



**STRUCTURAL  
SOILS LTD**

# **BALFOUR BEATTY INVESTMENTS LIMITED**

**INTERPRETIVE REPORT**  
**on**  
**SITE INVESTIGATION**  
**at**  
**BIOMASS POWER STATION**  
**ESTUARY PARK**  
**CHITTENING ROAD**  
**AVONMOUTH**

**AUGUST 2015**

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Document: Interpretive Report on Site Ground Investigation

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Date:

August 2015

## REVISION RECORD

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## 1 INTRODUCTION

This investigation was carried out on the instructions of Balfour Beatty Investments Limited (the Client). It is proposed to build a Biomass Power Station at the southern end of Estuary Park.

The purpose of the work was to undertake a Preliminary Risk Assessment that included research in to the past uses of the site and the surrounding area and production of a contamination conceptual model identifying potentially complete pollutant linkages, to investigate ground conditions and to provide information for foundation design and contamination assessment purposes.

The work included an intrusive investigation, laboratory testing and the preparation of this report, which contains a description of the site and the works carried out, the exploratory hole logs, in-situ and laboratory testing results.

The report gives recommendations relating to geotechnical aspects such as foundation design.

It presents an appraisal of geoenvironmental aspects such as soil contamination and gives recommendations on risk reduction. It should not be assumed that these would meet the requirements of the local authority, whose advice should be sought regarding planning permission.

The ground investigation has been carried out using intrusive ground investigation techniques in general accordance with the recommendations of BS5930: 1999 *Code of Practice for Site Investigations* (including Amendment A2, 2010). Whilst every attempt is made to record full details of the strata encountered in the exploratory holes, techniques of hole formation and sampling will inevitably lead to disturbance, mixing or loss of material in some soils and rocks.

The investigation has been carried out in accordance with BS10175: 2011 *Investigation of Potentially Contaminated Sites: Code of Practice* (including Amendment A1, 2013).

All information, comments and opinions given in this report are based on the ground conditions encountered during the site work, and on the results of laboratory and field tests performed during the investigation. However, there may be conditions at the site that have not been taken into account, such as unpredictable soil strata, contaminant concentrations and water conditions between or below exploratory holes. It should be noted that groundwater levels, gas concentrations and gas flows usually vary due to seasonal, atmospheric and/or other effects and may at times differ to those measured during the investigation.



All information, comments and opinions given in the desk study in this report are based on the information obtained. The information search cannot be exhaustive and there may be records that have not come to light. There may also be circumstances at the site that are not documented.

This report was prepared by Structural Soils Limited for the sole and exclusive use of Balfour Beatty Investments Limited in response to particular instructions. Any other parties using the information contained in this report do so at their own risk and any duty of care to those parties is excluded. No liability will be accepted after a period of 6 years from the date of the report.



## **2 SITE DESCRIPTION**

### **2.1 Location and Topography**

The site is located in Estuary Park on the north-west side of Chittening Road, 3km north-east of Avonmouth Village, Bristol (see Site Location Map in Appendix A). The British National Grid Reference of the site is ST 531 812.

The site is located on the south-west portion of Estuary Park and is used as the operational yard for Boomeco Limited. The oblong site is approximately 0.35 hectares in area. It is generally level and is divided in to two halves by an approximately 2m high wooden and barbed wire fence down the centre, trending north-east to south-west, as does the adjacent road.

The north-western half is used for storing waste wood, with eight concrete block construction storage bays at the northern end and a wood stockpile at the southern end, which had been removed by the end of the investigation. The area is mostly laid to asphalt but a concrete pad is present at the southern end, underneath where the wood stockpile was. The foundation outline of a past building can be seen within the asphalt. A disused railway line runs parallel with the north-west boundary of site. In the southern corner, at the end of the central fence, the remains of a former boom gate are present. Piles of waste concrete were also found here.

The south-eastern half of site is used for lorry-loaded container storage. Soft landscaping/gravel surfacing is present along the south side of the central fence and along the south-east boundary of site. Two concrete pads are located in the southern corner and midway along the central fence line, adjacent to the soft landscaping. The far southern corner of site is sectioned off via a wooden fence and has painted car parking bays. Storage containers are present along the south-east edge of site and on the central concrete pad. Old conveyor belts and associated machinery were littered along the central fence line.

The south-east boundary is bounded by an approximately 1.50m high fence with concrete blocks blocking the old entrance in the south-east corner of site. Approximately 2m high metal railings border the south-west and north-west of site. Further Boomeco operational areas can be found to the north-east of site and Chittening Industrial Estate to the north-west. Undeveloped land can be found on the south-west side of Chittening Road and further industrial development to the south-west of site.



## 2.2 Geology

Information on the geology of the site was obtained from the following sources published by the the British Geological Survey (BGS):

- BGS survey map (sheet 250, scale 1:50,000, published 1981).
- The BGS digital geology map, which utilises the most up to date names for geological units ([www.bgs.ac.uk/data](http://www.bgs.ac.uk/data)).
- The BGS Lexicon of Named Rock Units, which provides typical descriptions for most geological units ([www.bgs.ac.uk/lexicon](http://www.bgs.ac.uk/lexicon)).
- Information on geology obtained as part of the desk study, which is drawn from the BGS digital map.

The site is shown to be underlain by the following descending sequence of strata:

TABLE 1: SUMMARY OF SITE GEOLOGY	
Geological Unit Name	Description
Tidal Flat Deposits	Normally consolidated soft silty clay, with layers of sand, gravel and peat.
Mercia Mudstone Group	Dominantly red, less commonly green-grey mudstones and subordinate siltstones with thick halite-bearing units in some basinal areas. Thin beds of gypsum/anhydrite widespread; sandstones are also present.

Note: Information obtained from BGS digital records © NERC.

Various studies have been carried out in the area considering the geological sequence, depositional origin of the superficial soils present, and the engineering behaviour of those soils. In the paper *Depositional characteristics of estuarine alluvium: some engineering implications* (A.B. Hawkins, University of Bristol, 1984) the local geology is considered in relation to the behaviour of trial embankments constructed nearby in Avonmouth, and prior to the construction of the M5 motorway.

The paper notes that the estuarine sediments were generally deposited as sand towards their base, then as finer deposits above, due to the sea level and tidal level changes over time. Drainage channels known as *tidal pills* formed at surface level, and were themselves infilled over time. The infill sediments often have higher organic matter contents than the surrounding sediments, have a differing stress history, and may therefore display different settlement characteristics to



the ‘original’ undisturbed sediments. Such variations are difficult to detect through inspection and testing of discrete soil samples.

With regards to settlements, the paper notes that rates of settlement in the estuarine soils can be underestimated by laboratory consolidation tests on small samples as root holes and other discontinuities can lead to improved (i.e. faster) rates of drainage and hence settlement in the soil mass as a whole.

Other investigations by Structural Soils Limited on Severnside have shown that as well as mudstone, the Mercia Mudstone Group contains significant sandstone and siltstone beds.

### **2.3 Hydrogeology and Hydrology**

The GroundSure EnviroInsight Report (contained in Appendix H) has classified the geological units underlying the site as follows:

- Superficial Deposits (Tidal Flat Deposits) as an area of ‘Unproductive’ designation.
- Bedrock (Mercia Mudstone Group) as a Secondary ‘B’ Aquifer (variably permeable).

‘Unproductive Strata’ are rock layers or superficial deposits with low permeability that have negligible significance for water supply or river base flow.

‘Secondary’ aquifers include a wide range of rock layers or superficial deposits with an equally wide range of water permeability and storage. Secondary ‘B’ Aquifers are 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.

The site is not located with a Source Protection Zone (SPZ).

Drainage ditches (rhines) are present across undeveloped areas at Avonmouth. Any which formally crossed the site are believed to have been filled. The tidal River Severn lies approximately 750m to the north-west. The direction of flow of any groundwater contained within the Mercia Mudstone Group is likely to be to the north-west. Perched water within the shallow underlying soil is likely to flow into the drainage ditches where present.



## **2.4 Existing Ground Investigation Reports**

### **2.4.1 General**

The contents of the existing ground investigation reports most relevant to this project are briefly summarised in the following sections.

#### **2.4.2 *Somerset, Avon and Gloucester Fire Training Centre, Smoke Lane, Avonmouth. Report no. 10930 (November 2001)***

The ground investigation was undertaken at the Fire and Rescue Training Centre on Smoke Lane, approximately 50m south of site. It comprised four cable percussion boreholes and eight machine dug trial pits.

Clay and peat of the Tidal Flat Deposits were encountered to approximately 7.2m depth, where the alluvial deposits become sand and peat. Stiff, reddish brown clay with lithorelics of sandstone was encountered at 15.90m to 18.50m depth and is interpreted as the bedrock Mercia Mudstone Group. It should be noted that hole depths are from original ground level on this site because no made ground had been imported to raise it.

#### **2.4.3 *Honda Phase II Site, Avonmouth. Report no. 90313E (February 2000)***

This report details information from the Honda Phase II investigation but also the previous investigations from 1993 and 1997 at the same site. The Honda site is approximately 350m south-east of Estuary Park. It had had no imported fill to raise ground levels prior to the investigations.

The Tidal Flat Deposits encountered were divided into three categories: an alluvial crust, soft alluvial soil and alluvial sands. The crust was a surface layer of alluvium with reduced moisture content and was described as stiff clays. It had an average base depth of 2.4m. Soft and very soft mottled grey clays comprised the soft alluvium, overlying fine sand alluvium at 7.5m to 12.5m depth. The Mercia Mudstone was encountered as stiff reddish brown clay at 16.5m to 17.35m depth.

## **2.5 History of Site and Surrounding Area**

### **2.5.1 Historic Mapping**

A search of Ordnance Survey maps was undertaken to establish the land-use history of the site and surroundings. Extracts of the maps that are discussed below can be found in Appendix H of this report. Unless otherwise stated, all quoted distances are measured from the site boundary that is marked on the maps.





TABLE 2: SUMMARY OF HISTORICAL MAP DATA

Dates	Scale	Significant features, changes and developments:	
		On site	In surroundings [distance(m)]
1880-1887	1:10,560 & 1:2,500	Site is part of several fields with bordering drainage ditches. Farm buildings and <i>Well</i> present in S. <i>Washingpool Lane</i> runs across S of site.	Surrounding area is largely undeveloped with only farm buildings and associated ponds present. Numerous drainage ditches. Closest rhine is <i>Step Hill Rhine</i> ~150m NW, drains NW. Marsh land and beach ~450m NW. <i>High Water Mark of Ordinary Tides</i> ~650m NW.
1901-1903	1:10,560 & 1:2,500	Additional building in S of site, now named <i>Green Splot Farm</i> .	<i>Avon Branch</i> of railway constructed along the coastline ~450m NW. <i>High Water Mark of Ordinary Tides</i> is now ~750m NW.
1912-1921	1:10,560	Rail link along NW edge of site.	Second World War munitions factory with rail link adjacent NW of site. <i>Avonmouth &amp; Filton</i> railway cutting ~250m SW.
1935-1955	1:10,560	No significant changes.	Re-use of buildings within plot adjacent NW for warehousing and industrial workshops.
1964	1:10,560	Site is part of <i>Chittening Trading Estate</i> . <i>Green Splot Farm</i> is no longer present. A large building is present on southern portion of site. Railway tracks on NW boundary.	<i>Works</i> ~250m NE. <i>Depot</i> ~250m N and ~600m W.
1971-1973	1:10,000 & 1:2,500	Building on site is labelled <i>Warehouse</i> . Three <i>Drains</i> labelled in S.	<i>Tank</i> ~110m NE. Numerous <i>Works</i> , closest ~200m N. <i>Fuel Storage Depot</i> ~600m W and ~250m N.
1992-2014	1:10,000 & 1:1,250	Drains no longer present. Additional small buildings in S.	<i>Fuel Storage Depot</i> ~250m N no longer present. Area of raised ground ~750m NE. Ponds ~250m S. <i>Pipe Lines</i> ~500m W. Railway is now dismantled.

## 2.5.2 Site History from Other Sources

Bristol and Region Archaeological Services provided Structural Soils Limited with a series of map excerpts including a 1918 Plan of National Filling Factory No. 23, Chittening Road from the National Archive. (PRO MUN 4/1753) (contained in Appendix H). It records that the site was formerly within the bounds of a First World War munitions a filling factory (National Filling Factory No. 23). As is common for militarily sensitive sites there is no record of the facility on the Ordnance Survey Mapping of the period.

Research into the history of the site suggests that the wider site may have been the location of the original Avonmouth mustard gas factory, construction of which started in 1916/7 and terminated in April 1918 before those activities were relocated to another site in Avonmouth to the south of



Kingsweston Lane. After this time the Chittening facility was converted for the filling of shells, and principally mustard gas shells.

The factory ceased work following the cessation of hostilities and little appears to be known of the history until the Chittening Industrial Estate was developed after the Second World War. This development re-used a number of the pre-existing structures and was heavily influenced by the layout of the factory.

Although within the perimeter of the filling factory, the site was peripheral to the main operation areas. The structures of the Greensplot Farm buildings remain extant on the site throughout this period and are clearly still present and apparently in good condition on the 1946 aerial photography (<http://maps.bristol.gov.uk/knowyourplace/>), at a time when the filling factory appears largely unused.

Structures on the study site relating to the former filling factory are limited to the presence of a store building which straddles the north-eastern site boundary, and the potential presence of sidings/rail infrastructure in a narrow strip adjacent to the north-western site boundary.

A petroleum license search was undertaken for the site with the Environmental Protection Team at Bristol City Council. The search returned no records.

### **2.5.3 Summary of Site History**

Site was first mapped as part of farmland with numerous drainage ditches and rhines. The site was located within the perimeter of the National Filling Factory No. 23 from its inception in 1916 through to the closure of the factory in 1918. Green Splot Farm was present on site until the 1964 mapping, when a warehouse was first mapped on the north-west half of the southern end of site. The drainage ditches on site were filled by 1992 mapping. Railway lines run along the north-west boundary of the site, which were operational until at least 1973.

