually the reports will include SGVs for:

- heavy metals and other inorganic compounds: arsenic, cadmium, chromium, cyanide, lead (now withdrawn), mercury nickel (now withdrawn), and selenium;
- benzene, ethylbenzene, toluene, and xylenes;
- phenol;
- dioxins and dioxin-like polychlorinated biphenyls (PCBs);
- polycyclic aromatic hydrocarbons (PAHs) – 11 substances.

In September 2015, CLEA was re-issued as ‘CLEA Version 1.071’. Currently, the software has been used to produce an in-house GAC for nickel, following with withdrawal of the SGV.

In addition, CIEH through LQM and the EIC have published generic assessment criteria (GACs) for a wide variety of other parameters including metals, hydrocarbons, chlorinated aliphatic compounds, PAHs and explosive substances for three standard land uses. These have been produced to supplement the Environment Agency guidance. These GACs will be replaced by SGVs when or if the Environment Agency publishes any more SGVs.

The CLEA model has been developed to calculate an estimated tolerable daily soil intake (TDSI) for site users given a set ‘default’ exposure pathways. Ten human exposure pathways are covered in the CLEA model as presented below:



- Ingestion:
 - ingestion of outdoor soil;
 - ingestion of indoor dust;
 - ingestion of home-grown vegetables;
 - ingestion of soil attached to home grown vegetables.
- Dermal Contact:
 - dermal contact with outdoor soil;
 - dermal contact with indoor dust.
- Inhalation:
 - inhalation of outdoor dust;
 - inhalation of indoor dust;
 - inhalation of outdoor soil vapour;
 - inhalation of indoor soil vapour.

It should be noted that there are other potential exposure pathways on some sites not included in the CLEA model e.g., certain organic compounds can pass through plastic water pipes into drinking water supply.

The presence and/or significance of each of the above exposure pathways are dependent on the type of land use being considered and the nature of the contaminant under scrutiny. Accordingly, the CLEA model considers for principle 'default' land use types and makes a series of 'default' assumptions with regard to human exposure frequency, duration and critical human target groups for each land use considered:

- residential land use;
- allotments;
- commercial and industrial land use.

The land use categories defined in the CLEA are detailed below.

Residential: This land use category assumes that people live in a variety of dwellings including terraced, detached and semi-detached houses up to two storeys high. The structure of buildings varies. Default parameters for building materials and building design are included in CLEA documents to calculate the relevant multi-layer diffusion coefficients for vapour intrusion and to model indoor vapour intrusion. The CLEA model assumes that regardless of the style of housing the residents will have access to either a private garden or community open space nearby, and that soil tracked into the home will form indoor dust. It allows for the ingestion pathways from home grown vegetables.

Allotments: The CLEA model incorporates an assessment of land provided by local authorities specifically for people to grow fruit and vegetables for their own consumption. Consumption of such fruit and vegetables present several exposure pathways; plants absorb contaminants mainly via water uptake through roots, the contaminants move to edible portions of plants via translocation and contaminated soil particles become trapped in the skin and between leaves. At present the model fails to account for exposure through the consumption of animals, and their products (e.g., eggs), which have been reared on contaminated land.

Commercial/Industrial: Although there are a wide variety of workplaces and work-related activities, the CLEA assessment of this land-use assumes that work occurs in a permanent, three-storey structure, where employees spend most time indoors, conducting office-based or light physical work. The model assumes employees sit outside during breaks for most of the year. Limitations in applying this land-use to different industries is detailed in EA publication “Updated technical background to the CLEA model” (2011). The generic model assumes that the site would not be covered by hard standing. Risk of exposure to contaminants would be clearly less where commercial land is essentially all buildings and hard standing.

Based on the assumptions of each land use and the associated applicable exposure pathways, a ‘Soil Guideline Value’ (SGV) may be calculated for each contaminant under consideration for a particular land use in order to determine whether certain contaminant soil concentrations pose a significant risk to human health. The primary purpose of the CLEA SGVs are as ‘trigger values’ – indicators to a risk assessor that soil concentrations below this level require no further assessment as it can be assumed that the soil is suitable for the proposed use. Where soil concentrations occur above the SGV then further assessment of the results is required. The Contaminated Land (England) (Amendment) Regulations 2012 and Contaminated Land Statutory Guidance (DEFRA, 2012) which came into force in early April 2012 provides new clarity on the assessment of risk where soil concentrations exceed the SGV. The guidance introduces a four-stage classification system relating to concentration of contaminants and the assessed risk which indicates appropriate actions. Category 1 and 2 sites are classified as “Contaminated Land” as defined in Part IIA of The Environmental Protection Act (1990). Category 3 and 4 sites are not considered as “Contaminated Land” in accordance with the Act. This can be explained using the figure on the following page.

There are also difficulties in establishing soil concentrations of contaminants beyond which risks from exposure to these contaminants would be ‘unacceptable’ and that they would lead to “significant possibility of significant harm” as defined in Part IIA of The Environmental Protection Act (1990) and determine that the land is “contaminated.” This ultimately requires detailed ‘toxicological’ information of the health effects of individual contaminants and also a scientific judgement on what constitutes an ‘unacceptable’ risk. It is for local authorities or the

Environment Agency to determine whether a particular site is contaminated land, and it is for local Planning Authorities to determine whether land affected by contamination can be redeveloped.

Given the SGVs have been derived only for a limited number of contaminants and there was little prospect of further SGVs being published, two professional groupings have produced Generic Assessment Criteria (GACs) in accordance with the CLEA model for a large number of additional contaminants. These GACs were recognised in the new Contaminated Land Statutory Guidance (DEFRA, 2012) and have been produced as follows:

- *LQM/CIEH : 2009 Nathaniel CP, McCaffrey C, Ashmore MH, Cheng NPS GROUP, Gillett A, Ogden R & Scott D : 2009 . The LQM/CIEH Generic Assessment Criteria for Human Health Risk Assessment (2nd edition). Land Quality Press, Nottingham.*
- *CL:AIRE/EIC/AGS: 2009 : Soil Generic Assessment Criteria (GAC) for Human Health Risk Assessment. Contaminated Land: Applications in Real Environments, Environment Industries Commission & Association of Geotechnical and Environmental Specialists. December 2009.*

Category 4 Screening Levels and LQM/CIEH Suitable 4 Use Levels

For new developments progressing through the planning regime, it is desirable that the soil concentrations are within Category 4 where there is a valid contaminant linkage. The upper boundary between Category 4 and 3 is not defined in the guidance. This boundary can also be better defined by carrying out a Detailed Quantified Risk Assessment (DQRA) and this is discussed later in this appendix.

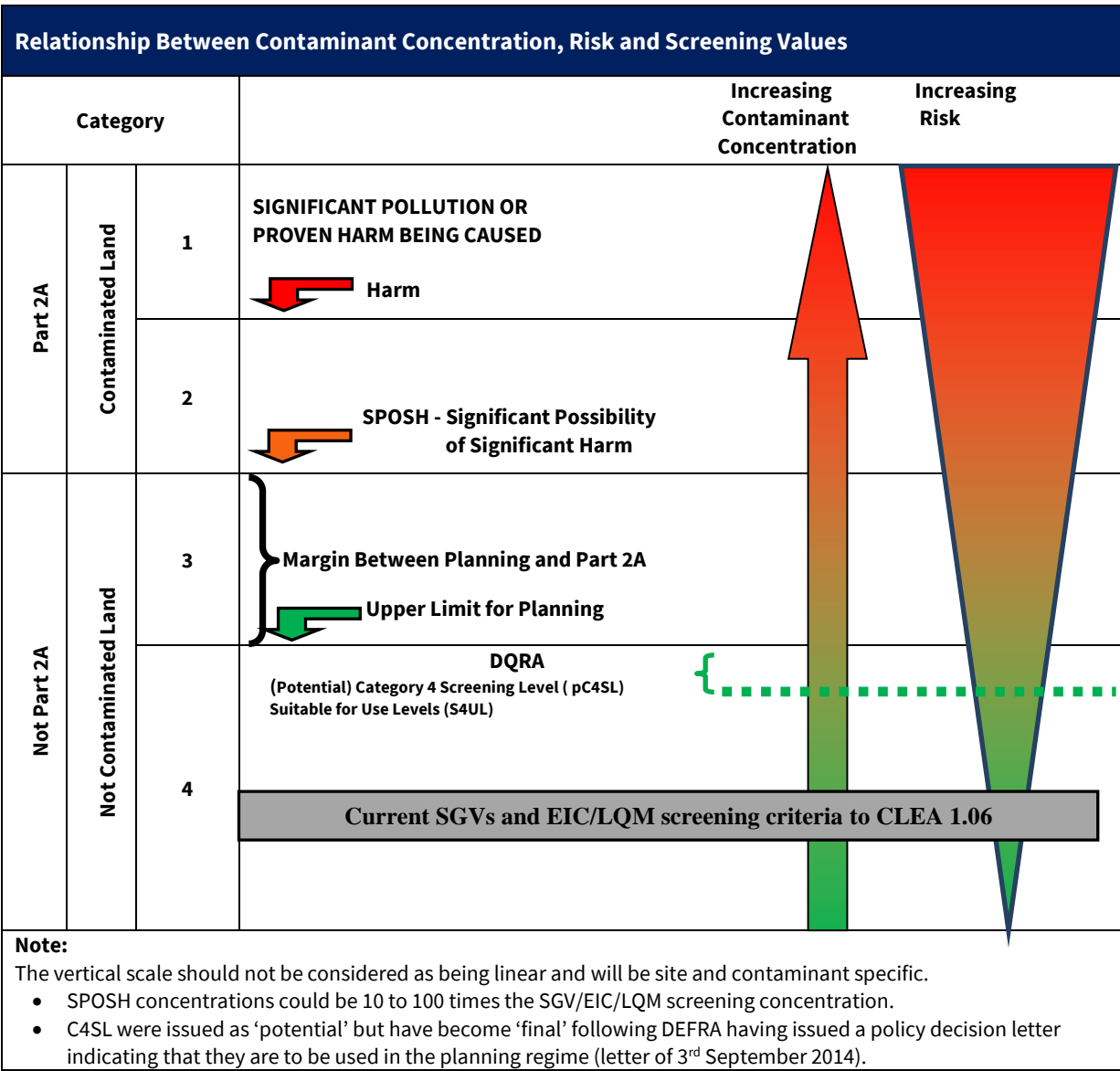
In December 2013 Defra issued the findings of a research project undertaken by CL:AIRE to set out the framework by which potential Category 4 Screening Levels (pC4SL) may be derived. The report was not designed to produce 'final' C4SL as the steering group producing the report believes that final C4SL should be set by a 'relevant authority' (e.g., Defra), the toxicological framework proposed has not been reviewed by the Committee on Toxicity and the document has yet to be subject to peer review.

In March 2014, appendices to the main Defra report were published detailing the derivation of pC4SL for 6 contaminants and other appendices regarding a review of the CIEH/CL:AIRE statistics guidance and sensitivity analysis. For each contaminant, a range of pC4SL have been produced relating to modifying toxicological parameters only, modifying exposure parameters only or by modifying both. It should be noted that the pC4SL produced for lead (the SGV was withdrawn in 2011) has undertaken a relatively large toxicological review in relation to modelling blood lead concentrations. pC4SL have been produced for:

- Arsenic;
- Benzene;
- Benzo(a)pyrene (as a surrogate marker for PAHs);
- Cadmium;
- Chromium (VI); and
- Lead

As previously discussed the values were initially published as 'potential' C4SL but have become 'final' following DEFRA having issued a policy decision letter indicating that they are to be used in the planning regime (letter of 3rd September 2014). It is considered that the pC4SL provide a

simple test for deciding whether land is suitable for use without any remediation. The pC4SL represent a new set of screening levels that are more pragmatic (but strongly precautionary) compared to the existing soil guideline values (SGVs and the other GACs calculate in accordance with the existing CLEA methodology). The pC4SL provide cautious estimates of contaminant concentrations in soil that are still considered to present an acceptable level of risk, within the context of Part 2A, by combining information on toxicology, exposure assessment and normal levels of exposure to these contaminants. pC4SL values should not be seen as ‘SPOH values.’ Exceeding a pC4SL means that further investigation is required, not that the land is necessarily contaminated. In January 2015, LQM published Suitable 4 Use Levels (S4ULs) for a further 89 contaminants using the Defra C4SL methodology. In a similar manner to the pC4SLs, no authoritative review has been undertaken although the approach and quality of the work undertaken is widely accepted as being of high quality.



Lead:

The SGV for lead was withdrawn in 2011 and is not used in this report. The pC4SL for lead provides a technically robust and conservative assessment tool using significantly updated toxicological modelling in line with current scientific understanding of lead toxicology.

Nickel

The SGV for nickel was withdrawn in 2015 and is not used in this report. In-house GACs for nickel have been produced using the updated toxicological review by the EFSA and the CLEA 1.071 software.

Public Open Space

The Defra report (December 2013) has also introduced exposure scenarios for two other commonly occurring land uses which require assessment (under the planning and Part 2A regimes) on a relatively frequent basis. These exposure scenarios are:

- Public Open Space – Space Near Residential Housing (POS_{resi}); and,
- Public Open Space – Public Park (POS_{park}).

Potential use of pC4SL relating to Public Open Space (POS) require care due to the significant variability in exposure characteristics. For example, POS may include:

- Children's play areas, public parks where children practise sport several times a week and teenagers only once a week;
- Grassed areas adjacent to residential properties which are rarely used;
- Dedicated sports grounds where exposure is only to players and groundworkers; and,
- Nature reserves or open ground with low level activity (for example, dog walking).

Within the Defra report (December 2013) the following exposure scenarios have been modelled as these are considered the most important for potential exposure for the critical receptor i.e., young children:

- Green open space close to housing, including tracking back of soil (POS_{resi}); and
- Park-type scenario where distance is considered sufficient to discount tracking back of soil (POS_{park}).

Detailed Quantified Risk Assessment (DQRA)

SGVs, GACs, pC4SL and S4ULs are based on a number of basic assumptions. There are two main options for developing Site Specific Assessment Criteria (SSAC) by adjusting the CLEA model so that they have greater relevance to the site:

- **Simple adjustment of the generic SGV / C4SL model.** Such adjustment is restricted to the choice of exposure routes selected for the generic land use, building type, soil type and soil organic matter content within the CLEA software.
- **Detailed adjustment.** It may be relevant to make greater modifications to the model due to the specific use of the land in question. This can include modification to any parameter value, including exposure assumptions, building parameters, and the choice and application of fate and transport models. This is equally relevant to site-specific modifications of existing generic land uses, the development of new land uses, and the inclusion of additional exposure pathways. Much of this can be undertaken using the CLEA software. Depending on the complexity of the detailed adjustments required, it may be necessary to use other tools either alone or in conjunction with the CLEA software. Both options should follow established protocols for DQRA and require sufficient justification and supporting information for the adjustments made. Detailed adjustments are likely to require substantially greater technical justification and supporting documentation, especially if modifications are based on information not contained within the SGV framework documents.

The two choices present the risk assessor with three options/decisions:

1. Use a published SGV/GAC/pC4SL/S4UL if it can be demonstrated that the assumptions inherent in the value are appropriate to the site in question. If they are not, proceed to either option 2 or 3 below.
2. Make simple site-specific adjustments to the generic exposure model used to derive the SSAC. Three examples of when this could be appropriate are:
 - a. High density residential development with no exposed contaminated soil at surface. It is appropriate in this case to consider the relevance of direct contact pathways and consumption of homegrown produce.
 - b. Soil type is significantly different (specifically when soil type is likely to be less protective e.g., made ground) to that assumed in the SGV/GAC/pC4SL/S4UL.
 - c. Soil organic matter content is significantly different to that assumed in the derivation of the SGV/GAC/pC4SL/S4UL.
3. If simple adjustments are not sufficient to reflect site conditions, undertake a DQRA. This may be undertaken using the CLEA software or by using an alternative risk assessment methodology that is relevant, appropriate, authoritative, and scientifically based. Changes to toxicological end points may also be considered, although this should only be undertaken by a toxicology expert. In the context of this guidance, simple adjustments of a generic land use scenario for soil type or SOM content for example are not considered sufficient to be classed as a DQRA.

DQRAs should be conducted with the agreement of the local authority (or the Environment Agency) since it is the authority that determines whether land is Contaminated Land or whether Planning Permission for a new development may be granted.

Representative Data

The type, quantity and quality of the available soil data influence the method chosen to obtain a site representative soil concentration that is compared with an SGV/GAC/pC4SL/S4UL in the screening process. The soil data should be representative of the exposure scenario being considered. This can include factors such as:

- Averaging area over which exposure occurs;
- Sample depth; and,
- Heterogeneity of soil.

where the 'averaging area' is defined as:

“That area (together with a consideration of depth) of soil to which a receptor is exposed or which otherwise contributes to the creation of hazardous conditions”.

Site investigations take discrete samples from a given area (and to a certain depth). It has to be assumed that these samples are to some degree representative of the contaminant concentration throughout that volume of soil. The critical soil volume (taking into account area and depth) which might be usefully compared with an SGV/GAC/pC4SL/S4UL is a site-specific decision, but a starting point is the generic land use scenarios used in the derivation of the SGV/GAC/pC4SL/S4UL. The critical soil volume depends on two factors:

- Contaminant distribution and vertical profile (bands of highly contaminated material or lateral hot spots should not necessarily be averaged out with more extensive cleaner areas of soil without justification)
- Contribution to average exposure underpinning the SGV. Direct contact exposure pathways depend on the adult or child coming into contact with near-surface soils and the area over which that exposure occurs is usually important (i.e., the averaging area). Vapour pathways are less dependent on surface area, for example vapour intrusion may result from a highly concentrated hot spot beneath a building leading to elevated average indoor air concentrations. For the three standard land uses for which SGVs are derived, relevant considerations are:
 - For the standard **residential or allotment land use**, the critical soil volume is the area of an individual garden, communal play area or working plot from the surface to a depth of between 0.50m and 1.00m. This is the ground over which children are most likely to come into contact with soil or from which vegetable and fruit produce will be harvested. In the case of volatile contaminants, it may also be appropriate to consider the volume of soil underneath the footprint of the building although vapour intrusion may be driven by a soil volume much smaller than this if the contaminant source is highly concentrated.
 - For the standard **commercial land use**, the critical soil volume has to be decided on a case-by- case basis due to the wide range of possible site layouts. However, for non-volatile contaminants, landscaped and recreational areas around the perimeter of office buildings are likely to be most important. For volatile contaminants, the footprint occupied by the building itself should also be considered.

- For **most exposure pathways**, the contamination is assumed to be at or within one metre of the surface.

The use of averaging areas must be justified on the basis of relevance to the exposure scenario. SGVs are relevant only when the exposure assumptions inherent in them are appropriate for the identified exposure averaging area. Further guidance on critical soil volumes and the consideration of averaging exposure areas can be found in:

- *Secondary model procedure for the development of appropriate soil sampling strategies for land contamination (Environment Agency, 2000);*
- *Guidance on comparing soil contamination data with a critical concentration (CIEH/CL:AIRE, 2009); and*
- *Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination – Appendix I (Defra December 2013, March 2014)*

It is the mean soil concentration for the individual contaminant within an individual averaging area, which is compared to the SGV. However, as contaminant concentrations vary across a site, and sampling and analysis will introduce measurement errors, the comparison between measured mean concentration and the SGV must take this uncertainty into account.

There are two principal options available to obtain site representative soil concentrations from a site investigation dataset; statistical and non-statistical methods. Data objectives, quality and quantity are likely to determine which approach is most appropriate. If statistical methods such as those presented in CIEH/CL:AIRE (2011) are to be used, sufficient data need to be available or obtained. No one single statistical approach is applicable to all sites and circumstances. The wider range of robust statistical techniques developed by organisations including the US Environmental Protection Agency (USEPA) are also important tools. Risk assessors should choose an appropriate statistical approach on the basis of the specific site and the decision that is being made. For further guidance on the appropriate use of statistical approaches, refer to USEPA 2006 or good environmental monitoring statistics textbooks.

When statistical approaches are inappropriate (this will depend on the objectives of the site investigation), individual or composite samples should be compared directly to the SGV. Guidance on use of alternative data handling approaches such as the use of composite sampling can be found in documents such as:

- *Verification of remediation of land contamination (Environment Agency, 2010);*
- *Sampling and testing of wastes to meet landfill Waste Acceptance Criteria (Environment Agency, 2005);*
- *Guidance on choosing a sampling design for environmental data collection (USEPA, 2002); and,*
- *Soil Quality – Sampling, ISO 10381 series (ISO, 2002–2007).*

The statistical tests should not be used as arbiters for decisions under Part 2A. They are an additional, useful line of evidence to assist in decision-making. The implications of the basis for the derivation of the site representative soil concentration must be taken into account in any decision-making process and clearly documented.

Where the statistical tests are conducted in accordance with the method described in CL:AIRE 2009:

- For the Planning situation, it has to be demonstrated that the concentration of contaminants is low compared to the pC4SL/S4UL or SSAC. All of the test data should be below the screening criteria and no statistical analysis is required or if there are exceedances of the criteria then a statistical assessment is required. For the statistical assessment this decision is based on whether there is at least a 95% confidence level that the true mean of the dataset is lower than the screening criteria.
- For the Part 2A scenario the regulator needs to determine whether the concentration of contaminants is greater than the SGV/GAC/pC4SL/S4UL or SSAC. This decision is based on whether there is at least a 95% confidence level that the true mean of the dataset is higher than the SSAC. However, the regulator may proceed with determination if there is just a 51% probability, “on the balance of probabilities.”

If the screening levels are exceeded then more sophisticated quantitative risk assessment can be undertaken or remedial action may be taken to break the contaminant linkages. The benefits of undertaking a quantitative risk assessment must be weighed against the likelihood that it will bring about cost savings in the proposed remediation. Further information about the use of soil guideline values is provided in Environment Agency : 2008: Using Soil Guideline Values SC050021/SGV Introduction, March 2008.

GENERIC RISK ASSESSMENT CRITERIA FOR RISK TO PLANTS

Soil contaminants, if present at sufficient concentrations, can have an adverse effect on the plant population. Phytotoxic effects can be manifested by a variety of responses, such as growth inhibition, interference with plant processes, contaminant-induced nutrient deficiencies and chlorosis (yellowing of leaves). All chemicals are probably capable of causing phytotoxic effects. Thus, the phytotoxic potential of substances is dependent on the concentrations capable of having adverse effects on plants and the concentrations likely to be found at contaminated sites. Phytotoxicity is a difficult parameter to quantify given that experimental techniques vary widely, and variations exist in plant tolerances, soil effects and synergistic/antagonistic reactions between chemicals. Contaminants may be taken up and accumulated by plants through a range of mechanisms. The principal pathways are active and/or passive uptake through the plant root, adsorption to root surfaces and volatilisation from the soil surface followed by foliar uptake. After plant uptake, contaminants may be metabolised or excreted, or they may be bioaccumulated and this is highly species dependant. Many of the substances capable of adversely affecting vegetation exert this effect because of their water solubility, a characteristic that could result in their transport from contaminated sites into adjacent locations where the chemical may generate a phytotoxic response. This could be important if, for example, the adjacent site has important conservation status.

The concentration in soil at which substances become phytotoxic depend on a range of factors including plant type, soil type, pH, the form and availability of the contaminant and other vegetation stress factors that may be present (such as drought). Some plants (including some rare plants) will only grow in soils where there are relatively high concentrations which would be phytotoxic to other species. Whilst many contaminants may be phytotoxic, data are limited. Some heavy metals are essential as trace elements for plant growth but may become toxic at higher concentrations.

ByrneLooby has carried out a review of a number of current and former guidance documents and other texts on phytotoxicity. It is not possible to produce a definitive list of phytotoxic substances on account of the variables mentioned above. However, a number of metals are repeatedly cited as commonly occurring priority pollutants. As a result, the following list is adopted by ByrneLooby as indicators of the potential for phytotoxicity: As, Cr, Cu, Ni and Zn (note that Boron has been excluded from this list because the more modern studies do not assess this).

As the CLEA framework is a risk-based approach, applied to humans, an alternative strategy is required to assess the risk to plants from substances that are phytotoxic. Reference to published criteria and background concentrations can help put site data into context. Published assessment criteria for the protection of plant life from a number of countries are given in the following Table. The most authoritative source is the British Standard for topsoil, but this only lists three elements. LCRM states that the ICRL Guidance Note 70/90 can be used for initial screening criteria. This approach has been adopted by ByrneLooby where BS3882 is lacking, but where an ICRL 70/90 criterion is lacking, the lowest criterion in Table below from, firstly UK, and, secondly, European and then other worldwide criteria. The adopted criteria are highlighted in the table 3.8. The MAFF value of 250 mg/kg has been chosen for As over the ICRL value of 50 mg/kg as MAFF explains the 50 is applicable to vegetables and human health, whereas 250 is applicable to the plants themselves.

Table B.5: Published Assessment Criteria for Phytotoxic Elements (mg/kg)

Reference	As	CR (Total)	Cr (III)	Cr (VI)	Cu	Ni	Zn
British Standard for topsoil (BS3882:2007)	-	-	-	-	200 (pH >7)	110 (pH >7)	300 (pH >7)
					135 (pH 6-7)	75 (pH 6-7)	200 (pH 6-7)
					100 (pH 5.5-6.0)	60 (pH 5.5-6.0)	200 (pH 5.5-6.0)
MAFF Code of Good Agricultural Practice for the Protection of Soil (1998)	250	-	400 for sites containing sewage and sludge	-	500 (grass) but may fall to 250 for clover and sensitive species (at pH>6)	110 (pH>7) 75 (pH 6-7) 60 (pH 5.5-6.0)	1000 (clover & grass at pH 6), may fall to 300 for sensitive species (at pH 6-7)
ICRCL 59/83 (1987) now withdrawn for human health assessment	-	-	-	-	130	70	300
ICRCL 70/90 (1990) threshold trigger value	50	-	-	25 *	250	-	1000
Dutch ecotoxicological intervention value (Swartjes 1993 & 1994)	40	230	-	7	190	-	-
Australian Guideline B(1) (1999), Interim Urban Ecological Investigation Level (EIL). Soils not generally considered phytotoxic below these EILs.	20	-	400	1	100	60	200
New Zealand guidelines for timber treatment sites (1977), estimated based on Cu bioavailability *	-	-	-	-	500 - 1000 clay soils	-	-
New Zealand guidelines for timber treatment sites (1977), soil criteria for protection of plant life (residential/ agricultural setting)	10-20	-	600	25	130	-	-

Note: * Cr (VI) is only likely to be present in as a significant proportion of total Cr where pH >12 so this does not routinely need to be tested for regarding plant health.

CURRENT GUIDANCE FOR CONTROLLED WATERS RISK ASSESSMENT

Summary of Regulatory Context

Government policy is based upon a “suitable for use approach,” which is relevant to both the current use of land and also to any proposed future use. When considering the current use of land, Part IIA of the Environment Protection Act 1990 ^[4] (EPA 1990) provides the regulatory regime, which was introduced by Section 57 of the Environment Act 1995 ^[5], which came into force in England on 1 April 2000. The main objective of introducing the Part IIA regime is to provide an improved system for the identification and remediation of land where contamination is causing unacceptable risks to human health, controlled waters or the wider environment given the current use and circumstances of the land. Part IIA provides a statutory definition of contaminated land under Section 78A(2) as:

“any land which appears to the Local Authority in whose area it is situated to be in such a condition, by reason of substances in, on, or under the land, that:

- a) *Significant harm is being caused or there is a significant possibility of such harm being caused; or,*
- b) *Pollution of controlled waters is being, or is likely to be, caused.”*

Part IIA provides a statutory definition of the pollution of controlled waters under Section 78A(9) as:

*“the entry into controlled waters of **any** poisonous, noxious or polluting matter or **any** solid waste matter”*

Part IIA is supported by a substantial quantity of guidance and other Regulations, especially for England, The Contaminated Land (England) (Amendment) Regulations 2012 and Contaminated Land Statutory Guidance (DEFRA, 2012) which came into force in early April 2012. The document re-confirms the duties of Enforcing Authorities in dealing with contamination including the role of the Environment Agency which has powers under Part 7 of The Water Resources Act (1991) to take action to prevent or remedy the pollution of controlled waters, including circumstances where the pollution arises from contamination in the land.

Part IIA introduces the concept of a contaminant linkage; where for potential harm to exist, there must be a connection between the source of the hazard and the receptor via a pathway. Risk assessment in contaminated land is therefore directed towards identifying the contaminants, pathways and receptors that can provide contaminant linkages. This is known as the contaminant-pathway-receptor link (CPR or contaminant linkage).

Part IIA places contaminated land responsibility as a part of the planning and redevelopment process rather than Local Authority or Environment Agency taking direct action except in situations of very high pollution risk or where harm is occurring. In the planning process guidance is provided by National Planning Policy Framework (NPPF) of March 2012. This requires that a site which has been developed shall not be capable of being determined “contaminated land” under Part IIA. Therefore, appropriate risk-based investigation is required to identify the contaminant

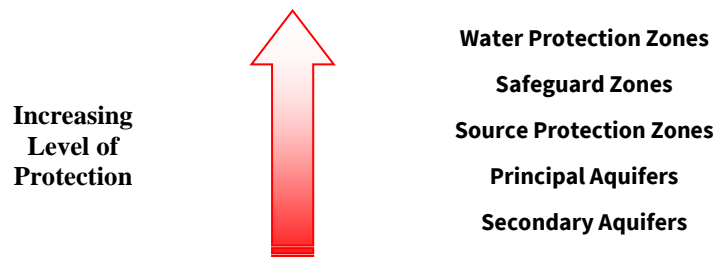
linkages that can then be assessed, and then mitigated using methods that can be readily agreed with the planners.

Environment Agency Guidance

Legislation and guidance surrounding the protection of controlled waters in the UK is numerous and can be complex. The Environment Agency’s overall position on groundwater is “*To protect and manage groundwater resources for present and future generation in ways that are appropriate for the risks that we identify*” (The Environment Agency’s Approach to Groundwater Protection, 2017). In brief, the core objectives of the existing legislation serve to enforce this position.

In 1992, the National Rivers Authority published their Policy and Practice for the Protection of Groundwater (PPPG), this document was influential as it provided a focus for key developments such as Source Protection Zones (SPZs) and Groundwater Vulnerability Maps. The Policy was then revised in 1998, since which there have been substantial changes in legislation, driven by Europe. Key European Directives relating to groundwater include the Groundwater Directive (80/68/EEC) and the Water Framework Directive (2000/60/EC). Aspects of these directives are controlled by primary UK legislation such as the Water Resources Act 1991 as amended by the Water Act 2003. Further to legislative changes, gaps identified in the 1998 PPPG required addressing. These changes are reflected in the Environment Agency Policy document *The Environment Agency’s Approach to Groundwater Protection*” of March 2017.

The Environment Agency follows a tiered, risk-based approach to drinking water protection, and this should be taken into account when carrying out controlled waters risk assessment:



Tools available for Risk Assessment of Controlled Waters

In order for a developer of a potentially contaminated site to fulfil their obligations under the legislation, a site assessment would be required to be undertaken in order to identify any potential risks to controlled waters and to derive suitable clean-up criteria if necessary to ensure the protection of controlled waters. A number of tools are available for this purpose.

Three main stages apply to any risk assessment of controlled waters, these are:

- i. Risk Screening (devise Conceptual Site Model, making reference to groundwater vulnerability maps, site setting etc)
- ii. Generic Risk Assessment (using the EA Remedial Targets Methodology – Tier 1 - Comparison of groundwater data with relevant standards)
- iii. Detailed Quantitative Risk Assessment (Consideration of aquifer properties and site-specific parameters, using the EA Remedial Targets Methodology - Tiers 2 & 3)

The process is summarised below (Taken from the Environment Agency GP3 consultation document, 2006):

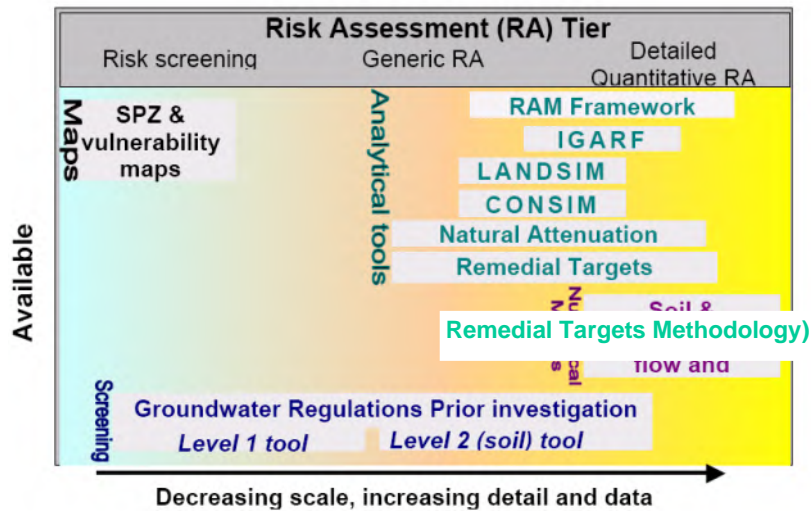


Figure 1-1 Environment Agency groundwater assessment tools, mapped against the different levels of risk assessment.

When assessing groundwater impact the Environment Agency advocate the application of their framework methodology “Remedial Targets Methodology – Hydrogeological Risk Assessment for Land Contamination” Environment Agency (2006). The methodology has four tiers of assessment:

Tier 1 utilises either a soil concentration (calculation of pore water concentrations based on partitioning calculations), leaching test or pore-water concentration of perched water as a source concentration input and these are contrasted directly to water quality standards. No dilution or attenuation is considered at Level 1.

Tier 2 (groundwater) considers dilution of the contaminant within the underlying receiving groundwater or surface water body. To determine a dilution, factor the infiltration rate of pore water and the discharge of groundwater beneath the source must be determined. Level 2 Assessment comprises a comparison between measured groundwater concentrations with to water quality standards.

Tier 3 considers natural attenuation in the form of dispersion, retardation and degradation of the contaminant. As the levels are progressed, the assessment becomes increasingly more detailed and less conservative as the data requirements are increased with each successive tier. The Environment Agency has released Excel Worksheets to carry out basic calculations using a conservative approach up to Tier 3. However, in this case the conceptual model is a simple one and assumes there is a simple migration of contaminants from the source zone into the aquifer receptor. Using these worksheets requires a sensitivity analysis showing how by varying each parameter, what effect it might have on the outcome of the assessment. Groundwater conceptual models are not always this simple.

Tier 4 is for more complex conceptual models where multiple sources, multiple pathways, multiple receptors and complex water balances can be assessed.

The Environment Agency developed a spreadsheet-based code to support the Remedial Target Methodology, and the code is capable of undertaking assessments for Tiers 1 to 3. Tier 4 assessment is not supported by the spreadsheet-based code.

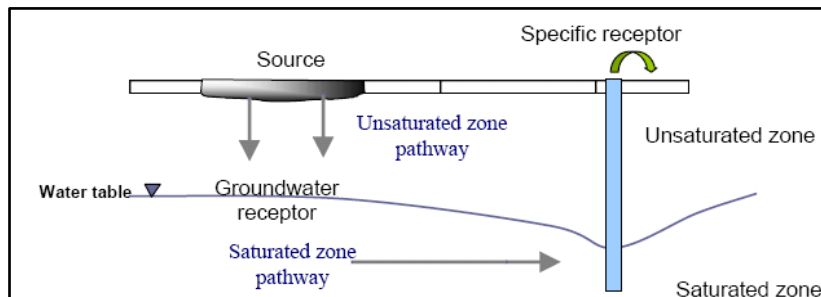
A more advanced code, ConSim 2, developed on behalf of the Environment Agency to support the Remedial Targets Methodology, allows for the introduction of additional geological horizons and is used mainly to determine the concentrations reaching a receptor and the timescales over which this may happen.

The codes assess only the dissolved phase contaminants. There are many further codes commercially available for use in controlled waters risk assessment, particularly for more complex situations, however, these should be used with caution and only once agreement has been obtained from the Environment Agency. All have the overall aim of the estimation of risk from contaminant linkages and the protection of controlled waters.

General notes on each stage of the controlled waters risk assessment process

Risk Screening

The understanding of the Conceptual Site Model (CSM) is the key to assessing any site. Using a robust CSM, potential pathways or receptors may be screened out from any further assessment at an early stage. For example, if the pathway through the unsaturated zone is blocked by the presence of a significant thickness of low permeability clay. A greater understanding of the CSM is achieved with each tier of risk assessment. An example of a basic Source-Pathway-Receptor concept is given below (taken from the Environment Agency GP3, 2006):



Generic Risk Assessment

When undertaking the Generic Hydrogeological Risk Assessment (EA Remedial Targets Methodology Tier 1), comparison of chemical analytical results is made with screening criteria. Published values of screening criteria with which chemical test results can be compared are published in the following guidance:

There is a hierarchy of screening criteria which is as follows:

- Updated Recommendations on Environmental Technical Standards, River Basin Management (2015-21), April 2012 by the UK Technical Advisory Group on the Water Framework Directive;
- Environmental Quality Standards (EQS) for freshwaters based on The EC Dangerous Substances Directive (76/464/EEC and Daughter Directives);

- Surface Waters (Abstraction for Drinking Water)(Classification) Regulations (1996)
- Surface Waters (Fishlife) (Classification) Regulations (1997)
- UK Drinking Water Standards (DWS) (Water Supply (Water Quality) Regulations 2000);
- Dutch Ministry of Housing, Spatial Planning and Environment (2001) Intervention Values and Target Values – soil quality standards;
- World Health Organisation Guidelines for Drinking Water (2004)

Should the Level 1 or 2 assessments indicate threshold levels to be exceeded, then there are three alternative ways in which to proceed:

- To devise suitable remedial solutions;
- To carry out more investigation, sampling and analysis;
- To conduct a site-specific Detailed Quantitative Risk Assessment (DQRA) to whether or not the soil materials are suitable for their site-specific intended use or to devise a site-specific clean-up level.

Detailed Quantitative Risk Assessment (DQRA)

The decision to carry out a DQRA will be dependent on the extent and implications of the initial qualitative and generic assessment. The scope of any such assessment will be accurately defined by the outcomes of the former two stages. The CSM will be sufficiently refined by this stage that only certain contaminants of concern, certain pathways and certain receptors will require further assessment, the remainder having been screened out.

Additional site-specific data is normally required for this stage of assessment, as explained above, more processes that are capable of affecting contaminant concentrations are considered (such as dilution and attenuation).

Remediation criteria derived will therefore be specific to each site and will be based on a detailed assessment of the potential impact at the identified receptor or *compliance point*. A greater level of confidence can be placed on the predicted impact on the compliance point following a DQRA.

Definition of Controlled Waters

The term ‘controlled waters’ is defined in Section 104 of the Water Resources Act 1991 as:

“Territorial Waters...which extend seawards for three miles..., coastal waters..., inland freshwaters, waters in any relevant lake or pond or of so much of any relevant river or watercourse as is above the freshwater limit, and ground waters, that is to say, any waters contained in underground strata.”

Note that the definition of groundwater under the Water Resources Act 1991 includes all water within underground strata (including soil / pore water in the unsaturated zone). The definition of groundwater under the Groundwater Directive however is limited to water in the saturated zone. For the purposes of Part IIA of the Environmental Protection Act 1990, the Environment Agency

recommends that the groundwater within the saturated zone only is considered as the receptor (rather than soil / pore water).

Environment Agency's Aquifer Designations

The Environment Agency have classified different types of aquifers from which groundwater can be extracted. The aquifer designations reflect the importance of aquifers in terms of groundwater as a resource (drinking water supply) but also their role in supporting surface water flows and wetland ecosystems. The aquifer designation data is based on geological mapping provided by the British Geological Survey.

The maps are split into two different types of aquifer designation:

- **Superficial (Drift)** – permeable unconsolidated (loose) deposits.
- **Bedrock (Solid)** – solid permeable formations e.g., sandstone, chalk, limestone.

The aquifer designations displayed on the Environment Agency maps are as follows:

- **Principal Aquifers (formerly termed Major Aquifers)** – These are 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. In most cases, principal aquifers are aquifers previously designated as a major aquifer.
- **Secondary Aquifers (formerly termed Minor Aquifers)** – These include a wide range of rock layers or drift deposits with an equally wide range of water permeability and storage. Secondary aquifers are subdivided into two types:
 - **Secondary A** - 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. These are generally aquifers formerly classified as minor aquifers;
 - **Secondary B** - predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers.
 - **Secondary Undifferentiated** - has been assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.
- **Unproductive Strata (formerly termed Non-Aquifer)** – These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.

Hazardous and Non-Hazardous Substances

The Groundwater (England and Wales) Regulations 2009 control the disposal to the hydrogeological environment of potentially polluting substances which are divided into Hazardous Substances and Non-hazardous Contaminants (this roughly approximates to the former List 1 and List 2 substances).

Hazardous Substances are the most damaging and toxic and must be prevented from directly or indirectly entering the groundwater environment. Hazardous Substances include mineral oils and hydrocarbons, pesticides, biocides, herbicides, solvents and some metals. Discharge of Hazardous Substances to Controlled Waters must be prevented.

Non-hazardous Pollutants are any contaminants other than Hazardous Substances. Non-hazardous Pollutants are potentially toxic but are less harmful than Hazardous Substances, but their direct discharge to groundwater is generally not permitted and any indirect discharge to groundwater must be limited and be controlled by technical precautions in order to prevent pollution. Non-hazardous Pollutants include ammonia and nitrites, many metals and fluorides.

MANAGEMENT OF CONTAMINATED LAND

When risk assessment of the site has been completed and this indicates that remedial works are required, the main guidance in managing this process is set out in the DEFRA/EA online guidance LCRM (2020) “Land Contamination: Risk Management” The stages of managing remediation are as follows:

- (a) Options Appraisal and develop Remediation Strategy;
- (b) Develop Implementation Plan and Verification Plan;
- (c) Remediation, Verification and Monitoring.

The Remediation Strategy sets out the remediation targets, identifies technically feasible remedial solutions and presents an evaluation of the options so that these can be assessed enabling that the most suitable solution is adopted. An outline of the proposed remedial method should be presented. Agreement should be sought of the appropriate statutory bodies for the Remediation Strategy before proceeding to the next stage.

The Implementation Plan is a detailed method statement setting out how the remediation is to be carried out including stating how the site will be managed, welfare procedures, health and safety considerations together with practical measures such as details of temporary works, programme of works, waste management licences and regulatory consents required. Agreement should again be sought of the appropriate statutory bodies for this Plan.

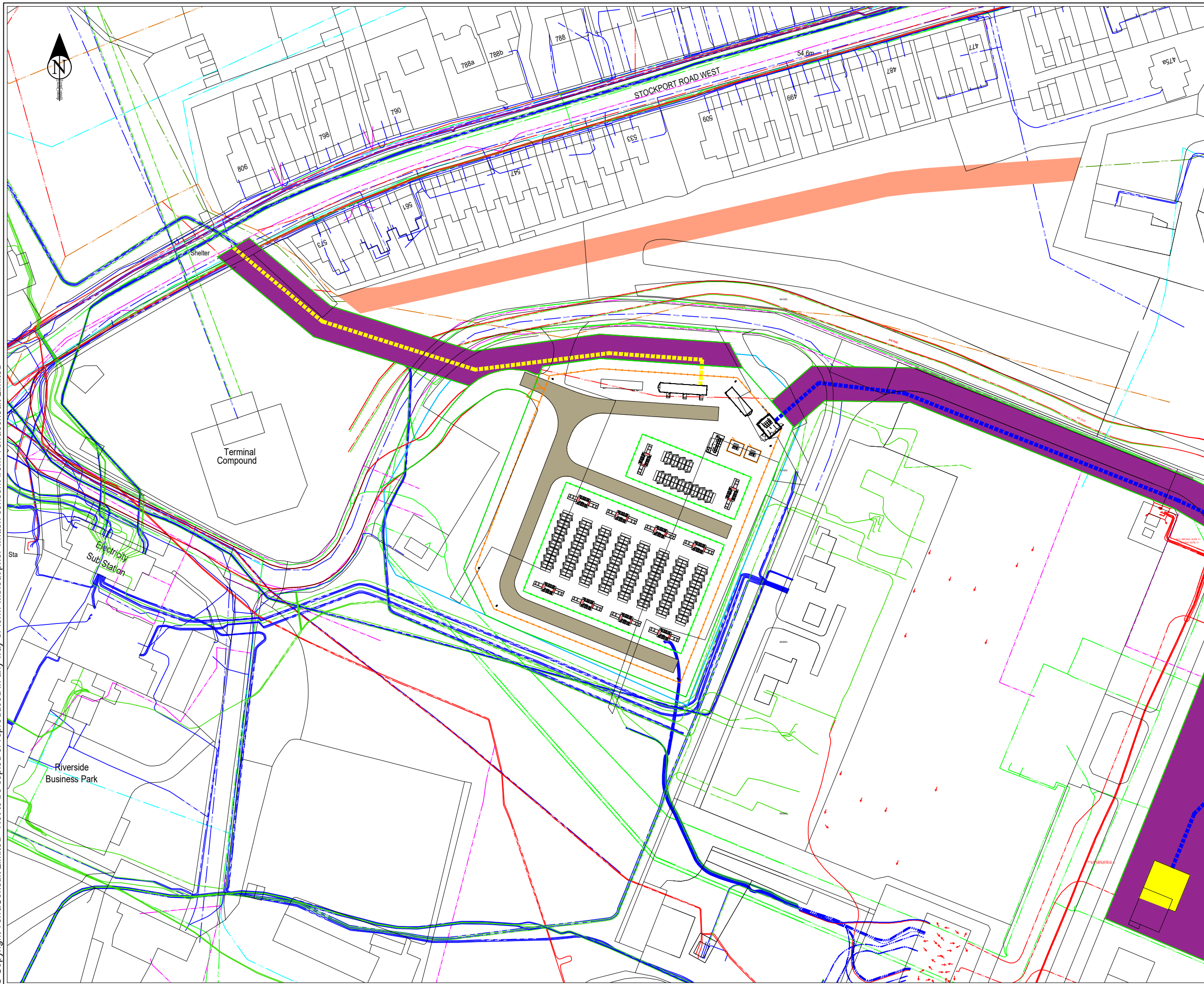
The Verification Plan sets out the requirements for gathering data to demonstrate that the remediation has met the required remediation objectives and criteria. The Verification Plan presents the requirements for a wide range of issues including the level of supervision, sampling and testing regimes for treated materials, waste and imported materials, required monitoring works during and post remediation, how compliance with all licenses and consents will be checked etc. Agreement should again be sought of the appropriate statutory bodies for the Verification Plan. On completion of the remediation a Verification Report should be produced to provide a complete record of all remediation activities on-site and the data collected as required in the Verification Plan. The Verification Report should demonstrate that the remediation has met the remedial targets to show that the site is suitable for the proposed use.

GLOSSARY

TERMS		UNITS	
AST	Above Ground Storage Tank	m	Metres
BGS	British Geological Survey	km	Kilometres
BSI	British Standards Institute	%	Percent
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes	%v/v	Percent volume in air
CIEH	Chartered Institute of Environmental Health	mb	Milli Bars (atmospheric pressure)
CIRIA	Construction Industry Research Association	l/hr	Litres per hour
CLEA	Contaminated Land Exposure Assessment	ha	Hectare (10,000m ²)
CSM	Conceptual Site Model	µg/l	Micrograms per Litre (parts per billion)
DNAPL	Dense Non-Aqueous Phase Liquid (chlorinated solvents, PCB)	ppb	Parts Per Billion
DWS	Drinking Water Standard	mg/kg	Milligrams per kilogram (parts per million)
EA	Environment Agency	ppm	Parts Per Million
EQS	Environmental Quality Standard	mg/m ³	Milligram per metre cubed
GAC	General Assessment Criteria	Mg/m ³	Megagram per metre cubed
GL	Ground Level	µg/m ³	Microgram per metre cubed
GSV	Gas Screening Value	m bgl	Metres Below Ground Level
HCV	Health Criteria Value	m bcl	Metre Below Cover Level
LNAPL	Light Non-Aqueous Phase Liquid (petrol, diesel)	mOD	Metres Above Ordnance Datum (sea level)
ND	Not Detected	kN/m ²	Kilo Newtons per metre squared
LMRL	Lower Method Reporting Limit	kPa	Kilo Pascal – same as kN/m ²
NR	Not Recorded	µm	Micro metre
OD	Ordnance Datum		
PAH	Poly Aromatic Hydrocarbon		
PCB	Poly-Chlorinated Biphenyl		
PID	Photo Ionisation Detector		
PCSM	Preliminary Conceptual Site Model		
SGV	Soil Guideline Value		
TPH (CWG)	Total Petroleum Hydrocarbon (Criteria Working Group)		
SPT	Standard Penetration Test		
SVOC	Semi Volatile Organic Compound		
UST	Underground Storage Tank		
VCCs	Vibro Concrete Columns	VSCs	Vibro Stone Columns
VOC	Volatile Organic Compound		

Appendix C – Current and Proposed Development Plans

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Key		
Client		
Site Site Title Text		
Title Title Text Size		
Scale	1:1,000	@ A3
Drawing No.	0000/1/000	
Rev	Date	Description
File	TSC25-Bredbury-GA-SK05-A [21.11.23-EXT]	
Date	0/15	Engineer GH
Drawn	PP GH	Checked DRAFT

Appendix D – Groundsure® Insights Report & Historical Ordnance
Survey Plans

ELECTRICITY SUB STATION 73M FROM 573 STOCKPORT ROAD WEST 18M FROM UNNAMED ROAD, STOCKPORT ROAD WEST, BREDBURY, STOCKPORT, SK6 2BS

Order Details

Date: 17/03/2022
Your ref: Bredbury_Substation_Battery_K0150
Our Ref: GS-8604195
Client: Rebecca Richardson

Site Details

Location: 391283 390987
Area: 0.91 ha
Authority: [Stockport Metropolitan Borough Council](#)



Summary of findings

p. 2

Aerial image

p. 8

OS MasterMap site plan

p.12

groundsure.com/insightuserguide

Contact us with any questions at:

info@groundsure.com

08444 159 000

Summary of findings

Page	Section	Past land use	On site	0-50m	50-250m	250-500m	500-2000m
13	1.1	<u>Historical industrial land uses</u>	0	4	27	69	-
17	1.2	<u>Historical tanks</u>	0	0	4	7	-
18	1.3	<u>Historical energy features</u>	0	0	7	2	-
19	1.4	Historical petrol stations	0	0	0	0	-
19	1.5	Historical garages	0	0	0	0	-
19	1.6	Historical military land	0	0	0	0	-
Page	Section	Past land use - un-grouped	On site	0-50m	50-250m	250-500m	500-2000m
20	2.1	<u>Historical industrial land uses</u>	0	4	38	81	-
25	2.2	<u>Historical tanks</u>	0	0	7	8	-
26	2.3	<u>Historical energy features</u>	0	0	10	3	-
27	2.4	Historical petrol stations	0	0	0	0	-
27	2.5	Historical garages	0	0	0	0	-
Page	Section	Waste and landfill	On site	0-50m	50-250m	250-500m	500-2000m
28	3.1	Active or recent landfill	0	0	0	0	-
28	3.2	Historical landfill (BGS records)	0	0	0	0	-
29	3.3	Historical landfill (LA/mapping records)	0	0	0	0	-
29	3.4	<u>Historical landfill (EA/NRW records)</u>	0	0	1	1	-
29	3.5	Historical waste sites	0	0	0	0	-
30	3.6	Licensed waste sites	0	0	0	0	-
30	3.7	<u>Waste exemptions</u>	0	0	0	4	-
Page	Section	Current industrial land use	On site	0-50m	50-250m	250-500m	500-2000m
31	4.1	<u>Recent industrial land uses</u>	0	0	24	-	-
33	4.2	Current or recent petrol stations	0	0	0	0	-
33	4.3	<u>Electricity cables</u>	0	4	1	0	-
34	4.4	Gas pipelines	0	0	0	0	-
34	4.5	Sites determined as Contaminated Land	0	0	0	0	-



34	4.6	Control of Major Accident Hazards (COMAH)	0	0	0	0	-
35	4.7	Regulated explosive sites	0	0	0	0	-
35	4.8	Hazardous substance storage/usage	0	0	0	0	-
35	4.9	Historical licensed industrial activities (IPC)	0	0	0	0	-
35	4.10	<u>Licensed industrial activities (Part A(1))</u>	0	0	0	1	-
36	4.11	Licensed pollutant release (Part A(2)/B)	0	0	0	0	-
36	4.12	Radioactive Substance Authorisations	0	0	0	0	-
36	4.13	<u>Licensed Discharges to controlled waters</u>	0	0	4	9	-
38	4.14	Pollutant release to surface waters (Red List)	0	0	0	0	-
38	4.15	Pollutant release to public sewer	0	0	0	0	-
38	4.16	List 1 Dangerous Substances	0	0	0	0	-
39	4.17	List 2 Dangerous Substances	0	0	0	0	-
39	4.18	<u>Pollution Incidents (EA/NRW)</u>	0	0	0	2	-
39	4.19	Pollution inventory substances	0	0	0	0	-
40	4.20	Pollution inventory waste transfers	0	0	0	0	-
40	4.21	Pollution inventory radioactive waste	0	0	0	0	-

Page	Section	Hydrogeology	On site	0-50m	50-250m	250-500m	500-2000m
41	5.1	<u>Superficial aquifer</u>	Identified (within 500m)				
43	5.2	<u>Bedrock aquifer</u>	Identified (within 500m)				
44	5.3	<u>Groundwater vulnerability</u>	Identified (within 50m)				
45	5.4	Groundwater vulnerability- soluble rock risk	None (within 0m)				
45	5.5	Groundwater vulnerability- local information	None (within 0m)				
46	5.6	<u>Groundwater abstractions</u>	0	0	0	0	15
50	5.7	<u>Surface water abstractions</u>	0	0	0	1	4
52	5.8	<u>Potable abstractions</u>	0	0	0	0	1
52	5.9	<u>Source Protection Zones</u>	0	0	1	0	-
52	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-

Page	Section	Hydrology	On site	0-50m	50-250m	250-500m	500-2000m
53	6.1	<u>Water Network (OS MasterMap)</u>	0	0	4	-	-



54	6.2	<u>Surface water features</u>	0	0	2	-	-
54	6.3	<u>WFD Surface water body catchments</u>	1	-	-	-	-
55	6.4	<u>WFD Surface water bodies</u>	0	0	1	-	-
55	6.5	<u>WFD Groundwater bodies</u>	1	-	-	-	-
Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
56	7.1	Risk of flooding from rivers and the sea	None (within 50m)				
56	7.2	Historical Flood Events	0	0	0	-	-
56	7.3	Flood Defences	0	0	0	-	-
57	7.4	Areas Benefiting from Flood Defences	0	0	0	-	-
57	7.5	Flood Storage Areas	0	0	0	-	-
58	7.6	Flood Zone 2	None (within 50m)				
58	7.7	Flood Zone 3	None (within 50m)				
Page	Section	Surface water flooding					
59	8.1	<u>Surface water flooding</u>	1 in 30 year, 0.1m - 0.3m (within 50m)				
Page	Section	Groundwater flooding					
61	9.1	<u>Groundwater flooding</u>	Moderate (within 50m)				
Page	Section	Environmental designations	On site	0-50m	50-250m	250-500m	500-2000m
62	10.1	Sites of Special Scientific Interest (SSSI)	0	0	0	0	0
63	10.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
63	10.3	Special Areas of Conservation (SAC)	0	0	0	0	0
63	10.4	Special Protection Areas (SPA)	0	0	0	0	0
63	10.5	National Nature Reserves (NNR)	0	0	0	0	0
64	10.6	<u>Local Nature Reserves (LNR)</u>	0	0	1	0	3
64	10.7	<u>Designated Ancient Woodland</u>	0	0	0	1	2
64	10.8	Biosphere Reserves	0	0	0	0	0
65	10.9	Forest Parks	0	0	0	0	0
65	10.10	Marine Conservation Zones	0	0	0	0	0
65	10.11	<u>Green Belt</u>	1	0	0	0	0
65	10.12	Proposed Ramsar sites	0	0	0	0	0

66	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
66	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
66	10.15	Nitrate Sensitive Areas	0	0	0	0	0
66	10.16	Nitrate Vulnerable Zones	0	0	0	0	0
67	10.17	SSSI Impact Risk Zones	0	-	-	-	-
67	10.18	SSSI Units	0	0	0	0	0
Page	Section	Visual and cultural designations	On site	0-50m	50-250m	250-500m	500-2000m
68	11.1	World Heritage Sites	0	0	0	-	-
69	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
69	11.3	National Parks	0	0	0	-	-
69	11.4	Listed Buildings	0	0	1	-	-
70	11.5	Conservation Areas	0	0	0	-	-
70	11.6	Scheduled Ancient Monuments	0	0	0	-	-
70	11.7	Registered Parks and Gardens	0	0	1	-	-
Page	Section	Agricultural designations	On site	0-50m	50-250m	250-500m	500-2000m
71	12.1	Agricultural Land Classification	Urban (within 250m)				
72	12.2	Open Access Land	0	0	0	-	-
72	12.3	Tree Felling Licences	0	0	0	-	-
72	12.4	Environmental Stewardship Schemes	0	0	0	-	-
72	12.5	Countryside Stewardship Schemes	0	0	0	-	-
Page	Section	Habitat designations	On site	0-50m	50-250m	250-500m	500-2000m
73	13.1	Priority Habitat Inventory	0	0	8	-	-
74	13.2	Habitat Networks	0	0	0	-	-
74	13.3	Open Mosaic Habitat	0	0	0	-	-
74	13.4	Limestone Pavement Orders	0	0	0	-	-
Page	Section	Geology 1:10,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
75	14.1	10k Availability	Identified (within 500m)				
76	14.2	Artificial and made ground (10k)	0	0	0	2	-
77	14.3	Superficial geology (10k)	1	1	2	8	-

78	14.4	<u>Landslip (10k)</u>	0	0	0	1	-
79	14.5	<u>Bedrock geology (10k)</u>	1	0	0	1	-
80	14.6	<u>Bedrock faults and other linear features (10k)</u>	0	0	0	3	-
Page	Section	Geology 1:50,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
81	15.1	<u>50k Availability</u>	Identified (within 500m)				
82	15.2	Artificial and made ground (50k)	0	0	0	0	-
82	15.3	Artificial ground permeability (50k)	0	0	-	-	-
83	15.4	<u>Superficial geology (50k)</u>	1	1	1	7	-
84	15.5	<u>Superficial permeability (50k)</u>	Identified (within 50m)				
84	15.6	Landslip (50k)	0	0	0	0	-
84	15.7	Landslip permeability (50k)	None (within 50m)				
85	15.8	<u>Bedrock geology (50k)</u>	1	0	0	1	-
86	15.9	<u>Bedrock permeability (50k)</u>	Identified (within 50m)				
86	15.10	<u>Bedrock faults and other linear features (50k)</u>	0	0	0	3	-
Page	Section	Boreholes	On site	0-50m	50-250m	250-500m	500-2000m
87	16.1	<u>BGS Boreholes</u>	0	0	1	-	-
Page	Section	Natural ground subsidence					
88	17.1	<u>Shrink swell clays</u>	Negligible (within 50m)				
89	17.2	<u>Running sands</u>	Very low (within 50m)				
90	17.3	<u>Compressible deposits</u>	Negligible (within 50m)				
91	17.4	<u>Collapsible deposits</u>	Very low (within 50m)				
92	17.5	<u>Landslides</u>	Very low (within 50m)				
93	17.6	<u>Ground dissolution of soluble rocks</u>	Negligible (within 50m)				
Page	Section	Mining, ground workings and natural cavities	On site	0-50m	50-250m	250-500m	500-2000m
94	18.1	Natural cavities	0	0	0	0	-
95	18.2	<u>BritPits</u>	0	0	0	1	-
95	18.3	<u>Surface ground workings</u>	0	0	14	-	-
96	18.4	<u>Underground workings</u>	0	0	0	0	12
97	18.5	Historical Mineral Planning Areas	0	0	0	0	-



97	18.6	<u>Non-coal mining</u>	0	0	0	0	1
97	18.7	Mining cavities	0	0	0	0	0
97	18.8	<u>JPB mining areas</u>	Identified (within 0m)				
98	18.9	<u>Coal mining</u>	Identified (within 0m)				
98	18.10	Brine areas	None (within 0m)				
98	18.11	Gypsum areas	None (within 0m)				
99	18.12	Tin mining	None (within 0m)				
99	18.13	Clay mining	None (within 0m)				
Page	Section	Radon					
100	19.1	<u>Radon</u>	Between 1% and 3% (within 0m)				
Page	Section	Soil chemistry	On site	0-50m	50-250m	250-500m	500-2000m
101	20.1	<u>BGS Estimated Background Soil Chemistry</u>	2	1	-	-	-
101	20.2	BGS Estimated Urban Soil Chemistry	0	0	-	-	-
101	20.3	BGS Measured Urban Soil Chemistry	0	0	-	-	-
Page	Section	Railway infrastructure and projects	On site	0-50m	50-250m	250-500m	500-2000m
102	21.1	Underground railways (London)	0	0	0	-	-
102	21.2	Underground railways (Non-London)	0	0	0	-	-
102	21.3	Railway tunnels	0	0	0	-	-
102	21.4	Historical railway and tunnel features	0	0	0	-	-
102	21.5	Royal Mail tunnels	0	0	0	-	-
103	21.6	Historical railways	0	0	0	-	-
103	21.7	Railways	0	0	0	-	-
103	21.8	Crossrail 1	0	0	0	0	-
103	21.9	Crossrail 2	0	0	0	0	-
103	21.10	HS2	0	0	0	0	-

Recent aerial photograph



Capture Date: 22/04/2019

Site Area: 0.91ha



Recent site history - 2018 aerial photograph



Capture Date: 27/06/2018

Site Area: 0.91ha



Recent site history - 2009 aerial photograph



Capture Date: 02/06/2009

Site Area: 0.91ha



Recent site history - 2000 aerial photograph

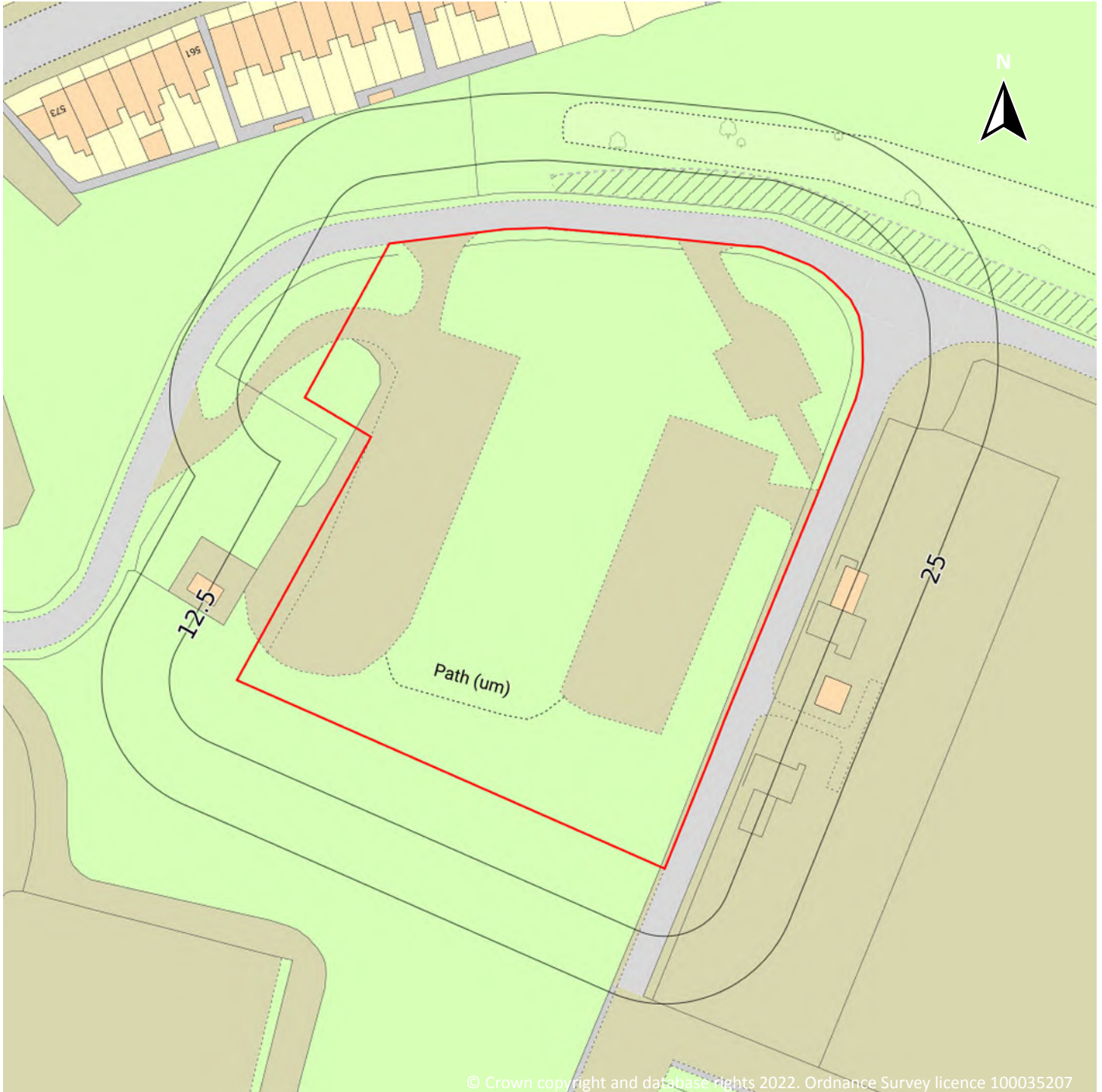


Capture Date: 19/06/2000

Site Area: 0.91ha



OS MasterMap site plan

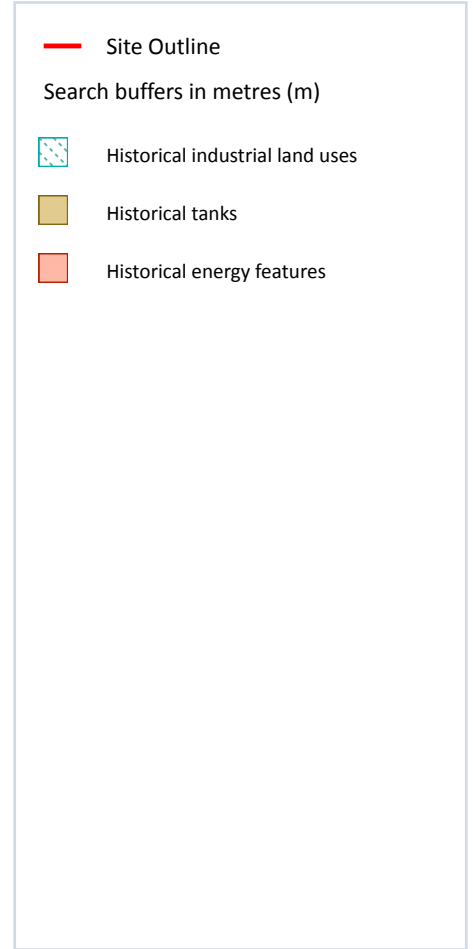
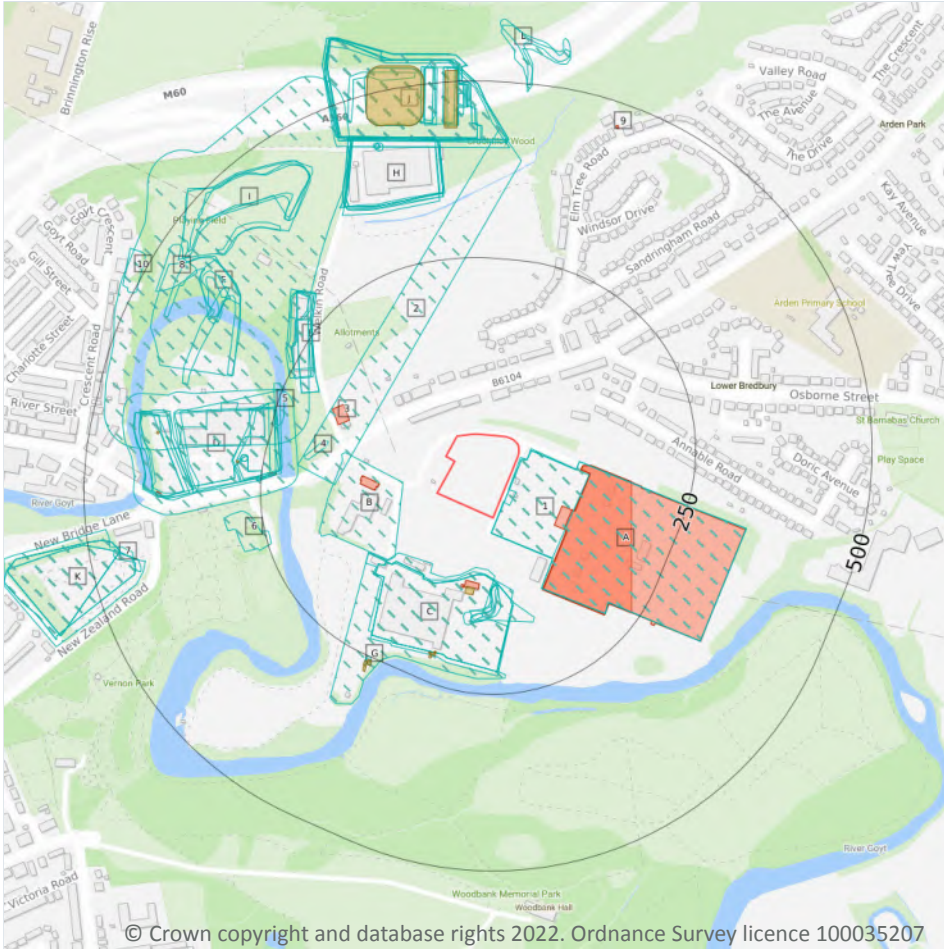


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Site Area: 0.91ha



1 Past land use



1.1 Historical industrial land uses

Records within 500m **100**

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 1:10,560 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 13**

ID	Location	Land use	Dates present	Group ID
1	4m E	Electric Substation	1992	963692