## **2.6 Environmental Data**

Environmental features such as landfills, groundwater abstraction points, etc, are detailed in the GroundSure EnviroInsight and GroundSure GeoInsight reports that can be found in Appendix H of this report. ‘Notable’ features in these data sets are listed below.



TABLE 3: SUMMARY OF SIGNIFICANT ENVIRONMENTAL DATA

Data Types Showing <u>Notable</u> Issues	No. of <u>Notable</u> Listings (or Yes/No) and Distance (m) from Site				Details of <u>Notable</u> Listings
	On site	0-250	250-500	>500	
<b>ENVIRONMENTAL PERMITS, INCIDENTS &amp; REGISTER</b>					
<b>Historic IPC Authorisations and Authorised IPPC and Part A(1) Activities</b>	-	14	-	-	All relating to Selvaco Ltd carbonisation and combustion 213-217m NE, 1996 to 2011.
<b>Red List Discharge Consents</b>	-	-	1	-	499m E trade discharges from Viridor Waste.
<b>List 1 &amp; 2 Dangerous Substances Inventory</b>	-	1	1	-	Authorised substances: chromium, copper, lead, pH and zinc. Closest 167m NE.
<b>Part A(2) &amp; Part B Activities &amp; Enforcements</b>	-	1	-	-	147m NW vehicle refinishing.
<b>Licensed Discharge Consents</b>	-	3	17	-	Sewage and trade discharges, closest ~166m NE.
<b>Records of Planning Hazardous Substance Consents and Enforcements</b>	-	2	-	-	168m NW.
<b>COMAH &amp; NIHHS sites</b>	Yes	-	2	-	Historical NIHHS.
<b>EA Recorded Pollution Incidents</b>	-	8	4	-	Mostly minor or no impact events of smoke, dust, solvents and fumes, closest 92m NW. Significant water and land impact from oil or fuel 171m NE.
<b>LANDFILL</b>					
<b>EA &amp; Landfill Data Registered Landfills</b>	-	-	-	1	696m NE.
<b>EA &amp; Landfill Data Historic and Non-Operational landfills</b>	-	-	-	10	All over 906m from site.
<b>BGS/DoE Landfill Site Survey</b>	-	-	-	3	All over 1376m from site. Risk to minor aquifer.
<b>OTHER WASTE SITES</b>					
<b>Operational, Transfer and Disposal Sites</b>	-	4	2	-	Closest 15m NW.
<b>EA Licensed Waste Sites</b>	-	6	-	41	Closest 45m SE.
<b>GEOLOGY</b>					
<b>Artificial and Made Ground</b>	-	-	2	-	Closest 317m W.
<b>Radon Affected Area</b>	No	-	-	-	The property is not in a radon affected area, as less than 1% of properties are above the action level. No radon protection measures are required for new homes.



TABLE 3: SUMMARY OF SIGNIFICANT ENVIRONMENTAL DATA					
Data Types Showing <u>Notable</u> Issues	No. of <u>Notable</u> Listings (or Yes/No) and Distance (m) from Site				Details of <u>Notable</u> Listings
	On site	0-250	250-500	>500	
<b>GROUND WORKINGS</b>					
Historical Surface and Underground Workings	-	2	-	-	Surface workings for pond 98m NE.
Current Ground Workings	-	-	-	1	Clay and shale surface workings, ceased operations, 915m NE.
<b>NATURAL GROUND SUBSIDENCE</b>					
Compressible and Collapsible Deposits	Yes	-	-	-	Moderate-High.
Running Sand	Yes	-	-	-	Moderate-High.
<b>HYDROGEOLOGY &amp; HYDROLOGY</b>					
Groundwater Abstraction Licences	-	-	-	4	Closest 975m S.
Surface Water Features (within 250m)	-	22	-	-	Closest 24m E.
<b>DESIGNATED ENVIRONMENTALLY SENSITIVE SITES</b>					
Sites of Special Scientific Interest (SSSI)	-	-	1	1	Severn Estuary 476m NW.
Special Areas of Conservation and Protection	-	-	2	2	Severn Estuary 476m NW.
<b>CURRENT LAND USE</b>					
Industrial Site Data	-	26	-	-	Closest 38m SE electricity substation. Tank 141m NE.

Note: N = north, S = south, E = east, W = west.

### 2.6.1 Summary of Environmental Data

The site has two historical NIHHS authorisations for Shell Gas Ltd and A E Murphy Ltd. The closest landfill site is 696m north-east of Estuary Park, and a tank is present 141m north-east. Numerous smoke, dust and fume pollution incidents have been recorded in the Avonmouth area.

## 2.7 Initial Conceptual Model

The information presented in Sections 2.1 to 2.6 has been used to compile an initial conceptual model. The identified potential sources of contamination, associated contaminants and receptors have been considered with plausible pathways that may link them. The resulting potential pollutant linkages are considered in Section 2.7.5. The risk classification has been estimated in accordance with information in Appendix F.

### 2.7.1 Summary of Potential Contamination Sources

Potential source and their associated contaminants of concern are summarised in Table 4 below.



It should be noted that mustard gas (dichloroethylsulphide) and its precursors ethylene and disulfur dichloride, have not been identified as potential contaminants of concern due the length of time that has elapsed since production is believed to have ceased at the site (97 years). Mustard gas is a strong oxidising agent and highly reactive, and unless contained in a sealed vessel, is considered unlikely to remain active in the environment over the intervening period. Disulphur dichloride reacts violently and breaks down in contact with water and is therefore also unlikely to survive for extended periods in the environment.

Given the outlying location in the factory complex it is considered that contamination on the site is much more likely to be sourced from the more recent uses of the site as a part of the Chittening Industrial Estate.

<b>TABLE 4: SUMMARY OF POTENTIAL SOURCES AND CONTAMINANTS</b>	
<b>On Site (Historical)</b>	<b>Contaminants of Concern</b>
Alluvium (Tidal Flat Deposits) including peat	Ground gas
Made Ground	Asbestos, heavy metals and hydrocarbons
<b>On Site (Current)</b>	<b>Contaminants of Concern</b>
None	N/A
<b>Off Site</b>	<b>Contaminants of Concern</b>
Alluvium (Tidal Flat Deposits) including peat	Ground gas
Aerial deposition of particulates from industry in Avonmouth to the SW.	Heavy metals including zinc, cadmium and lead.

### 2.7.2 Summary of Potential Receptors

Considering the setting of the site and the proposed redevelopment, sensitive receptors are considered to include:

- future site users
- adjacent site users
- potable water supply pipes
- groundwater beneath site
- surface water features including rhines and drainage ditches



Please note that construction workers have not been identified in the conceptual model as receptors because risks are considered to be managed through health and safety procedures including CDM regulations.

### **2.7.3 Pathways**

Pathways that could result in a potentially complete contaminant linkage include:

- direct contact (soil and dust ingestion, dust inhalation and dermal contact)
- inhalation of ground gas
- permeation of plastic water supply pipes
- preferential pathways including permeable pipe surrounds
- leaching of soluble contaminants to surface water and ground water.

### **2.7.4 Potentially Complete Contaminant Linkages**

The potentially complete contaminant linkages identified for the proposed end use are:

1. direct contact by future site users with soil that may be impacted by heavy metals, asbestos or hydrocarbons via soft landscaping.
2. migration and accumulation of ground gas in buildings, manhole chambers and around buried service runs potentially resulting in asphyxiation or explosion.
3. direct contact of water supply pipes with contaminated soils.
4. leaching of contaminants to groundwater beneath site.

### **2.7.5 Risk Estimation for Potentially Complete Contaminant Linkages**

The potentially complete contaminant linkages are detailed above with the estimated risk associated with each being detailed in Table 6 below. The risk classification has been undertaken in accordance with CIRIA C552, with a summary of the relevant section being included in Appendix F.



<b>TABLE 5: RISK ESTIMATION FOR POTENTIALLY COMPLETE CONTAMINANT LINKAGES</b>			
<b>Contaminant Linkage</b>	<b>Likelihood</b>	<b>Severity</b>	<b>Risk and justification</b>
1	Unlikely	Medium	Low: The site will mostly be hard covered with a little soft landscaping so the site users will have little opportunity to come into direct contact with soil.
2	Low	Severe	Moderate: Elevated ground gas levels are expected from the alluvial soils, but flow rates are expected to be very low.
3	Low	Medium	Moderate/low: Significant hydrocarbon contamination is not anticipated
4	Low	Medium	Moderate/low: Shallow groundwater expected in the natural soils beneath site, but these have low permeability.

The review of the available information and the production of the initial conceptual model and risk assessment has identified risks associated with potentially complete pollutant linkages that vary from moderate/low to moderate.

Linkages with risk estimations of moderate/low or above require further investigation and this has been tailored into the intrusive site investigation.



### 3 FIELDWORK

#### 3.1 Scope of Works

The following works were completed between 15 June and 25 June 2015 at locations shown on the Exploratory Hole Location Plan in Appendix A:

TABLE 6: SCOPE OF INTRUSIVE WORKS AND IN-SITU TESTING		
Number	Exploratory Hole or In-Situ Test Type	Hole / Test Numbers
6	Cable Percussion Boreholes extended by Rotary Coring.	BH1 to BH6
12	Machine Dug Trial Pits.	TP1 to TP12

The scope of investigation and choice of investigation equipment was decided by Balfour Beatty Investments Limited in consultation with Structural Soils Limited. Sampling and in-situ testing details were specified by Structural Soils Limited.

The positions were selected by Balfour Beatty Investments Limited, set out by Structural Soils Limited and adjusted where necessary to take account of buried or overhead services, or other restrictions.

The exploratory holes were logged by an engineer in accordance with the recommendations of BS5930: 1999 (Amendment A2, 2010, which incorporates the requirements of BS EN ISO 14688-1, 14688-2 and 14689-1), and C570 *Engineering in Mercia Mudstone*. Detailed descriptions, together with relevant comments, are given in the logs included in Appendix B.

Prior to the commencement of any exploratory hole or intrusive test a cable avoidance scan was carried out using a cable avoidance tool (CAT) and signal generator ('genny').

#### 3.2 Cable Percussion Boreholes

The boreholes were drilled using a cable tool percussion drilling rig and were 150mm in diameter. The depths of the boreholes were 15.00m to 17.00m. Small and bulk disturbed soil samples were taken from the boreholes at regular intervals.

All of the six boreholes were extended using rotary drilling techniques.

100mm diameter undisturbed samples were recovered from suitable strata in accordance with BS EN ISO 22475-1 using a thick walled U100 sampler and thin walled UT100 sampler.





Standard Penetration Tests (SPT) were carried out at regular intervals (see In-Situ Testing, below).

### 3.3 Rotary Boreholes

The boreholes were drilled using a tracked rotary drilling rig. These boreholes were drilled using rotary coring techniques. Steel casing was inserted where necessary to offer temporary support to the holes.

Rotary coring was carried out using a double tube PWF core barrel to produce a hole of 121mm diameter. A clear perspex liner was incorporated within the inner barrel to maximise the quality of core recovery where required, to produce a core of 87mm diameter with liner, or of 92mm diameter without. The boreholes were drilled to depths of up to 25.20m by this method. Water was used as a flush medium.

All dynamic and core samples were extruded horizontally, laid out sequentially in wooden coreboxes. Photographs of the samples are contained in Appendix B.

### 3.4 Trial Pits

The machine dug trial pits were excavated using a wheeled mechanical excavator and were approximately 2.60m to 3.80m x 0.80m in plan and were up to 4.50m deep.

Small and bulk disturbed soil samples were taken from the trial pits at regular intervals. Hand vane and/or hand penetrometer tests were carried out in the cohesive strata (within the pit where safe to do so, else on excavated material).

### 3.5 Backfill, Monitoring Wells and Installations

On completion 50mm diameter gas and groundwater monitoring wells were installed in all six exploratory holes the design having been decided by Structural Soils Limited. The installation details are shown on the exploratory hole logs in Appendix B.

The well details are also summarised below:

TABLE 7: SUMMARY OF MONITORING WELL INSTALLATIONS					
Location	Well Diameter (mm)	Well Depth (m bgl)	Well Response Zone (m bgl)	Type of Protective Cover	Notes
BH1	50	5.0	1.0 to 5.0	Flush	

**TABLE 7: SUMMARY OF MONITORING WELL INSTALLATIONS**

<b>TABLE 7: SUMMARY OF MONITORING WELL INSTALLATIONS</b>					
BH2	50	5.0	1.3 to 5.0	Flush	
BH3	50	3.0	1.0 to 3.0	Flush	
BH4	50	4.0	0.7 to 4.0	Flush	
BH5	50	3.0	0.7 to 4.0	Flush	
BH6	50	6.0	3.0 to 6.0	Flush	

On completion, the trial pits were backfilled with arisings and compacted in layers by the excavator bucket. Trial pits in hard-standing areas were surface reinstated with concrete.

The Client or site owner should ensure that the monitoring wells and their protective covers are not damaged or covered until such time as information is no longer required from them. Extra costs would be incurred if it were necessary to reinstate damaged wells.

### **3.6 Chemical Contamination Sampling**

Samples for contamination testing were taken from the exploratory holes where indicated on the exploratory hole logs, recorded as sample types ES for soil or EW for water.

Water samples were also taken from the monitoring wells as described in Monitoring and Post Fieldwork Environmental Sampling, below.

All samples were placed in appropriate contamination sample containers that were supplied by the laboratory. Containers for volatiles testing of soil samples were filled to capacity. Any water sample containers (with preservatives where required) were filled to capacity to minimise volatilisation. All samples were then kept in cool boxes with ice packs and were transported to the laboratories under Chain of Custody documentation, as promptly as possible to maintain sample integrity.

### **3.7 In-Situ Testing**

Standard Penetration Tests (SPT) were carried out in the exploratory holes, where noted in the preceding sections, in accordance with BS EN ISO 22476-3 using a hammer or hammers which had been calibrated for efficiency. The calibration certificate(s) is included in Appendix C. Seating drives have been recorded in increments of 75mm in accordance with recommended UK practice.



The SPT N-values are reported on the exploratory hole logs, on which the serial number of the hammer used is recorded. The full results are presented in tabular format on the Summary of Standard Penetration Tests in Appendix C, on which the normalised  $N_{60}$  values are also reported, which are the equivalent N-value for a hammer delivering 60% of the theoretical drop energy. Plots showing both N and  $N_{60}$  values versus depth are also included.

Where 50 test blows failed to achieve 300mm of penetration, the SPT N-value equivalent to that for 300mm of penetration has been extrapolated and reported on the exploratory hole logs using the guidance contained in CIRIA Report *The Standard Penetration Test (SPT) - Methods and Use* (1995).

### **3.8 Monitoring and Post Fieldwork Environmental Sampling**

Gas concentrations and groundwater levels were recorded in the monitoring wells on 3 July, 10 July and 16 July 2015. BH04 could not be monitored after the first round as the well head was found destroyed on the second visit on 10 July 2015. The results together with the temporal (weather) conditions are tabulated in Appendix G.

Ground gas monitoring was carried out over 3 no. monitoring rounds. This included periods of falling atmospheric pressures.

An infrared gas meter was used to measure concentrations of carbon dioxide ( $\text{CO}_2$ ), methane ( $\text{CH}_4$ ) and oxygen ( $\text{O}_2$ ) in percentage by volume, whilst hydrogen sulphide ( $\text{H}_2\text{S}$ ) and carbon monoxide ( $\text{CO}$ ) were recorded in parts per million. Initial and steady state concentrations were recorded. An integral flow meter was used to measure borehole flow rates (initial and steady state) in litres per hour (l/hr). In addition the atmospheric pressure before and during monitoring, together with the weather conditions were recorded.

Holes were screened with a Photo-Ionisation Detector (PID) to establish if there are any interferences and cross-sensitivity of other hydrocarbons with the infrared gas meter. The results are recorded as ppm (isobutylene equivalent).

The wells were purged of three well volumes of groundwater (unless indicated otherwise on the monitoring results) on the first monitoring visit.

Groundwater samples were retrieved using a United States Environment Protection Agency (USEPA) approved Low-Flow Purging and Sampling Methodology.



The Low-Flow Purging and Sampling method relies on moving groundwater through the well screen at approximately the same rate as it flows through the geological formation. This results in a significant reduction in the volume of water extracted before sampling and significantly reduces the amount of disturbance of the water in the monitoring well during purging and sampling.

Groundwater levels in the monitoring well and water quality indicator parameters (pH, temperature, electrical conductivity, redox potential and dissolved oxygen) are monitored during low-flow purging, with parameter stabilisation indicating that purging is complete and sampling can begin. As the flow rate used for purging is (in most cases) the same as or only slightly higher than the flow rate used for sampling, purging and sampling are conducted as one continuous operation in the field.

*In situ* water quality measurements (pH, temperature, electrical conductivity, redox potential and dissolved oxygen) undertaken during the purging or sampling process and are provided in Appendix G.



## 4 LABORATORY TESTING

Samples for potential geotechnical testing were returned to one of the Company's UKAS accredited laboratories, and those for potential contamination testing were sent to a sister company Envirolab Limited, a MCERTS and UKAS accredited chemical testing laboratory. Laboratory tests were scheduled by Structural Soils Limited.

### 4.1 Geotechnical Laboratory Testing

Geotechnical laboratory testing was generally carried out in accordance with BS1377: 1990, *Methods of Test for Soils for Civil Engineering Purposes*, Parts 1 to 8. The number of tests completed and the test methods used are summarised below. Where non-standard procedures have been undertaken, this is recorded on the report sheet. The results are reported in tabular and/or graphical form and included as Appendix D of this report.

TABLE 8: SUMMARY OF GEOTECHNICAL LABORATORY TESTING			
Number of tests	Test	Test Method	Notes
<b>Classification Tests</b>			
5	Moisture content.	BS1377: Part 2.	
5	Liquid and plastic (Atterberg) limits.	BS1377: Part 2.	
4	Particle size distribution by sieving.	BS1377: Part 2.	
5	Particle size distribution by sedimentation.	BS1377: Part 2.	
<b>Compressibility, Permeability and Durability Tests</b>			
4	One-dimensional consolidation test.	BS1377: Part 5.	
<b>Shear Strength - Total Stress</b>			
10	Point Load Index	ISRM (1985) <i>Suggested Methods</i>	The natural ('as received') moisture content of the samples was determined.
<b>Chemical Tests: Soil</b>			
2	Water soluble sulphate content and pH value.	BRE SD1*.	

Note:

\* Test(s) carried out to method approved in BRE Special Digest 1.



## 4.2 Contamination

The contamination testing carried out is summarised in the following table. The results are included as Appendix E of this report, and include details of the test method.

<b>TABLE 9: SUMMARY OF CONTAMINATION LABORATORY TESTING*</b>		
<b>Numbers of tests</b>	<b>Description</b>	<b>Notes</b>
<b>SOIL</b>		
10	SSL HHA Human Screening suite	Comprises arsenic, cadmium, chromium (total), lead, mercury, selenium, copper, nickel, zinc, speciated polycyclic aromatic hydrocarbons (PAH), total petroleum hydrocarbons (TPH banded 1), organic matter, soluble sulphate and pH.
9	Metals 9	Arsenic, cadmium, chromium, copper, nickel, lead, selenium, zinc.
13	Asbestos presence screen.	Identification was undertaken if/where asbestos fibres were detected.
3	Asbestos quantification.	Quantification of percentage asbestos in sample positively identified.
<b>WATER</b>		
5	SSL GWS Groundwater Screening suite.	Comprises arsenic, cadmium, chromium (total), lead, mercury, selenium, copper, nickel, zinc, speciated polycyclic aromatic hydrocarbons (PAH), total petroleum hydrocarbons (TPHCWG (speciated)), sulphate, hardness and pH.
<b>WASTE ACCEPTANCE CRITERIA (WAC)</b>		
2	WAC-E suite.	Total waste suite. Single batch test (BS EN 12457-2, L/S 10:1).

Note: Tests carried out in accordance with MCERTS/UKAS standards where noted on the results sheets.



## 5 GROUND CONDITIONS

### 5.1 General

The exploratory holes were logged by an engineer and the ground conditions encountered are detailed on the logs contained in Appendix B. The exploratory holes encountered the following general descending sequence of strata:

<b>TABLE 10: SUMMARY OF GROUND CONDITIONS</b>			
<b>Strata</b>	<b>Exploratory holes encountered in</b>	<b>Depth to top of stratum m bgl</b>	<b>Thickness (m)</b>
Asphalt Surface	BH1, BH2, BH5, BH6 TP1 to TP4, TP11, TP12	0.00	0.05 to 0.11
Made Ground	All holes	0.00 to 0.11	0.30 to 1.82
Tidal Flat Deposits	BH1 to BH6 TP1 to TP7, TP9, TP11, TP12	0.30 to 1.90	4.60 to 6.10
Estuarine Alluvium	BH1 to BH6	5.30 to 6.60	7.00 to 10.3
Mercia Mudstone Group	BH1 to BH6	13.00 to 16.40	Proved to base of all boreholes 8.80 to 12.10

A cross section is presented in Appendix C. This illustrates the boreholes only, as the drawing is too cluttered if the trial pits are included. The section line is from south-west to north east close to BH3, BH4, BH5 and BH6, and BH1 and BH2 are projected onto the line of section.

The ground conditions are summarised in more detail below.

### 5.2 Made Ground

Made ground was present in all holes, extending to between 0.30m and 1.90m depth. An asphalt surface between 55mm and 110mm thick was present at approximately half the exploratory hole locations (see table 10), and was underlain by pinkish grey hardcore of limestone to 0.22m to 0.60m depth. This hardcore also formed the surface at several locations.

Underlying the surfacing was gravelly clay or clayey gravel, with gravel of limestone and also brick, concrete, slate, wood and charcoal. The made ground extended to between 0.3m and 1.9m below ground level, but there was no systematic variation in thickness across the site.



### **5.3 Tidal Flat Deposits**

The made ground was underlain by firm to very stiff, silty or slightly sandy clays that were generally orange/brown in colour. This represents a stiffer alluvial ‘crust’ of the Tidal Flat Deposits that overlies increasingly softer clay. The undrained shear strength of the crust decreases with depth as is demonstrated on the plot of undrained shear strength from hand vane testing vs. depth, which is included in Appendix C. The ‘crust’ was generally encountered to a depth of 2.50m, but varied across the site from 1.40m to 2.90m depth. The measured strengths were typically between 50kPa and 125kPa down to 2.0m depth, falling to 30-60kPa by 2.5m and then close to 20kPa from 3.0m depth.

The underlying soft/very soft silty, and sometimes slightly sandy, grey clays of the Tidal Flat Deposits have a varying but generally low organic content. A peat layer was picked up across the site in the boreholes at 4.40m to 5.30m depth, and possibly two layers in BH2. On sites in the area where CPT testing has been carried out, the peats have been proved to be thin (typically 0.10m thick) but laterally continuous and this is probably the case here, but the peats and their depths are difficult to identify exactly in cable percussion boreholes.

### **5.4 Estuarine Alluvium**

Very loose to medium dense silty sands were encountered at the base of the Tidal Flat Deposits and have been separated from these clay deposits and defined as Estuarine Alluvium. The boundary between these units is consistent across the site at about +1.0m OD, which is a typical feature of many Avonmouth sites. Peat was noted towards the base of the silty sands in BH2 and BH4, and this probably represents another continuous thin (c.0.10m) layer. In most boreholes, there is an approximately 1m to 2m thick layer of sandy clay below the silty sands. In BH5, this contains some gravel just below the sands. Peat was found just above the Mercia Mudstone in BH5, which represents the basal peat which is widespread across the Avonmouth area.

### **5.5 Mercia Mudstone Group**

The Tidal Flat Deposits were typically underlain by very stiff to hard reddish brown silty clays passing into extremely weak reddish brown coloured mudstone or siltstone of the Mercia Mudstone Group. Most cable percussion boreholes penetrated between 1m and 2m into the unit, with the last half metre of penetration typically achieved by chiselling. The boundaries drawn between the hard clay and the extremely weak mudstone, where present on the logs, are tentative as the change is gradational.





Within the red mudstones 2 distinctive thin green-coloured sandstone and siltstone beds were proved in all boreholes, at approximately the same depths across the site, as illustrated in the cross-section in Appendix C. This shows that the Mercia Mudstone is horizontally bedded and unfaulted beneath the site.

Old coal exploration boreholes in the area proved coal measures at between -40m and -45m OD, so these would be of the order of 50m below ground level under the site, and 25m below the base of the boreholes. The coal has never been worked in this area.

## **5.6 Groundwater**

Groundwater levels in the standpipes have been recorded at 1.1m to 2.2m below ground level.

## **5.7 Indications of Contamination**

Possible asbestos was noted in the made ground in BH5 (although no asbestos was detected in a sample of this material screened at the laboratory – sample from 0.70m, screen result noted in Appendix E)..



## **6 GEOTECHNICAL SITE ASSESSMENT**

### **6.1 Proposed Development**

The proposed development is a biomass fuel power station. No details of the loadings or of the proposed foundation method have been provided by the client. We have interpreted our brief as supplying ground information including geotechnical parameters to allow the design of the foundations by others.

### **6.2 Site Preparation and Excavation**

Groundwater ingress into excavations is likely below depths of about 1.0m. However, it should be noted that groundwater levels may change due to seasonal or other variations. Surface water run-off from rainfall may also enter excavations. Advice on suitable dewatering techniques is given in CIRIA Report C515 *Groundwater Control – design and practice*.

Unsupported excavations are unlikely to remain stable and will require support. All excavations should be planned and due consideration should be given to providing temporary support or suitable battering. Excavations should be regularly inspected by a competent person to ensure continued safety. Further advice on the safety of excavations is given in *Health and Safety in Construction*.

### **6.3 Foundations**

Given the thickness of soft compressible soils beneath the site, it is presumed that the main structure and possibly the floor slabs will be built off piles.

The possible effects of noise and ground vibrations from pile driving on the surrounding area and nearby structures including buried services should be taken into account during pile selection and design. The Local Authority and/or statutory undertakers should be consulted where appropriate.

The piles would be driven through the superficial soils and into the underlying Mercia Mudstone bedrock. However, some negative skin friction from the Tidal Flat Deposits due to loading and consolidation of the clays is possible if the ground levels are raised shortly prior to pile installation and this should be considered in the design.

This problem would be worse if levels were to be raised further. Any imported fill may settle under its own weight, and both may undergo further future settlement under construction or operational loads. Due to the high organic content of the alluvial soils settlements can also occur as the organic material and peat decay with time, even if there is no change in loading. Changes



in the groundwater regime, for example if band drainage was installed, could increase the rate or influence the amount of settlement.

Pile lengths would be expected to vary only slightly across the footprint of the structure, with the depth to bedrock. Depths to rockhead across the site are given in Table 9 in section 5. Given the nature of the soils and rocks present on the site it is envisaged that pile capacity will be determined by driving piles to a pre-determined resistance, or 'set', as opposed to a pre-determined length based on static pile design calculations.

For piled foundations in the Mercia Mudstone Bristol City Council have, based on experience, traditionally placed limits on the acceptable peak ultimate unit skin friction and ultimate unit end bearing capacity for piles constructed within the Mercia Mudstone to 250kN/m<sup>2</sup> and 7500kN/m<sup>2</sup> respectively. It would be prudent to confirm with the Local Authority whether any similar limitations apply to this site.