ID	Location	Land use	Dates present	Group ID
A	6m E	Electric Substation	1968	871213
A	6m E	Electric Substation	1978	955204
B	50m W	Unspecified Works	1968	830572
C	74m S	Unspecified Mill	1992	919875
C	80m S	Unspecified Mill	1917 - 1938	964950
C	82m S	Unspecified Works	1968	830571
C	82m S	Unspecified Mill	1954	956251
C	82m S	Unspecified Mill	1978	982537
C	92m S	Unspecified Pit	1954	840666
C	93m S	Refuse Heap	1917 - 1934	956628
C	95m S	Refuse Heap	1934	857073
C	96m S	Refuse Heap	1938	961590
2	116m NW	Rifle Range	1897	835006
4	168m W	Unspecified Ground Workings	1917	800923
D	199m W	Unspecified Mills	1954	963741
E	202m NW	Unspecified Works	1968	873674
E	202m NW	Unspecified Works	1978	915994
F	203m W	Mineral Water Works	1934	953444
E	219m NW	Mineral Water Works	1938 - 1954	889886
D	222m W	Unspecified Works	1978	951521
D	223m W	Unspecified Mills	1934 - 1938	941481
E	223m NW	Mineral Water Works	1934	974826
D	224m W	Unspecified Works	1968	851025
E	225m NW	Unspecified Works	1992	990934
D	226m W	Unspecified Mills	1917 - 1934	936490
D	230m W	Unspecified Mill	1911	910446
5	236m W	Refuse Heap	1934	829251
D	238m W	Unspecified Mill	1897	948578



ID	Location	Land use	Dates present	Group ID
6	244m W	Sand Pit	1851	797593
D	250m W	Unspecified Works	1968	900033
G	250m SW	Unspecified Tank	1954	912782
G	254m SW	Unspecified Tank	1934 - 1938	849015
E	255m NW	Unspecified Heap	1954	804115
D	256m W	Unspecified Depot	1992	818446
D	273m W	Chimney	1968	918296
D	273m W	Chimney	1978	935914
E	276m NW	Refuse Heap	1934	829250
D	281m W	Unspecified Tank	1917 - 1923	933789
F	322m W	Unspecified Ground Workings and Heap	1934	806973
F	324m W	Unspecified Heap	1934	902269
H	331m N	Unspecified Mill	1923	910924
H	337m N	Unspecified Mill	1938 - 1954	946822
H	338m N	Unspecified Mill	1934	971901
D	340m W	Unspecified Mills	1934 - 1938	936489
H	341m N	Unspecified Mill	1911 - 1917	961886
H	341m N	Spinning Mill	1938	797090
H	342m N	Unspecified Works	1992	862047
H	342m N	Unspecified Works	1978	863847
H	342m N	Unspecified Works	1968	885410
H	344m N	Unspecified Mill	1934	898499
D	345m W	Unspecified Commercial/Industrial	1978	796879
D	350m W	Unspecified Mill	1938	938151
D	358m W	Unspecified Mill	1897	953014
D	359m W	Unspecified Mill	1917 - 1923	867805
F	359m NW	Unspecified Ground Workings	1954	800924
F	375m NW	Refuse Heap	1938	945047



ID	Location	Land use	Dates present	Group ID
I	376m NW	Unspecified Heap	1934	857090
F	378m NW	Refuse Heap	1917 - 1923	919053
I	383m NW	Unspecified Ground Workings	1934	800925
I	386m NW	Unspecified Ground Workings and Heap	1934	806972
I	388m NW	Refuse Heaps	1938	808292
I	391m NW	Refuse Heap	1954	829235
J	406m N	Sewage Works	1923	992007
J	413m N	Sewage Works	1938 - 1954	848732
J	414m N	Sewage Works	1934	861723
J	417m N	Sewage Works	1938	876434
J	417m N	Unspecified Works	1978	872768
J	417m N	Unspecified Works	1968	894664
J	418m N	Sewage Works	1911	971037
H	418m N	Chimney	1968	835776
J	420m N	Sewage Works	1917	907014
J	420m N	Sewage Works	1934	945473
H	422m N	Unspecified Tank	1938	858711
H	423m N	Unspecified Tank	1911	899142
K	424m W	Corporation Sanitary Deposit	1897	832062
7	432m W	Unspecified Ground Workings	1954	800926
8	434m NW	Unspecified Heap	1911	944085
J	438m N	Filter Beds	1938	956868
J	439m N	Filter Beds	1911	984731
K	439m W	Unspecified Heap	1917	862352
K	439m W	Unspecified Heap	1934	959106
J	441m N	Filter Beds	1938	938194
J	442m N	Filter Beds	1934	926708
J	442m N	Filter Beds	1917	985866



ID	Location	Land use	Dates present	Group ID
J	444m N	Filter Beds	1917	910127
J	444m N	Filter Beds	1934	935581
J	445m N	Unspecified Tanks	1978	947195
J	445m N	Unspecified Tanks	1954 - 1968	975124
J	447m N	Unspecified Tanks	1954	932407
J	453m N	Filter Beds	1923	980447
K	456m W	Unspecified Heap	1992	878862
K	456m W	Unspecified Heap	1968	902457
K	456m W	Unspecified Heap	1978	962008
J	466m N	Filter Beds	1934	900997
J	466m N	Filter Beds	1917	989676
J	470m N	Unspecified Ground Workings	1923	861936
L	489m N	Unspecified Ground Workings	1923	978737
10	496m NW	Refuse Heap	1934 - 1938	983004
L	499m N	Unspecified Ground Workings	1938	844782

This data is sourced from Ordnance Survey / Groundsure.

1.2 Historical tanks

Records within 500m

11

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original ungrouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 13**

ID	Location	Land use	Dates present	Group ID
C	103m S	Tanks	1975 - 1988	146772
C	206m SW	Unspecified Tank	1958 - 1959	134559
C	209m SW	Unspecified Tank	1975	116778



ID	Location	Land use	Dates present	Group ID
C	214m SW	Unspecified Tank	1922 - 1934	132837
G	254m SW	Unspecified Tank	1938	116779
G	257m SW	Unspecified Tank	1934	116776
G	264m SW	Unspecified Tank	1922	116775
D	285m W	Unspecified Tank	1893	116785
D	403m W	Unspecified Tank	1893	116786
J	434m N	Settling Tanks	1934	108688
J	444m N	Tanks	1959 - 1960	137588

This data is sourced from Ordnance Survey / Groundsure.

1.3 Historical energy features

Records within 500m

9

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original ungrouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 13**

ID	Location	Land use	Dates present	Group ID
B	83m W	Electricity Substation	1975 - 1988	82126
A	84m E	Electricity Substation	1988	71606
A	91m E	Electricity Substation	1975	68042
C	95m S	Electricity Substation	1975	62365
C	104m SW	Electricity Substation	1988	62364
3	146m W	Electricity Substation	1988 - 1991	85036
D	229m W	Electricity Substation	1975	62368
D	391m W	Electricity Substation	1975	62367
9	464m N	Electricity Substation	1988 - 1991	64192

This data is sourced from Ordnance Survey / Groundsure.



1.4 Historical petrol stations

Records within 500m

0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original ungrouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

1.5 Historical garages

Records within 500m

0

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original ungrouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

1.6 Historical military land

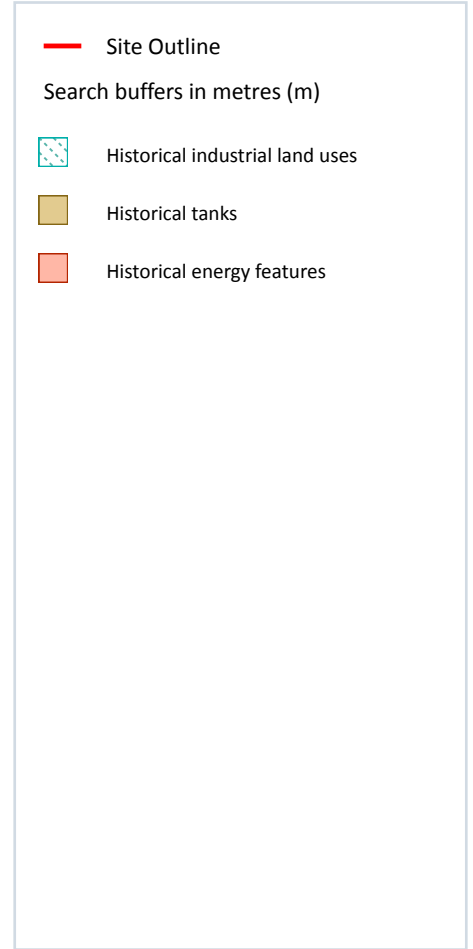
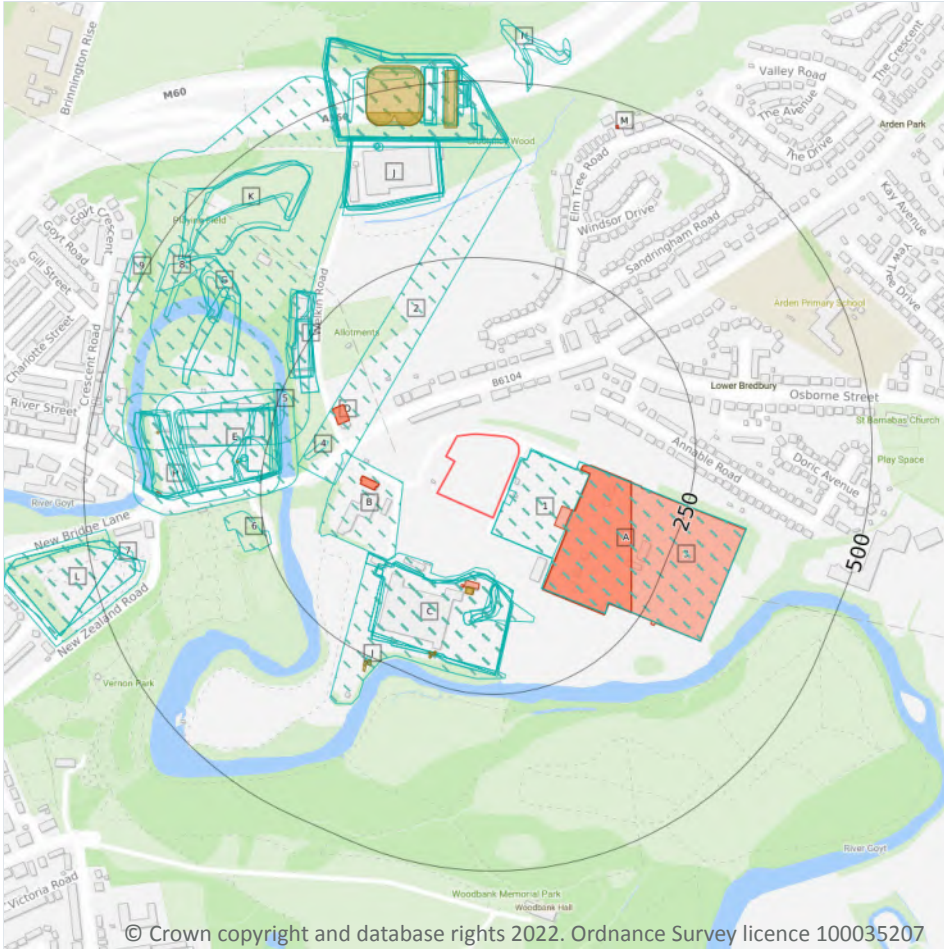
Records within 500m

0

Areas of military land digitised from multiple sources including the National Archives, local records, MOD records and verified other sources, intelligently grouped into contiguous features.

This data is sourced from Ordnance Survey / Groundsure / other sources.

2 Past land use - un-grouped



2.1 Historical industrial land uses

Records within 500m

123

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 10,560 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 20**

ID	Location	Land Use	Date	Group ID
1	4m E	Electric Substation	1992	963692
A	6m E	Electric Substation	1968	871213
A	6m E	Electric Substation	1978	955204

ID	Location	Land Use	Date	Group ID
B	50m W	Unspecified Works	1968	830572
C	74m S	Unspecified Mill	1992	919875
C	80m S	Unspecified Mill	1934	964950
C	80m S	Unspecified Mill	1917	964950
C	80m S	Unspecified Mill	1923	964950
C	82m S	Unspecified Works	1968	830571
C	82m S	Unspecified Mill	1978	982537
C	82m S	Unspecified Mill	1954	956251
C	84m S	Unspecified Mill	1938	964950
C	87m S	Unspecified Mill	1934	964950
C	92m S	Unspecified Pit	1954	840666
C	93m S	Refuse Heap	1934	956628
C	93m S	Refuse Heap	1917	956628
C	93m S	Refuse Heap	1923	956628
C	95m S	Refuse Heap	1934	857073
C	96m S	Refuse Heap	1938	961590
2	116m NW	Rifle Range	1897	835006
4	168m W	Unspecified Ground Workings	1917	800923
E	199m W	Unspecified Mills	1954	963741
F	202m NW	Unspecified Works	1968	873674
F	202m NW	Unspecified Works	1978	915994
G	203m W	Mineral Water Works	1934	953444
F	219m NW	Mineral Water Works	1938	889886
F	220m NW	Mineral Water Works	1954	889886
E	222m W	Unspecified Works	1978	951521
E	223m W	Unspecified Mills	1938	941481
F	223m NW	Mineral Water Works	1934	974826
E	224m W	Unspecified Works	1968	851025



ID	Location	Land Use	Date	Group ID
H	225m W	Unspecified Mills	1954	963741
F	225m NW	Unspecified Works	1992	990934
E	226m W	Unspecified Mills	1934	941481
E	226m W	Unspecified Mills	1934	936490
E	230m W	Unspecified Mill	1911	910446
E	234m W	Unspecified Mills	1917	936490
E	234m W	Unspecified Mills	1923	936490
5	236m W	Refuse Heap	1934	829251
E	238m W	Unspecified Mill	1897	948578
6	244m W	Sand Pit	1851	797593
H	250m W	Unspecified Works	1968	900033
I	250m SW	Unspecified Tank	1954	912782
I	254m SW	Unspecified Tank	1938	849015
F	255m NW	Unspecified Heap	1954	804115
I	255m SW	Unspecified Tank	1934	849015
E	256m W	Unspecified Depot	1992	818446
E	273m W	Chimney	1968	918296
E	273m W	Chimney	1978	935914
F	276m NW	Refuse Heap	1934	829250
E	281m W	Unspecified Tank	1917	933789
E	281m W	Unspecified Tank	1923	933789
G	322m W	Unspecified Ground Workings and Heap	1934	806973
G	324m W	Unspecified Heap	1934	902269
J	331m N	Unspecified Mill	1923	910924
J	337m N	Unspecified Mill	1938	946822
J	338m N	Unspecified Mill	1934	971901
H	340m W	Unspecified Mills	1938	936489
J	341m N	Unspecified Mill	1911	961886



ID	Location	Land Use	Date	Group ID
J	341m N	Spinning Mill	1938	797090
J	342m N	Unspecified Works	1968	885410
J	342m N	Unspecified Works	1978	863847
J	342m N	Unspecified Works	1992	862047
J	342m N	Unspecified Mill	1954	946822
J	344m N	Unspecified Mill	1934	898499
J	344m N	Unspecified Mill	1917	961886
H	345m W	Unspecified Commercial/Industrial	1978	796879
H	350m W	Unspecified Mill	1938	938151
H	358m W	Unspecified Mill	1897	953014
H	359m W	Unspecified Mills	1934	936489
H	359m W	Unspecified Mill	1917	867805
H	359m W	Unspecified Mill	1923	867805
G	359m NW	Unspecified Ground Workings	1954	800924
G	375m NW	Refuse Heap	1938	945047
K	376m NW	Unspecified Heap	1934	857090
G	378m NW	Refuse Heap	1917	919053
G	378m NW	Refuse Heap	1923	919053
K	383m NW	Unspecified Ground Workings	1934	800925
K	386m NW	Unspecified Ground Workings and Heap	1934	806972
K	388m NW	Refuse Heaps	1938	808292
K	391m NW	Refuse Heap	1954	829235
J	406m N	Sewage Works	1923	992007
J	413m N	Sewage Works	1938	848732
J	414m N	Sewage Works	1934	861723
J	417m N	Sewage Works	1938	876434
J	417m N	Sewage Works	1938	876434
J	417m N	Unspecified Works	1968	894664



ID	Location	Land Use	Date	Group ID
J	417m N	Unspecified Works	1978	872768
J	417m N	Sewage Works	1954	848732
J	418m N	Sewage Works	1911	971037
J	418m N	Chimney	1968	835776
J	420m N	Sewage Works	1934	945473
J	420m N	Sewage Works	1917	907014
J	422m N	Unspecified Tank	1938	858711
J	423m N	Unspecified Tank	1911	899142
L	424m W	Corporation Sanitary Deposit	1897	832062
7	432m W	Unspecified Ground Workings	1954	800926
8	434m NW	Unspecified Heap	1911	944085
J	438m N	Filter Beds	1938	956868
J	438m N	Filter Beds	1938	956868
J	439m N	Filter Beds	1911	984731
L	439m W	Unspecified Heap	1934	959106
L	439m W	Unspecified Heap	1917	862352
J	441m N	Filter Beds	1938	938194
J	441m N	Filter Beds	1938	938194
J	442m N	Filter Beds	1934	926708
J	442m N	Filter Beds	1917	985866
J	444m N	Filter Beds	1934	935581
J	444m N	Filter Beds	1917	910127
J	445m N	Unspecified Tanks	1968	975124
J	445m N	Unspecified Tanks	1978	947195
J	447m N	Unspecified Tanks	1954	932407
J	449m N	Unspecified Tanks	1954	975124
J	453m N	Filter Beds	1923	980447
L	456m W	Unspecified Heap	1968	902457



ID	Location	Land Use	Date	Group ID
L	456m W	Unspecified Heap	1978	962008
L	456m W	Unspecified Heap	1992	878862
J	466m N	Filter Beds	1934	900997
J	466m N	Filter Beds	1917	989676
J	470m N	Unspecified Ground Workings	1923	861936
N	489m N	Unspecified Ground Workings	1923	978737
9	496m NW	Refuse Heap	1938	983004
N	499m N	Unspecified Ground Workings	1938	844782

This data is sourced from Ordnance Survey / Groundsure.

2.2 Historical tanks

Records within 500m

15

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 20**

ID	Location	Land Use	Date	Group ID
C	103m S	Tanks	1975	146772
C	104m S	Tanks	1988	146772
C	206m SW	Unspecified Tank	1958	134559
C	206m SW	Unspecified Tank	1959	134559
C	209m SW	Unspecified Tank	1975	116778
C	214m SW	Unspecified Tank	1922	132837
C	214m SW	Unspecified Tank	1934	132837
I	254m SW	Unspecified Tank	1938	116779
I	257m SW	Unspecified Tank	1934	116776
I	264m SW	Unspecified Tank	1922	116775
E	285m W	Unspecified Tank	1893	116785
H	403m W	Unspecified Tank	1893	116786



ID	Location	Land Use	Date	Group ID
J	434m N	Settling Tanks	1934	108688
J	444m N	Tanks	1960	137588
J	445m N	Tanks	1959	137588

This data is sourced from Ordnance Survey / Groundsure.

2.3 Historical energy features

Records within 500m	13
----------------------------	-----------

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 20**

ID	Location	Land Use	Date	Group ID
B	83m W	Electricity Substation	1975	82126
B	84m W	Electricity Substation	1988	82126
A	84m E	Electricity Substation	1988	71606
A	91m E	Electricity Substation	1975	68042
C	95m S	Electricity Substation	1975	62365
C	104m SW	Electricity Substation	1988	62364
D	146m W	Electricity Substation	1988	85036
D	146m W	Electricity Substation	1991	85036
3	164m E	Electricity Substation	1975	68042
E	229m W	Electricity Substation	1975	62368
H	391m W	Electricity Substation	1975	62367
M	464m N	Electricity Substation	1988	64192
M	464m N	Electricity Substation	1991	64192

This data is sourced from Ordnance Survey / Groundsure.



2.4 Historical petrol stations

Records within 500m

0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

2.5 Historical garages

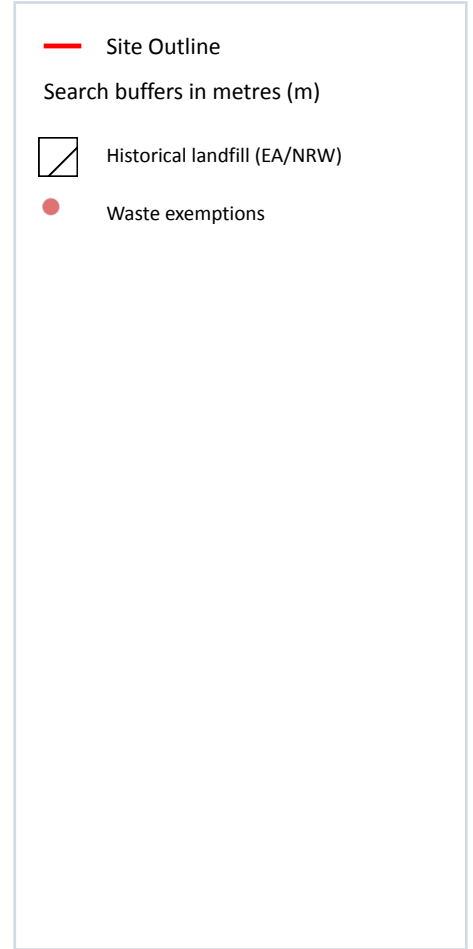
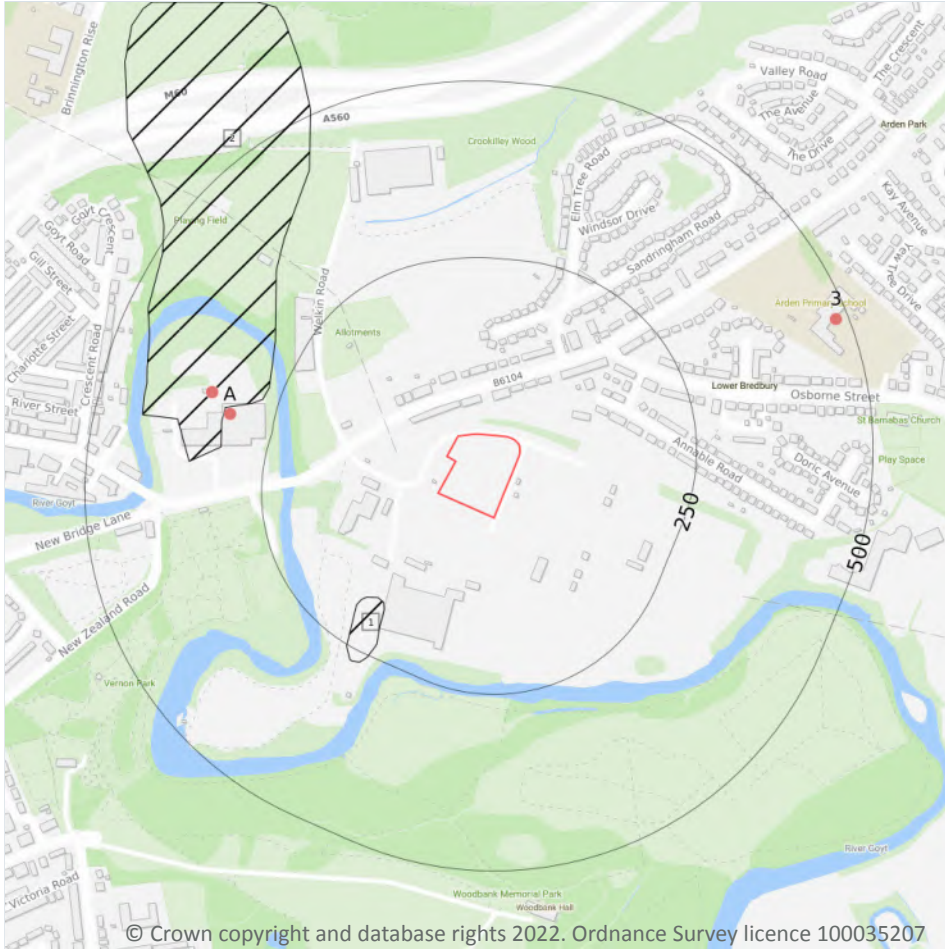
Records within 500m

0

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

3 Waste and landfill



3.1 Active or recent landfill

Records within 500m

0

Active or recently closed landfill sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.2 Historical landfill (BGS records)

Records within 500m

0

Landfill sites identified on a survey carried out on behalf of the DoE in 1973. These sites may have been closed or operational at this time.

This data is sourced from the British Geological Survey.

3.3 Historical landfill (LA/mapping records)

Records within 500m

0

Landfill sites identified from Local Authority records and high detail historical mapping.

This data is sourced from the Ordnance Survey/Groundsure and Local Authority records.

3.4 Historical landfill (EA/NRW records)

Records within 500m

2

Known historical (closed) landfill sites (e.g. sites where there is no PPC permit or waste management licence currently in force). This includes sites that existed before the waste licensing regime and sites that have been licensed in the past but where a licence has been revoked, ceased to exist or surrendered and a certificate of completion has been issued.

Features are displayed on the Waste and landfill map on **page 28**

ID	Location	Details		
1	170m SW	Site Address: Warth Meadow, Portwood, Greater Manchester, Greater Manchester Licence Holder Address: -	Waste Licence: - Site Reference: J046a Waste Type: - Environmental Permitting Regulations (Waste) Reference: - Licence Issue: - Licence Surrender: -	Operator: - Licence Holder: - First Recorded: - Last Recorded: -
2	269m W	Site Address: Warth Meadow, Portwood, Greater Manchester Licence Holder Address: -	Waste Licence: Yes Site Reference: RD/LIC/469/87, J046 Waste Type: Inert, Industrial, Commercial, Household Environmental Permitting Regulations (Waste) Reference: - Licence Issue: 01/01/1974 Licence Surrender: -	Operator: - Licence Holder: Stockport Metropolitan Borough Council First Recorded 31/12/1950 Last Recorded: 31/12/1978

This data is sourced from the Environment Agency and Natural Resources Wales.

3.5 Historical waste sites

Records within 500m

0

Waste site records derived from Local Authority planning records and high detail historical mapping.

This data is sourced from Ordnance Survey/Groundsure and Local Authority records.



3.6 Licensed waste sites

Records within 500m

0

Active or recently closed waste sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.7 Waste exemptions

Records within 500m

4

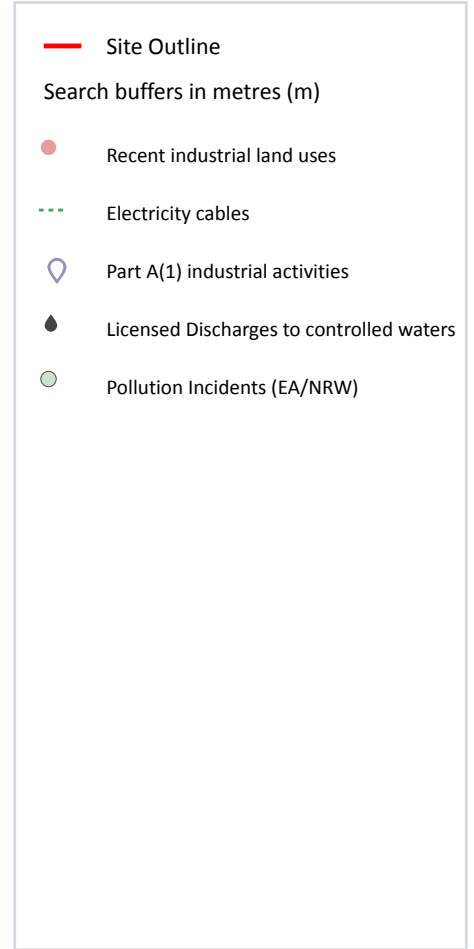
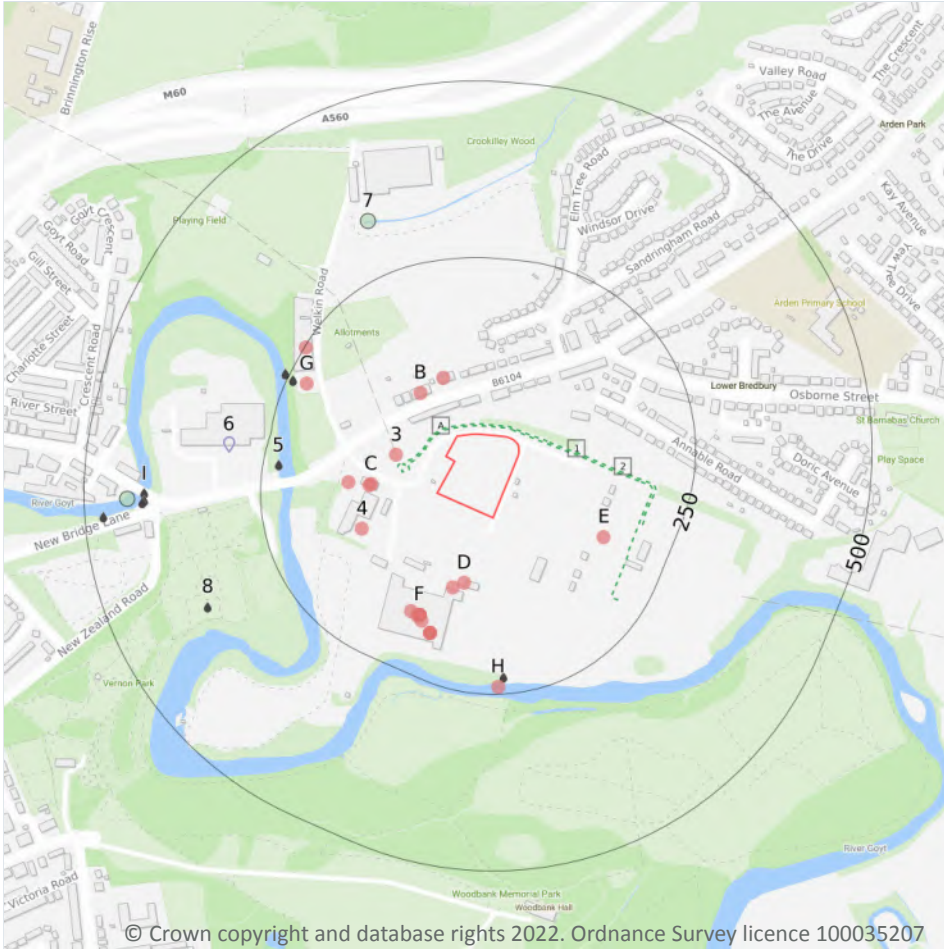
Activities involving the storage, treatment, use or disposal of waste that are exempt from needing a permit. Exemptions have specific limits and conditions that must be adhered to.

Features are displayed on the Waste and landfill map on **page 28**

ID	Location	Site	Reference	Category	Sub-Category	Description
A	313m W	. Newbridge Lane STOCKPORT Cheshire SK1 2GT	EPR/XE5187ZT /A001	Using waste exemption	Agricultural Waste Only	Use of waste derived biodiesel as fuel
A	345m W	British Gas Services Ltd Newbridge Lane Stockport Stockport SK1 2GT	EPR/CE5546ZN /A001	Treating waste exemption	Non- Agricultural Waste Only	Aerobic composting and associated prior treatment
A	345m W	British Gas Services Ltd Newbridge Lane Stockport Stockport SK1 2GT	EPR/CE5546ZN /A001	Using waste exemption	Non- Agricultural Waste Only	Spreading waste on non- agricultural land to confer benefit
3	482m E	Arden Primary School Osbourne Street Bredbury Lancashire SK6 2EX	EPR/FF0801CG /A001	Using waste exemption	Non- Agricultural Waste Only	Use of waste in construction

This data is sourced from the Environment Agency and Natural Resources Wales.

4 Current industrial land use



4.1 Recent industrial land uses

Records within 250m

24

Current potentially contaminative industrial sites.

Features are displayed on the Current industrial land use map on **page 31**

ID	Location	Company	Address	Activity	Category
3	71m W	Pylon	Greater Manchester, SK6	Electrical Features	Infrastructure and Facilities
B	81m NW	Same Day Services	794, Stockport Road West, Bredbury, Stockport, Greater Manchester, SK6 2BQ	Construction and Tool Hire	Hire Services

ID	Location	Company	Address	Activity	Category
B	85m N	Conroy Building Services Ltd	788a, Stockport Road West, Bredbury, Stockport, Greater Manchester, SK6 2BQ	Building and Component Suppliers	Construction Services
C	95m W	Stockport Sea Cadets	Pear Mill Industrial Estate, Stockport Road West, Bredbury, Stockport, Greater Manchester, SK6 2BP	Armed Services	Central and Local Government
C	97m W	Electricity Sub Station	Greater Manchester, SK6	Electrical Features	Infrastructure and Facilities
D	101m SW	Electricity Sub Station	Greater Manchester, SK6	Electrical Features	Infrastructure and Facilities
D	114m SW	Chimney	Greater Manchester, SK6	Chimneys	Industrial Features
4	118m SW	Business Park	Greater Manchester, SK6	Business Parks and Industrial Estates	Industrial Features
C	127m W	Electricity Sub Station	Greater Manchester, SK6	Electrical Features	Infrastructure and Facilities
E	156m E	Electricity Sub Station	Greater Manchester, SK6	Electrical Features	Infrastructure and Facilities
F	167m SW	Midway Designs Ltd	Unit A1 Pear Mill Industrial Estate, Stockport Road West, Bredbury, Stockport, Greater Manchester, SK6 2BP	Signs	Industrial Products
F	167m SW	Emerald Weld	Unit A4 Pear Mill Industrial Estate, Stockport Road West, Bredbury, Stockport, Greater Manchester, SK6 2BP	Cutting, Drilling and Welding Services	Construction Services
F	167m SW	Cathian Leather Goods	Pear Mill Industrial Estate, Stockport Road West, Bredbury, Stockport, Greater Manchester, SK6 2BP	Clothing, Components and Accessories	Consumer Products
F	167m SW	Sketch Twenty 3	Unit A8 Pear Mill Industrial Estate, Stockport Road West, Bredbury, Stockport, Greater Manchester, SK6 2BP	Wood Products Including Charcoal, Paper, Card and Board	Industrial Products
F	167m SW	Shop Massive Ltd	Unit A10 Pear Mill Industrial Estate, Stockport Road West, Bredbury, Stockport, Greater Manchester, SK6 2BP	Electronic Equipment	Industrial Products
F	168m SW	M P D	Unit E2 Pear Mill Industrial Estate, Stockport Road West, Bredbury, Stockport, Greater Manchester, SK6	Published Goods	Industrial Products
F	171m SW	Pear New Mill Industrial Estate	Greater Manchester, SK6	Business Parks and Industrial Estates	Industrial Features



ID	Location	Company	Address	Activity	Category
F	174m SW	Jim Fleeting Guitars	Unit E5 Pear Mill Industrial Estate, Stockport Road West, Bredbury, Stockport, Greater Manchester, SK6 2BP	Sports and Leisure Equipment Repair	Repair and Servicing
F	185m SW	Burnage Motors	Pear Mill Industrial Estate, Stockport Road West, Bredbury, Stockport, Greater Manchester, SK6 2BP	Secondhand Vehicles	Motoring
F	185m SW	Phantom Ltd	Unit D7 Pear Mill Industrial Estate, Stockport Road West, Bredbury, Stockport, Greater Manchester, SK6 2BP	Vehicle Components	Industrial Products
F	185m SW	Reloved Upholstery & Design	Unit E10 Pear Mill Industrial Estate, Stockport Road West, Stockport, Greater Manchester, SK6 2BP	Furniture	Consumer Products
G	222m NW	Welkin Road Industrial Estate	Greater Manchester, SK6	Business Parks and Industrial Estates	Industrial Features
H	239m S	Outfall	Greater Manchester, SK6	Waste Storage, Processing and Disposal	Infrastructure and Facilities
G	248m NW	Hillgate Precision Engineers Ltd	Unit 3, Welkin Road, Stockport, Greater Manchester, SK6 2BH	Precision Engineers	Engineering Services

This data is sourced from Ordnance Survey.