As the capacity of piles can vary depending on the type and method of installation, it is recommended that the advice of specialist piling contractors be sought with regard to the final design of piles. Consideration should also be given to undertaking loading tests on selected piles.

Tomlinson (2001) has some comments which are pertinent: in the section on driven piles founded on rock he states that: *Mudstones and shales frequently consist of bands of moderately strong partly weathered rock interbedded with weak partly to completely weathered rock of firm to stiff clay consistency.* He goes on to say that *Unless rock bands can be proved to be of appreciable thickness over the piled area, it is advisable to base the end resistance of the pile on the shear strength of clay bands.* At this site the mudstone has been proved for >5m with few or no clay horizons, once the initial layer of clay has been penetrated, and we would recommend that pile design assume that the bedrock is extremely weak mudstone.

We have seen the results of pile tests on 275mm square driven piles at a site to the north-east with similar ground conditions. The data show that the piles mostly had proposed working loads of 800kN, and that the mobilised soil resistance was well in excess of the working load. It is presumed that the piles were driven to a set. Given the similarity of conditions, we consider that similar sized piles driven to the same set could carry the same working load, which should give the designer of likely working load of piles.



## 6.4 Hardstanding Areas: Settlement Considerations

The two prime considerations are the amount of settlement, and the rate at which it will occur. These are separate issues and will be dealt with separately.

### 6.4.1 Amount of Settlement.

The amount of settlement is controlled by three factors: (1) the net increase in pressure, (2) the compressibility of soils being loaded, and (3) the thickness of the soils. In the discussion below, the net increase in pressure is not considered, the approach being to estimate the amount of settlement that would occur for a net increase in pressure of 10kPa (equivalent to raising ground level by approximately 0.5m). Since the amount of settlement varies in direct proportion to the net increase in pressure, it is a simple matter for the designer to calculate the predicted settlement for the actual design pressures. Some simplifying assumptions have been made: (a) That any settlement due to consolidation in the underlying Mercia Mudstone is trivial, and can be ignored. (b) That since the areas to be loaded – i.e. the areas where levels will be raised – are very large in comparison with the thickness of the soils, the reduction with depth of the net increase in pressure is very small, and can be treated as zero. (c) The effect of any compaction in the fill due to its self-weight is not included, the long-term settlement is calculated as if the fill were a natural clay, and assigned a suitable compressibility.

The compressibility of the soil is defined by the coefficient of volume compressibility,  $m_v$ , which is measured in  $m^2/MN$ . The coefficient is approximately inversely proportional to the undrained shear strength in clays soils. It is measured in the laboratory oedometer (one dimensional consolidation) test. Test results from Estuary Park are plotted with the results from >200 test stages on >40 samples from other sites at Severnside. To better assess the results, all tests at pressures less than the original overburden pressure of the sample were excluded as these test stages are of dubious value, and secondly the test results were subdivided on the basis of the original moisture content of the sample. The results are plotted on the graph overleaf:

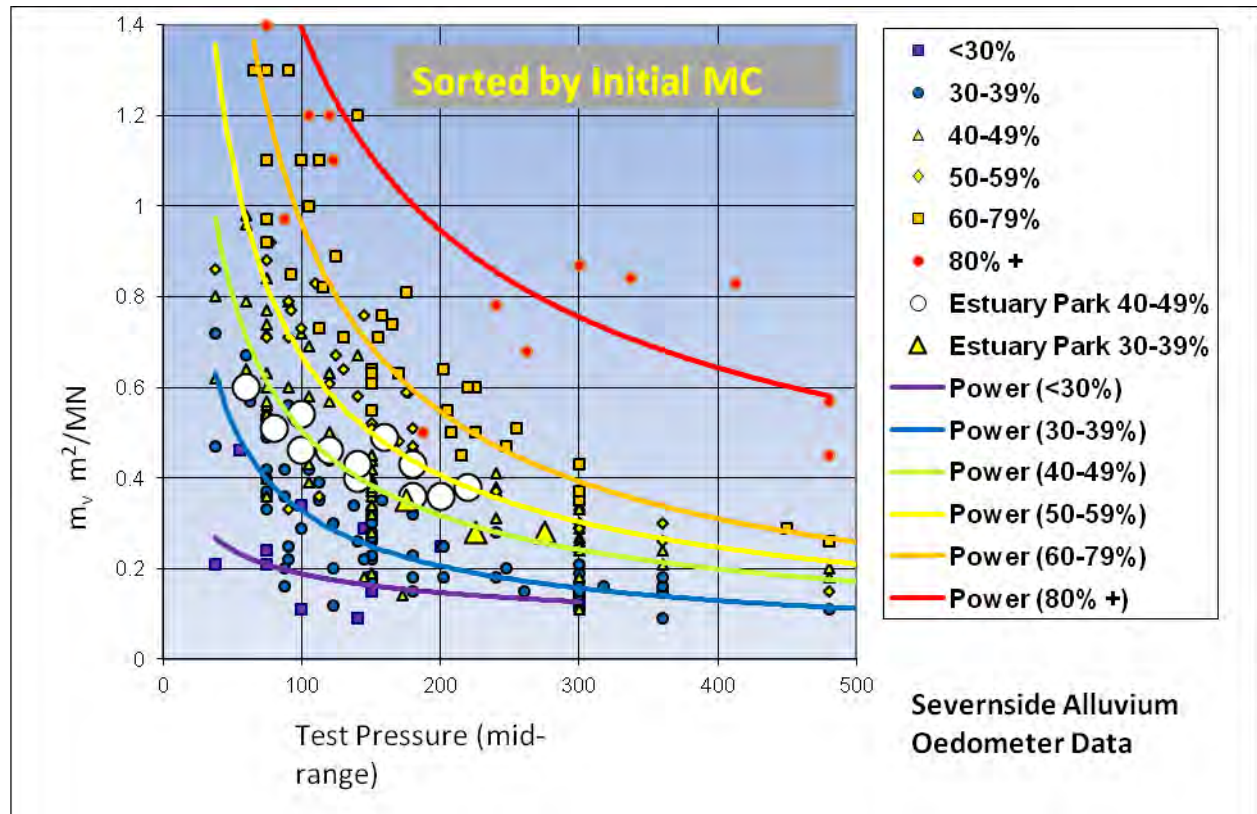


Figure 1. Compilation of  $m_v$  results from Tidal Flat Deposits at Severnside sorted by natural moisture content

The results show that there is a very strong correlation between the  $m_v$  value and the initial moisture content of the sample. The Severnside soils with Moisture Contents (MC) greater than 70% are organic soils, grading into peats. Most alluvial soils at Severnside have MC in the range 31 to 70%. Those with lower moisture contents are restricted to the firm alluvial crust at shallow depth. The 4 tested samples from Estuary Park had a restricted range of natural moisture contents of 35 to 45%, and their compressibility falls precisely within the expected ranges. Below +2m OD and particularly below 0.0m OD the moisture contents are lower, because these soils are siltier, sandier and less plastic than those above. This change is almost universal across Severnside and the Severn Estuary generally, and occurs at c +1.0m OD at Estuary Park.

Based on the above we would recommend assuming an  $M_v$  value of  $0.4m^2/MN$  for the silty clay soils in settlement calculations. We would recommend assuming an  $M_v$  value of  $0.2m^2/MN$  for the deeper silty sand soils, at the relevant pressures. There are some thin peats present but these are thin and although their  $m_v$  will be high, of the order of  $1.0m^2/MN$ , they only represent of the order of 5% of the thickness so their effect will be negligible. The peats are combined in the calculation shown in the table below, where an  $M_v$  of  $1.0m^2/MN$  is assumed.



**TABLE 11:  
SETTLEMENT CALCULATION: TYPICAL GROUND CONDITIONS**

GEOLOGY	Depth Range	Mid Point	Thickness (m)	Effective overburden pressure (kPa) at midpoint (GW = 2.0m)	Estimated MC (%)	Estimated $m_v$	Consolidation Settlement mm per 10kPa increase in pressure
MADE GROUND (Gravelly Clay)	0-1.0	0.5m	1.0	25	N/A	0.20	2
SILTY CLAY	1.0-6.0	3.5m	5.0	55	35-45	0.40	20
SILTY SAND	6.0-15.0	10.5m	9.0	125	30	0.20	18
PEATS	--	--	0.5	--	100	1.00	5

Based on these values, the long-term consolidation settlement under a large loaded area is estimated to be of the order of 45mm for each increment of 10kPa in increased pressure. This can be taken to apply over the whole of the site, as there is little variation in the thickness of the layers. There would consequently only be very minor lateral variations in total settlement across all parts of the site.

There do not appear to be any thick peat units beneath the site such as occur elsewhere on the Severnside levels, and the total thickness of peat is estimated to be of the order of 0.5m. Long-term secondary compression can occur over decades where peats are present but this is likely to be negligible and can be ignored unless the plant would be susceptible to such small long-term secondary settlements.

#### **6.4.2 General Geotechnical Parameters**

The details of any foundation design or ground improvement are not known. The following table of characteristic values is presented for use in preliminary design, based on parameters for the ‘Pencol’ system which has been used on other sites in the area with the same ground conditions. The method of deriving the factors is based on the method used to estimate the soil parameters for Pencol. Peat layers are excluded.



**TABLE 12: SUMMARY OF GROUND CONDITIONS FOR PRELIMINARY PENCOL DESIGN**

Depth (m)	Strata	Unit Weight (kN/m <sup>2</sup> )	Undrained Strength $c_u$ (kN/m <sup>2</sup> )	Friction angle $\phi'$	Young's Modulus E (MPa)	Young's Modulus E' (MPa)
0-1.0	MADE GROUND (Gravelly Clay)	19	75	25	31	25
1.0-3.0	Firm becoming soft CLAY	19	25-50	25	6-31	5-25
3.0-6.0	Soft CLAY	17	15-25	25	1.8-3.0	1.5-2.5
6.0-14.0	Sandy SILT / silty SAND*	18	25	28	3.0	2.5
14.0-17.0	Stiff CLAY (weathered MUDSTONE)	20	100-200	35	65-130	50-100
17.0-25.0	Extremely weak MUDSTONE	20	500	35	315	250

- \*Treated as cohesive.

## 6.5 Protection of Buried Concrete

This assessment of the potential for chemical attack on buried concrete is based on current guidance contained in BRE Special Digest 1 ('SD1', 2005) *Concrete in Aggressive Ground Part 1: Assessing the aggressive chemical environment*. Third Edition.

The site is classed as *brownfield*, as it has been subject to previous industrial development and might contain chemical residues produced by or associated with industrial production. Table C2 in BRE SD1 is therefore used to assess the site.

Soil pH values ranging from 7.78 to 9.63 were recorded. From these results a 'Characteristic Value' of 7.85 is derived.

Groundwater pH values ranging from 7.38 to 8.67 were recorded. From these results a 'Characteristic Value' of 7.38 is derived.

The water-soluble sulphate (SO<sub>4</sub>) results range from <10mg/l to 886mg/l. The groundwater sulphate (SO<sub>4</sub>) results range from 6mg/l to 91mg/l.

The Characteristic Value for pH is defined as the lowest ('worst case') pH value for a data set of less than five pH values, as the mean of the lowest two pH values for a data set of five to nine pH



values, and as the mean of the lowest 20% for ten or more results. To determine Characteristic Values for sulphate and any other compounds the highest results are used.

Based on the results the Design Sulphate Class for the site is DS-2.

The Aggressive Chemical Environment for Concrete (ACEC) class is AC-2. The designer should utilise these classifications in order to produce the concrete specification.





## **7 GEOENVIRONMENTAL SITE ASSESSMENT**

### **7.1 Proposed Development**

The proposed development is detailed in Section 6.1 of this report.

### **7.2 Contamination – Soil: Generic Quantitative Risk Assessment (GQRA)**

#### **7.2.1 Risk to Human Health**

##### ***General***

To determine whether contaminants are present at levels that may be deemed to pose a significant hazard to human health, measured contamination levels in soil at the site are directly compared against derived guideline values ('Tier 2' soil screening). Where contaminants are present above the screening values it is probable that site-specific information will be required to further examine the potential risk of harm arising from such contamination.

The background to the assessment is contained in Appendix F and the findings are summarised in the following pages.

The proposed use of the site is power station and thus the commercial scenario guidelines have been used to assess the results.

##### ***Results***

Olfactory or visual indications of contamination are detailed in Section 5.

Contaminants assessed against the GAC's are: arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, zinc, Polycyclic Aromatic Hydrocarbons (PAH) & Total Petroleum Hydrocarbons (TPH).

All of the individual results for the above contaminants were all below the GAC for a commercial end-use. However, loose chrysotile asbestos fibres were observed in samples from 0.35m depth in TP3 and 0.10m depth in TP7. Cement bound chrysotile asbestos was observed in a sample from 0.20m in BH1.

Quantification of these positive screens indicated that the loose fibres and cement bound asbestos made up between 0.001% and 0.013% of the respective samples by mass.

##### ***Conclusions***

The soils appear largely uncontaminated except for the presence of different forms of asbestos. To date only chrysotile asbestos has been positively identified, and this was at relatively low



concentrations in 3 no. of the 13no. samples screened. All three positive screens were from the near surface granular made ground, and in the case of two of the samples, this was the sub-base beneath the current asphalt hardstanding. Other contaminants assessed against the GAC were below the assessment criteria.

## **7.2.2 Risks to Water Supply Pipes (Brownfield)**

### ***General***

It should be noted that at the time of this investigation the future routes of water supply pipes had not been established, hence the investigation and sampling strategy may not be fully compliant with UKWIR recommendations. Consequently, a targeted investigation and specific sampling/analytical strategy may be required at a later date once the route of the supply pipes is known.

For possible pollutant linkages to proposed water supply pipes, the laboratory test results have been subject to initial assessment against the GAC presented in Appendix F (reproduced from the Table 3.1 of UKWIR).

Full testing has not been undertaken to determine the suitability of metallic pipe materials.

### ***Results***

The soils results indicate that relevant pollutant linkages associated with organic contaminants are unlikely to exist and therefore PE plastic water supply pipes are expected to be suitable for use on the development.

It is recommended that this assessment be given to the relevant water supply company at an early stage (ideally prior to an application for planning permission being made) to confirm its requirements, which may not necessarily be the same as those recommended by UKWIR.

### ***Conclusions***

The investigation has shown that the levels of hydrocarbon contamination in the soils investigated to be very low, which indicates that no risks to standard plastic water pipes have been identified. However it is recognised that the actual water supply pipe route is unlikely to have been investigated in detail, and that the analysis undertaken does not accord with the full requirements of the UKWIR guidance. As such we would recommend that the report be submitted to the local water supply company to ensure that they accept the use of standard PE pipe before this is utilised on the development.



## **7.3 Contamination – Groundwater: Generic Quantitative Risk Assessment (GQRA)**

### **7.3.1 Risks to Human Health**

#### ***General***

The results have been compared against the GRAC ‘Groundwater Assessment Criteria’ for Human Health purposes presented in Appendix F.

#### ***Results***

None of the groundwater results have exceeded the GRAC.

#### ***Conclusions***

The investigation has shown contaminant levels in the groundwater to be below the groundwater assessment criteria, which indicates that no risks to human health have been identified from potentially volatile contamination in the groundwater.

### **7.3.2 Risk to Groundwater**

#### ***General***

The Tidal Flat Deposits which immediately underlie the site are classed as Unproductive Strata. Without reduced levels it is not possible to be certain, but it appears that the groundwater in the shallow wells represents a continuous body of water across the site. The groundwater results have been compared to the respective GACs, presented in Appendix F.

#### ***Results***

Groundwater samples from BH2, BH3, BH5 and BH6 slightly exceed the drinking water standard for arsenic, however they are all below the freshwater EQS. Given that the nearest receptor is expected to be a surface water drainage rhine we do not considered the results to be significant.

#### ***Conclusions***

The monitoring and analysis undertaken has not identified any significant groundwater contamination.

### **7.3.3 Ground Gases**

#### ***General***

In order to assess the significance of ground gases at the site, measured concentrations (by volume in air) and flow rates have been used to generate Gas Screening Values (GSVs). These



have then been compared to the Revised Wilson and Card Classification and CIRIA Report 665. BS8485 has also been referenced.

It is recommended that the gas risk should be assessed by the consideration of pathways to human receptors as gas entering the building through the substructure and building up to hazardous levels.

### ***Results***

The following ground gas parameters have been recorded over the 3 no. gas monitoring rounds:

- A maximum methane concentration of 16.7%
- A maximum carbon dioxide concentration of 6.7%
- A maximum initial flow rate of 0.1 l/hr
- A maximum residual flow rate of 0.0 l/h

The maximum methane and carbon dioxide concentrations were recorded on the first monitoring round in BH5. Aside from these figures the highest recorded methane and carbon dioxide concentrations 0.8% and 4.5% respectively. It is considered possible that the results from the first round in BH5 represent the short term release of ancient ground gas that has been generated over long periods and trapped within the peat horizons in the alluvium. Similar observations have been made at other sites on the same geology in the area. Although gas concentrations in these strata are very high, flow rates (gas flux) are typically very low.

On the first visit on 3 July 2015 BH3 showed an initial flow rate of -3.9 l/h. The water level however was only 1.12mbgl, which is very close to the upper sealed section of the standpipe and may therefore indicate that a soil gas pressure difference was trapped in the upper section of pipe and suddenly equalised when the pipe was monitored, giving rise to the very brief flow of gas into the borehole. So although gas flows are potentially reversible this flow rate has not been used to derive GSVs for the site as detailed below.

The worst case Gas Screening Values (GSV) for both methane and carbon dioxide have been calculated. In accordance with NHBC guidance for methane the GSV is calculated using the peak concentration and flow and for carbon dioxide the residual concentrations and flow rates are used.



## **Conclusion**

GSVs for methane and carbon dioxide have been calculated to be 0.02 l/hr and 0.00 l/hr respectively.

Therefore the site falls into ‘Characteristic Situation’ 1 in Table 8.5 of CIRIA 665. However the table states that because methane has been encountered above 1%, an increase to CS2 should be considered. Moreover, because no monitoring has been done under worst cast conditions (low and falling pressure) this is a further reason why CS2 would be the appropriate gas regime. This is also in line with CL:AIRE publication RB17 which considers that CS2 is appropriate for organic alluvial soils with or without peat.

### **7.4 Contamination Conclusion**

Soil/Groundwater/Ground Gas contamination has been recorded at the site resulting in complete pollutant linkages.

The linkages are summarised below:

- Inhalation of asbestos fibres released from exposed contaminated soils.
- migration and accumulation of methane gas in buildings, manhole chambers and around buried service runs potentially resulting in asphyxiation or explosion.

Therefore the following has been carried out in order to assess the risk to the future end users and the environment.

### **7.5 Final Conceptual Site Model and Risk Assessment**

#### **7.5.1 General**

This section of the report aims to refine the ‘Initial Contamination Conceptual Model’, in the light of the findings of the ground investigation. The methodology used to assess the risk is presented in Appendix F.

#### **7.5.2 Uncertainty**

Asbestos contamination is inherently variable in its distribution and therefore areas of greater asbestos concentration could be encountered during the works

In regards to ground gas there is an absence of worst case gas monitoring data. But this has been countered by selecting Characteristic Situation 2 as the gas regime. But given that CL:AIRE report RB17 allows this type of site to be gas risk-assessed without any gas monitoring at all, and



that the gas risk assessment in this report is consistent with the gas regime used by RB17 for this type of geology, the uncertainty is not considered significant.

The complete linkages and current resulting risks have been identified and are presented in the table below:

<b>TABLE 13: FINAL RISK ASSESSMENT</b>				
<b>Source</b>	<b>Pathway</b>	<b>Receptor</b>	<b>Probability &amp; Consequence</b>	<b>Risk</b>
Asbestos	Inhalation	Future on-site users	Likely, Medium	Moderate
		Maintenance workers	Low likelihood, Medium	Moderate/low
Ground gas	Migration along backfill around services, more permeable strata inhalation/explosion	Future on-site users	Low likelihood, Severe	Moderate/low
		Maintenance workers	Low likelihood, Severe	Moderate/low

Please note that construction workers have not been identified in the conceptual model as receptors because risks are considered to be managed through health and safety procedures, such as the use of appropriate PPE, and application of the CDM Regulations.

## **7.6 Remediation and Risk Reduction Recommendations**

The Local Environmental Health Officer (and the NHBC if involved) will usually require a ‘Validation Report’ to confirm that all risk reduction strategies recommended below, and any others subsequently required, have been undertaken.

### **7.6.1 Unforeseen Risks During Development**

Given the existence of made ground on the site it would be prudent to maintain vigilance during site clearance and construction, in case any further areas of suspected contamination are encountered. If areas are found then a suitably qualified person should undertake appropriate sampling, testing and further risk assessment.

### **7.6.2 Site Worker Safety**

Asbestos contamination is inherently variable in its distribution and therefore areas of greater asbestos concentration could be encountered during the works.

Since asbestos has already been found in three soil samples precautions should be taken to control the releases of fibres to air in order to prevent inhalation. Precautions should include



damping down where necessary, and sheeting of stockpiles, skips and lorries. The need for PPE such as overalls, gloves and respirators should be considered.

### 7.6.3 Ground Gas

It is recommended that gas protection be provided to Characteristic Situation 2 of CIRIA C665: 2007. The type of building proposed is commercial and for this Table 8.6 of CIRIA 665 indicates that one to two main protection measures are required in the new buildings.

- a) Reinforced concrete cast in situ floor slab (suspended, non-suspended or raft) with at least 1200 g DPM.
- b) Beam and block or pre cast concrete slab and minimum 2000 g DPM/reinforced gas membrane.
- c) Possibly underfloor venting or pressurisation in combination with a) and b) depending on use.

All joints and penetrations sealed.

Underfloor venting is required in any buildings with smaller rooms, as opposed to a warehouse building where underfloor venting is not required.

A more detailed and more flexible breakdown of gas protection requirements is given in BS8485: 2015. Here a commercial (Type C) building with CS2 gas regime requires a gas protection score of 2.5. This score can be accumulated using two or three of the main gas protection elements: floor construction, venting layer and gas membrane. This approach begins with the floor construction, because this has usually already been decided, the options for the other elements can then be evaluated.

This approach cannot be taken further here because no construction details are available. But the approach is more flexible: for instance the required score could be obtained by adding a membrane to a suitable floor construction without the need for an underfloor venting layer (which is different from CIRIA C665). However it should be noted that the installation and validation requirements for membranes are now more stringent: validation should comply with CIRIA report C735.



## 7.7 Off-site Disposal of Surplus Soil

### 7.7.1 General

All excavated material and excess spoil must be classified for waste disposal purposes prior to disposal at landfill. Under the Landfill (England and Wales) Regulations 2002 (as amended), prior to disposal all wastes must be classified as:

- ‘inert’, or
- ‘non-hazardous’, or
- ‘hazardous’.

The Environment Agency’s *Hazardous Waste (Technical Guidance WM3)* document outlines the methodology for classifying wastes.

Currently all wastes may require pre-treatment prior to disposal at landfill.

### 7.7.2 Initial Waste Characterisation

EnviroLab have produced an assessment tool, ‘Haswaste’, that characterises contaminated waste soil by following the guidance within WM3. The ‘total solid testing’ results from this investigation have been run through this assessment tool to aid potential future off-site disposal of materials. This assessment produces an ‘initial’ characterisation of the waste which determines if it is hazardous or not (if it is ‘not’ hazardous, then it may be either inert (insoluble and inorganic) or non-hazardous. However, due to complications with the terminology of ‘inert waste’ it is best not to refer to it as such until after Waste Acceptance Criteria testing).

The assessment is included in Appendix D. Any samples that are classed as hazardous will have light cells with bold text, in the respective sample columns (assuming results are in black & white, otherwise yellow cells on a colour copy). The results are summarised as follows:

Asbestos was positively identified in BH1, TP3 and TP7 at 0.20m, 0.35m and 0.10m depth respectively, but the percentage present in the soil was below hazardous waste guidelines. Therefore these samples are deemed non-hazardous. Hazardous samples have been identified from TP1 at 0.34m (due to lead and zinc) and TP9 at 0.20m depth (due to TPH).

It is important to note that whilst we believe our in-house assessment tool to be an accurate interpretation of the requirements of WM3, thereby producing initial classifications in accordance with it, landfill operators often have their own assessment tools and can often come





to a different conclusion. As a result, some landfill operators could even refuse to take apparently suitable waste.

### **Waste Acceptance Criteria (WAC) Testing**

One sample of made ground and one sample of natural a ground (Tidal Flat Deposits) were analysed for a WAC suite. Both samples showed results within the WAC inert limits.

Therefore apart for the soils classed above as hazardous, and the soils classed as non-hazardous due to asbestos, the soils WAC-tested are considered suitable for disposal as inert waste.

The samples classed as hazardous may require WAC-hazardous testing in order to determine whether they are suitable for disposal to hazardous waste landfill or whether they require treatment before they can be landfilled.

Any made ground containing visible asbestos containing material is likely to be classed as hazardous waste for disposal, unless the soil can be separated out and shown to contain less than 0.1% asbestos only visible under microscope. The separated asbestos would be classed as hazardous waste.



## **8 SUMMARY**

- 8.1** It is proposed to build a biomass power station at Estuary Park in Avonmouth.
- 8.2** A preliminary risk assessment identified potentially complete contamination links that required further investigation. These were: direct contact by future site users with soil that may be contaminated, migration and accumulation of ground gas, leaching of contaminants into drinking water supply pipes and to groundwater beneath site.
- 8.3** An intrusive investigation comprising six cable percussion boreholes, extended by rotary coring, and twelve machine dug trial pits was carried out with geotechnical and contamination analysis of soil samples in the laboratory.
- 8.4** The investigation proved the site to be underlain by made ground, the Tidal Flats Deposits, Estuarine Alluvium and the Mercia Mudstone Group.
- 8.5** Given the thickness of soft compressible soils beneath the site, it is presumed that the main structure and possibly the floor slabs will be built off piles. The piles would be driven through the superficial soils and into the underlying extremely weak Mercia Mudstone bedrock. However, some negative skin friction from the Tidal Flat Deposits due to loading and consolidation of the clays is possible if the ground levels are raised shortly prior to pile installation and this should be considered in the design. We would recommend that pile design assume that the bedrock is extremely weak mudstone.
- 8.6** Concrete specification should utilise the ACEC class AC-2.
- 8.7** Since asbestos has already been found in three soil samples precautions should be taken to control the releases of fibres to air in order to prevent inhalation. Precautions should include damping down where necessary, and sheeting of stockpiles, skips and lorries. The need for PPE such as overalls, gloves and respirators should be considered.
- 8.8** Asbestos contamination is inherently variable in its distribution and therefore areas of greater asbestos concentration could be encountered during the works.
- 8.9** It is recommended that gas protection be provided to Characteristic Situation 2 of CIRIA C665: 2007. This would typically comprise a gas membrane and an underfloor vented void. A wider range of options can be used for the same gas regime by referring to BS 8485: 2015.



- 8.10** Asbestos was positively identified in BH1, TP3 and TP7 at 0.20m, 0.35m and 0.10m depth respectively, but the percentage present in the soil was below hazardous waste guidelines. Therefore these samples are deemed non-hazardous. Hazardous samples have been identified from TP1 at 0.34m (due to lead and zinc) and TP9 at 0.20m depth (due to TPH).
- 8.11** One sample of made ground and one sample of natural a ground (Tidal Flat Deposits) were analysed for a WAC suite. Both samples showed results within the WAC inert limits. Therefore apart for the soils classed above as hazardous, and the soils classed as non-hazardous due to asbestos, the soils WAC-tested are considered suitable for disposal as inert waste.