4.2 Current or recent petrol stations

Records within 500m

0

Open, closed, under development and obsolete petrol stations.

This data is sourced from Experian.

4.3 Electricity cables

Records within 500m

5

High voltage underground electricity transmission cables.

Features are displayed on the Current industrial land use map on **page 31**



ID	Location	Cable Set	Cable Route	Details	
A	12m N	BREDBURY - YO001 CABLE SECTION 01	BREDBURY - SOUTH MANCHESTER 1	Cable Make: AEI 275KV OIL Cable Type: A/C Operating Voltage (kV): 275	Year of installation: 1967 Cable in tunnel? Not specified
1	12m N	BREDBURY - YO001 CABLE SECTION 02	BREDBURY - SOUTH MANCHESTER 1	Cable Make: AEI 275KV OIL Cable Type: A/C Operating Voltage (kV): 275	Year of installation: 1967 Cable in tunnel? Not specified
A	14m N	BREDBURY 275KV CABLES	BREDBURY 275KV S/S	Cable Make: AEI 275KV OIL Cable Type: A/C Operating Voltage (kV): 275	Year of installation: 1967 Cable in tunnel? Not specified
2	43m E	BREDBURY 275KV CABLES	BREDBURY 275KV S/S	Cable Make: AEI 275KV OIL Cable Type: A/C Operating Voltage (kV): 275	Year of installation: 1967 Cable in tunnel? Not specified
E	177m E	BREDBURY - YO001 CABLE SECTION 03	BREDBURY - SOUTH MANCHESTER 1	Cable Make: - Cable Type: A/C Operating Voltage (kV): 275	Year of installation: 1967 Cable in tunnel? Not specified

This data is sourced from National Grid.

4.4 Gas pipelines

Records within 500m	0
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High pressure underground gas transmission pipelines.

This data is sourced from National Grid.

4.5 Sites determined as Contaminated Land

Records within 500m	0
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Contaminated Land Register of sites designated under Part 2a of the Environmental Protection Act 1990.

This data is sourced from Local Authority records.

4.6 Control of Major Accident Hazards (COMAH)

Records within 500m	0
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Control of Major Accident Hazards (COMAH) sites. This data includes upper and lower tier sites, and includes a historical archive of COMAH sites and Notification of Installations Handling Hazardous Substances (NIHHS) records.

This data is sourced from the Health and Safety Executive.

4.7 Regulated explosive sites

Records within 500m

0

Sites registered and licensed by the Health and Safety Executive under the Manufacture and Storage of Explosives Regulations 2005 (MSER). The last update to this data was in April 2011.

This data is sourced from the Health and Safety Executive.

4.8 Hazardous substance storage/usage

Records within 500m

0

Consents granted for a site to hold certain quantities of hazardous substances at or above defined limits in accordance with the Planning (Hazardous Substances) Regulations 2015.

This data is sourced from Local Authority records.

4.9 Historical licensed industrial activities (IPC)

Records within 500m

0

Integrated Pollution Control (IPC) records of substance releases to air, land and water. This data represents a historical archive as the IPC regime has been superseded.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.10 Licensed industrial activities (Part A(1))

Records within 500m

1

Records of Part A(1) installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

Features are displayed on the Current industrial land use map on **page 31**

ID	Location	Details	
6	302m W	Operator: GB GAS HOLDINGS LIMITED Installation Name: BRITISH GAS OFFICE, STOCKPORT - EPR/CP3636QS Process: NEW MEDIUM COMBUSTION PLANT Permit Number: CP3636QS Original Permit Number: CP3636QS	EPR Reference: - Issue Date: 25/02/2019 Effective Date: 25/02/2019 Last date noted as effective: 01/01/2022 Status: EFFECTIVE

This data is sourced from the Environment Agency and Natural Resources Wales.

4.11 Licensed pollutant release (Part A(2)/B)

Records within 500m

0

Records of Part A(2) and Part B installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

This data is sourced from Local Authority records.

4.12 Radioactive Substance Authorisations

Records within 500m

0

Records of the storage, use, accumulation and disposal of radioactive substances regulated under the Radioactive Substances Act 1993.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.13 Licensed Discharges to controlled waters

Records within 500m

13

Discharges of treated or untreated effluent to controlled waters under the Water Resources Act 1991.

Features are displayed on the Current industrial land use map on **page 31**

ID	Location	Address	Details	
H	226m S	BREDBURY SUBSTATION, STOCKPORT ROAD WEST, LOWER BREDBURY, STOCKPORT	Effluent Type: TRADE DISCHARGES - SITE DRAINAGE (CONTAM SURFACE WATER, NOT WASTE SIT Permit Number: 016993595 Permit Version: 1 Receiving Water: RIVER GOYT	Status: REVOKED UNDER EPR 2010 Issue date: 25/11/2004 Effective Date: 25/11/2004 Revocation Date: 11/08/2010
5	228m W	CARRINGTON & GOYT MILL SITE SWO, NEWBRIDGE LANE, STOCKPORT, GREATER MANCHESTER	Effluent Type: MISCELLANEOUS DISCHARGES - SURFACE WATER Permit Number: 016991162 Permit Version: 1 Receiving Water: RIVER GOYT	Status: REVOKED - UNSPECIFIED Issue date: - Effective Date: 01/07/1991 Revocation Date: 01/07/1991
G	242m NW	STOCKPORT ROAD WEST CSO, STOCKPORT ROAD WEST, BREDBURY, STOCKPORT, GREATER MANCHESTER, SK6 2BQ	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 01STK0012 Permit Version: 1 Receiving Water: RIVER GOYT	Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: - Effective Date: 01/01/1995 Revocation Date: 13/04/2009

ID	Location	Address	Details	
G	242m NW	STOCKPORT ROAD WEST CSO, STOCKPORT ROAD WEST, BREDBURY, STOCKPORT, GREATER MANCHESTER, SK6 2BQ	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 01STK0012 Permit Version: 2 Receiving Water: RIVER GOYT	Status: VARIED UNDER EPR 2010 Issue date: 14/04/2009 Effective Date: 14/04/2009 Revocation Date: 10/01/2017
G	255m NW	STOCKPORT ROAD WEST CSO, STOCKPORT ROAD WEST, BREDBURY, STOCKPORT, GREATER MANCHESTER, SK6 2BQ	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 01STK0012 Permit Version: 3 Receiving Water: RIVER GOYT	Status: VARIED UNDER EPR 2010 Issue date: 11/01/2017 Effective Date: 11/01/2017 Revocation Date: 03/11/2020
G	255m NW	STOCKPORT ROAD WEST CSO, STOCKPORT ROAD WEST, BREDBURY, STOCKPORT, GREATER MANCHESTER, SK6 2BQ	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 01STK0012 Permit Version: 4 Receiving Water: RIVER GOYT VIA SWS	Status: VARIED UNDER EPR 2010 Issue date: 04/11/2020 Effective Date: 04/11/2020 Revocation Date: -
8	362m SW	VERNON PARK SWO, NEWBRIDGE LANE, STOCKPORT, GREATER MANCHESTER	Effluent Type: MISCELLANEOUS DISCHARGES - SURFACE WATER Permit Number: 016991390 Permit Version: 1 Receiving Water: RIVER GOYT	Status: REVOKED - UNSPECIFIED Issue date: - Effective Date: 01/04/1993 Revocation Date: 21/05/1993
I	414m W	NEWBRIDGE LANE CSO, 262 NEWBRIDGE LANE, STOCKPORT, GREATER MANCHESTER, SK1 2PG	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 016982656 Permit Version: 1 Receiving Water: RIVER GOYT	Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: 30/09/1994 Effective Date: 30/09/1994 Revocation Date: 20/12/2020
I	414m W	NEWBRIDGE LANE CSO, 262 NEWBRIDGE LANE, STOCKPORT, GREATER MANCHESTER, SK1 2PG	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 01STK0086 Permit Version: 1 Receiving Water: RIVER GOYT	Status: CONSENT REVOKED OR REVISED - NEW CONSENT ISSUED (37(1)) Issue date: - Effective Date: 01/01/1995 Revocation Date: 01/01/1995
I	415m W	NEWBRIDGE LANE CSO, 262 NEWBRIDGE LANE, STOCKPORT, GREATER MANCHESTER, SK1 2PG	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 016982657 Permit Version: 1 Receiving Water: RIVER GOYT	Status: POST NRA LEGISLATION WHERE ISSUE DATE > 31-AUG-89 (HISTORIC ONLY) Issue date: - Effective Date: 30/09/1994 Revocation Date: 06/12/2020



ID	Location	Address	Details	
I	415m W	NEWBRIDGE LANE CSO, 262 NEWBRIDGE LANE, STOCKPORT, GREATER MANCHESTER, SK1 2PG	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 01STK0087 Permit Version: 1 Receiving Water: RIVER GOYT	Status: CONSENT REVOKED OR REVISED - NEW CONSENT ISSUED (37(1)) Issue date: - Effective Date: 01/01/1995 Revocation Date: 01/01/1995
I	418m W	NEWBRIDGE LANE CSO, 262 NEWBRIDGE LANE, STOCKPORT, GREATER MANCHESTER, SK1 2PG	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 016982656 Permit Version: 2 Receiving Water: RIVER GOYT	Status: VARIED UNDER EPR 2010 Issue date: 21/12/2020 Effective Date: 21/12/2020 Revocation Date: -
I	474m W	NEWBRIDGE LANE CSO, 262 NEWBRIDGE LANE, STOCKPORT, GREATER MANCHESTER, SK1 2PG	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 016982657 Permit Version: 2 Receiving Water: RIVER GOYT	Status: VARIED UNDER EPR 2010 Issue date: 07/12/2020 Effective Date: 07/12/2020 Revocation Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

4.14 Pollutant release to surface waters (Red List)

Records within 500m

0

Discharges of specified substances under the Environmental Protection (Prescribed Processes and Substances) Regulations 1991.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.15 Pollutant release to public sewer

Records within 500m

0

Discharges of Special Category Effluents to the public sewer.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.16 List 1 Dangerous Substances

Records within 500m

0

Discharges of substances identified on List I of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.



4.17 List 2 Dangerous Substances

Records within 500m

0

Discharges of substances identified on List II of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.18 Pollution Incidents (EA/NRW)

Records within 500m

2

Records of substantiated pollution incidents. Since 2006 this data has only included category 1 (major) and 2 (significant) pollution incidents.

Features are displayed on the Current industrial land use map on **page 31**

ID	Location	Details	
7	329m NW	Incident Date: 07/06/2001 Incident Identification: 8079 Pollutant: Oils and Fuel Pollutant Description: Unidentified Oil	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
1	439m W	Incident Date: 14/08/2002 Incident Identification: 100228 Pollutant: Specific Waste Materials Pollutant Description: Batteries	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

This data is sourced from the Environment Agency and Natural Resources Wales.

4.19 Pollution inventory substances

Records within 500m

0

The pollution inventory (substances) includes reporting on annual emissions of certain regulated substances to air, controlled waters and land. A reporting threshold for each substance is also included. Where emissions fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

4.20 Pollution inventory waste transfers

Records within 500m

0

The pollution inventory (waste transfers) includes reporting on annual transfers and recovery/disposal of controlled wastes from a site. A reporting threshold for each waste type is also included. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

4.21 Pollution inventory radioactive waste

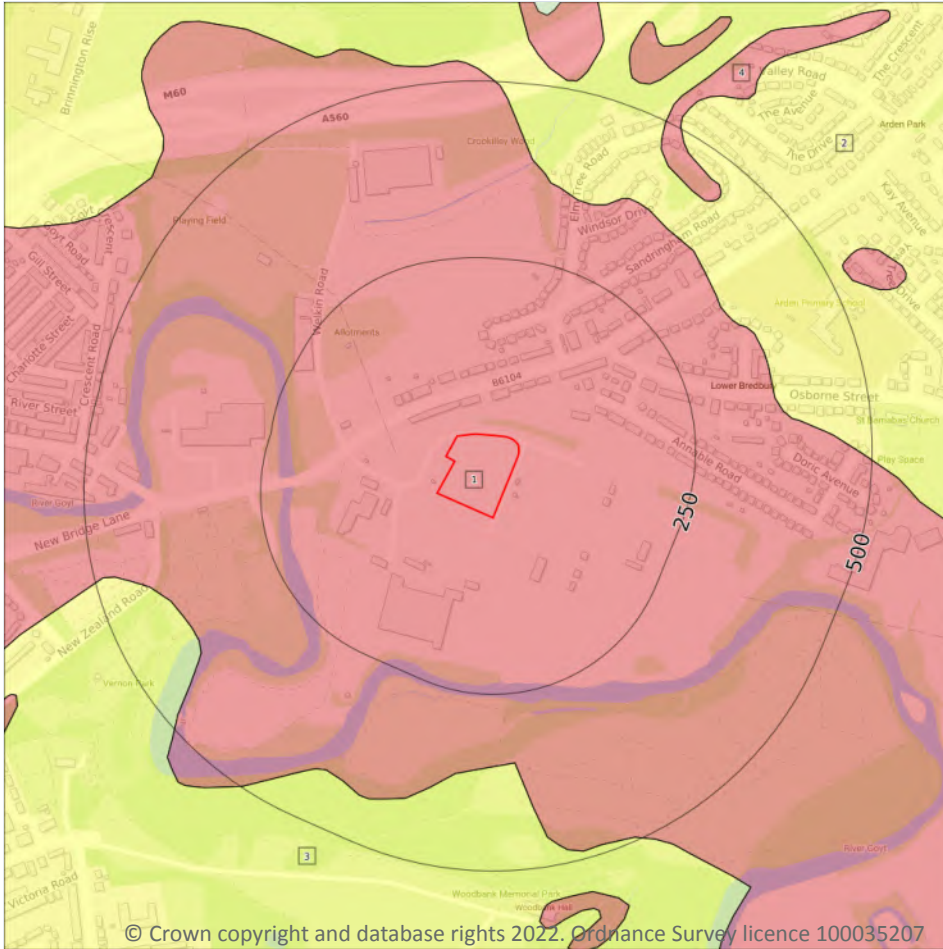
Records within 500m

0

The pollution inventory (radioactive wastes) includes reporting on annual releases of radioactive substances from a site, including the means of release. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

5 Hydrogeology - Superficial aquifer



— Site Outline
 Search buffers in metres (m)

- Principal
- Secondary A
- Secondary B
- Secondary Undifferentiated
- Unproductive
- Unknown

5.1 Superficial aquifer

Records within 500m

4

Aquifer status of groundwater held within superficial geology.

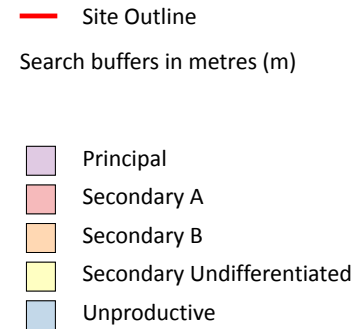
Features are displayed on the Hydrogeology map on **page 41**

ID	Location	Designation	Description
1	On site	Secondary A	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. These are generally aquifers formerly classified as minor aquifers
2	347m NE	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type

ID	Location	Designation	Description
3	348m S	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
4	434m NE	Secondary A	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. These are generally aquifers formerly classified as minor aquifers

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Bedrock aquifer



5.2 Bedrock aquifer

Records within 500m

1

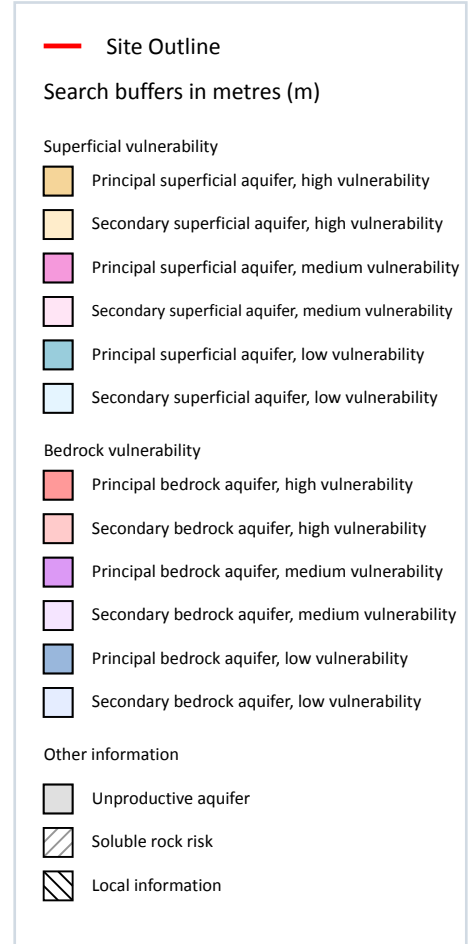
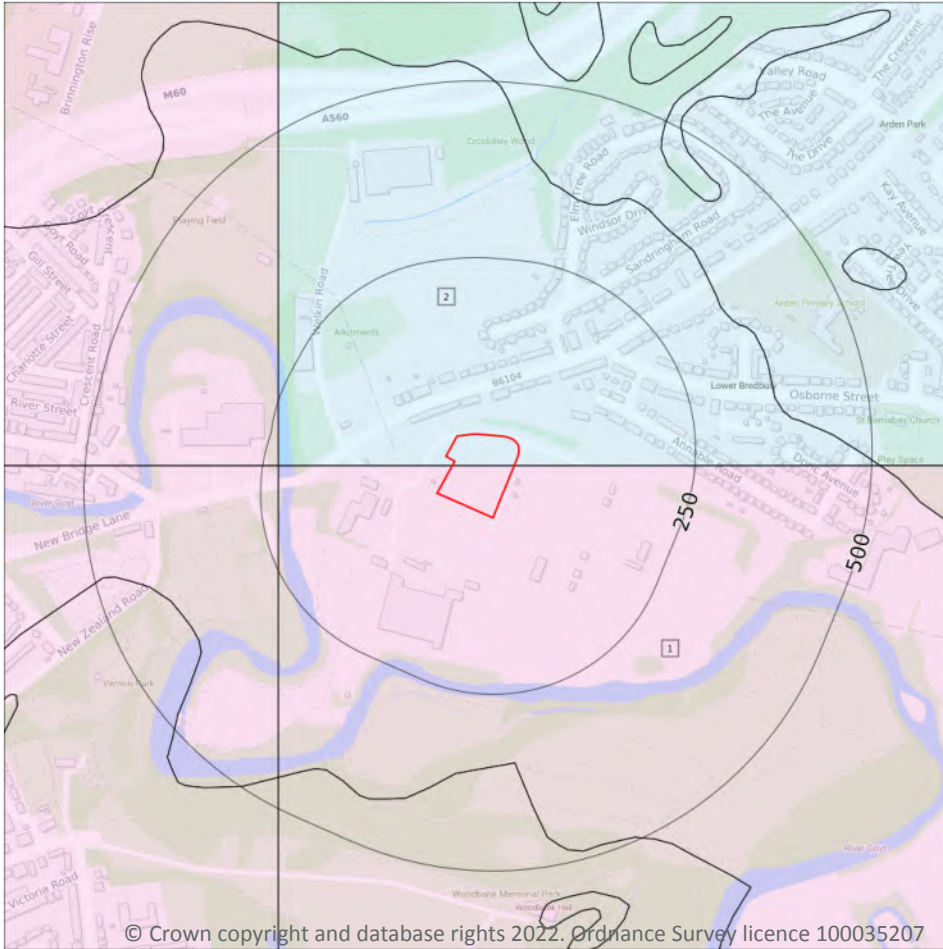
Aquifer status of groundwater held within bedrock geology.

Features are displayed on the Bedrock aquifer map on **page 43**

ID	Location	Designation	Description
1	On site	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Groundwater vulnerability



5.3 Groundwater vulnerability

Records within 50m

2

An assessment of the vulnerability of groundwater to a pollutant discharged at ground level based on the hydrological, geological, hydrogeological and soil properties within a one kilometre square grid. Groundwater vulnerability is described as High, Medium or Low as follows:

- High - Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits.
- Medium - Intermediate between high and low vulnerability.
- Low - Areas that provide the greatest protection from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability.

Features are displayed on the Groundwater vulnerability map on **page 44**

ID	Location	Summary	Soil / surface	Superficial geology	Bedrock geology
1	On site	Summary Classification: Secondary superficial aquifer - Medium Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: Intermediate Infiltration value: >70% Dilution value: 300-550mm/year	Vulnerability: Medium Aquifer type: Secondary Thickness: >10m Patchiness value: >90% Recharge potential: High	Vulnerability: Low Aquifer type: Principal Flow mechanism: Well connected fractures
2	On site	Summary Classification: Secondary superficial aquifer - Low Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: Low Infiltration value: <40% Dilution value: 300-550mm/year	Vulnerability: Low Aquifer type: Secondary Thickness: >10m Patchiness value: >90% Recharge potential: High	Vulnerability: Low Aquifer type: Principal Flow mechanism: Intergranular

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

5.4 Groundwater vulnerability- soluble rock risk

Records on site	0
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This dataset identifies areas where solution features that enable rapid movement of a pollutant may be present within a 1km grid square.

This data is sourced from the British Geological Survey and the Environment Agency.

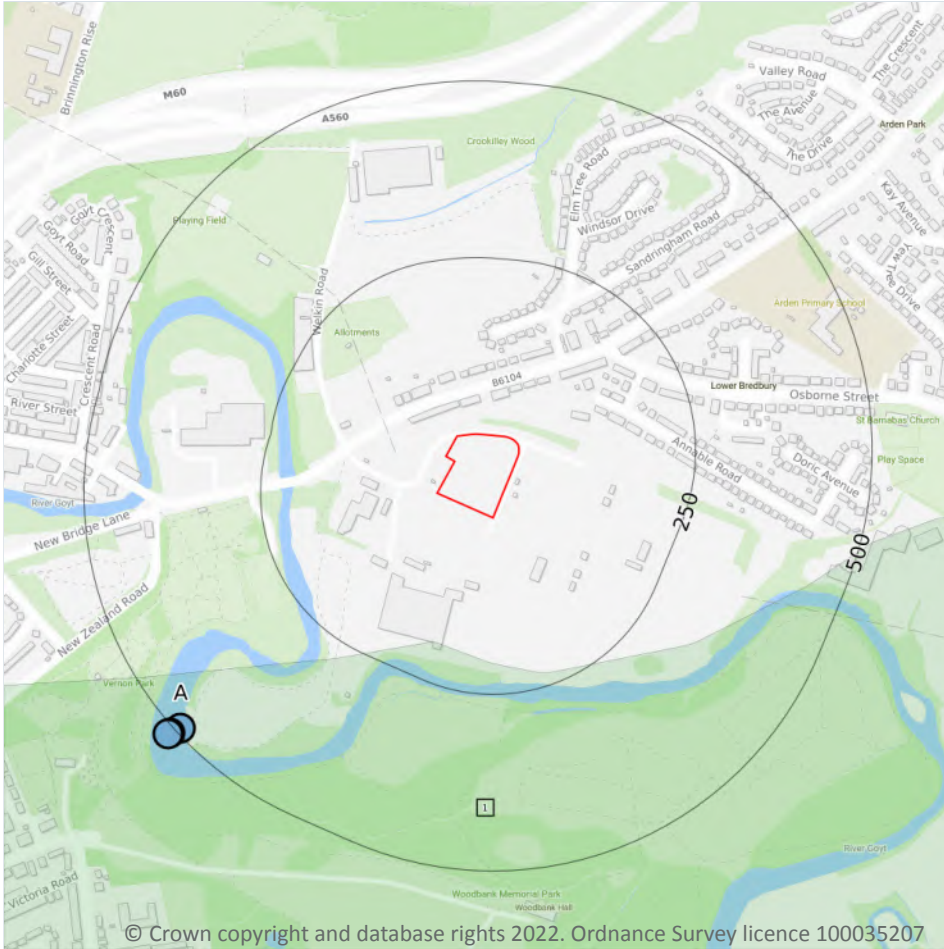
5.5 Groundwater vulnerability- local information

Records on site	0
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This dataset identifies areas where additional local information affecting vulnerability is held by the Environment Agency. Further information can be obtained by contacting the Environment Agency local Area groundwater team through the Environment Agency National Customer Call Centre on 03798 506 506 or by email on enquiries@environment-agency.gov.uk.

This data is sourced from the British Geological Survey and the Environment Agency.

Abstractions and Source Protection Zones



5.6 Groundwater abstractions

Records within 2000m

15

Licensed groundwater abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, between two points (line data) or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 46**

ID	Location	Details	
-	1531m W	Status: Active Licence No: 2569011023 Details: Process Water Direct Source: Ground Water - North West Region Point: BOREHOLES (2) AT STOCKPORT Data Type: Point Name: FREDERIC ROBINSON LTD Easting: 389800 Northing: 390400	Annual Volume (m ³): 272,760 Max Daily Volume (m ³): 3,636.80 Original Application No: 0353 Original Start Date: 17/02/1966 Expiry Date: - Issue No: 101 Version Start Date: 30/11/2004 Version End Date: -
-	1687m SW	Status: Historical Licence No: 2569013010 Details: Boiler Feed Direct Source: Ground Water - North West Region Point: BOREHOLE AT PREMISES, HIGHER HILL GATE, STOCKPORT, GREATER Data Type: Point Name: CHRISTY & CO LTD Easting: 390000 Northing: 389800	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: 07/02/1966 Expiry Date: - Issue No: 100 Version Start Date: 07/01/1993 Version End Date: -
-	1687m SW	Status: Historical Licence No: 2569013010 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: BOREHOLE AT PREMISES, HIGHER HILL GATE, STOCKPORT, GREATER Data Type: Point Name: CHRISTY & CO LTD Easting: 390000 Northing: 389800	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: 07/02/1966 Expiry Date: - Issue No: 100 Version Start Date: 07/01/1993 Version End Date: -
-	1687m SW	Status: Historical Licence No: 2569013010 Details: Process water Direct Source: Ground Water - North West Region Point: BOREHOLE AT PREMISES, HIGHER HILL GATE, STOCKPORT, GREATER Data Type: Point Name: CHRISTY & CO LTD Easting: 390000 Northing: 389800	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: 07/02/1966 Expiry Date: - Issue No: 100 Version Start Date: 07/01/1993 Version End Date: -

ID	Location	Details	
-	1843m SW	Status: Historical Licence No: 2569011018 Details: Process Water Direct Source: Ground Water - North West Region Point: BOREHOLES (2) AT STOCKPORT Data Type: Point Name: EUROPEAN COLOUR PIGMENTS LTD Easting: 390100 Northing: 389500	Annual Volume (m ³): 8000 Max Daily Volume (m ³): 500 Original Application No: - Original Start Date: 17/02/1966 Expiry Date: - Issue No: 103 Version Start Date: 27/03/2009 Version End Date: -
-	1856m W	Status: Historical Licence No: 2569013009 Details: Process water Direct Source: Ground Water - North West Region Point: "BOREHOLE AT PREMISES, LANCASHIRE HILL, STOCKPORT, CHESHIRE" Data Type: Point Name: WILLIAM NELSTROP & CO LTD Easting: 389400 Northing: 391300	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: 17/02/1966 Expiry Date: - Issue No: 100 Version Start Date: 17/02/1966 Version End Date: -
-	1856m W	Status: Active Licence No: 2569013009 Details: Process Water Direct Source: Ground Water - North West Region Point: BOREHOLE AT PREMISES, LANCASHIRE HILL, STOCKPORT, CHESHIRE Data Type: Point Name: WILLIAM NELSTROP & CO LTD Easting: 389400 Northing: 391300	Annual Volume (m ³): 68,190 Max Daily Volume (m ³): 272.76 Original Application No: 1353 Original Start Date: 17/02/1966 Expiry Date: - Issue No: 100 Version Start Date: 17/02/1966 Version End Date: -
-	1902m SW	Status: Historical Licence No: 2569013007 Details: Boiler Feed Direct Source: Ground Water - North West Region Point: "BOREHOLE AT MARRIOT STREET MILL, STOCKPORT, CHESHIRE" Data Type: Point Name: THE MANCHESTER ANTIQUE CO. Easting: 389800 Northing: 389700	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: 17/02/1966 Expiry Date: - Issue No: 100 Version Start Date: 25/03/1998 Version End Date: -

ID	Location	Details	
-	1902m SW	Status: Historical Licence No: 2569013007 Details: General Cooling (Existing Licences Only) (Low Loss) Direct Source: Ground Water - North West Region Point: "BOREHOLE AT MARRIOT STREET MILL, STOCKPORT, CHESHIRE" Data Type: Point Name: THE MANCHESTER ANTIQUE CO. Easting: 389800 Northing: 389700	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: 17/02/1966 Expiry Date: - Issue No: 100 Version Start Date: 25/03/1998 Version End Date: -
-	1902m SW	Status: Historical Licence No: 2569013007 Details: Process water Direct Source: Ground Water - North West Region Point: "BOREHOLE AT MARRIOT STREET MILL, STOCKPORT, CHESHIRE" Data Type: Point Name: THE MANCHESTER ANTIQUE CO. Easting: 389800 Northing: 389700	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: 17/02/1966 Expiry Date: - Issue No: 100 Version Start Date: 25/03/1998 Version End Date: -
-	1902m SW	Status: Historical Licence No: 2569013007 Details: General Cooling (Existing Licences Only) (Low Loss) Direct Source: Ground Water - North West Region Point: BOREHOLE AT MARRIOT STREET MILL, STOCKPORT, CHESHIRE Data Type: Point Name: THE MANCHESTER ANTIQUE CO Easting: 389800 Northing: 389700	Annual Volume (m ³): 5168.8 Max Daily Volume (m ³): 45.46 Original Application No: - Original Start Date: 17/02/1966 Expiry Date: - Issue No: 100 Version Start Date: 25/03/1998 Version End Date: -
-	1902m SW	Status: Historical Licence No: 2569013007 Details: Process Water Direct Source: Ground Water - North West Region Point: BOREHOLE AT MARRIOT STREET MILL, STOCKPORT, CHESHIRE Data Type: Point Name: THE MANCHESTER ANTIQUE CO Easting: 389800 Northing: 389700	Annual Volume (m ³): 5168.8 Max Daily Volume (m ³): 45.46 Original Application No: - Original Start Date: 17/02/1966 Expiry Date: - Issue No: 100 Version Start Date: 25/03/1998 Version End Date: -

ID	Location	Details	
-	1902m SW	Status: Historical Licence No: 2569013007 Details: Boiler Feed Direct Source: Ground Water - North West Region Point: BOREHOLE AT MARRIOT STREET MILL, STOCKPORT, CHESHIRE Data Type: Point Name: THE MANCHESTER ANTIQUE CO Easting: 389800 Northing: 389700	Annual Volume (m ³): 5168.8 Max Daily Volume (m ³): 45.46 Original Application No: - Original Start Date: 17/02/1966 Expiry Date: - Issue No: 100 Version Start Date: 25/03/1998 Version End Date: -
-	1974m SW	Status: Historical Licence No: 2569011038 Details: Non-Evaporative Cooling Direct Source: Ground Water - North West Region Point: "BOREHOLE AT CARRINGTON FIELD STREET, STOCKPORT" Data Type: Point Name: SOVEREIGN RUBBER Easting: 390190 Northing: 389280	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: - Expiry Date: 27-Jun-09 Issue No: 1 Version Start Date: 28/06/1999 Version End Date: -
-	1974m SW	Status: Historical Licence No: 2569011038 Details: Non-Evaporative Cooling Direct Source: Ground Water - North West Region Point: BOREHOLE AT CARRINGTON FIELD STREET, STOCKPORT Data Type: Point Name: SOVEREIGN RUBBER LIMITED Easting: 390190 Northing: 389280	Annual Volume (m ³): 25094.6 Max Daily Volume (m ³): 126.83 Original Application No: - Original Start Date: 28/06/1999 Expiry Date: 27/06/2009 Issue No: 2 Version Start Date: 10/01/2005 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.7 Surface water abstractions

Records within 2000m

5

Licensed surface water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 46**



ID	Location	Details	
A	492m SW	Status: Active Licence No: NW/069/0011/002/1 Details: Hydroelectric Power Generation Direct Source: Surface, Non-Tidal - North West Region Point: STRINGERS WEIR Data Type: Point Name: Hallidays Hydropower Limited Easting: 390862 Northing: 390628	Annual Volume (m ³): 140,000,000 Max Daily Volume (m ³): 509,760 Original Application No: NPS/WR/029725 Original Start Date: 20/06/2019 Expiry Date: 31/03/2029 Issue No: 1 Version Start Date: 20/06/2019 Version End Date: -
A	508m SW	Status: Historical Licence No: NW/069/0011/002 Details: Hydroelectric Power Generation Direct Source: Surface, Non-Tidal - North West Region Point: RIVER GOYT AT STRINGERS WEIR Data Type: Point Name: H14 Energy Limited Easting: 390846 Northing: 390622	Annual Volume (m ³): 112,147,200 Max Daily Volume (m ³): 509760 Original Application No: - Original Start Date: 26/01/2012 Expiry Date: 31/03/2029 Issue No: 4 Version Start Date: 01/07/2016 Version End Date: -
A	511m SW	Status: Historical Licence No: NW/069/0011/005 Details: Transfer Between Sources (Post Water Act 2003) Direct Source: Surface, Non-Tidal - North West Region Point: RIVER GOYT AT STRINGERS WEIR Data Type: Point Name: H14 Energy Limited Easting: 390844 Northing: 390620	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: 26/01/2012 Expiry Date: 31/03/2029 Issue No: 4 Version Start Date: 01/07/2016 Version End Date: -
-	1957m SE	Status: Active Licence No: NW/069/0011/003 Details: Mineral Washing Direct Source: Surface, Non-Tidal - North West Region Point: RIVER GOYT MARPLE ROAD Data Type: Point Name: OFFERTON SAND AND GRAVEL LIMITED Easting: 392727 Northing: 389582	Annual Volume (m ³): 37,140 Max Daily Volume (m ³): 300 Original Application No: - Original Start Date: 23/12/2010 Expiry Date: 31/03/2029 Issue No: 2 Version Start Date: 29/07/2011 Version End Date: -
-	1957m SE	Status: Active Licence No: NW/069/0011/003 Details: Mineral Washing Direct Source: Surface, Non-Tidal - North West Region Point: RIVER GOYT, MARPLE ROAD Data Type: Point Name: OFFERTON SAND AND GRAVEL LIMITED Easting: 392727 Northing: 389582	Annual Volume (m ³): 37,140 Max Daily Volume (m ³): 300 Original Application No: - Original Start Date: 23/12/2010 Expiry Date: 31/03/2029 Issue No: 2 Version Start Date: 29/07/2011 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.



5.8 Potable abstractions

Records within 2000m

1

Licensed potable water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 46**

ID	Location	Details	
-	1687m SW	Status: Historical Licence No: 2569013010 Details: Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services Direct Source: Ground Water - North West Region Point: BOREHOLE AT PREMISES, HIGHER HILL GATE, STOCKPORT, GREATER Data Type: Point Name: CHRISTY & CO LTD Easting: 390000 Northing: 389800	Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: - Original Start Date: 07/02/1966 Expiry Date: - Issue No: 100 Version Start Date: 07/01/1993 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.9 Source Protection Zones

Records within 500m

1

Source Protection Zones define the sensitivity of an area around a potable abstraction site to contamination.

Features are displayed on the Abstractions and Source Protection Zones map on **page 46**

ID	Location	Type	Description
1	194m S	3	Total catchment

This data is sourced from the Environment Agency and Natural Resources Wales.

5.10 Source Protection Zones (confined aquifer)

Records within 500m

0

Source Protection Zones in the confined aquifer define the sensitivity around a deep groundwater abstraction to contamination. A confined aquifer would normally be protected from contamination by overlying geology and is only considered a sensitive resource if deep excavation/drilling is taking place.

This data is sourced from the Environment Agency and Natural Resources Wales.



6 Hydrology



- Site Outline
- Search buffers in metres (m)
- Water Network (OS MasterMap)
- Surface water features (wider than 5m)
- Surface water features (narrower than 5m)
- ⋯ WFD River, canal and surface water transfer water bodies
- WFD Lake water bodies
- WFD Transitional and coastal water bodies
- WFD Surface water body catchments boundaries
- WFD Groundwater body boundaries

6.1 Water Network (OS MasterMap)

Records within 250m

4

Detailed water network of Great Britain showing the flow and precise central course of every river, stream, lake and canal.

Features are displayed on the Hydrology map on **page 53**

ID	Location	Type of water feature	Ground level	Permanence	Name
2	212m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	River Goyt

ID	Location	Type of water feature	Ground level	Permanence	Name
4	244m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	River Goyt
B	245m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	River Goyt
C	246m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-

This data is sourced from the Ordnance Survey.

6.2 Surface water features

Records within 250m

2

Covering rivers, streams and lakes (some overlap with OS MasterMap Water Network data in previous section) but additionally covers smaller features such as ponds. Rivers and streams narrower than 5m are represented as a single line. Lakes, ponds and rivers or streams wider than 5m are represented as polygons.

Features are displayed on the Hydrology map on **page 53**

This data is sourced from the Ordnance Survey.

6.3 WFD Surface water body catchments

Records on site

1

The Water Framework Directive is an EU-led framework for the protection of inland surface waters, estuaries, coastal waters and groundwater through river basin-level management planning. In terms of surface water, these basins are broken down into smaller units known as management, operational and water body catchments.

Features are displayed on the Hydrology map on **page 53**

ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
A	On site	River	Goyt (Etherow to Mersey)	GB112069061000	Goyt Etherow Tame	Mersey Upper

This data is sourced from the Environment Agency and Natural Resources Wales.

6.4 WFD Surface water bodies

Records identified	1
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Surface water bodies under the Directive may be rivers, lakes, estuary or coastal. To achieve the purpose of the Directive, environmental objectives have been set and are reported on for each water body. The progress towards delivery of the objectives is then reported on by the relevant competent authorities at the end of each six-year cycle. The river water body directly associated with the catchment listed in the previous section is detailed below, along with any lake, canal, coastal or artificial water body within 250m of the site. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each water body listed.

Features are displayed on the Hydrology map on **page 53**

ID	Location	Type	Name	Water body ID	Overall rating	Chemical rating	Ecological rating	Year
3	213m W	River	Goyt (Etherow to Mersey)	GB112069061000	Poor	Fail	Poor	2019

This data is sourced from the Environment Agency and Natural Resources Wales.

6.5 WFD Groundwater bodies

Records on site	1
------------------------	----------

Groundwater bodies are also covered by the Directive and the same regime of objectives and reporting detailed in the previous section is in place. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each groundwater body listed.

Features are displayed on the Hydrology map on **page 53**

ID	Location	Name	Water body ID	Overall rating	Chemical rating	Quantitative	Year
A	On site	Manchester and East Cheshire Permo-Triassic Sandstone Aquifers	GB41201G101100	Poor	Poor	Poor	2019

This data is sourced from the Environment Agency and Natural Resources Wales.

7 River and coastal flooding

7.1 Risk of flooding from rivers and the sea

Records within 50m

0

The chance of flooding from rivers and/or the sea in any given year, based on cells of 50m within the Risk of Flooding from Rivers and Sea (RoFRaS)/Flood Risk Assessment Wales (FRAW) models. Each cell is allocated one of four flood risk categories, taking into account flood defences and their condition. The risk categories for RoFRaS for rivers and the sea and FRAW for rivers are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 100 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 100 chance) or High (greater than or equal to 1 in 30 chance). The risk categories for FRAW for the sea are; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 200 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 200 chance) or High (greater than or equal to 1 in 30 chance).

This data is sourced from the Environment Agency and Natural Resources Wales.

7.2 Historical Flood Events

Records within 250m

0

Records of historic flooding from rivers, the sea, groundwater and surface water. Records began in 1946 when predecessor bodies started collecting detailed information about flooding incidents, although limited details may be included on flooding incidents prior to this date. Takes into account the presence of defences, structures, and other infrastructure where they existed at the time of flooding, and includes flood extents that may have been affected by overtopping, breaches or blockages.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.3 Flood Defences

Records within 250m

0

Records of flood defences owned, managed or inspected by the Environment Agency and Natural Resources Wales. Flood defences can be structures, buildings or parts of buildings. Typically these are earth banks, stone and concrete walls, or sheet-piling that is used to prevent or control the extent of flooding.

This data is sourced from the Environment Agency and Natural Resources Wales.



7.4 Areas Benefiting from Flood Defences

Records within 250m

0

Areas that would benefit from the presence of flood defences in a 1 in 100 (1%) chance of flooding each year from rivers or 1 in 200 (0.5%) chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.5 Flood Storage Areas

Records within 250m

0

Areas that act as a balancing reservoir, storage basin or balancing pond to attenuate an incoming flood peak to a flow level that can be accepted by the downstream channel or to delay the timing of a flood peak so that its volume is discharged over a longer period.

This data is sourced from the Environment Agency and Natural Resources Wales.

River and coastal flooding - Flood Zones

7.6 Flood Zone 2

Records within 50m

0

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land between Flood Zone 3 (see next section) and the extent of the flooding from rivers or the sea with a 1 in 1000 (0.1%) chance of flooding each year.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.7 Flood Zone 3

Records within 50m

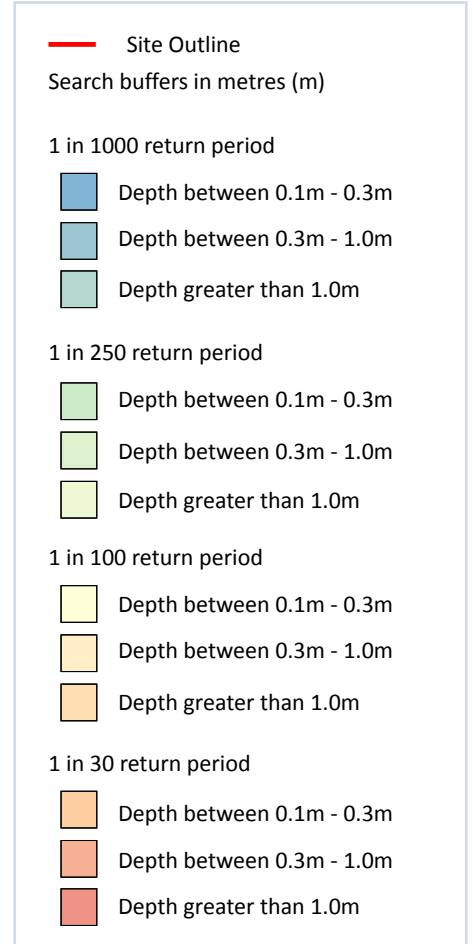
0

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land with a 1 in 100 (1%) or greater chance of flooding each year from rivers or a 1 in 200 (0.5%) or greater chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.



8 Surface water flooding



8.1 Surface water flooding

Highest risk on site

1 in 100 year, 0.1m - 0.3m

Highest risk within 50m

1 in 30 year, 0.1m - 0.3m

Ambiental Risk Analytics surface water (pluvial) FloodMap identifies areas likely to flood as a result of extreme rainfall events, i.e. land naturally vulnerable to surface water ponding or flooding. This data set was produced by simulating 1 in 30 year, 1 in 100 year, 1 in 250 year and 1 in 1,000 year rainfall events. Modern urban drainage systems are typically built to cope with rainfall events between 1 in 20 and 1 in 30 years, though some older ones may flood in a 1 in 5 year rainfall event.

Features are displayed on the Surface water flooding map on **page 59**

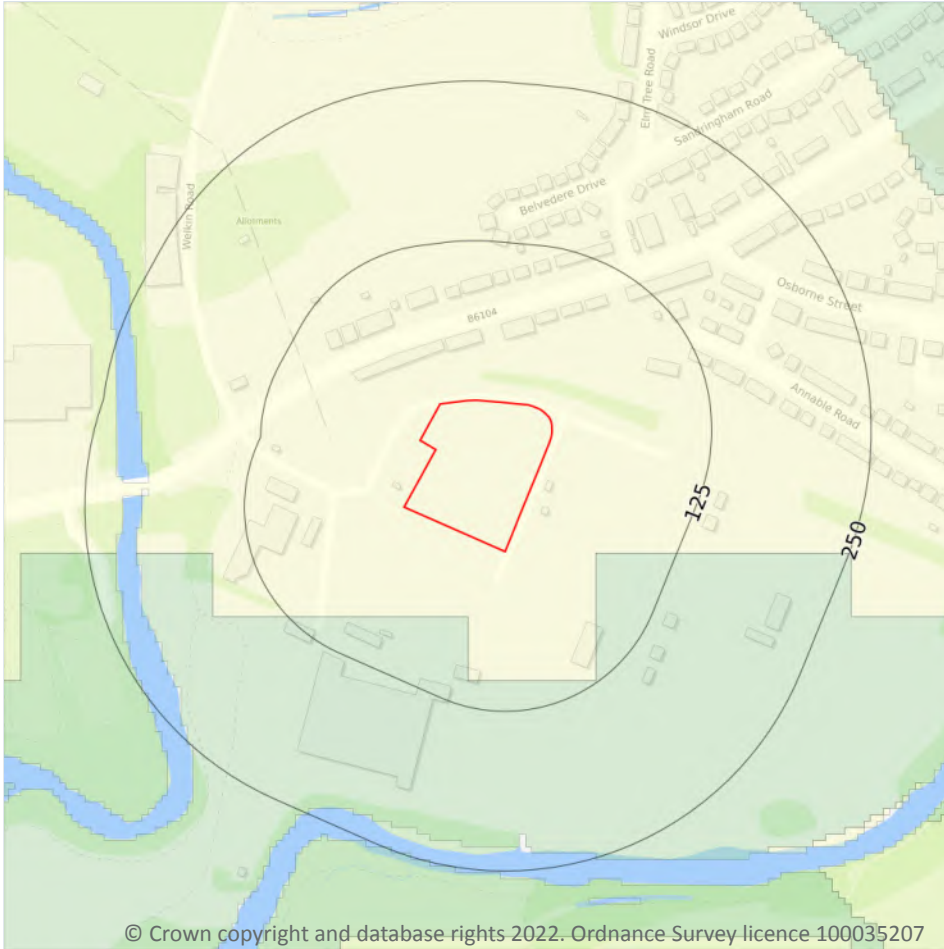
The data shown on the map and in the table above shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on a site.

The table below shows the maximum flood depths for a range of return periods for the site.

Return period	Maximum modelled depth
1 in 1000 year	Between 0.1m and 0.3m
1 in 250 year	Between 0.1m and 0.3m
1 in 100 year	Between 0.1m and 0.3m
1 in 30 year	Negligible

This data is sourced from Ambiental Risk Analytics.

9 Groundwater flooding



— Site Outline
Search buffers in metres (m)

- High
- Moderate - High
- Moderate
- Low
- Negligible

9.1 Groundwater flooding

Highest risk on site

Moderate

Highest risk within 50m

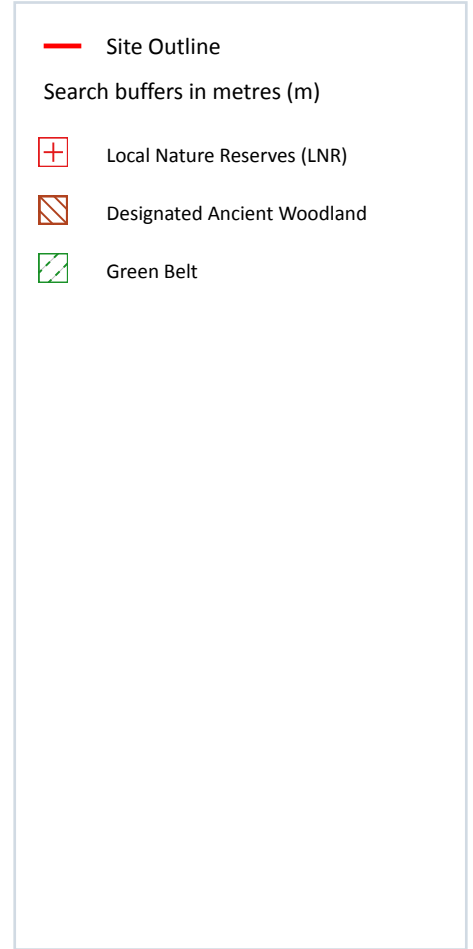
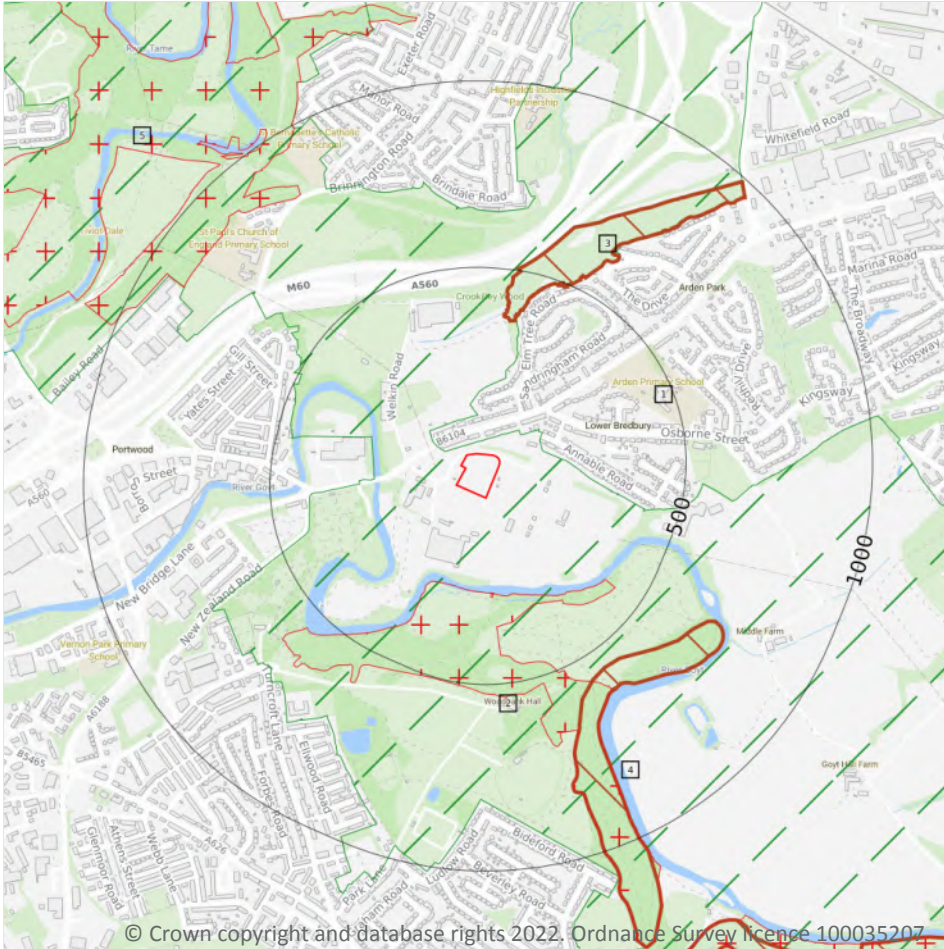
Moderate

Groundwater flooding is caused by unusually high groundwater levels. It occurs when the water table rises above the ground surface or within underground structures such as basements or cellars. Groundwater flooding tends to exhibit a longer duration than surface water flooding, possibly lasting for weeks or months, and as a result it can cause significant damage to property. This risk assessment is based on a 1 in 100 year return period and a 5m Digital Terrain Model (DTM).

Features are displayed on the Groundwater flooding map on **page 61**

This data is sourced from Ambiental Risk Analytics.

10 Environmental designations



10.1 Sites of Special Scientific Interest (SSSI)

Records within 2000m

0

Sites providing statutory protection for the best examples of UK flora, fauna, or geological or physiographical features. Originally notified under the National Parks and Access to the Countryside Act 1949, SSSIs were re-notified under the Wildlife and Countryside Act 1981. Improved provisions for the protection and management of SSSIs were introduced by the Countryside and Rights of Way Act 2000 (in England and Wales) and (in Scotland) by the Nature Conservation (Scotland) Act 2004 and the Wildlife and Natural Environment (Scotland) Act 2010.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.2 Conserved wetland sites (Ramsar sites)

Records within 2000m

0

Ramsar sites are designated under the Convention on Wetlands of International Importance, agreed in Ramsar, Iran, in 1971. They cover all aspects of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities. These sites cover a broad definition of wetland; marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, and even some marine areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.3 Special Areas of Conservation (SAC)

Records within 2000m

0

Areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.4 Special Protection Areas (SPA)

Records within 2000m

0

Sites classified by the UK Government under the EC Birds Directive, SPAs are areas of the most important habitat for rare (listed on Annex I to the Directive) and migratory birds within the European Union.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.5 National Nature Reserves (NNR)

Records within 2000m

0

Sites containing examples of some of the most important natural and semi-natural terrestrial and coastal ecosystems in Great Britain. They are managed to conserve their habitats, provide special opportunities for scientific study or to provide public recreation compatible with natural heritage interests.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.6 Local Nature Reserves (LNR)

Records within 2000m

4

Sites managed for nature conservation, and to provide opportunities for research and education, or simply enjoying and having contact with nature. They are declared by local authorities under the National Parks and Access to the Countryside Act 1949 after consultation with the relevant statutory nature conservation agency.

Features are displayed on the Environmental designations map on **page 62**

ID	Location	Name	Data source
2	249m S	Woodbank Park	Natural England
5	827m NW	Reddish Vale	Natural England
A	1297m SE	Poise Brook	Natural England
-	1810m NW	Reddish Vale	Natural England

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.7 Designated Ancient Woodland

Records within 2000m

3

Ancient woodlands are classified as areas which have been wooded continuously since at least 1600 AD. This includes semi-natural woodland and plantations on ancient woodland sites. 'Wooded continuously' does not mean there is or has previously been continuous tree cover across the whole site, and not all trees within the woodland have to be old.

Features are displayed on the Environmental designations map on **page 62**

ID	Location	Name	Woodland Type
3	363m N	Crookilley Wood	Ancient & Semi-Natural Woodland
4	555m SE	Unknown	Ancient & Semi-Natural Woodland
A	1297m SE	Offerton Wood	Ancient & Semi-Natural Woodland

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.8 Biosphere Reserves

Records within 2000m

0

Biosphere Reserves are internationally recognised by UNESCO as sites of excellence to balance conservation and socioeconomic development between nature and people. They are recognised under the Man and the Biosphere (MAB) Programme with the aim of promoting sustainable development founded on the work of the

local community.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.9 Forest Parks

Records within 2000m

0

These are areas managed by the Forestry Commission designated on the basis of recreational, conservation or scenic interest.

This data is sourced from the Forestry Commission.

10.10 Marine Conservation Zones

Records within 2000m

0

A type of marine nature reserve in UK waters established under the Marine and Coastal Access Act (2009). They are designated with the aim to protect nationally important, rare or threatened habitats and species.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.11 Green Belt

Records within 2000m

1

Areas designated to prevent urban sprawl by keeping land permanently open.

Features are displayed on the Environmental designations map on **page 62**

ID	Location	Name	Local Authority name
1	On site	Merseyside and Greater Manchester	Stockport

This data is sourced from the Ministry of Housing, Communities and Local Government.

10.12 Proposed Ramsar sites

Records within 2000m

0

Ramsar sites are areas listed as a Wetland of International Importance under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (the Ramsar Convention) 1971. The sites here supplied have a status of 'Proposed' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.13 Possible Special Areas of Conservation (pSAC)

Records within 2000m

0

Special Areas of Conservation are areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive. Those sites supplied here are those with a status of 'Possible' having been identified for potential adoption under the framework.

This data is sourced from Natural England and Natural Resources Wales.

10.14 Potential Special Protection Areas (pSPA)

Records within 2000m

0

Special Protection Areas (SPAs) are areas designated (or 'classified') under the European Union Wild Birds Directive for the protection of nationally and internationally important populations of wild birds. Those sites supplied here are those with a status of 'Potential' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.15 Nitrate Sensitive Areas

Records within 2000m

0

Areas where nitrate concentrations in drinking water sources exceeded or was at risk of exceeding the limit of 50 mg/l set by the 1980 EC Drinking Water Directive. Voluntary agricultural measures as a means of reducing the levels of nitrate were introduced by DEFRA as MAFF, with payments being made to farmers who complied. The scheme was started as a pilot in 1990 in ten areas, later implemented within 32 areas. The scheme was closed to further new entrants in 1998, although existing agreements continued for their full term. All Nitrate Sensitive Areas fell within the areas designated as Nitrate Vulnerable Zones (NVZs) in 1996 under the EC Nitrate Directive (91/676/EEC).

This data is sourced from Natural England.

10.16 Nitrate Vulnerable Zones

Records within 2000m

0

Areas at risk from agricultural nitrate pollution designated under the EC Nitrate Directive (91/676/EEC). These are areas of land that drain into waters polluted by nitrates. Farmers operating within these areas have to follow mandatory rules to tackle nitrate loss from agriculture.

This data is sourced from Natural England and Natural Resources Wales.



SSSI Impact Zones and Units

10.17 SSSI Impact Risk Zones

Records on site

0

Developed to allow rapid initial assessment of the potential risks to SSSIs posed by development proposals. They define zones around each SSSI which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts.

This data is sourced from Natural England.

10.18 SSSI Units

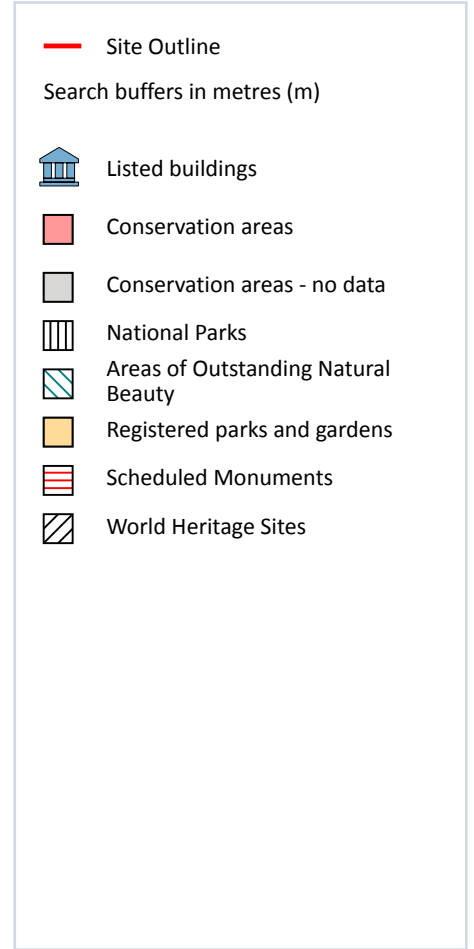
Records within 2000m

0

Divisions of SSSIs used to record management and condition details. Units are the smallest areas for which Natural England gives a condition assessment, however, the size of units varies greatly depending on the types of management and the conservation interest.

This data is sourced from Natural England and Natural Resources Wales.

11 Visual and cultural designations



11.1 World Heritage Sites

Records within 250m

0

Sites designated for their globally important cultural or natural interest requiring appropriate management and protection measures. World Heritage Sites are designated to meet the UK's commitments under the World Heritage Convention.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.2 Area of Outstanding Natural Beauty

Records within 250m

0

Areas of Outstanding Natural Beauty (AONB) are conservation areas, chosen because they represent 18% of the finest countryside. Each AONB has been designated for special attention because of the quality of their flora, fauna, historical and cultural associations, and/or scenic views. The National Parks and Access to the Countryside Act of 1949 created AONBs and the Countryside and Rights of Way Act, 2000 added further regulation and protection. There are likely to be restrictions to some developments within these areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

11.3 National Parks

Records within 250m

0

In England and Wales, the purpose of National Parks is to conserve and enhance landscapes within the countryside whilst promoting public enjoyment of them and having regard for the social and economic well-being of those living within them. In Scotland National Parks have the additional purpose of promoting the sustainable use of the natural resources of the area and the sustainable social and economic development of its communities. The National Parks and Access to the Countryside Act 1949 established the National Park designation in England and Wales, and The National Parks (Scotland) Act 2000 in Scotland.

This data is sourced from Natural England, Natural Resources Wales and the Scottish Government.

11.4 Listed Buildings

Records within 250m

1

Buildings listed for their special architectural or historical interest. Building control in the form of 'listed building consent' is required in order to make any changes to that building which might affect its special interest. Listed buildings are graded to indicate their relative importance, however building controls apply to all buildings equally, irrespective of their grade, and apply to the interior and exterior of the building in its entirety, together with any curtilage structures.

Features are displayed on the Visual and cultural designations map on **page 68**

ID	Location	Name	Grade	Reference Number	Listed date
1	165m SW	Pear New Mill, Bredbury And Woodley, Stockport, SK6	II*	1240634	20/06/1991

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.5 Conservation Areas

Records within 250m

0

Local planning authorities are obliged to designate as conservation areas any parts of their own area that are of special architectural or historic interest, the character and appearance of which it is desirable to preserve or enhance. Designation of a conservation area gives broader protection than the listing of individual buildings. All the features within the area, listed or otherwise, are recognised as part of its character. Conservation area designation is the means of recognising the importance of all factors and of ensuring that planning decisions address the quality of the landscape in its broadest sense.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.6 Scheduled Ancient Monuments

Records within 250m

0

A scheduled monument is an historic building or site that is included in the Schedule of Monuments kept by the Secretary of State for Digital, Culture, Media and Sport. The regime is set out in the Ancient Monuments and Archaeological Areas Act 1979. The Schedule of Monuments has c.20,000 entries and includes sites such as Roman remains, burial mounds, castles, bridges, earthworks, the remains of deserted villages and industrial sites. Monuments are not graded, but all are, by definition, considered to be of national importance.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.7 Registered Parks and Gardens

Records within 250m

1

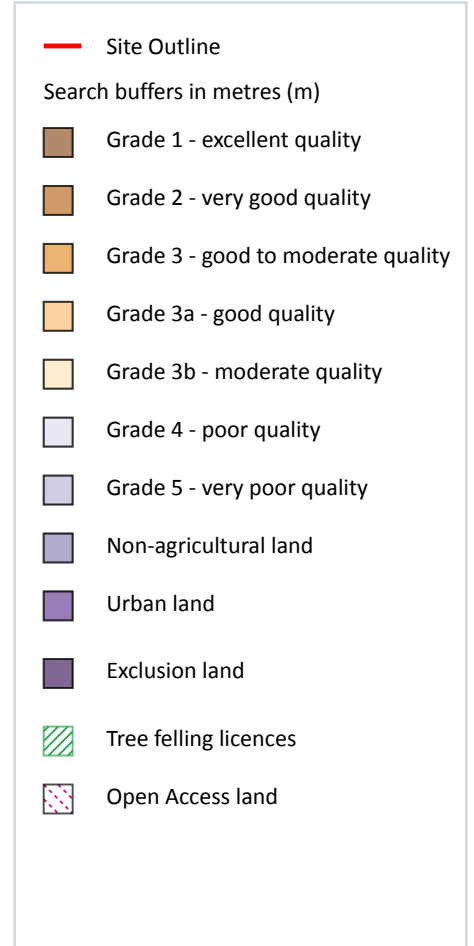
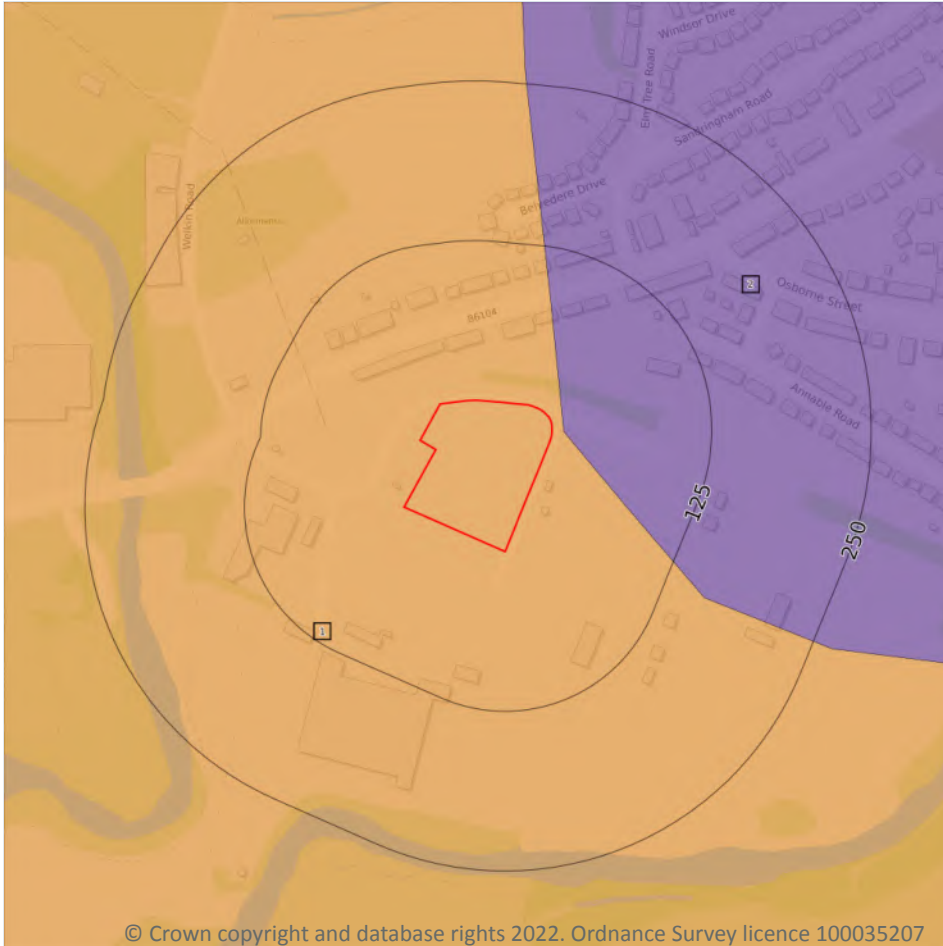
Parks and gardens assessed to be of particular interest and of special historic interest. The emphasis being on 'designed' landscapes, rather than on planting or botanical importance. Registration is a 'material consideration' in the planning process, meaning that planning authorities must consider the impact of any proposed development on the special character of the landscape.

Features are displayed on the Visual and cultural designations map on **page 68**

ID	Location	Name	Grade
2	219m W	Vernon Park	II

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

12 Agricultural designations



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12.1 Agricultural Land Classification

Records within 250m

2

Classification of the quality of agricultural land taking into consideration multiple factors including climate, physical geography and soil properties. It should be noted that the categories for the grading of agricultural land are not consistent across England, Wales and Scotland.

Features are displayed on the Agricultural designations map on **page 71**

ID	Location	Classification	Description
1	On site	Grade 3	Good to moderate quality agricultural land. Land with moderate limitations which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. Where more demanding crops are grown yields are generally lower or more variable than on land in Grades 1 and 2.
2	9m E	Urban	-

This data is sourced from Natural England.

12.2 Open Access Land

Records within 250m

0

The Countryside and Rights of Way Act 2000 (CROW Act) gives a public right of access to land without having to use paths. Access land includes mountains, moors, heaths and downs that are privately owned. It also includes common land registered with the local council and some land around the England Coast Path. Generally permitted activities on access land are walking, running, watching wildlife and climbing.

This data is sourced from Natural England and Natural Resources Wales.

12.3 Tree Felling Licences

Records within 250m

0

Felling Licence Application (FLA) areas approved by Forestry Commission England. Anyone wishing to fell trees must ensure that a licence or permission under a grant scheme has been issued by the Forestry Commission before any felling is carried out or that one of the exceptions apply.

This data is sourced from the Forestry Commission.

12.4 Environmental Stewardship Schemes

Records within 250m

0

Environmental Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. The schemes identified may be historical schemes that have now expired, or may still be active.

This data is sourced from Natural England.

12.5 Countryside Stewardship Schemes

Records within 250m

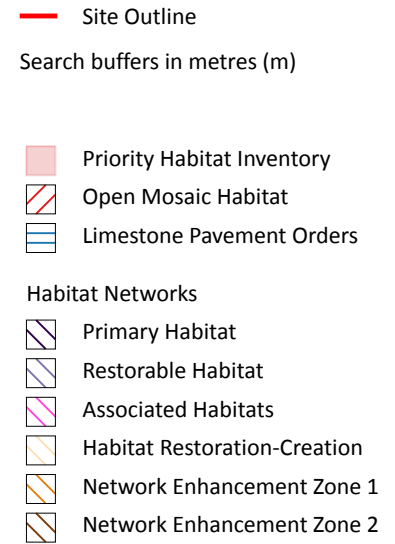
0

Countryside Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. Main objectives are to improve the farmed environment for wildlife and to reduce diffuse water pollution.

This data is sourced from Natural England.



13 Habitat designations



13.1 Priority Habitat Inventory

Records within 250m

8

Habitats of principal importance as named under Natural Environment and Rural Communities Act (2006) Section 41.

Features are displayed on the Habitat designations map on **page 73**

ID	Location	Main Habitat	Other habitats
1	75m S	No main habitat but additional habitats present	Additional: DWOOD (INV 50%)
2	122m SW	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
3	139m W	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
4	195m W	Deciduous woodland	Main habitat: DWOOD (INV > 50%)

ID	Location	Main Habitat	Other habitats
A	203m W	No main habitat but additional habitats present	Additional: DWOOD (INV 50%)
5	220m W	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
A	233m W	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
6	245m W	Deciduous woodland	Main habitat: DWOOD (INV > 50%)

This data is sourced from Natural England.

13.2 Habitat Networks

Records within 250m

0

Habitat networks for 18 priority habitat networks (based primarily, but not exclusively, on the priority habitat inventory) and areas suitable for the expansion of networks through restoration and habitat creation.

This data is sourced from Natural England.

13.3 Open Mosaic Habitat

Records within 250m

0

Sites verified as Open Mosaic Habitat. Mosaic habitats are brownfield sites that are identified under the UK Biodiversity Action Plan as a priority habitat due to the habitat variation within a single site, supporting an array of invertebrates.

This data is sourced from Natural England.