#### **STRUCTURAL SOILS LIMITED**

S Stanley BSc (Hons) FGS

A Cattell BSc PhD CGeol FGS



## 9 REFERENCES

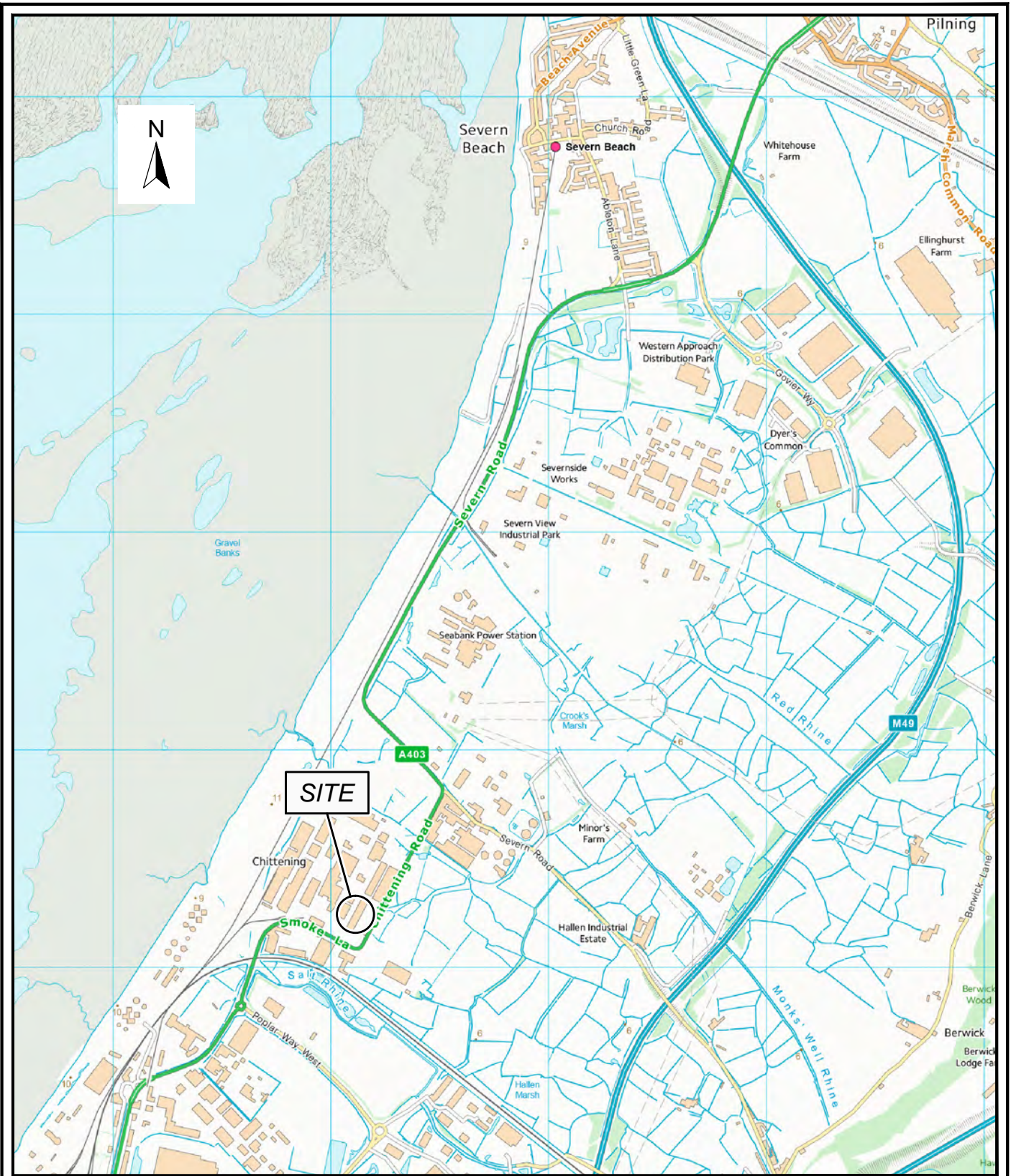
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- 9.25** *Hazardous Waste: Interpretation of the Definition and Classification of Hazardous Waste*, Environment Agency, WM3 Version 1.0, June 2015
- 9.26** *Landfill (England & Wales) Regulations 2002*

## **APPENDIX A**

- (i) Site Location Plan
- (ii) Exploratory Hole Location Plan



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CLIENT

Balfour Beatty Investments Limited

PROJECT

Estuary Park, Avonmouth

TITLE

SITE LOCATION MAP

REV.	DATE	DESCRIPTION	BY	CHD.	APR.
00	01.07.2015	-	JH	SS	-
DIMENSION		SCALE	DRAWING STATUS		
m		1:25,000	-		

JOB NO

729873

GRID REF

ST 531 812

SCALE BAR



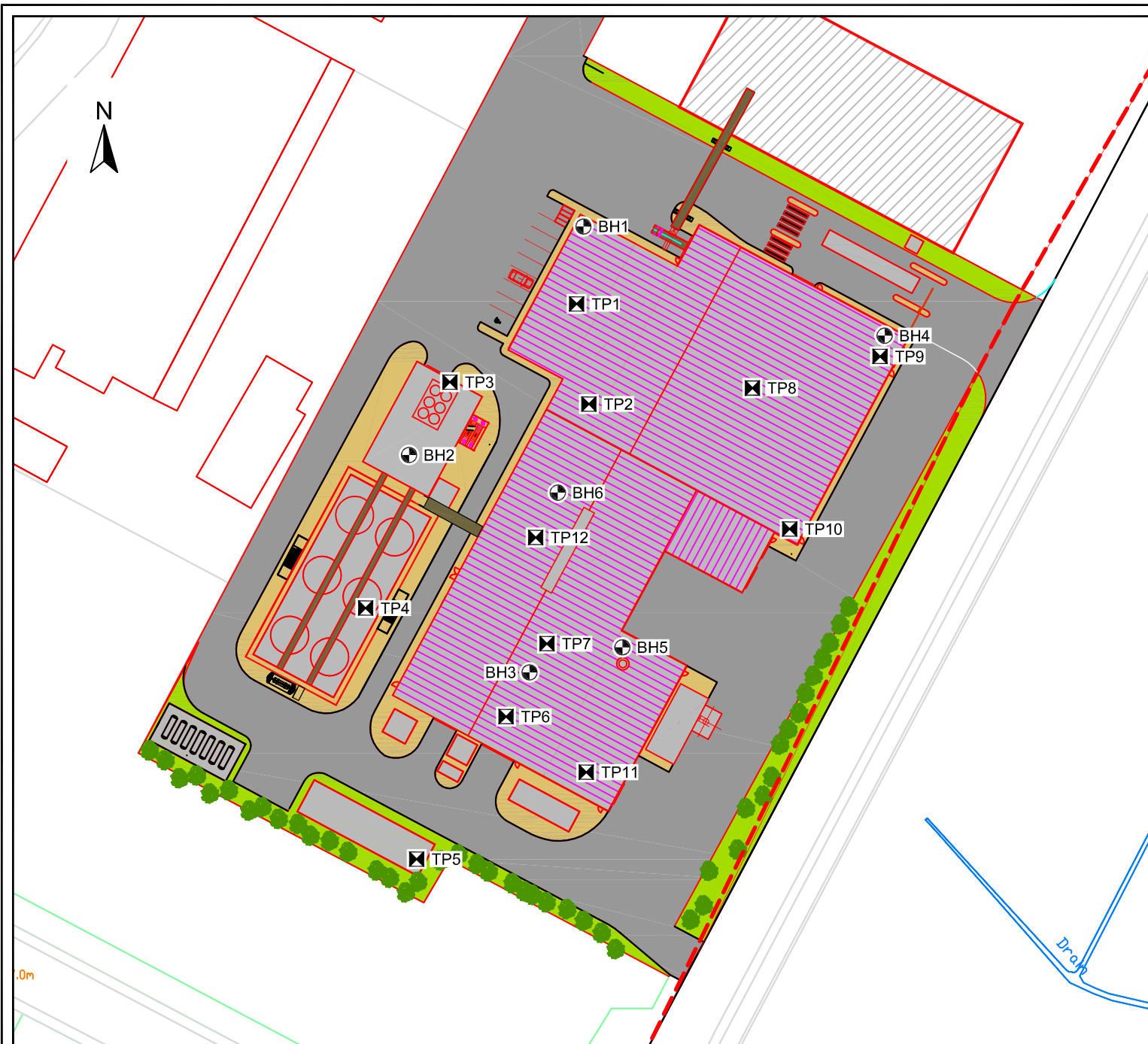
ORIGIN SIZE

A4

FIGURE

1





**LEGEND**

- ✕ Trial Pit Location
- ⊕ Borehole Location

00	01.07.2015	-	JH	SS	-
REV	DATE	DESCRIPTION	BY	CHD	APR
DIMENSION		SCALE		ORIGIN SIZE	
m		1:1000		A4	



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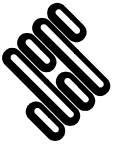
Tel: 0117 947 1000  
 Fax: 0117 947 1004  
 ask@soils.co.uk  
 www.soils.co.uk

CLIENT	
Balfour Beatty Investments Limited	
PROJECT	
Estuary Park, Avonmouth	
TITLE	
EXPLORATORY HOLE LOCATION PLAN	
JOB NO	FIGURE
729873	2
DRAWING STATUS	REV
-	00
SCALE BAR	



## **APPENDIX B**

- (i) Key to Exploratory Hole Logs
- (ii) Borehole Logs
- (iii) Trial Pit Logs



### KEY TO EXPLORATORY HOLE LOGS - SUMMARY OF ABBREVIATIONS

#### SAMPLING

##### *Sample type codes*

B	=	Bulk disturbed sample.
CS	=	Core sample taken from rotary core for lab testing.
D	=	Small disturbed sample.
DSPT	=	Small disturbed sample originating from SPT test.
ES	=	Soil sample for environmental testing.
U	=	Undisturbed driven tube sample - Number of blows indicated. % recovery reported.

##### *Undisturbed sample detail codes*

U <sub>(100)</sub>	=	100mm diameter undisturbed sample.
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#### IN-SITU TESTING

SPT	=	Standard Penetration Test using split spoon sampler. (SPT <sub>(NR)</sub> indicates 'No Sample Recovery').
HP	=	Hand Penetrometer Test. Value given as shear strength $c_u$ , in kPa.
V	=	Field Vane Test. Peak value ( $c_u$ ) & Residual value ( $c_r$ ), given as shear strength in kPa.

#### ROTARY DRILLING INFORMATION

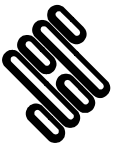
W	=	Water flush returns (%)
TCR	=	Total core recovery (%)
SCR	=	Solid core recovery (%)
RQD	=	Rock quality designations (%)
If	=	Fracture spacing (mm).

In the fracture column (i) denotes discontinuity is infilled (refer to Fracture Table for details).  
Where variable the minimum - average - maximum spacing may be quoted.  
'NI' denotes non-intact core. 'NA' denotes not applicable.

All lengths used to determine rock core mechanical properties taken along the centre line of the core.  
Obvious induced fractures have been ignored.  
The assessment of solid core is based on lengths that show a full diameter and not necessarily a full circumference.  
AZCL = Assessed zone of core loss.

#### ADDITIONAL NOTES

1. All soil and rock descriptions and legends in general accordance with BS EN ISO 14688-1, 14688-2, 14689-1, and BS5930:1999 including Amendment 2 (2010).
2. Material types divided by a broken line (- - -) indicates an unclear boundary.
3. The data on any sheet within the report showing the AGS icon is available in the AGS format.



### KEY TO EXPLORATORY HOLE LOGS - SUMMARY OF GRAPHIC SYMBOLS

#### WATER COLUMN SYMBOLS



First water strike, second water strike etc.

Standing water level following first strike, standing water level following second strike etc.

Seepage.

Standing water level recorded at documented date.

#### MATERIAL GRAPHIC LEGENDS



CLAY



Clayey SAND



MADE GROUND



Mudstone



SAND



Sandstone



Sandy CLAY



Sandy silty CLAY



Sandy gravelly CLAY



Siltstone



Silty CLAY



Silty SAND

#### INSTRUMENTATION SYMBOLS



Backfill



Bentonite seal



Concrete



Gravel filter



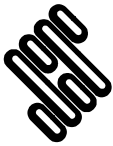
Flush cover



Plain pipe



Slotted pipe



Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH1</b>
Contract Ref: <b>729873</b>	Start: <b>15.06.15</b> End: <b>17.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353138.0 N:181260.0</b>	Sheet: <b>1 of 9</b>

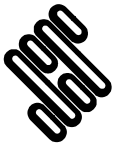
Depth (m)	Samples & Testing			Mechanical Log				Flush Returns & Details & Backfill & Instrumentation	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend
	No	Type	Results	TCR (%)	SCR (%)	RQD (%)	If (mm)					
0.20-0.40	1	B								MADE GROUND: Asphalt.	0.09	
										MADE GROUND: Dark red and grey mottled clayey sandy GRAVEL with a high cobble content. Sand is fine to coarse. Gravel and cobbles are angular to subangular of limestone. Gravel is fine to coarse.	(0.41)	
0.60	2	D									0.50	
0.80-1.00	3	B								MADE GROUND: Very stiff dark grey slightly gravelly CLAY with a low rootlet content. Gravel is angular to rounded fine to coarse of brick and quartz.	0.80	
1.20-1.70	4	U <sub>(100)</sub>	45 blows							Stiff becoming firm dark brown mottled orange CLAY with frequent rust orange coloured rootlets.		
1.20-1.70	5	B	100% recovery							(TIDAL FLAT DEPOSITS)		
1.40		V	c <sub>u</sub> =90								(1.70)	
1.70-2.15	6	U <sub>(100)</sub>	40 blows									
			100% recovery									
2.15-2.20	7	D										
2.15		V	c <sub>u</sub> =45									
2.50	8	D								Very soft dark grey slightly sandy silty CLAY. Sand is fine.		
2.70-3.15	5	U <sub>(100)</sub>	15 blows							(TIDAL FLAT DEPOSITS)		
2.70		V	100% recovery									
			c <sub>u</sub> =18									
3.15		V	c <sub>u</sub> =18									
3.50	11	D										
3.70-4.15	12	SPT	N=4									
4.50	13	D										
4.70-5.15	14	U <sub>(100)</sub>	14 blows									
4.70		V	100% recovery									
			c <sub>u</sub> =0									
5.15-5.20	15	D								... at 5.15m pseudo-fibrous peat.		
5.15		V	c <sub>u</sub> =15									

Boring Progress and Water Observations						Chiselling / Slow Progress			General Remarks	
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	From	To	Duration (hh:mm)		
15/06/15		6.00	6.00	150	6.00	14.60	15.00	00:30		
16/06/15	08:10	8.50	7.50	150	7.50					
16/06/15	16:26	16.00	15.00	121	2.54					
17/06/15	08:00	16.00	15.00	121	2.50					
17/06/15	13:10	25.00	15.10	121	2.50					

Method Used: <b>Cable Percussion + Rotary Cored</b>	Plant Used: <b>Pilcon Wayfarer 1500 + Comacchio MC300</b>	Drilled By: <b>JW + LH</b>	Logged By: <b>BSaimen + SStanley</b>	Checked By: <b>Az</b>	Scale: <b>1:31</b>	
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GINT LIBRARY v8.05 - Lib0004 ProjVersion: v8.05 - Core+Full Bristol SI - 0003 | Log COMPOSITE LOG: 729873 ESTUARY PARK AVONMOUTH.GPJ - v8.05 | 07/08/15 - 09:57 | AC.  
 Structural Soils Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1004, Web: www.structuralsols.co.uk, Email: ask@structuralsols.co.uk

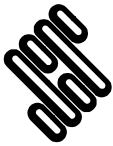


Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH1</b>
Contract Ref: <b>729873</b>	Start: <b>15.06.15</b> End: <b>17.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353138.0 N:181260.0</b>	Sheet: <b>2 of 9</b>

Depth (m)	Samples & Testing			Mechanical Log				Flush Returns & Details & Backfill & Instrumentation	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend
	No	Type	Results	TCR (%)	SCR (%)	RQD (%)	If (mm)					
5.50	16	D								Very soft dark grey slightly sandy silty CLAY. Sand is fine. (TIDAL FLAT DEPOSITS) (stratum copied from 2.50m from previous sheet)		
6.00-6.45	17	U <sub>(100)</sub>	55 blows 100% recovery c <sub>u</sub> =12									
6.00		V										
6.40-6.50	18	D								Very loose grey silty SAND. Sand is fine to coarse. (ESTUARINE ALLUVIUM)	6.45	
6.45		V	c <sub>u</sub> =20									
7.00	19	D									(1.05)	
7.50-7.95	20	SPT	N=3									
8.50	21	D										
9.00-9.45	22	SPT	N=7									
10.00	23	D										
10.50-10.95	24	SPT	N=10									
											(4.00)	

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Boring Progress and Water Observations						Chiselling / Slow Progress			General Remarks	
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	From	To	Duration (hh:mm)		
Method Used: <b>Cable Percussion + Rotary Cored</b>						Plant Used: <b>Pilcon Wayfarer 1500 + Comacchio MC300</b>			Drilled By: <b>JW + LH</b>	
Logged By: <b>BSaimen + SStanley</b>						Checked By: <b>AGS</b>			Scale: <b>1:31</b>	



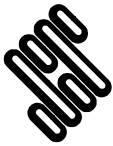
Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH1</b>
Contract Ref: <b>729873</b>	Start: <b>15.06.15</b> End: <b>17.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353138.0 N:181260.0</b>	Sheet: <b>3 of 9</b>

Depth (m)	Samples & Testing			Mechanical Log				Flush Returns & Details & Backfill & Instrumentation	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend
	No	Type	Results	TCR (%)	SCR (%)	RQD (%)	If (mm)					
11.50	25	D								Loose to medium dense brownish grey silty SAND. Sand is fine to medium. (ESTUARINE ALLUVIUM) (stratum copied from 9.00m from previous sheet)	13.00	
12.00-12.45	26	SPT	N=10									
13.00	27	D								Dense reddish brown mottled grey very clayey SAND. Sand is fine to medium. (ESTUARINE ALLUVIUM)	(1.30)	
13.50-13.95	28	SPT	N=43									
14.30-14.74	29	SPT	N=52*							Very stiff reddish brown sandy CLAY with gravel size lithorelics of sandstone. Sand is fine to medium. (MERCIA MUDSTONE GROUP)	(1.10)	
15.00-16.00 15.00-15.40	30	SPT	N=61*	↑ 100 ↓	↑ 60 ↓	↑ 60 ↓		↑ 100% return Water ↓				
16.00-17.50				↑ 100 ↓	↑ 100 ↓	↑ 87 ↓				Extremely weak reddish brown MUDSTONE with occasional greenish grey patchy silty mudstone which crumbles into fine to coarse angular gravel of extremely weak mudstone. (MERCIA MUDSTONE GROUP Zone II)	(1.40)	

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Boring Progress and Water Observations						Chiselling / Slow Progress			General Remarks	
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	From	To	Duration (hh:mm)		
Method Used: <b>Cable Percussion + Rotary Cored</b>		Plant Used: <b>Pilcon Wayfarer 1500 + Comacchio MC300</b>		Drilled By: <b>JW + LH</b>		Logged By: <b>BSaimen + SStanley</b>		Checked By: <i>Az</i>		

All dimensions in metres Scale: **1:31**

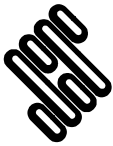


Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH1</b>
Contract Ref: <b>729873</b>	Start: <b>15.06.15</b> End: <b>17.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353138.0 N:181260.0</b>	Sheet: <b>4 of 9</b>

Depth (m)	Samples & Testing			Mechanical Log				Flush Returns & Details & Backfill & Instrumentation	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend
	No	Type	Results	TCR (%)	SCR (%)	RQD (%)	If (mm)					
17.50-19.00				100	100	87		80% return Water		Very weak very thinly to thinly bedded reddish brown calcareous MUDSTONE with occasional greenish grey patches of silty mudstone and occasional dissolution cavities. Fractures are subhorizontal medium spaced undulating rough infilled with reddish brown fragments of mudstone. (MERCIA MUDSTONE GROUP Zone I) ... between 17.30m and 17.50m fine to coarse gravel sized patches of green silty mudstone. ... at 17.80m non-intact recovered as fine to coarse angular fragments of mudstone.	16.80	
							NI 380 600	80% return Water			(2.45)	
19.00-20.50				90	87	87		80% return Water		... at 18.45m 50mm of highly weakened extremely weak mudstone. ... between 18.60m and 19.10m occasional greenish grey patchy fine to medium green sandstone up to 10mm.	19.25	
							NI 200 400	80% return Water			(1.25)	
20.50-22.00				87	73	67		80% return Water		Extremely weak very thinly to thinly bedded reddish brown and silty MUDSTONE with occasional greenish grey patches of silty mudstone. (MERCIA MUDSTONE GROUP Zone II) ... between 20.05m and 20.27m partly non-intact recovered as fine to coarse angular fragments of extremely weak mudstone.	20.50	
							NI 100 170	80% return Water			(1.10)	
				100	80	73		80% return Water		Extremely weak to very weak very thinly to thinly bedded reddish brown and silty MUDSTONE with weak very closely to medium spaced very thin beds of reddish brown siltstone and green sandstone. Fractures are subhorizontal closely to medium spaced undulating rough with smears of clay. (MERCIA MUDSTONE GROUP Zone I) ... between 21.00m and 21.10m non-intact recovered as fine to coarse fragments of angular mudstone.	21.60	
											(0.50)	

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Boring Progress and Water Observations						Chiselling / Slow Progress			General Remarks	
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	From	To	Duration (hh:mm)		
Method Used: <b>Cable Percussion + Rotary Cored</b> Plant Used: <b>Pilcon Wayfarer 1500 + Comacchio MC300</b> Drilled By: <b>JW + LH</b> Logged By: <b>BSaimen + SStanley</b> Checked By: <i>AC</i> Scale: <b>1:31</b>										



Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH1</b>
Contract Ref: <b>729873</b>	Start: <b>15.06.15</b> End: <b>17.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353138.0 N:181260.0</b>	Sheet: <b>5 of 9</b>

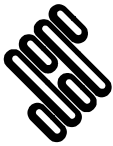
Depth (m)	Samples & Testing			Mechanical Log				Flush Returns & Details & Backfill & Instrumentation	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend
	No	Type	Results	TCR (%)	SCR (%)	RQD (%)	If (mm)					
22.00-23.50				93	40	33	NI 100 170	80% return Water		Weak greenish grey medium to coarse grained calcareous and silty SANDSTONE with occasional dissolution cavities. (MERCIA MUDSTONE GROUP Zone I) . . . between 21.60m and 21.85m very weak mudstone with firm reddish and greenish completely weathered clay. (stratum copied from 21.60m from previous sheet)	(0.70)	
23.50-25.00				93	83	56	NI 150 250	80% return Water		Extremely weak very thinly to thinly bedded reddish brown and silty MUDSTONE with weak very closely to medium spaced very thin beds of reddish brown siltstone and green sandstone. Fractures are subhorizontal very closely to medium spaced undulating rough with smears of clay. (MERCIA MUDSTONE GROUP Zone I) Weak greenish grey SILTSTONE with occasional coarse gravel sized dissolution cavities. . . . between 22.80m and 23.50m green siltstone contains occasional coarse gravel sized dissolution cavities. Weak very thinly to thinly bedded reddish brown and silty MUDSTONE with extremely weak reddish brown MUDSTONE and very stiff reddish brown weathered clay. (MERCIA MUDSTONE GROUP Zone I) . . . between 23.50m and 25.00m mudstone is weak with very thin zones weathered to clay up to 30mm. Rotary coring terminated at 25.00m depth.	(1.50)	

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Boring Progress and Water Observations						Chiselling / Slow Progress			General Remarks	
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	From	To	Duration (hh:mm)		
Method Used: <b>Cable Percussion + Rotary Cored</b>		Plant Used: <b>Pilcon Wayfarer 1500 + Comacchio MC300</b>		Drilled By: <b>JW + LH</b>		Logged By: <b>BSaimen + SStanley</b>		Checked By: <b>AC</b>		
All dimensions in metres								Scale: <b>1:31</b>		







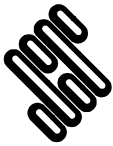
Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH1</b>
Contract Ref: <b>729873</b>	Start: <b>15.06.15</b> End: <b>17.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353138.0 N:181260.0</b>	Sheet: <b>6 of 9</b>

BH1 15.00-17.50m



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Method Used: <b>Cable Percussion + Rotary Cored</b>	Plant Used: <b>Pilcon Wayfarer 1500 + Comacchio MC300</b>	Drilled By: <b>JW + LH</b>	Logged By: <b>BSaimen + SStanley</b>	Checked By: <b>Az</b>	
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Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH1</b>
Contract Ref: <b>729873</b>	Start: <b>15.06.15</b> End: <b>17.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353138.0 N:181260.0</b>	Sheet: <b>7 of 9</b>

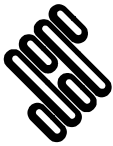
BH1 17.50-20.50m



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Method Used: <b>Cable Percussion + Rotary Cored</b>	Plant Used: <b>Pilcon Wayfarer 1500 + Comacchio MC300</b>	Drilled By: <b>JW + LH</b>	Logged By: <b>BSaimen + SStanley</b>	Checked By: <b>Az</b>	
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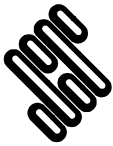
Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH1</b>
Contract Ref: <b>729873</b>	Start: <b>15.06.15</b> End: <b>17.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353138.0 N:181260.0</b>	Sheet: <b>8 of 9</b>

BH1 20.50-23.50m



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Method Used:	<b>Cable Percussion + Rotary Cored</b>	Plant Used:	<b>Pilcon Wayfarer 1500 + Comacchio MC300</b>	Drilled By:	<b>JW + LH</b>	Logged By:	<b>BSaimen + SStanley</b>	Checked By:	<i>Az</i>	
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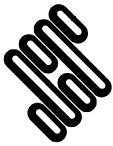
Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH1</b>
Contract Ref: <b>729873</b>	Start: <b>15.06.15</b> End: <b>17.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353138.0 N:181260.0</b>	Sheet: <b>9 of 9</b>

BH1 23.50-25.00m



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Method Used:	<b>Cable Percussion + Rotary Cored</b>	Plant Used:	<b>Pilcon Wayfarer 1500 + Comacchio MC300</b>	Drilled By:	<b>JW + LH</b>	Logged By:	<b>BSaimen + SStanley</b>	Checked By:	<b>Az</b>	
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Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH2</b>
Contract Ref: <b>729873</b>	Start: <b>16.06.15</b> End: <b>18.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353106.0 N:181222.0</b>	Sheet: <b>1 of 9</b>

Depth (m)	Samples & Testing			Mechanical Log				Flush Returns & Details	Backfill & Instrumentation	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend	
	No	Type	Results	TCR (%)	SCR (%)	RQD (%)	If (mm)							
0.30	1	B	N=6								MADE GROUND: Asphalt.	0.05		
0.60	2	B										MADE GROUND: Pinkish grey sandy GRAVEL. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of limestone.	0.23	
0.85	3	B										MADE GROUND: Orangish brown slightly clayey very sandy GRAVEL. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of limestone.	0.53	
1.10	4	B										MADE GROUND: Dark brown very sandy GRAVEL. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of limestone, brick, cement and sandstone.	0.85	
1.20-1.65	5	SPT										MADE GROUND: Dark black sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of charcoal, limestone, brick and clinker. Rare cobbles of brick and limestone. (Cess waste odour).	(0.35)	
1.20-1.70	6	B										Soft dark grey slightly sandy silty CLAY. Sand is fine. (TIDAL FLAT DEPOSITS)	1.20	
2.00	7	D	23 blows 100% recovery											
2.20-2.65	8	U												
2.65-2.70	9	D	14 blows 100% recovery											
3.00	10	D												
3.20-3.65	11	U												
3.65-3.70	12	D	15 blows 100% recovery											
3.70-4.20	13	B										... at 3.70m black amorphous peat recovered in gravel size.	(4.80)	
4.20-4.65	14	U									... at 4.00m shell fragments and rootlets recovered.			
4.65-4.70	15	D												
5.20-5.65	16	SPT	N=4								... at 5.20m black amorphous peat.			