13.4 Limestone Pavement Orders

Records within 250m

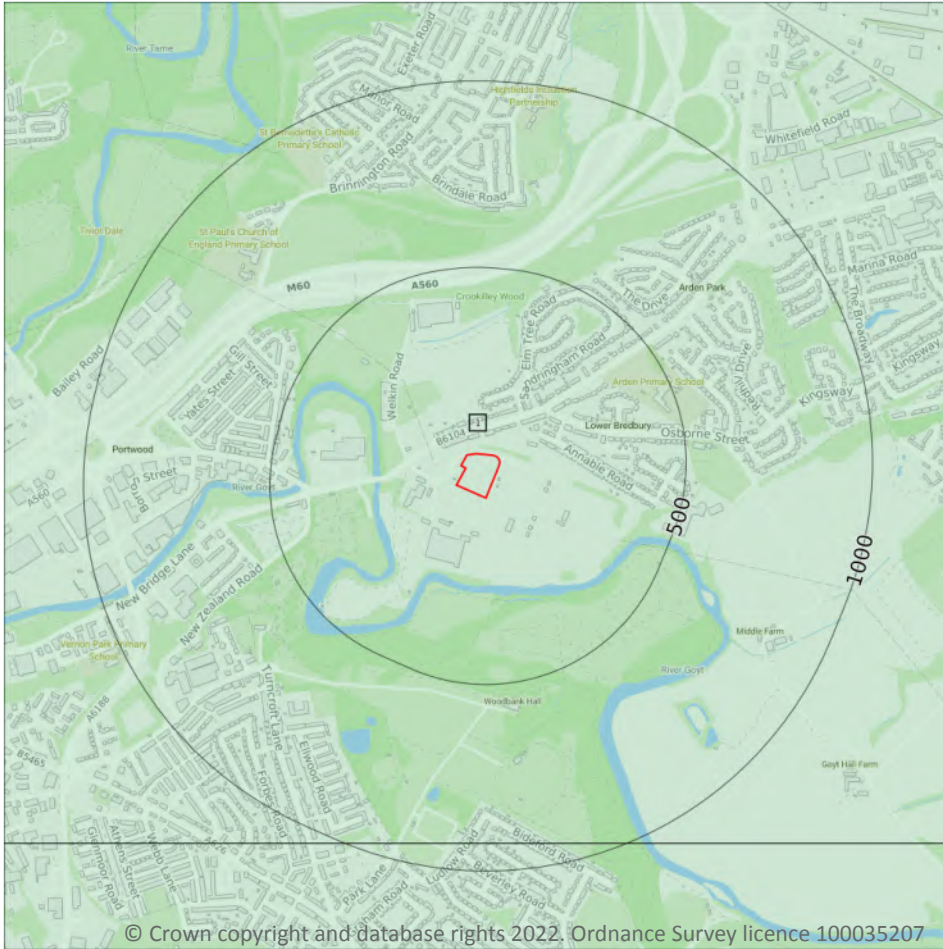
0

Limestone pavements are outcrops of limestone where the surface has been worn away by natural means over millennia. These rocks have the appearance of paving blocks, hence their name. Not only do they have geological interest, they also provide valuable habitats for wildlife. These habitats are threatened due to their removal for use in gardens and water features. Many limestone pavements have been designated as SSSIs which affords them some protection. In addition, Section 34 of the Wildlife and Countryside Act 1981 gave them additional protection via the creation of Limestone Pavement Orders, which made it a criminal offence to remove any part of the outcrop. The associated Limestone Pavement Priority Habitat is part of the UK Biodiversity Action Plan priority habitat in England.

This data is sourced from Natural England.



14 Geology 1:10,000 scale - Availability



— Site Outline
 Search buffers in metres (m)

- Full coverage
- Partial coverage
- No coverage

14.1 10k Availability

Records within 500m

1

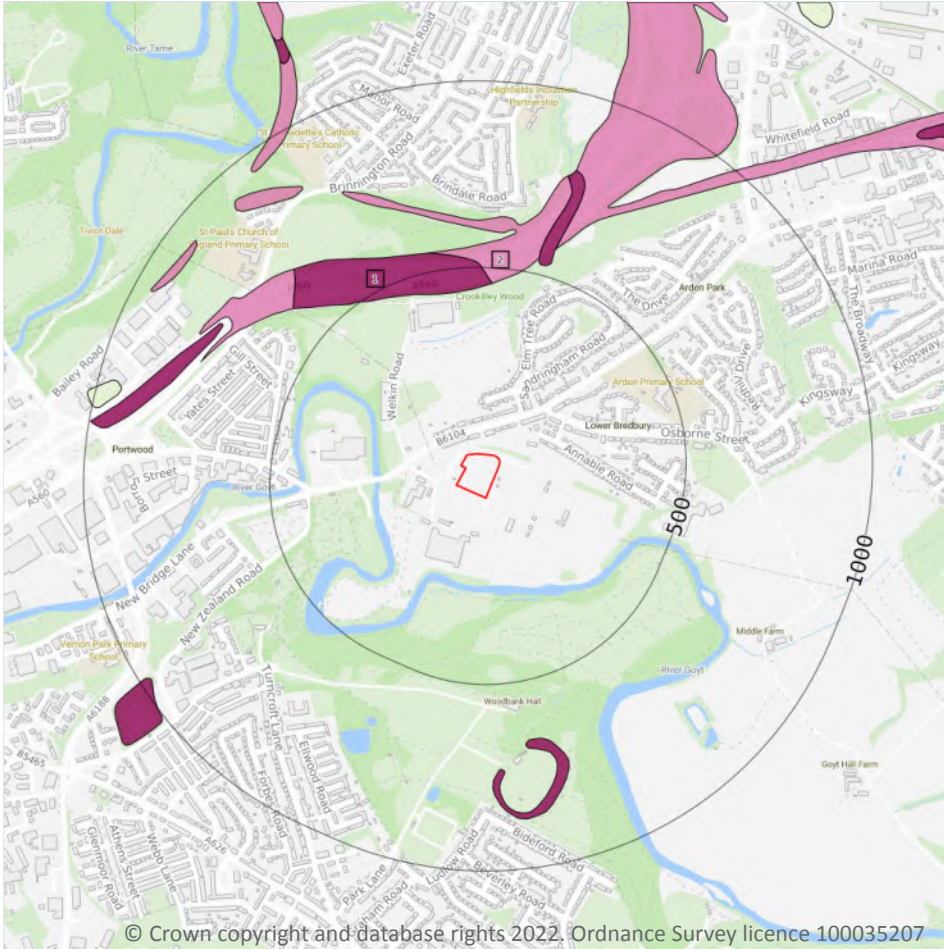
An indication on the coverage of 1:10,000 scale geology data for the site, the most detailed dataset provided by the British Geological Survey. Either 'Full', 'Partial' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:10,000 scale - Availability map on **page 75**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	On site	Full	Full	Full	Full	SJ99SW

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Artificial and made ground



- Site Outline
- Search buffers in metres (m)
- Reclaimed ground
- Made ground
- Worked ground
- Infilled ground
- Disturbed ground
- Landscaped ground

14.2 Artificial and made ground (10k)

Records within 500m

2

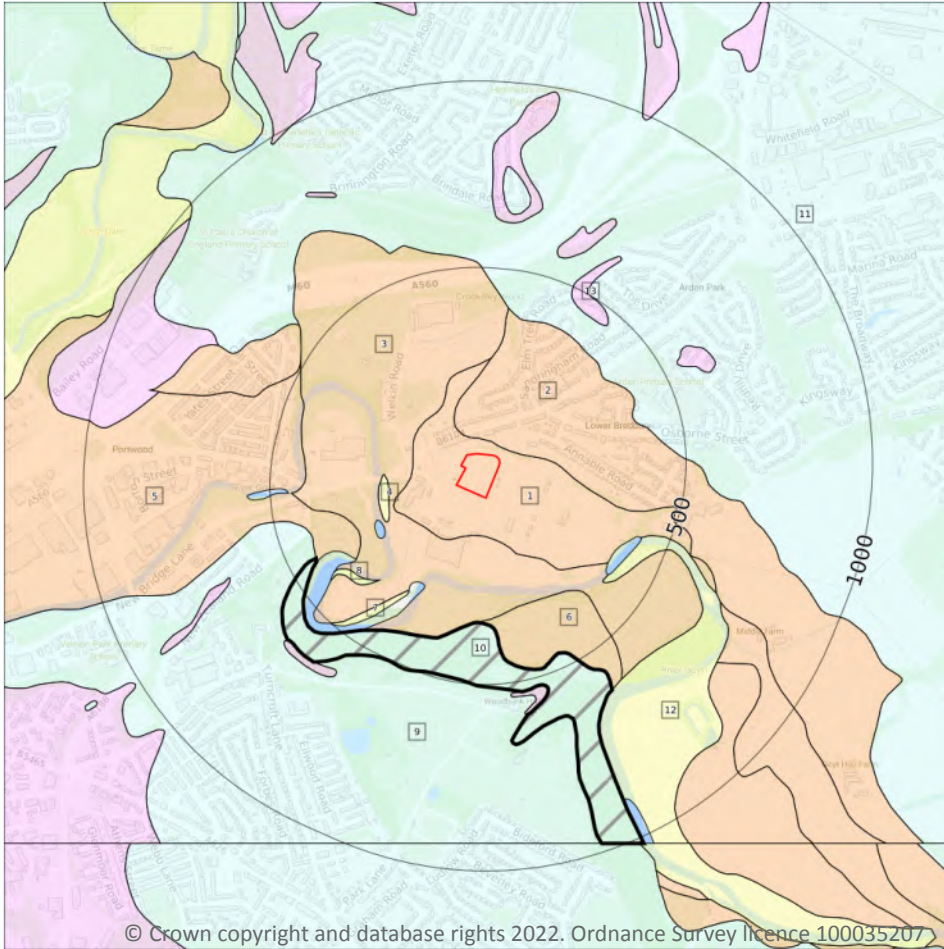
Details of made, worked, infilled, disturbed and landscaped ground at 1:10,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

Features are displayed on the Geology 1:10,000 scale - Artificial and made ground map on **page 76**

ID	Location	LEX Code	Description	Rock description
1	436m N	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
2	459m N	WGR-VOID	Worked Ground (Undivided)	Void

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Superficial



- Site Outline
- Search buffers in metres (m)
- Landslip (10k)
- Superficial geology (10k)
Please see table for more details.

14.3 Superficial geology (10k)

Records within 500m

12

Superficial geological deposits at 1:10,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:10,000 scale - Superficial map on **page 77**

ID	Location	LEX Code	Description	Rock description
1	On site	RTD2-XSV	River Terrace Deposits, 2 - Sand And Gravel	Sand And Gravel
2	28m NE	RTD3-XSV	River Terrace Deposits, 3 - Sand And Gravel	Sand And Gravel
3	103m S	RTD1-XSV	River Terrace Deposits, 1 - Sand And Gravel	Sand And Gravel
4	182m W	ALV-XCZSV	Alluvium - Clay, Silt, Sand And Gravel	Clay, Silt, Sand And Gravel

ID	Location	LEX Code	Description	Rock description
5	290m SW	RTD2-XSV	River Terrace Deposits, 2 - Sand And Gravel	Sand And Gravel
6	303m S	RTD2-XSV	River Terrace Deposits, 2 - Sand And Gravel	Sand And Gravel
7	310m SW	ALV-XCZSV	Alluvium - Clay, Silt, Sand And Gravel	Clay, Silt, Sand And Gravel
8	329m SW	ALV-XCZSV	Alluvium - Clay, Silt, Sand And Gravel	Clay, Silt, Sand And Gravel
9	334m S	TILLD-DMTN	Till, Devensian - Diamicton	Diamicton
11	355m NE	TILLD-DMTN	Till, Devensian - Diamicton	Diamicton
12	384m SE	ALV-XCZSV	Alluvium - Clay, Silt, Sand And Gravel	Clay, Silt, Sand And Gravel
13	451m NE	GFICD-XSV	Glaciofluvial Ice Contact Deposits, Devensian - Sand And Gravel	Sand And Gravel

This data is sourced from the British Geological Survey.

14.4 Landslip (10k)

Records within 500m

1

Mass movement deposits on BGS geological maps at 1:10,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

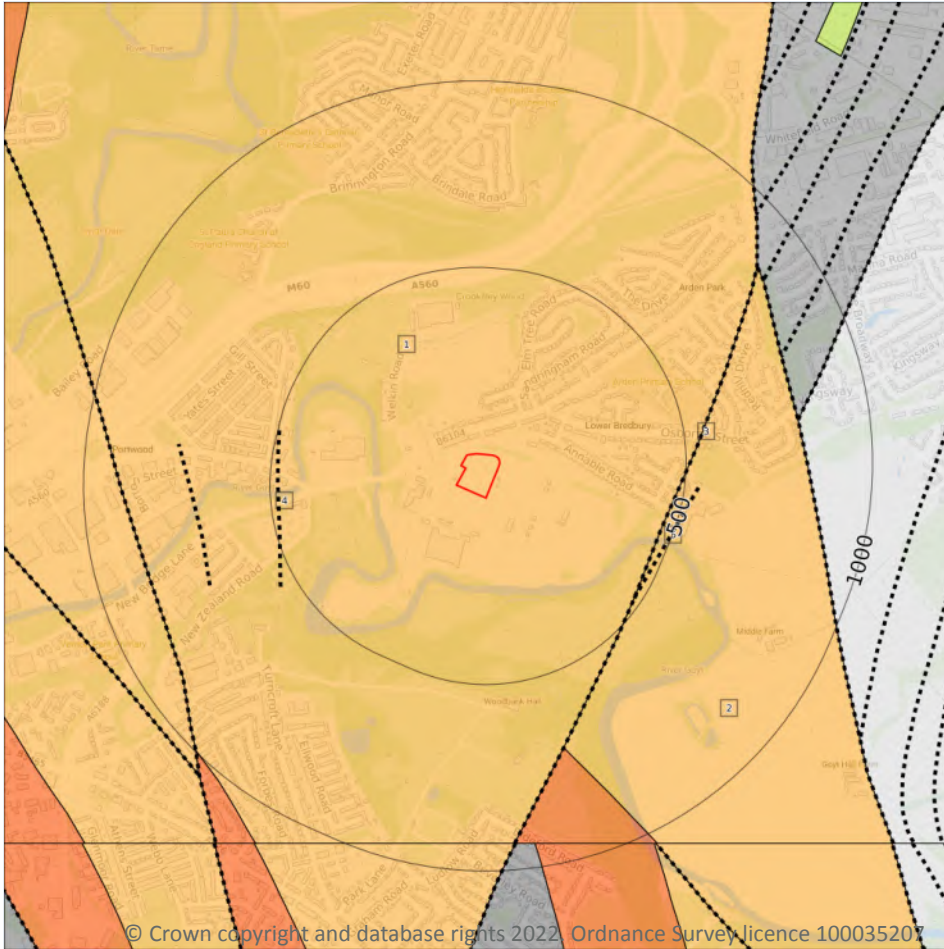
Features are displayed on the Geology 1:10,000 scale - Superficial map on **page 77**

ID	Location	LEX Code	Description	Rock description
10	334m S	SLIP-UNKNOWN	Landslide Deposits	Unknown/unclassified Entry

This data is sourced from the British Geological Survey.



Geology 1:10,000 scale - Bedrock



- Site Outline
- Search buffers in metres (m)
- Bedrock faults and other linear features (10k)
- Bedrock geology (10k)
Please see table for more details.

14.5 Bedrock geology (10k)

Records within 500m

2

Bedrock geology at 1:10,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:10,000 scale - Bedrock map on **page 79**

ID	Location	LEX Code	Description	Rock age
1	On site	CS-SDST	Collyhurst Sandstone Formation - Sandstone	Cisuralian Epoch
2	467m E	CS-SDST	Collyhurst Sandstone Formation - Sandstone	Cisuralian Epoch

This data is sourced from the British Geological Survey.

14.6 Bedrock faults and other linear features (10k)

Records within 500m

3

Linear features at the ground or bedrock surface at 1:10,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

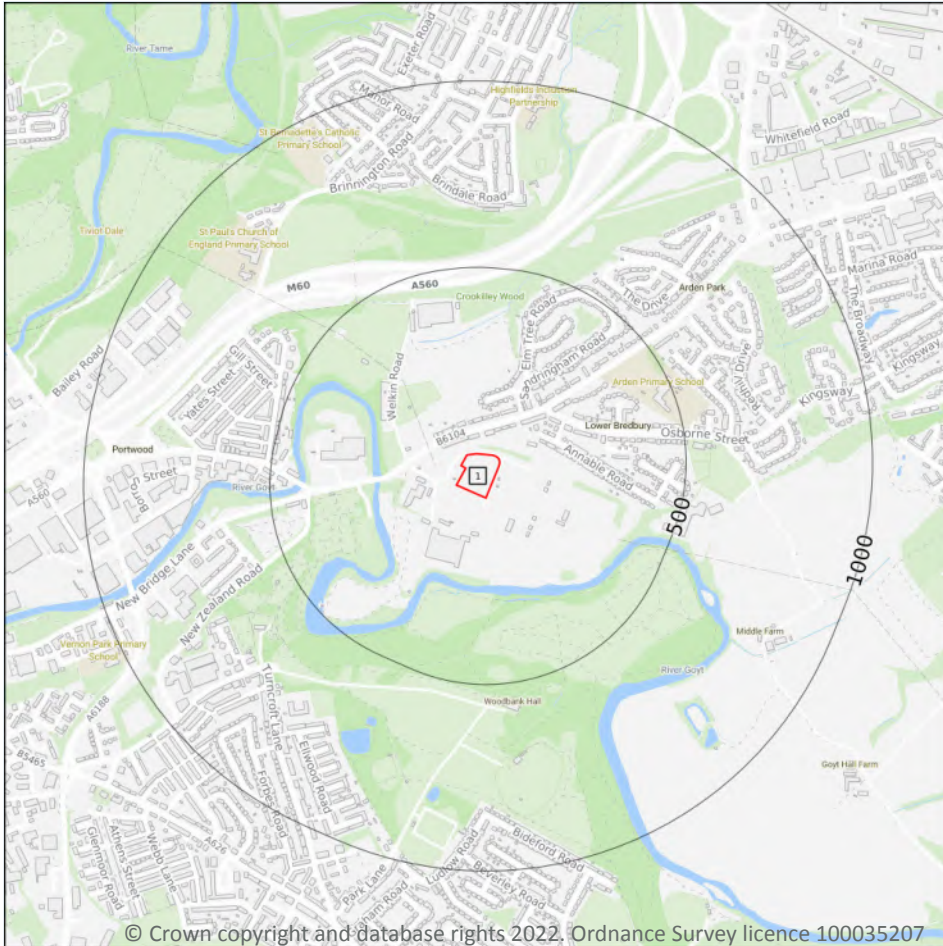
Features are displayed on the Geology 1:10,000 scale - Bedrock map on **page 79**

ID	Location	Category	Description
3	467m E	FAULT	Normal fault, inferred; crossmarks on downthrow side
4	478m W	FAULT	Normal fault, inferred; crossmarks on downthrow side
5	479m SE	FAULT	Normal fault, inferred; crossmarks on downthrow side

This data is sourced from the British Geological Survey.



15 Geology 1:50,000 scale - Availability



- Site Outline
- Search buffers in metres (m)
- Geological map tile

15.1 50k Availability

Records within 500m

1

An indication on the coverage of 1:50,000 scale geology data for the site. Either 'Full' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:50,000 scale - Availability map on **page 81**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	On site	No coverage	Full	Full	Full	EW098_stockport_v4

This data is sourced from the British Geological Survey.



Geology 1:50,000 scale - Artificial and made ground

15.2 Artificial and made ground (50k)

Records within 500m

0

Details of made, worked, infilled, disturbed and landscaped ground at 1:50,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

This data is sourced from the British Geological Survey.

15.3 Artificial ground permeability (50k)

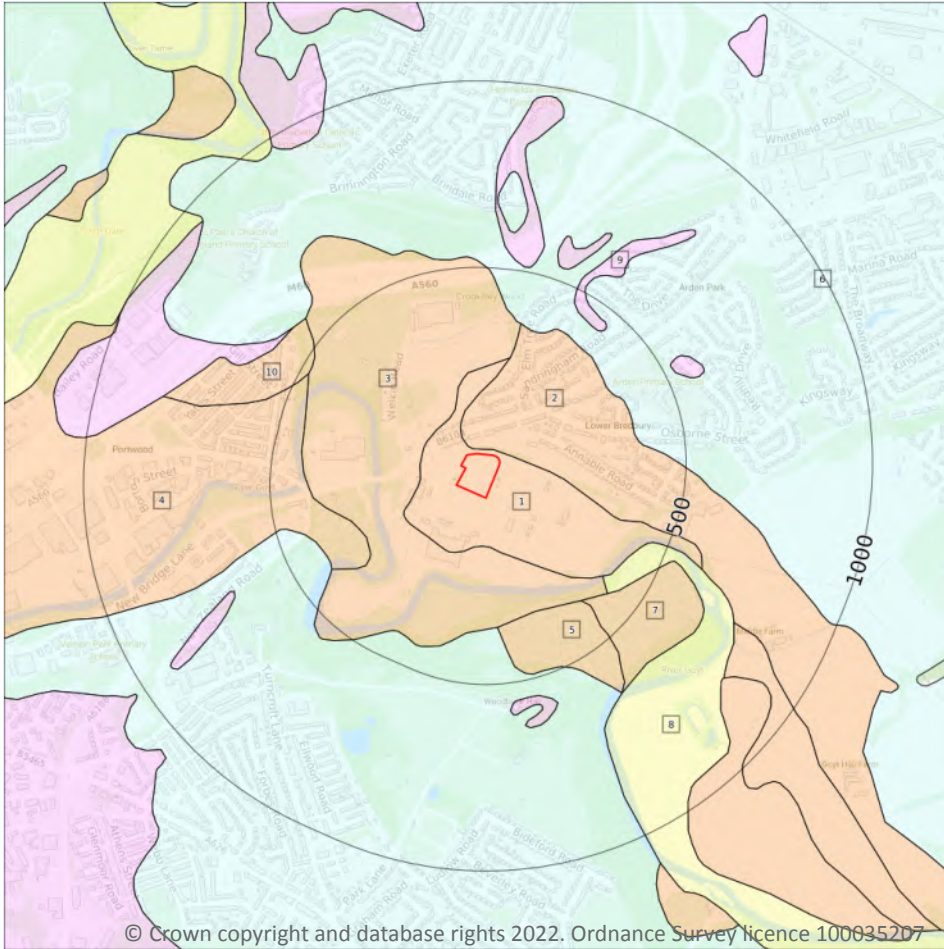
Records within 50m

0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any artificial deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Superficial



- Site Outline
- Search buffers in metres (m)
- Landslip (50k)
- Superficial geology (50k)
Please see table for more details.

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15.4 Superficial geology (50k)

Records within 500m

10

Superficial geological deposits at 1:50,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:50,000 scale - Superficial map on **page 83**

ID	Location	LEX Code	Description	Rock description
1	On site	RTDU-XSV	RIVER TERRACE DEPOSITS (UNDIFFERENTIATED)	SAND AND GRAVEL
2	13m N	RTDU-XSV	RIVER TERRACE DEPOSITS (UNDIFFERENTIATED)	SAND AND GRAVEL
3	98m W	RTDU-XSV	RIVER TERRACE DEPOSITS (UNDIFFERENTIATED)	SAND AND GRAVEL
4	279m SW	RTDU-XSV	RIVER TERRACE DEPOSITS (UNDIFFERENTIATED)	SAND AND GRAVEL

ID	Location	LEX Code	Description	Rock description
5	331m SE	RTDU-XSV	RIVER TERRACE DEPOSITS (UNDIFFERENTIATED)	SAND AND GRAVEL
6	347m NE	TILLD-DMTN	TILL, DEVENSIAN	DIAMICTON
7	375m SE	RTDU-XSV	RIVER TERRACE DEPOSITS (UNDIFFERENTIATED)	SAND AND GRAVEL
8	376m SE	ALV-XCZSV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL
9	434m NE	GFDUD-XSV	GLACIOFLUVIAL DEPOSITS, DEVENSIAN	SAND AND GRAVEL
10	477m NW	RTDU-XSV	RIVER TERRACE DEPOSITS (UNDIFFERENTIATED)	SAND AND GRAVEL

This data is sourced from the British Geological Survey.

15.5 Superficial permeability (50k)

Records within 50m

1

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any superficial deposits (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	Intergranular	Very High	High

This data is sourced from the British Geological Survey.

15.6 Landslip (50k)

Records within 500m

0

Mass movement deposits on BGS geological maps at 1:50,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

15.7 Landslip permeability (50k)

Records within 50m

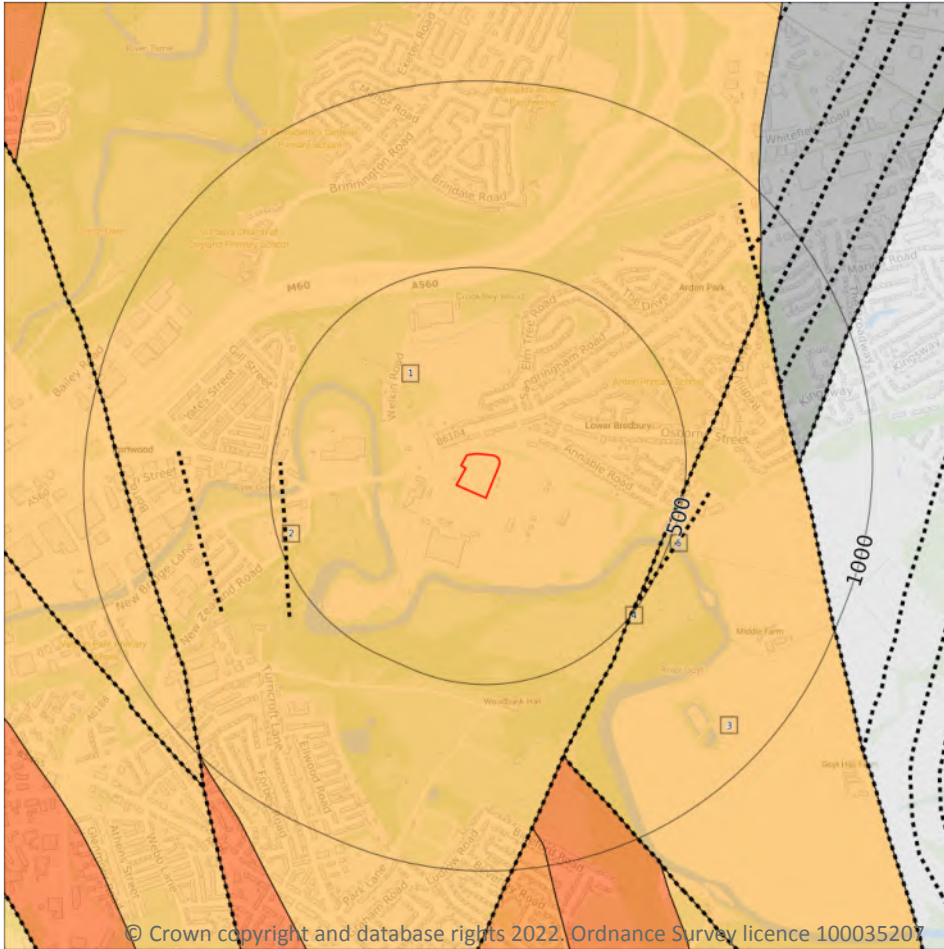
0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any landslip deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.



Geology 1:50,000 scale - Bedrock



- Site Outline
- Search buffers in metres (m)
- Bedrock faults and other linear features (50k)
- Bedrock geology (50k)
Please see table for more details.

15.8 Bedrock geology (50k)

Records within 500m

2

Bedrock geology at 1:50,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 85**

ID	Location	LEX Code	Description	Rock age
1	On site	CS-SDST	COLLYHURST SANDSTONE FORMATION - SANDSTONE	-
3	480m E	CS-SDST	COLLYHURST SANDSTONE FORMATION - SANDSTONE	-

This data is sourced from the British Geological Survey.

15.9 Bedrock permeability (50k)

Records within 50m

1

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of bedrock (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	Intergranular	High	High

This data is sourced from the British Geological Survey.

15.10 Bedrock faults and other linear features (50k)

Records within 500m

3

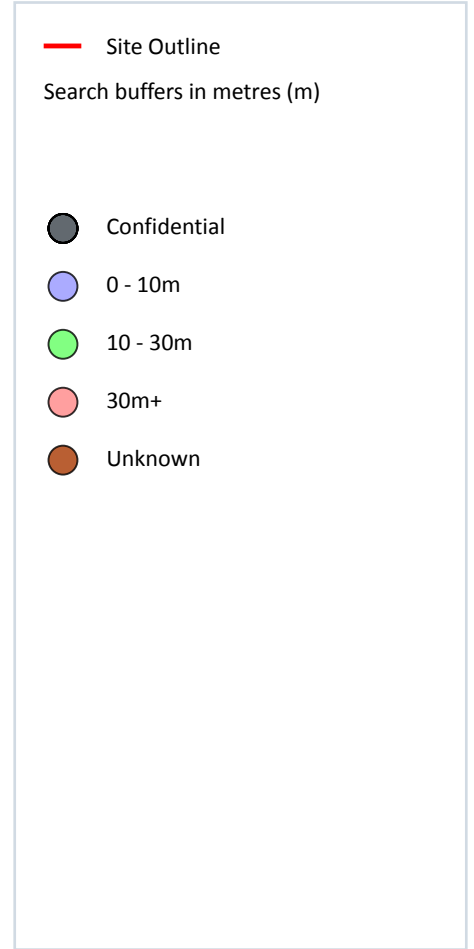
Linear features at the ground or bedrock surface at 1:50,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 85**

ID	Location	Category	Description
2	467m W	FAULT	Fault, inferred
4	480m E	FAULT	Fault, inferred
5	494m SE	FAULT	Fault, inferred

This data is sourced from the British Geological Survey.

16 Boreholes



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16.1 BGS Boreholes

Records within 250m

1

The Single Onshore Boreholes Index (SOBI); an index of over one million records of boreholes, shafts and wells from all forms of drilling and site investigation work held by the British Geological Survey. Covering onshore and nearshore boreholes dating back to at least 1790 and ranging from one to several thousand metres deep. Features are displayed on the Boreholes map on **page 87**

ID	Location	Grid reference	Name	Length	Confidential	Web link
1	243m NW	391030 391140	VERNON PARK	61.11	N	188349

This data is sourced from the British Geological Survey.

17 Natural ground subsidence - Shrink swell clays



— Site Outline
Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.1 Shrink swell clays

Records within 50m

1

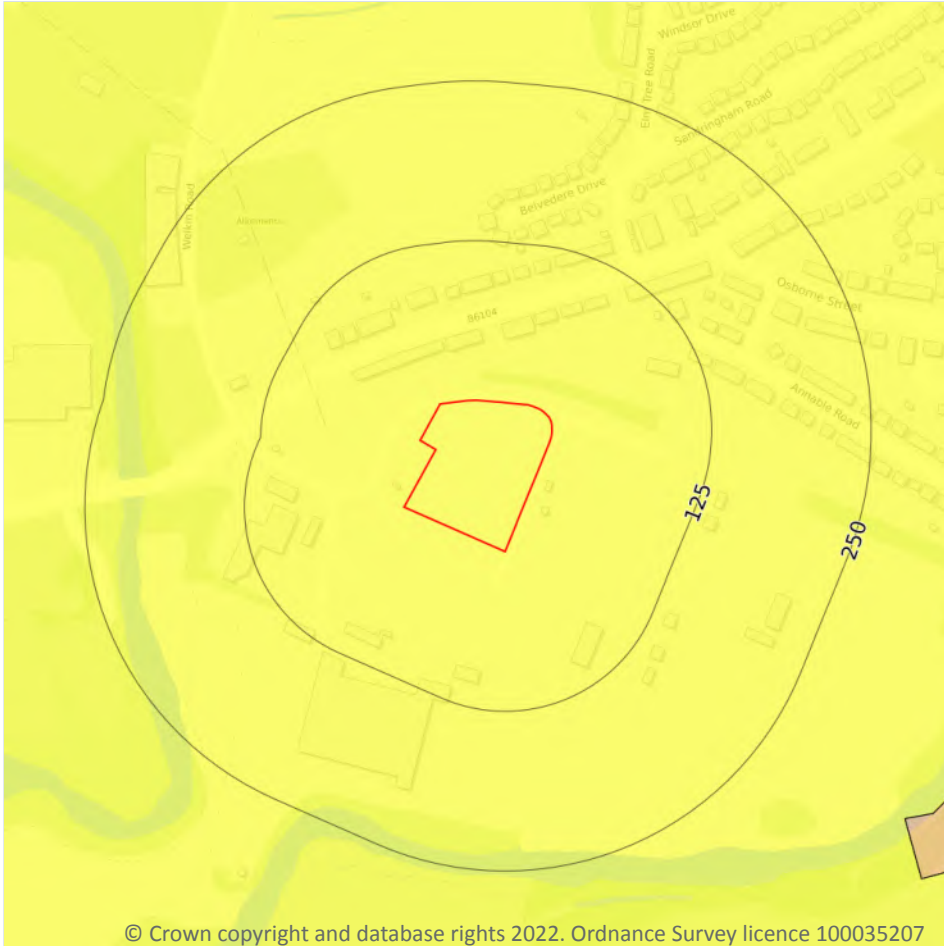
The potential hazard presented by soils that absorb water when wet (making them swell), and lose water as they dry (making them shrink). This shrink-swell behaviour is controlled by the type and amount of clay in the soil, and by seasonal changes in the soil moisture content (related to rainfall and local drainage).

Features are displayed on the Natural ground subsidence - Shrink swell clays map on **page 88**

Location	Hazard rating	Details
On site	Negligible	Ground conditions predominantly non-plastic.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Running sands



— Site Outline
Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.2 Running sands

Records within 50m

1

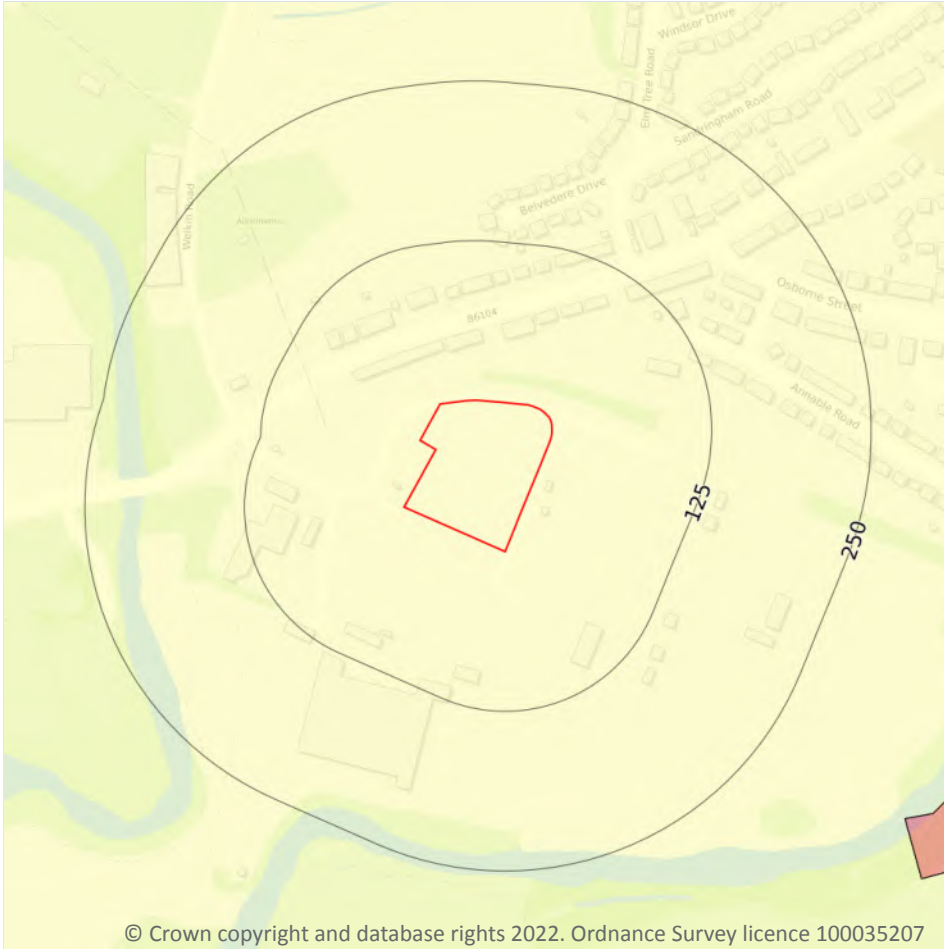
The potential hazard presented by rocks that can contain loosely-packed sandy layers that can become fluidised by water flowing through them. Such sands can 'run', removing support from overlying buildings and causing potential damage.

Features are displayed on the Natural ground subsidence - Running sands map on **page 89**

Location	Hazard rating	Details
On site	Very low	Running sand conditions are unlikely. No identified constraints on land use due to running conditions unless water table rises rapidly.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Compressible deposits



17.3 Compressible deposits

Records within 50m

1

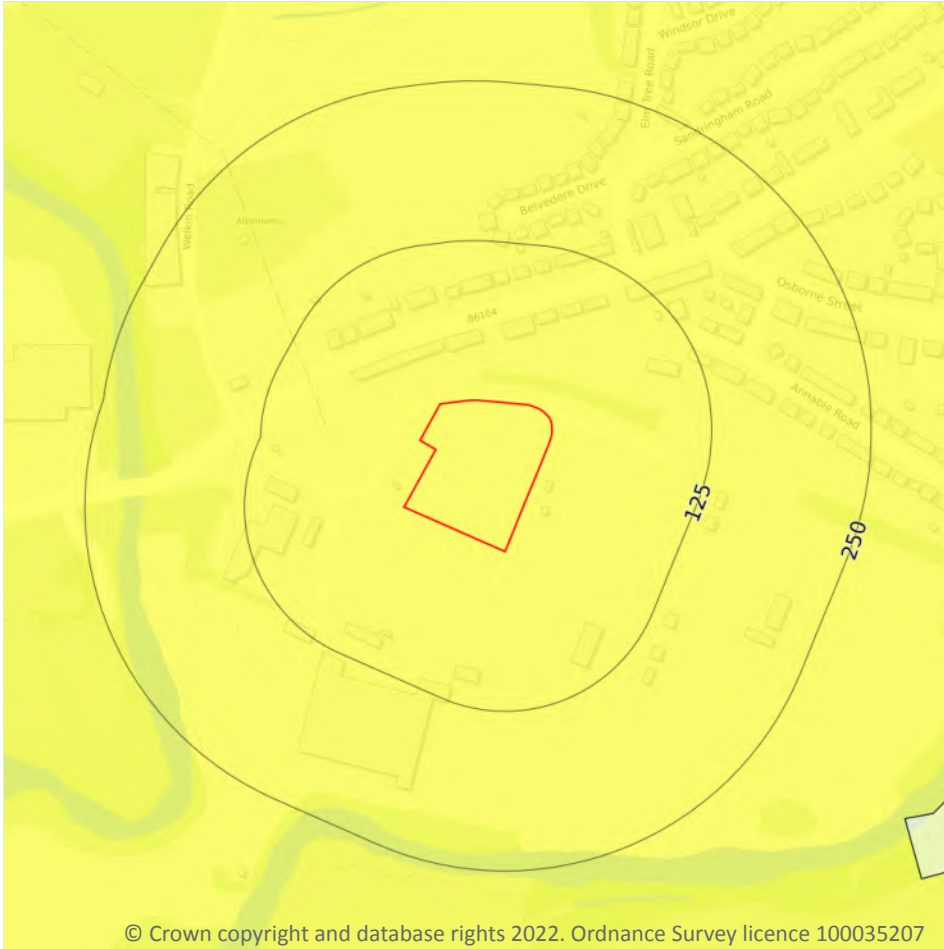
The potential hazard presented by types of ground that may contain layers of very soft materials like clay or peat and may compress if loaded by overlying structures, or if the groundwater level changes, potentially resulting in depression of the ground and disturbance of foundations.

Features are displayed on the Natural ground subsidence - Compressible deposits map on **page 90**

Location	Hazard rating	Details
On site	Negligible	Compressible strata are not thought to occur.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Collapsible deposits



— Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

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17.4 Collapsible deposits

Records within 50m

1

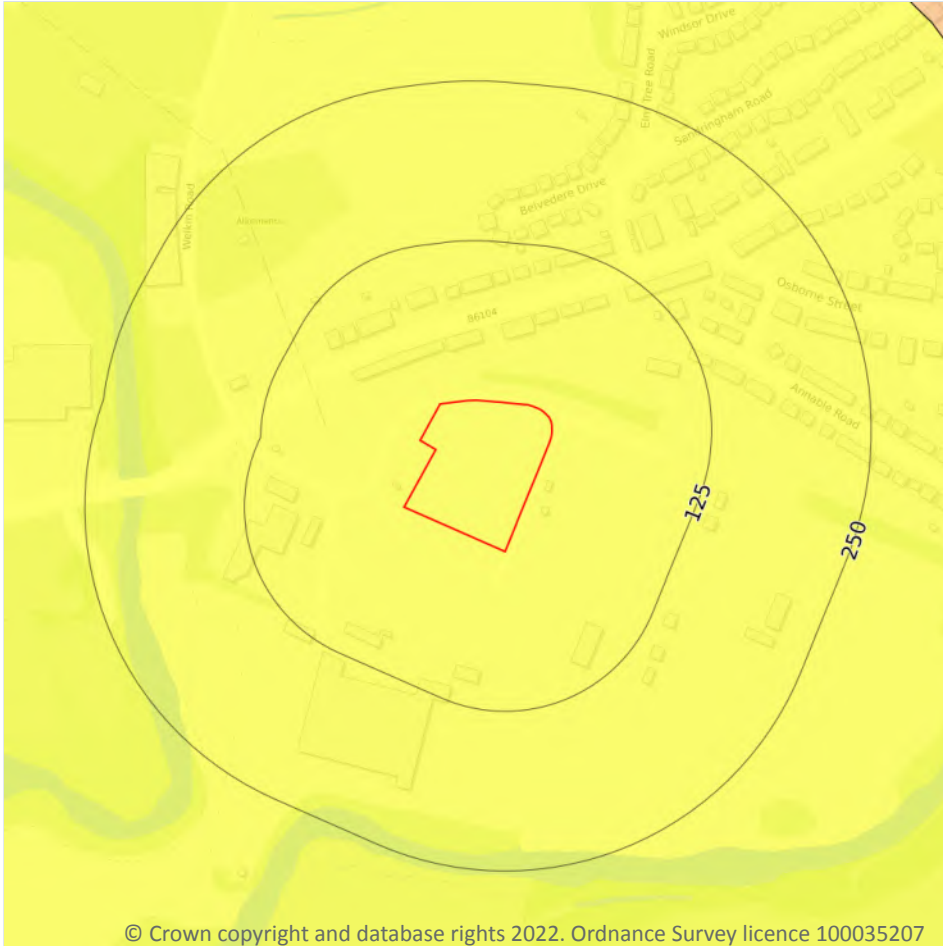
The potential hazard presented by natural deposits that could collapse when a load (such as a building) is placed on them or they become saturated with water.

Features are displayed on the Natural ground subsidence - Collapsible deposits map on **page 91**

Location	Hazard rating	Details
On site	Very low	Deposits with potential to collapse when loaded and saturated are unlikely to be present.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Landslides



— Site Outline
Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.5 Landslides

Records within 50m

1

The potential for landsliding (slope instability) to be a hazard assessed using 1:50,000 scale digital maps of superficial and bedrock deposits, combined with information from the BGS National Landslide Database and scientific and engineering reports.

Features are displayed on the Natural ground subsidence - Landslides map on **page 92**

Location	Hazard rating	Details
On site	Very low	Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.

This data is sourced from the British Geological Survey.

Natural ground subsidence - Ground dissolution of soluble rocks



— Site Outline
Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.6 Ground dissolution of soluble rocks

Records within 50m

1

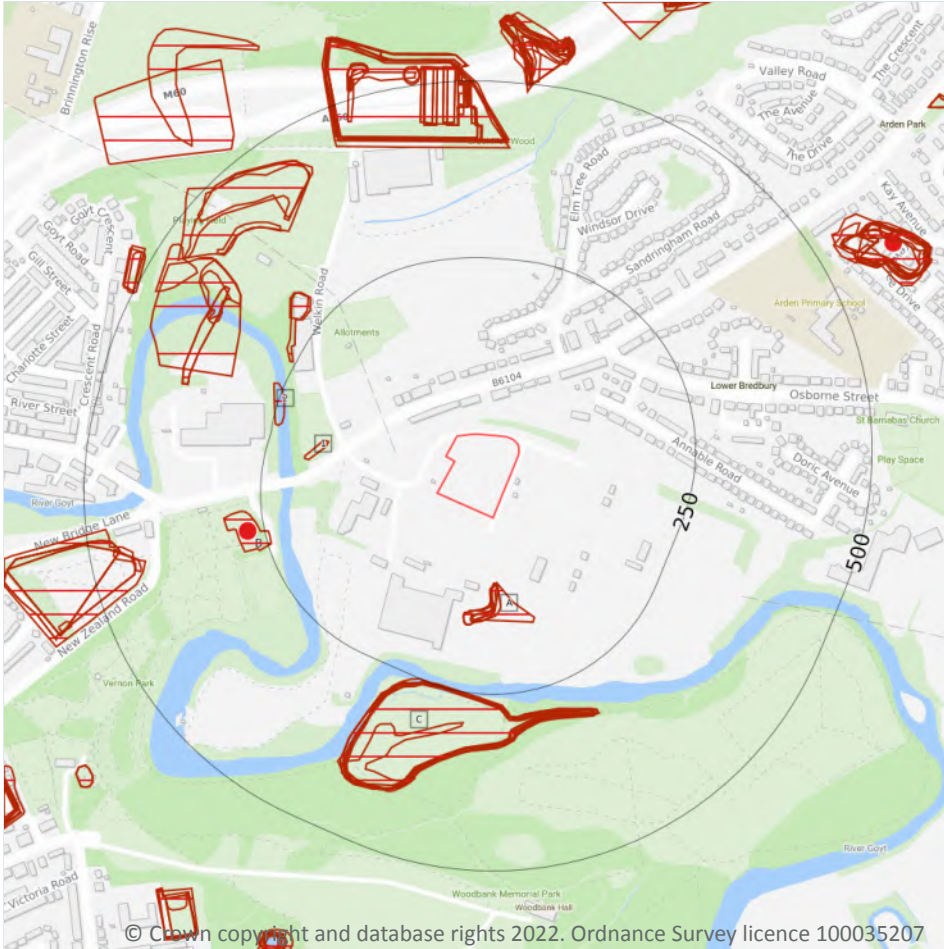
The potential hazard presented by ground dissolution, which occurs when water passing through soluble rocks produces underground cavities and cave systems. These cavities reduce support to the ground above and can cause localised collapse of the overlying rocks and deposits.

Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on **page 93**

Location	Hazard rating	Details
On site	Negligible	Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.

This data is sourced from the British Geological Survey.

18 Mining, ground workings and natural cavities



18.1 Natural cavities

Records within 500m

0

Industry recognised national database of natural cavities. Sinkholes and caves are formed by the dissolution of soluble rock, such as chalk and limestone, gulls and fissures by cambering. Ground instability can result from movement of loose material contained within these cavities, often triggered by water.

This data is sourced from Stantec UK Ltd.

18.2 BritPits

Records within 500m

1

BritPits (an abbreviation of British Pits) is a database maintained by the British Geological Survey of currently active and closed surface and underground mineral workings. Details of major mineral handling sites, such as wharfs and rail depots are also held in the database.

Features are displayed on the Mining, ground workings and natural cavities map on **page 94**

ID	Location	Details	Description
B	274m W	Name: New Bridge Sand Pit Address: Portwood, STOCKPORT, Greater Manchester Commodity: Sand Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority

This data is sourced from the British Geological Survey.

18.3 Surface ground workings

Records within 250m

14

Historical land uses identified from Ordnance Survey mapping that involved ground excavation at the surface. These features may or may not have been subsequently backfilled.

Features are displayed on the Mining, ground workings and natural cavities map on **page 94**

ID	Location	Land Use	Year of mapping	Mapping scale
A	92m S	Unspecified Pit	1954	1:10560
A	93m S	Refuse Heap	1934	1:10560
A	93m S	Refuse Heap	1917	1:10560
A	93m S	Refuse Heap	1923	1:10560
A	95m S	Refuse Heap	1934	1:10560
A	96m S	Refuse Heap	1938	1:10560
1	168m W	Unspecified Ground Workings	1917	1:10560
2	236m W	Refuse Heap	1934	1:10560
B	244m W	Sand Pit	1851	1:10560
C	248m S	Reservoir	1954	1:10560



ID	Location	Land Use	Year of mapping	Mapping scale
C	250m S	Reservoir	1938	1:10560
C	250m S	Reservoir	1923	1:10560
C	250m S	Reservoir	1934	1:10560
C	250m S	Reservoir	1917	1:10560

This is data is sourced from Ordnance Survey/Groundsure.

18.4 Underground workings

Records within 1000m	12
-----------------------------	-----------

Historical land uses identified from Ordnance Survey mapping that indicate the presence of underground workings e.g. mine shafts.

Features are displayed on the Mining, ground workings and natural cavities map on **page 94**

ID	Location	Land Use	Year of mapping	Mapping scale
-	752m NW	Tunnel	1923	1:10560
-	753m NW	Tunnel	1968	1:10560
-	753m NW	Tunnel	1978	1:10000
-	753m NW	Tunnel	1992	1:10000
-	753m NW	Tunnel	1949	1:10560
-	760m NW	Tunnel	1911	1:10560
-	761m NW	Tunnel	1934	1:10560
-	761m NW	Tunnel	1917	1:10560
-	761m NW	Tunnel	1897	1:10560
-	884m NW	Tunnel	1923	1:10560
-	891m NW	Tunnel	1897	1:10560
-	894m NW	Tunnel	1917	1:10560

This is data is sourced from Ordnance Survey/Groundsure.

18.5 Historical Mineral Planning Areas

Records within 500m

0

Boundaries of mineral planning permissions for England and Wales. This data was collated between the 1940s (and retrospectively to the 1930s) and the mid 1980s. The data includes permitted, withdrawn and refused permissions.

This data is sourced from the British Geological Survey.

18.6 Non-coal mining

Records within 1000m

1

The potential for historical non-coal mining to have affected an area. The assessment is drawn from expert knowledge and literature in addition to the digital geological map of Britain. Mineral commodities may be divided into seven general categories - vein minerals, chalk, oil shale, building stone, bedded ores, evaporites and 'other' commodities (including ball clay, jet, black marble, graphite and chert).

Features are displayed on the Mining, ground workings and natural cavities map on **page 94**

ID	Location	Name	Commodity	Class	Likelihood
-	802m E	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered

This data is sourced from the British Geological Survey.

18.7 Mining cavities

Records within 1000m

0

Industry recognised national database of mining cavities. Degraded mines may result in hazardous subsidence (crown holes). Climatic conditions and water escape can also trigger subsidence over mine entrances and workings.

This data is sourced from Stantec UK Ltd.

18.8 JPB mining areas

Records on site

1

Areas which could be affected by former coal and other mining. This data includes some mine plans unavailable to the Coal Authority.

Location	Details
On site	In addition to being located inside an area where The Coal Authority have information on coal mining activities, Johnson Poole & Bloomer (JPB) have information such as mining plans and maps held within their archive of mining activities that have occurred within 1km of this property which may supplement this information. Please note, the plans held by JPB may also relate to non-mining records. Further details and a quote for services (if appropriate) can be obtained by emailing this report to enquiries.gs@jpb.co.uk .

This data is sourced from Johnson Poole and Bloomer.

18.9 Coal mining

Records on site	1
-----------------	---

Areas which could be affected by past, current or future coal mining.

Location	Details
On site	The site is located within a coal mining area as defined by the Coal Authority. A Consultants Coal Mining Report is recommended to further assess coal mining issues at the site. This can be ordered directly through Groundsure or your preferred search provider.

This data is sourced from the Coal Authority.

18.10 Brine areas

Records on site	0
-----------------	---

The Cheshire Brine Compensation District indicates areas that may be affected by salt and brine extraction in Cheshire and where compensation would be available where damage from this mining has occurred. Damage from salt and brine mining can still occur outside this district, but no compensation will be available.

This data is sourced from the Cheshire Brine Subsidence Compensation Board.

18.11 Gypsum areas

Records on site	0
-----------------	---

Generalised areas that may be affected by gypsum extraction.

This data is sourced from British Gypsum.

18.12 Tin mining

Records on site

0

Generalised areas that may be affected by historical tin mining.

This data is sourced from Groundsure.

18.13 Clay mining

Records on site

0

Generalised areas that may be affected by kaolin and ball clay extraction.

This data is sourced from the Kaolin and Ball Clay Association (UK).

19 Radon



— Site Outline
 Search buffers in metres (m)

- Greater than 30%
- Between 10% and 30%
- Between 5% and 10%
- Between 3% and 5%
- Between 1% and 3%
- Less than 1%

19.1 Radon

Records on site

1

Estimated percentage of dwellings exceeding the Radon Action Level. This data is the highest resolution radon dataset available for the UK and is produced to a 75m level of accuracy to allow for geological data accuracy and a 'residential property' buffer. The findings of this section should supersede any estimations derived from the Indicative Atlas of Radon in Great Britain. The data was derived from both geological assessments and long term measurements of radon in more than 479,000 households.

Features are displayed on the Radon map on **page 100**

Location	Estimated properties affected	Radon Protection Measures required
On site	Between 1% and 3%	None

This data is sourced from the British Geological Survey and Public Health England.

20 Soil chemistry

20.1 BGS Estimated Background Soil Chemistry

Records within 50m

3

The estimated values provide the likely background concentration of the potentially harmful elements Arsenic, Cadmium, Chromium, Lead and Nickel in topsoil. The values are estimated primarily from rural topsoil data collected at a sample density of approximately 1 per 2 km². In areas where rural soil samples are not available, estimation is based on stream sediment data collected from small streams at a sampling density of 1 per 2.5 km²; this is the case for most of Scotland, Wales and southern England. The stream sediment data are converted to soil-equivalent concentrations prior to the estimation.

Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	15 - 25 mg/kg	No data	600 - 1200 mg/kg	360 - 720 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 - 25 mg/kg	No data	300 - 600 mg/kg	240 - 360 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
13m NE	15 - 25 mg/kg	No data	300 - 600 mg/kg	240 - 360 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg

This data is sourced from the British Geological Survey.

20.2 BGS Estimated Urban Soil Chemistry

Records within 50m

0

Estimated topsoil chemistry of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc and bioaccessible Arsenic and Lead in 23 urban centres across Great Britain. These estimates are derived from interpolation of the measured urban topsoil data referred to above and provide information across each city between the measured sample locations (4 per km²).

This data is sourced from the British Geological Survey.

20.3 BGS Measured Urban Soil Chemistry

Records within 50m

0

The locations and measured total concentrations (mg/kg) of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc in urban topsoil samples from 23 urban centres across Great Britain. These are collected at a sample density of 4 per km².

This data is sourced from the British Geological Survey.



21 Railway infrastructure and projects

21.1 Underground railways (London)

Records within 250m 0

Details of all active London Underground lines, including approximate tunnel roof depth and operational hours.

This data is sourced from publicly available information by Groundsure.

21.2 Underground railways (Non-London)

Records within 250m 0

Details of the Merseyrail system, the Tyne and Wear Metro and the Glasgow Subway. Not all parts of all systems are located underground. The data contains location information only and does not include a depth assessment.

This data is sourced from publicly available information by Groundsure.

21.3 Railway tunnels

Records within 250m 0

Railway tunnels taken from contemporary Ordnance Survey mapping.

This data is sourced from the Ordnance Survey.

21.4 Historical railway and tunnel features

Records within 250m 0

Railways and tunnels digitised from historical Ordnance Survey mapping as scales of 1:1,250, 1:2,500, 1:10,000 and 1:10,560.

This data is sourced from Ordnance Survey/Groundsure.

21.5 Royal Mail tunnels

Records within 250m 0

The Post Office Railway, otherwise known as the Mail Rail, is an underground railway running through Central London from Paddington Head District Sorting Office to Whitechapel Eastern Head Sorting Office. The line is 10.5km long. The data includes details of the full extent of the tunnels, the depth of the tunnel, and the depth to track level.



This data is sourced from Groundsure/the Postal Museum.

21.6 Historical railways

Records within 250m	0
---------------------	---

Former railway lines, including dismantled lines, abandoned lines, disused lines, historic railways and razed lines.

This data is sourced from OpenStreetMap.

21.7 Railways

Records within 250m	0
---------------------	---

Currently existing railway lines, including standard railways, narrow gauge, funicular, trams and light railways.

This data is sourced from Ordnance Survey and OpenStreetMap.

21.8 Crossrail 1

Records within 500m	0
---------------------	---

The Crossrail railway project links 41 stations over 100 kilometres from Reading and Heathrow in the west, through underground sections in central London, to Shenfield and Abbey Wood in the east.

This data is sourced from publicly available information by Groundsure.

21.9 Crossrail 2

Records within 500m	0
---------------------	---

Crossrail 2 is a proposed railway linking the national rail networks in Surrey and Hertfordshire via an underground tunnel through London.

This data is sourced from publicly available information by Groundsure.

21.10 HS2

Records within 500m	0
---------------------	---

HS2 is a proposed high speed rail network running from London to Manchester and Leeds via Birmingham. Main civils construction on Phase 1 (London to Birmingham) of the project began in 2019, and it is currently anticipated that this phase will be fully operational by 2026. Construction on Phase 2a (Birmingham to Crewe) is anticipated to commence in 2021, with the service fully operational by 2027. Construction on Phase 2b (Crewe to Manchester and Birmingham to Leeds) is scheduled to begin in 2023 and be operational by 2033.

This data is sourced from HS2 Ltd.



Data providers

Groundsure works with respected data providers to bring you the most relevant and accurate information. To find out who they are and their areas of expertise see <https://www.groundsure.com/sources-reference>.

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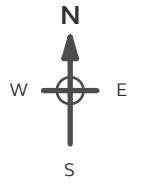
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Report Ref: GS-8604194
Grid Ref: 391283, 390985

Map Name: County Series

Map date: 1872

Scale: 1:2,500

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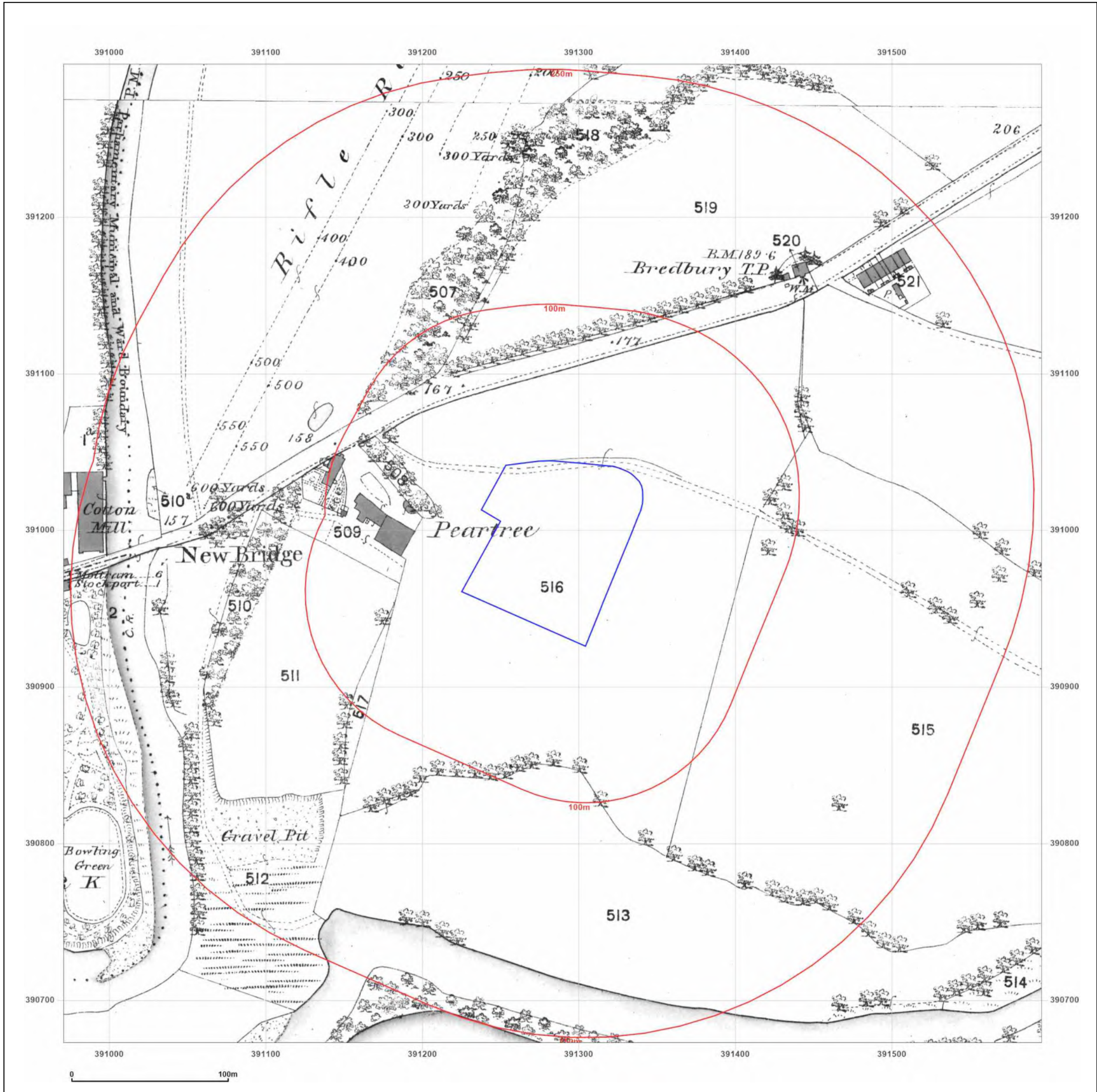


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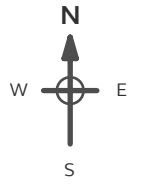
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Grid Ref: 391283, 390985

Map Name: County Series

Map date: 1893

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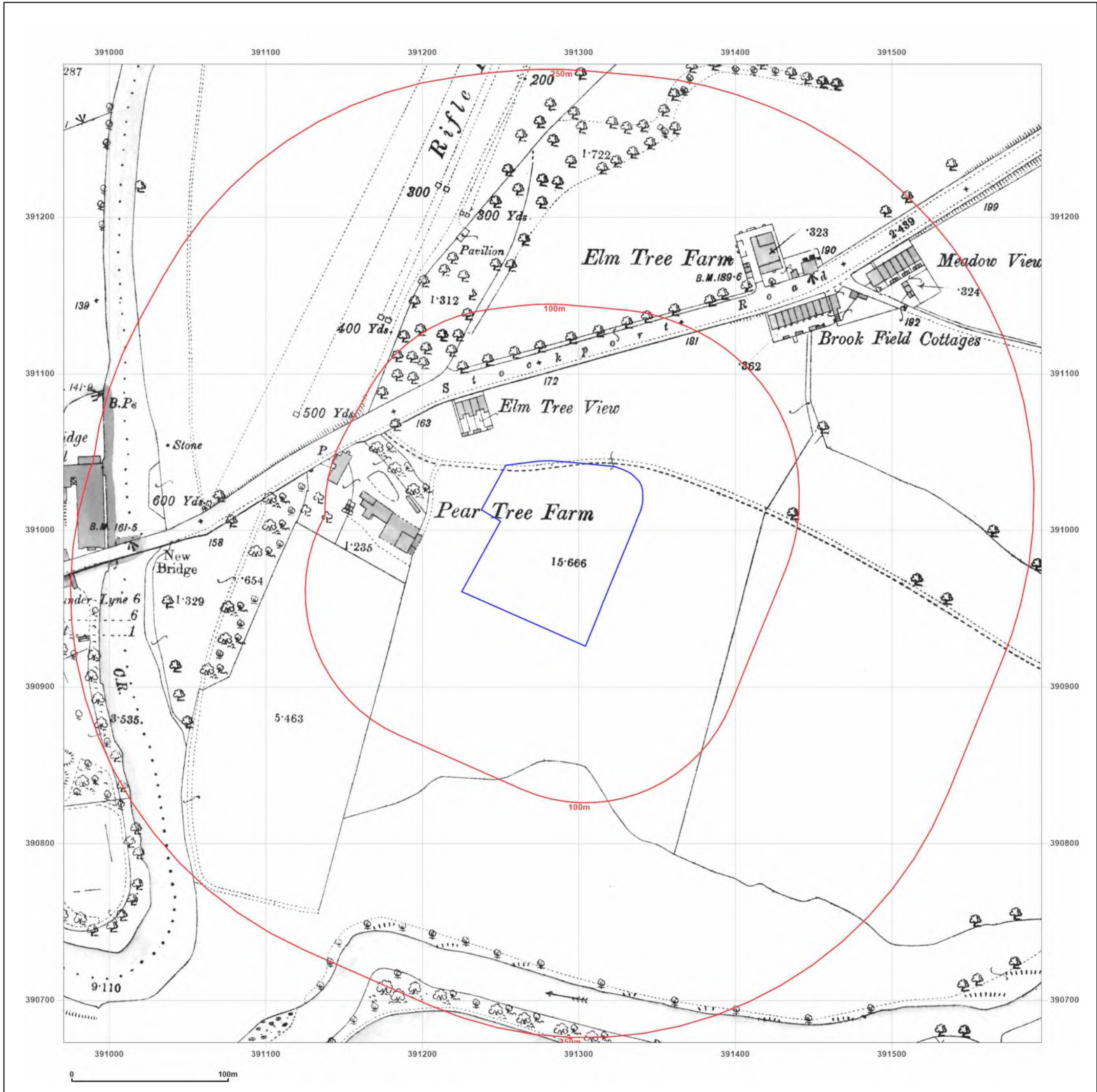


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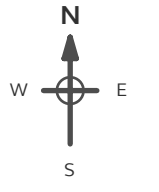




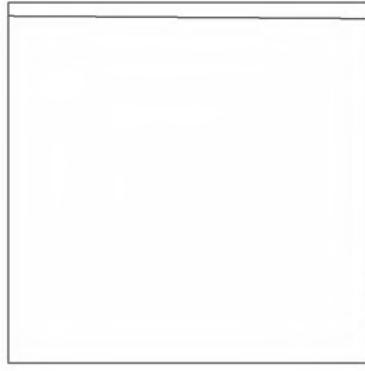
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Map Name: County Series
Map date: 1898
Scale: 1:2,500
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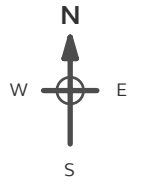
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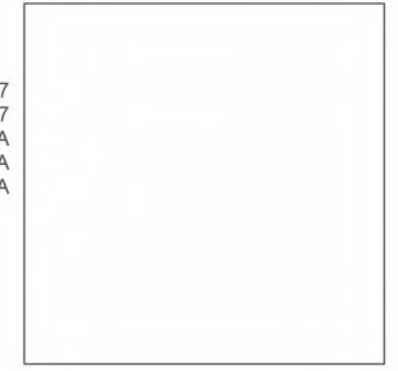
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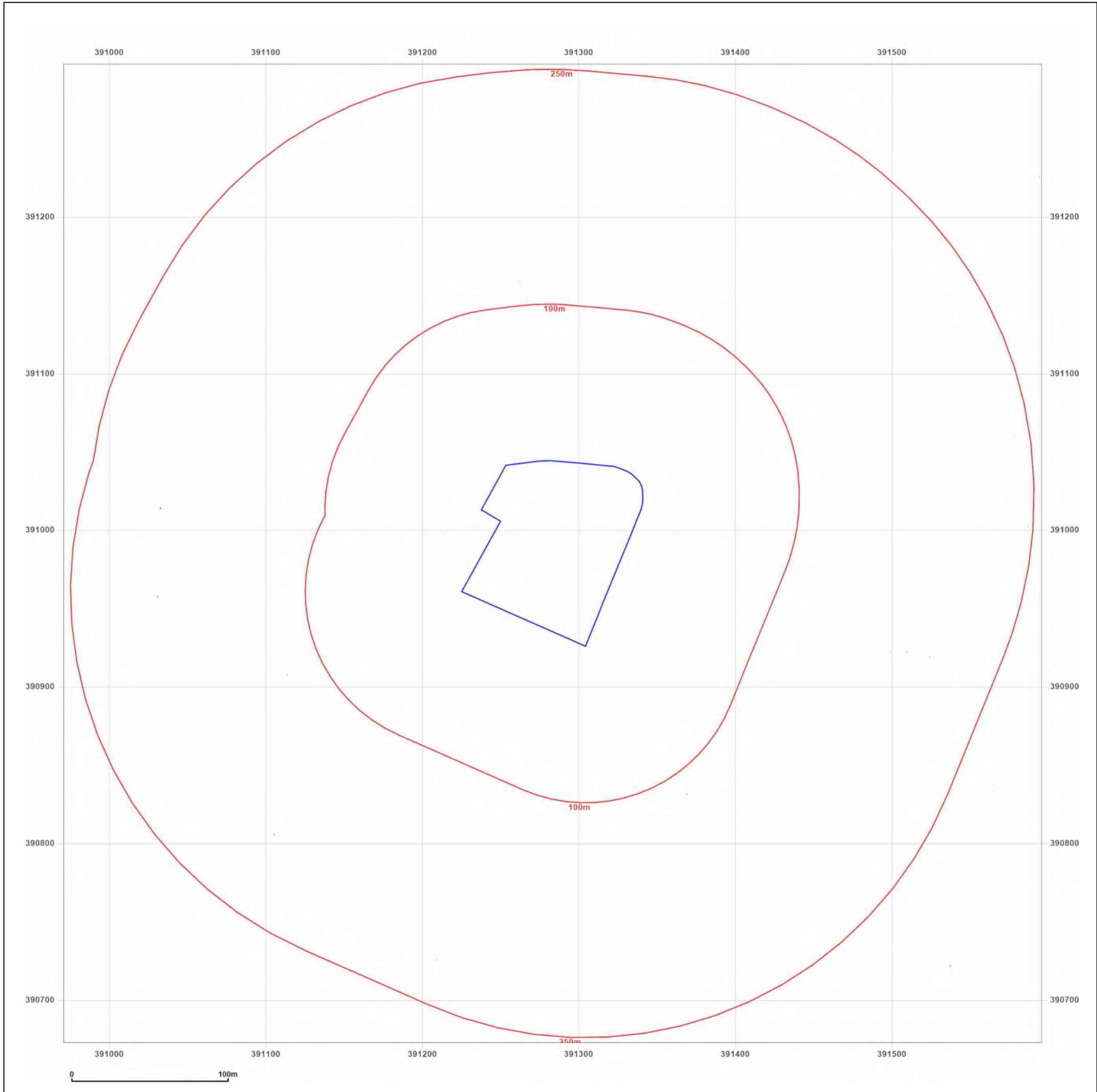


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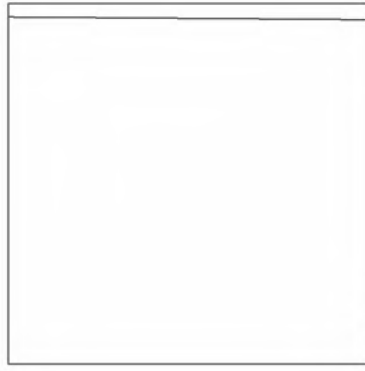
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Map Name: County Series

Map date: 1922

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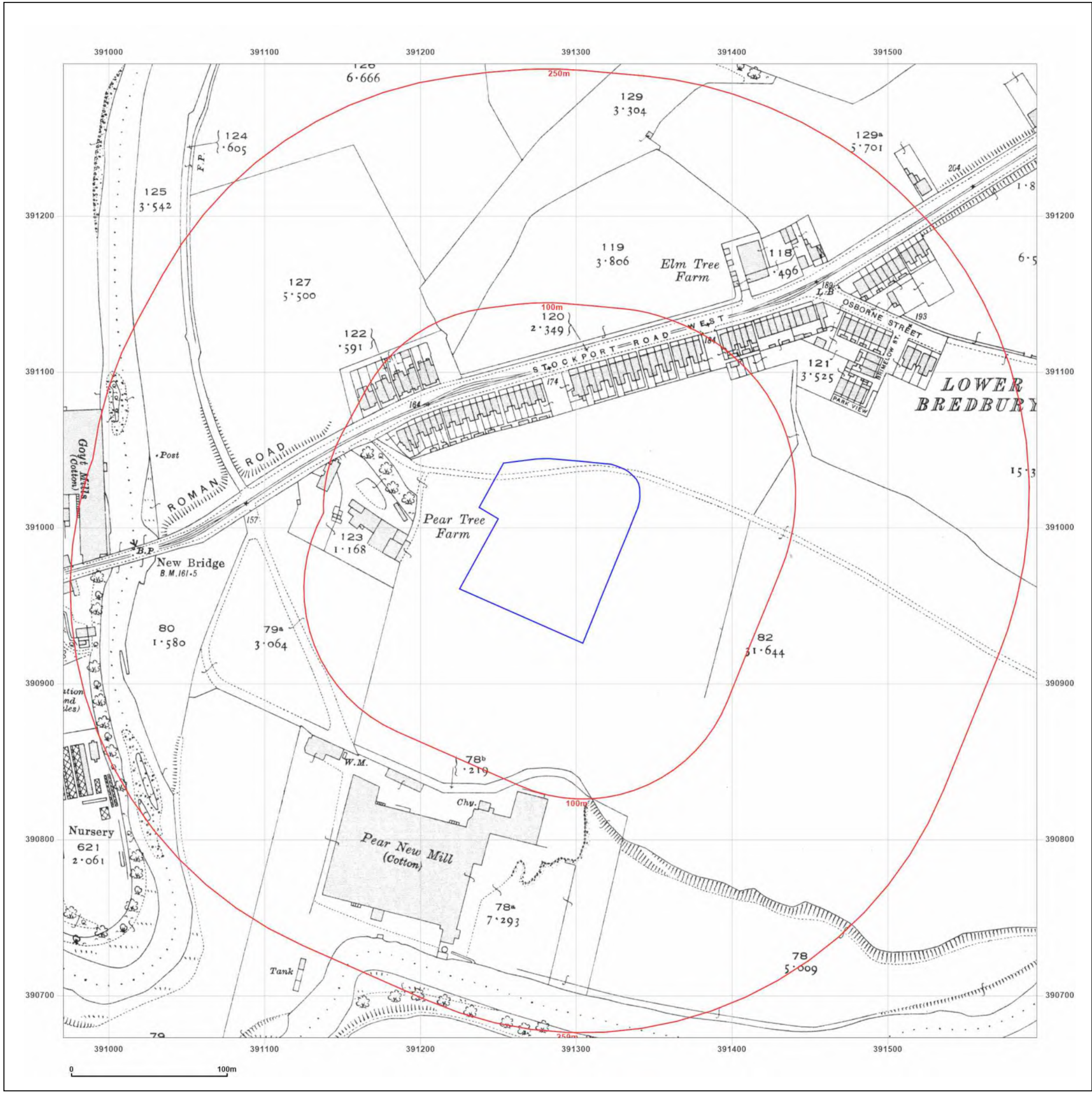


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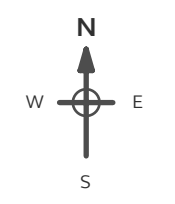


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Grid Ref: 391283, 390985

Map Name: National Grid
Map date: 1959-1960
Scale: 1:1,250
Printed at: 1:2,000



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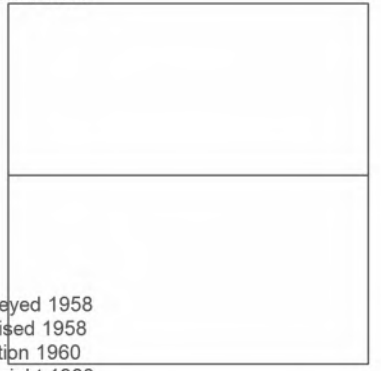
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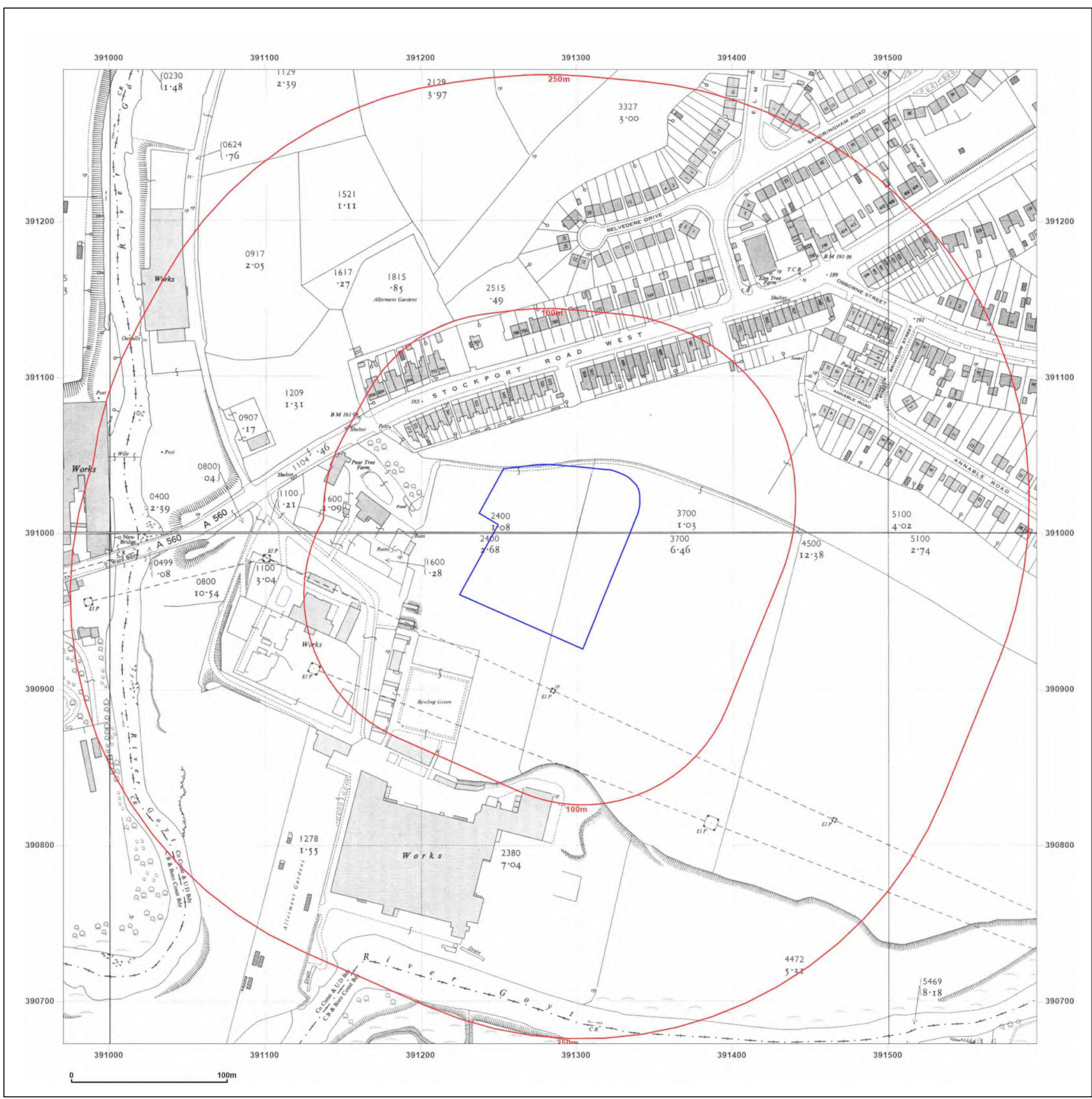


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Client Ref: Bredbury_Substation_Battery_K0150
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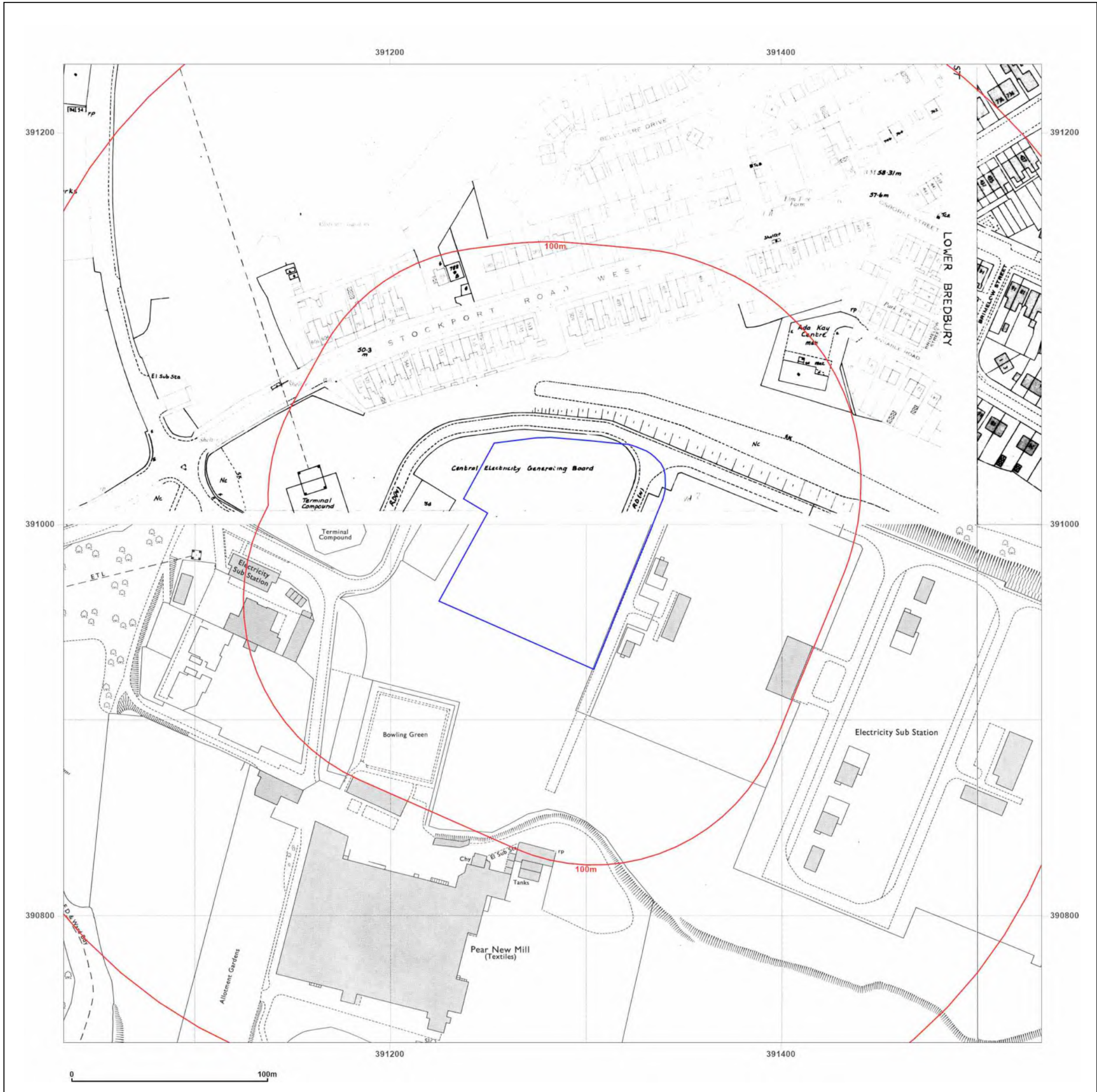
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Client Ref: Bredbury_Substation_Battery_K0150
Report Ref: GS-8604194
Grid Ref: 391283, 390985

Map Name: National Grid

Map date: 1988-1991

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Report Ref: GS-8604194
Grid Ref: 391283, 390985

Map Name: National Grid

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Scale: 1:1,250

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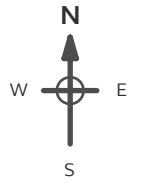
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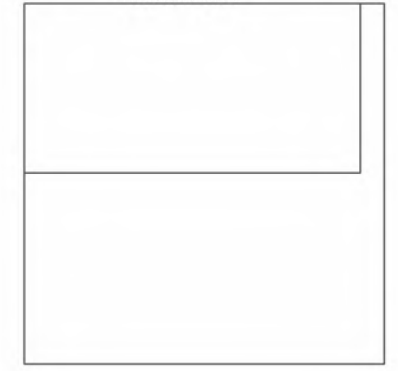
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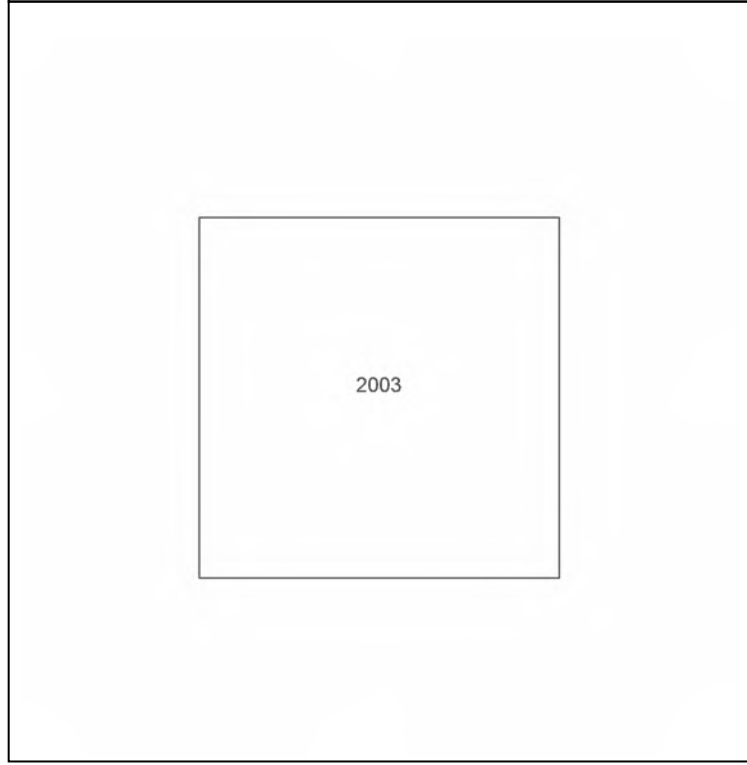
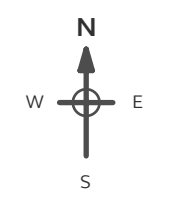


Site Details:

ELECTRICITY SUB STATION
 73M FROM 573 STOCKPORT
 ROAD WEST 18M FROM
 UNNAMED ROAD, STOCKPORT
 ROAD WEST, BREDBURY,
 STOCKPORT, SK6 2BS

Client Ref: Bredbury_Substation_Battery_K0150
Report Ref: GS-8604194
Grid Ref: 391283, 390985

Map Name: LandLine
Map date: 2003
Scale: 1:1,250
Printed at: 1:1,250

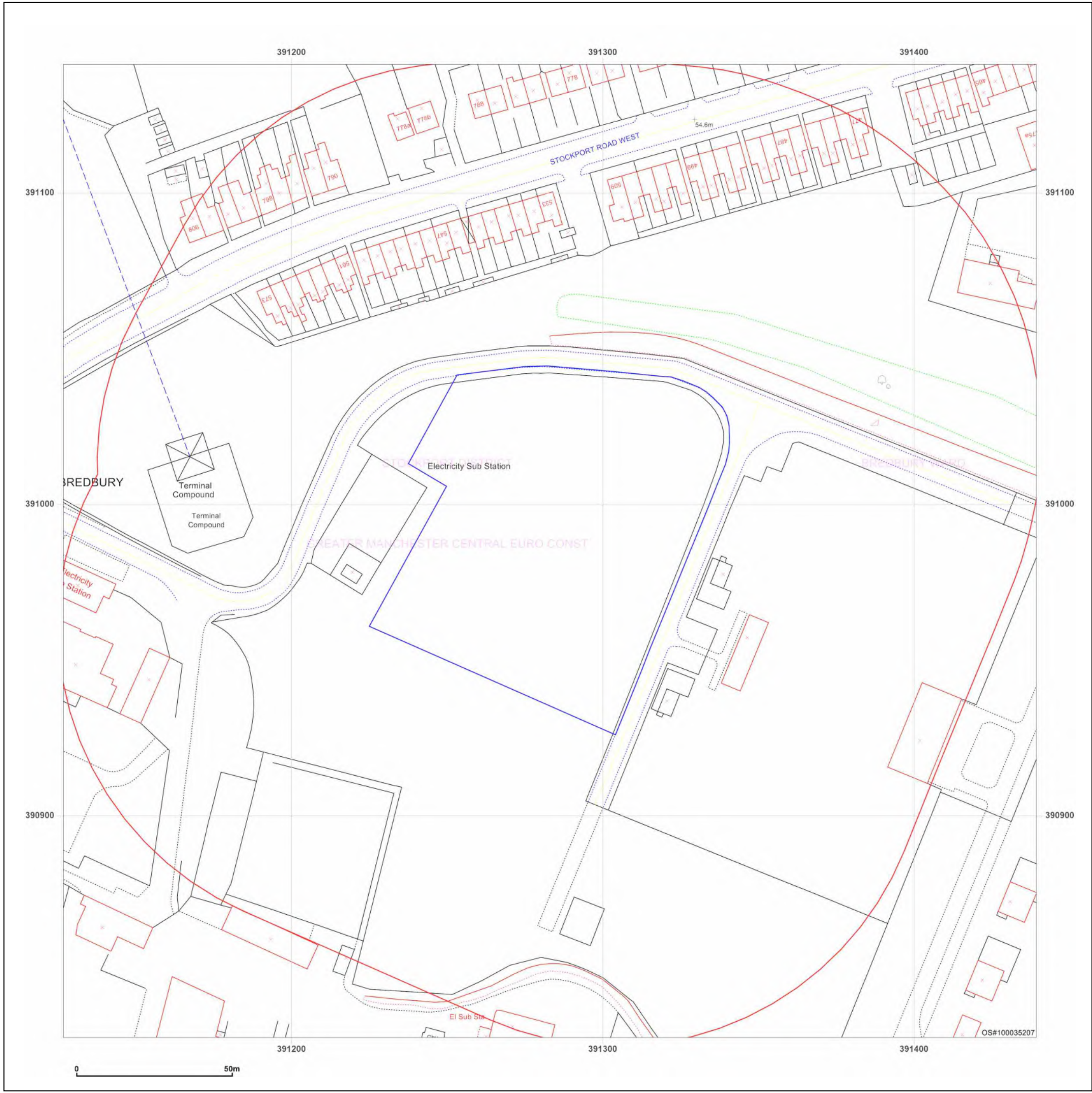


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Site Details:

ELECTRICITY SUB STATION
 73M FROM 573 STOCKPORT
 ROAD WEST 18M FROM
 UNNAMED ROAD, STOCKPORT
 ROAD WEST, BREDBURY,
 STOCKPORT, SK6 2BS

Client Ref: Bredbury_Substation_Battery_K0150
Report Ref: GS-8604194
Grid Ref: 391283, 390985

Map Name: County Series

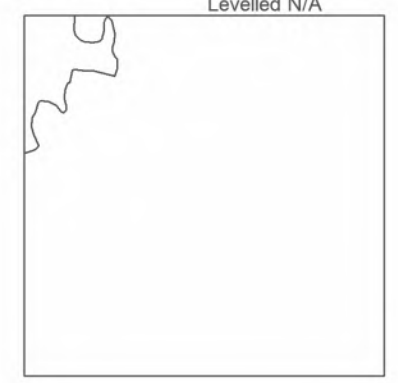
Map date: 1848

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1845
 Revised N/A
 Edition 1848
 Copyright N/A
 Levelled N/A

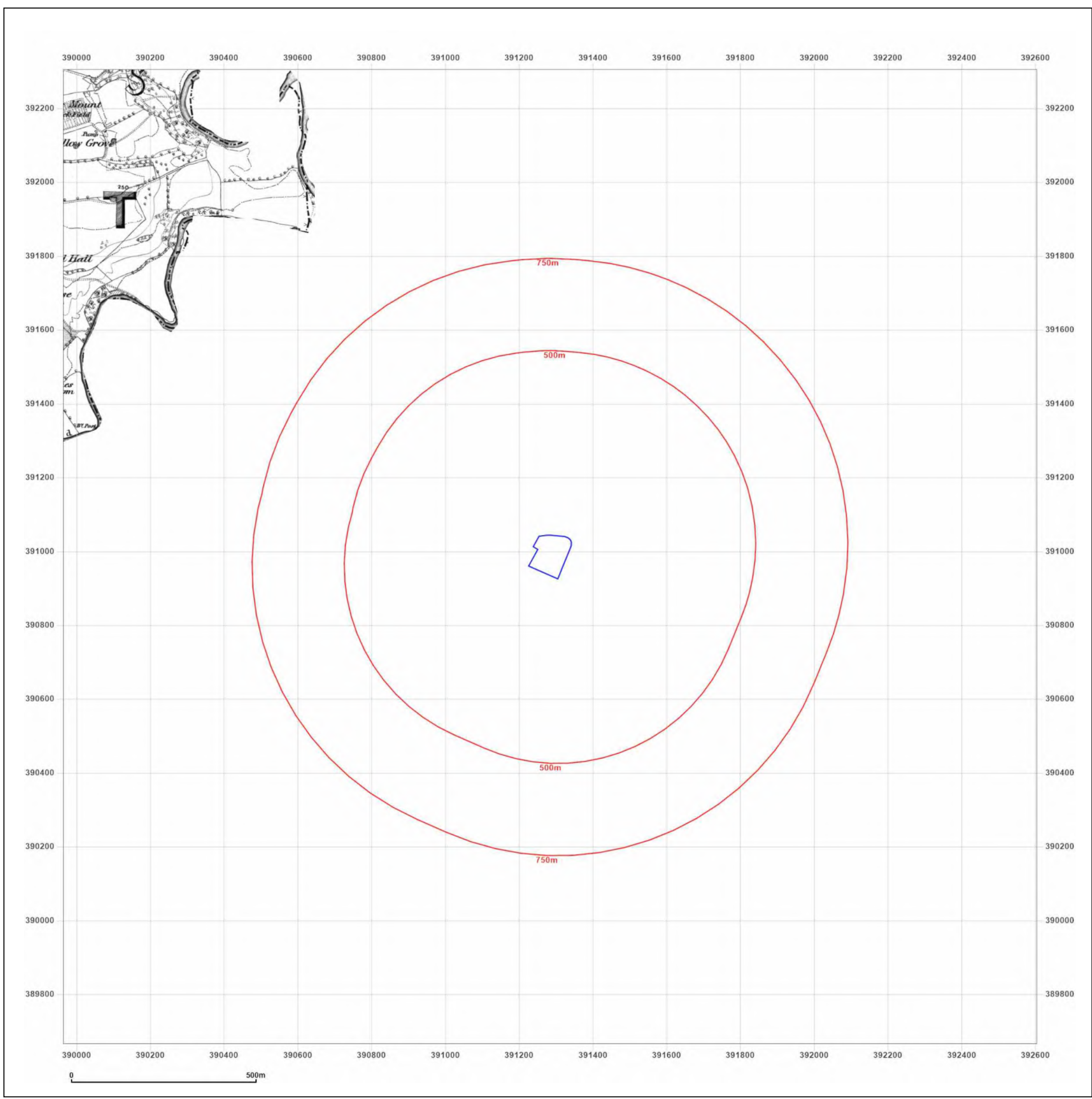


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Site Details:

ELECTRICITY SUB STATION
 73M FROM 573 STOCKPORT
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 ROAD WEST, BREDBURY,
 STOCKPORT, SK6 2BS

Client Ref: Bredbury_Substation_Battery_K0150
Report Ref: GS-8604194
Grid Ref: 391283, 390985

Map Name: County Series

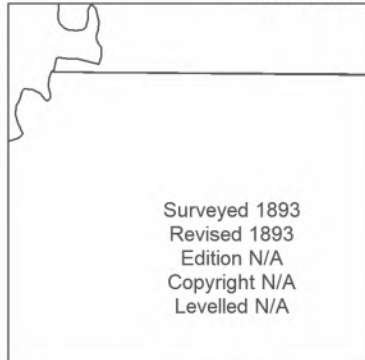
Map date: 1892-1893

Scale: 1:10,560

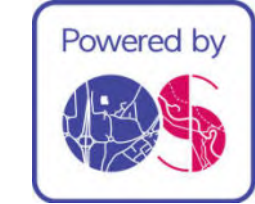
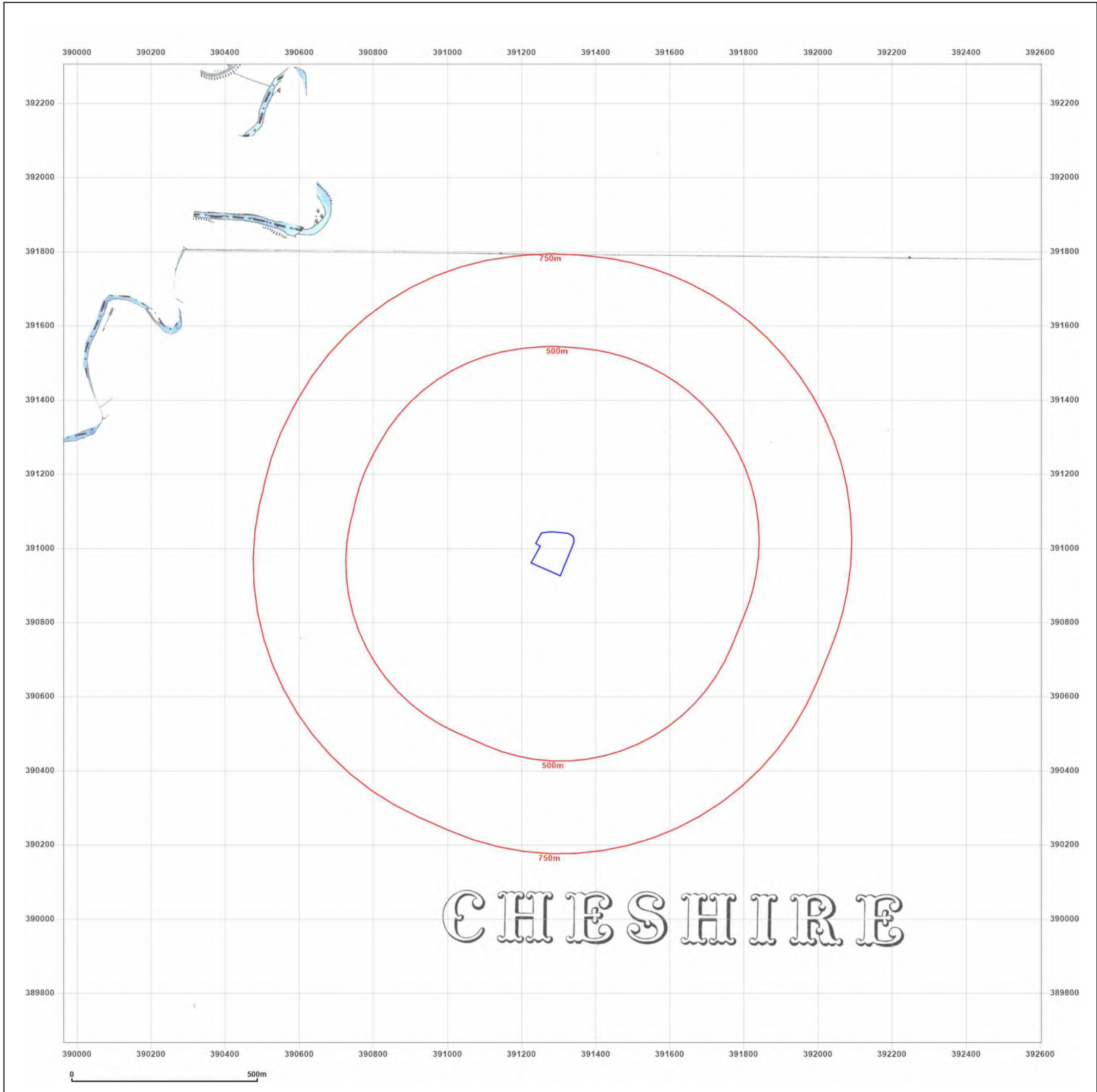
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Surveyed 1892
 Revised 1892
 Edition N/A
 Copyright N/A
 Levelled N/A



Surveyed 1893
 Revised 1893
 Edition N/A
 Copyright N/A
 Levelled N/A



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Site Details:

ELECTRICITY SUB STATION
 73M FROM 573 STOCKPORT
 ROAD WEST 18M FROM
 UNNAMED ROAD, STOCKPORT
 ROAD WEST, BREDBURY,
 STOCKPORT, SK6 2BS

Client Ref: Bredbury_Substation_Battery_K0150
Report Ref: GS-8604194
Grid Ref: 391283, 390985

Map Name: County Series

Map date: 1897

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1872
 Revised 1897
 Edition N/A
 Copyright N/A
 Levelled N/A

Surveyed 1872
 Revised 1897
 Edition N/A
 Copyright N/A
 Levelled N/A

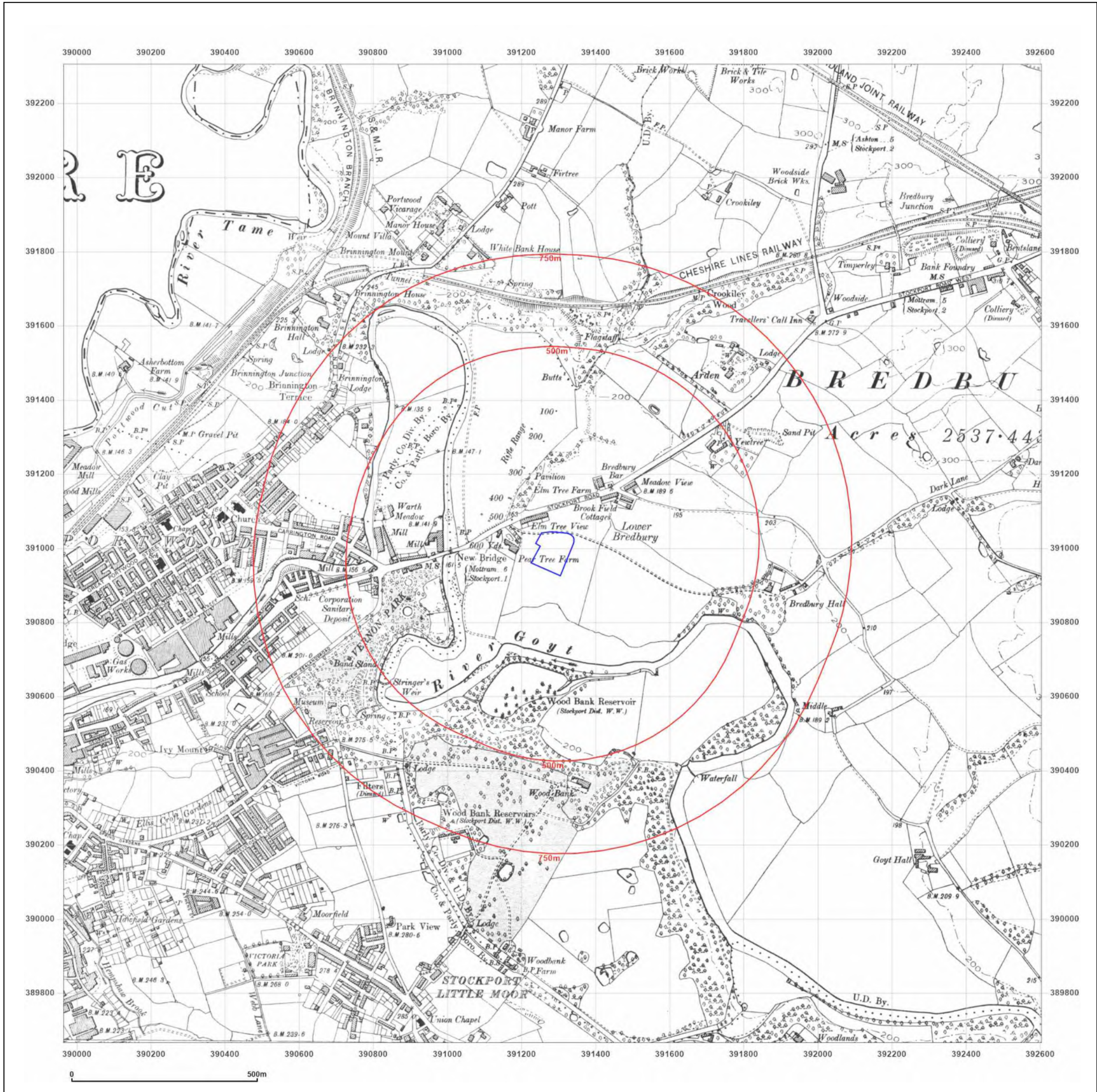


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Site Details:

ELECTRICITY SUB STATION
 73M FROM 573 STOCKPORT
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 STOCKPORT, SK6 2BS

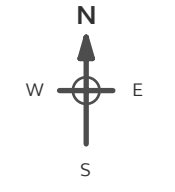
Client Ref: Bredbury_Substation_Battery_K0150
Report Ref: GS-8604194
Grid Ref: 391283, 390985

Map Name: County Series

Map date: 1904

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1844
 Revised 1904
 Edition N/A
 Copyright N/A
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