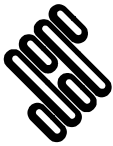
GINT LIBRARY v8.05.GLB LibVersion: v8.05 - Core+Full Bristol SI - 0003 | Log COMPOSITE LOG | 729873 ESTUARY PARK AVONMOUTH.GPJ - v8.05 | 07/08/15 - 09:59 | AC.  
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Boring Progress and Water Observations						Chiselling / Slow Progress			General Remarks	
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	From	To	Duration (hh:mm)		
17/06/15	07:45	5.50	4.50	150	4.80					
17/06/15	16:25	17.60	15.00	121	2.70					
18/06/15	08:05	17.60	15.00	121	2.70					

Method Used: <b>Cable Percussion + Rotary Cored</b>	Plant Used: <b>Pilcon Wayfarer 1500 + Comacchio MC300</b>	Drilled By: <b>JW + LH</b>	Logged By: <b>BSaimen + SStanley</b>	Checked By: <i>Az</i>	Scale: <b>1:31</b>	
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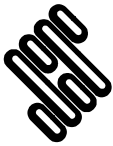
Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH2</b>
Contract Ref: <b>729873</b>	Start: <b>16.06.15</b> End: <b>18.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353106.0 N:181222.0</b>	Sheet: <b>2 of 9</b>

Depth (m)	Samples & Testing			Mechanical Log				Flush Returns & Details & Backfill & Instrumentation	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend
	No	Type	Results	TCR (%)	SCR (%)	RQD (%)	If (mm)					
5.50-6.00	17	B								Soft dark grey slightly sandy silty CLAY. Sand is fine. (TIDAL FLAT DEPOSITS) (stratum copied from 1.20m from previous sheet)	6.00	
6.20-6.65	18	SPT	N=12							Loose to medium dense dark grey silty SAND. Sand is fine to medium. (ESTUARINE ALLUVIUM)		
7.00	19	D										
7.50-7.95	20	SPT	N=7									
8.50	21	D										
9.00-9.45	22	SPT	N=7									
9.00	23	B									(7.00)	
10.50-10.95	24	SPT	N=8									

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Boring Progress and Water Observations						Chiselling / Slow Progress			General Remarks		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	From	To	Duration (hh:mm)			
Method Used: <b>Cable Percussion + Rotary Cored</b>								Plant Used: <b>Pilcon Wayfarer 1500 + Comacchio MC300</b>		Drilled By: <b>JW + LH</b>	
Logged By: <b>BSaimen + SStanley</b>								Checked By: <b>AS</b>		Scale: <b>1:31</b>	





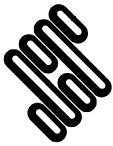
Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH2</b>
Contract Ref: <b>729873</b>	Start: <b>16.06.15</b> End: <b>18.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353106.0 N:181222.0</b>	Sheet: <b>3 of 9</b>

Depth (m)	Samples & Testing			Mechanical Log				Flush Returns & Details & Backfill & Instrumentation	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend
	No	Type	Results	TCR (%)	SCR (%)	RQD (%)	If (mm)					
11.50-12.00	25	B								Loose to medium dense dark grey silty SAND. Sand is fine to medium. (ESTUARINE ALLUVIUM) (stratum copied from 6.00m from previous sheet)		[Graphic Legend: Sand]
12.00-12.45	26	SPT	N=8								at 12.00m brown amorphous peat layer.	
13.00-13.50	27	B								Very soft reddish brown sandy CLAY. Sand is fine to medium. (MERCIA MUDSTONE GROUP)		[Graphic Legend: Clay]
13.50-13.95	28	SPT	N=10								(2.00)	
14.50-15.00	29	B								Hard reddish brown sandy CLAY. Sand is fine. (MERCIA MUDSTONE GROUP)		[Graphic Legend: Clay]
15.00-15.41	30	SPT	N=59*								15.00	
15.00-15.50	31	B								Extremely weak reddish brown silty calcareous MUDSTONE with frequent green mottling. Fractures are closely to widely spaced undulated rough open/partially open/reddish clay. (MERCIA MUDSTONE GROUP)		[Graphic Legend: Mudstone]
15.50-16.20	32	SPT	N=61*								(0.50)	
15.50-15.90											15.50	
16.20-17.60				100	86	86	NI 300 700	100% return	Water			

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Boring Progress and Water Observations						Chiselling / Slow Progress			General Remarks	
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	From	To	Duration (hh:mm)		
Method Used: <b>Cable Percussion + Rotary Cored</b>		Plant Used: <b>Pilcon Wayfarer 1500 + Comacchio MC300</b>		Drilled By: <b>JW + LH</b>		Logged By: <b>BSaimen + SStanley</b>		Checked By: <i>AC</i>		

All dimensions in metres Scale: **1:31**  
 AGS



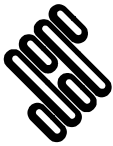
Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH2</b>
Contract Ref: <b>729873</b>	Start: <b>16.06.15</b> End: <b>18.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353106.0 N:181222.0</b>	Sheet: <b>4 of 9</b>

Depth (m)	Samples & Testing			Mechanical Log				Flush Returns & Details & Backfill & Instrumentation	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend
	No	Type	Results	TCR (%)	SCR (%)	RQD (%)	If (mm)					
17.60-19.10				100	86	86	NI 300 700	100% return Water		Extremely weak reddish brown silty calcareous MUDSTONE with frequent green mottling. Fractures are closely to widely spaced undulated rough open/partially open/reddish clay. (MERCIA MUDSTONE GROUP) (stratum copied from 15.50m from previous sheet)	(4.40)	
19.10-20.60				100	87	37	NI 300 500	100% return Water		... from 16.60m to 17.30m mudstone breaks up into fine to coarse extremely weak angular blocks of mudstone. ... from 16.80m to 17.20m fine to coarse patches of gravelly grey siltstone. ... from 17.60m to 17.90m mudstone contains coarse gravel sized cavities. ... from 17.93m to 17.98m greenish grey calcareous siltstone.  ... from 18.40m to 19.10m material in partially non-intact with dissolution cavities and breaks up into angular fine to coarse gravel of extremely weak mudstone.  ... from 19.10m to 20.60m material disturbed by possible drilling action and recovered without limestone.	19.90	
20.60-22.10				100	73	60	NI 150 230	100% return Water		Very weak thinly bedded reddish brown silty very closely jointed MUDSTONE with occasional greenish grey mottling. Joints are randomly orientated undulating rough partially open brown discolouration. (MERCIA MUDSTONE GROUP) ... from 20.10m to 20.60m non-intact probably due to drilling action. ... from 20.60m to 20.90m occasional dissolution cavities up to 6mm.	(1.40)	
21.00		HP	$c_u=75$	93	87	60		100% return Water		... at 21.10m very thin band of firm reddish brown clay. ... from 21.10m to 21.20m non-intact recovered as fine to coarse angular fragments of green siltstone. Very weak to weak thinly to thickly laminated greenish grey fine to medium calcareous SANDSTONE with thin laminae of greenish grey mudstone and occasional fine to coarse gravel sized	21.30 (0.45) 21.75	

Boring Progress and Water Observations						Chiselling / Slow Progress			General Remarks	
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	From	To	Duration (hh:mm)		
Method Used: <b>Cable Percussion + Rotary Cored</b>		Plant Used: <b>Pilcon Wayfarer 1500 + Comacchio MC300</b>		Drilled By: <b>JW + LH</b>		Logged By: <b>BSaimen + SStanley</b>		Checked By: <i>AC</i>		

GINT LIBRARY v8.05.GLB LibVersion: v8.05 - Core+Full Bristol SI - 0003 | Log COMPOSITE LOG 729873 ESTUARY PARK AVONMOUTH.GPJ - v8.05 | 07/08/15 - 09:59 | AC. Structural Soils Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.structuralsols.co.uk, Email: ask@structuralsols.co.uk





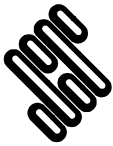
Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH2</b>
Contract Ref: <b>729873</b>	Start: <b>16.06.15</b> End: <b>18.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353106.0 N:181222.0</b>	Sheet: <b>5 of 9</b>

Depth (m)	Samples & Testing			Mechanical Log				Flush Returns & Details	Backfill & Instrumentation	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend
	No	Type	Results	TCR (%)	SCR (%)	RQD (%)	If (mm)						
22.10-23.60				100	90	83		100% return Water			dissolution cavities. Fractures are subhorizontal very closely to closely spaced. (MERCIA MUDSTONE GROUP) ... at 21.30m to 21.45m occasional dissolution cavities up to 10mm. Very weak to weak very thinly bedded to thickly bedded reddish brown silty calcareous MUDSTONE with very closely to closely spaced greenish grey patches of siltstone. Bedding fractures are subhorizontal at 60° undulating rough partially open to medium wide red clay or fragments of very weak mudstone. (MERCIA MUDSTONE GROUP) <i>(stratum copied from 21.75m from previous sheet)</i>	(0.65) 22.40	
23.60-25.10				97	90	79	NI 180 280	80% return Water			Thinly interbedded medium strong greenish grey SANDSTONE and weak reddish brown MUDSTONE. ... from 22.50m to 22.70m occasional fine to coarse gravel sized dissolution cavities up to 225mm. Weak very thin to thinly bedded reddish brown silty MUDSTONE with occasional greenish grey pockets. Fractures are 5° to 80° very close to medium spaced undulating rough partially rough infilled with fine to medium gravel/reddish clay. (MERCIA MUDSTONE GROUP) ... from 23.00m to 23.17m incipient joint dips at 65° (possibly open by drilling action). ... between 23.35m to 23.60m incipient joint 65° undulating rough partially open clean. ... from 24.38m to 24.43m non-intact recovered as fine to coarse angular gravel of mudstone. ... from 24.65m to 24.85m joint is 80° partially rough partially open smears of red clay. ... from 24.90m to 24.95m joint is 50° partially rough with smears of red. Rotary coring terminated at 25.10m depth.	(2.10) 25.10	

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Boring Progress and Water Observations						Chiselling / Slow Progress			General Remarks	
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	From	To	Duration (hh:mm)		
Method Used: <b>Cable Percussion + Rotary Cored</b>		Plant Used: <b>Pilcon Wayfarer 1500 + Comacchio MC300</b>		Drilled By: <b>JW + LH</b>		Logged By: <b>BSaimen + SStanley</b>		Checked By: <i>AC</i>		

All dimensions in metres Scale: **1:31**



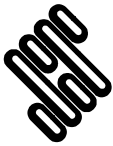
Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH2</b>
Contract Ref: <b>729873</b>	Start: <b>16.06.15</b> End: <b>18.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353106.0 N:181222.0</b>	Sheet: <b>6 of 9</b>

BH2 15.00-17.60m



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Method Used:	<b>Cable Percussion + Rotary Cored</b>	Plant Used:	<b>Pilcon Wayfarer 1500 + Comacchio MC300</b>	Drilled By:	<b>JW + LH</b>	Logged By:	<b>BSaimen + SStanley</b>	Checked By:	<b>Az</b>	
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# STRUCTURAL SOILS

# BOREHOLE LOG

Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH2</b>
Contract Ref: <b>729873</b>	Start: <b>16.06.15</b> End: <b>18.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353106.0 N:181222.0</b>	Sheet: <b>7 of 9</b>

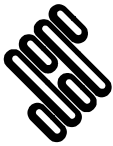
BH2 17.60-20.60m



GINT LIBRARY v8.05.GLB LibVersion: v8.05 - Lib0004 ProjVersion: v8.05 - Core+Full Bristol SI - 0003 | Log COMPOSITE LOG: 729873 ESTUARY PARK AVONMOUTH.GPJ - v8.05 | 07/08/15 - 09:59 | AC.  
 Structural Soils Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.soils.co.uk, Email: ask@soils.co.uk

Method Used: <b>Cable Percussion + Rotary Cored</b>	Plant Used: <b>Pilcon Wayfarer 1500 + Comacchio MC300</b>	Drilled By: <b>JW + LH</b>	Logged By: <b>BSaimen + SStanley</b>	Checked By: <b>Az</b>	
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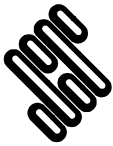
Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH2</b>
Contract Ref: <b>729873</b>	Start: <b>16.06.15</b> End: <b>18.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353106.0 N:181222.0</b>	Sheet: <b>8 of 9</b>

BH2 20.60-23.60m



GINT LIBRARY v8.05.GLB LibVersion: v8.05 - Lib0004 ProjVersion: v8.05 - Core+Full Bristol SI - 0003 | Log COMPOSITE LOG | 729873 ESTUARY PARK AVONMOUTH.GPJ - v8.05 | 07/08/15 - 09:59 | AC.  
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Method Used: <b>Cable Percussion + Rotary Cored</b>	Plant Used: <b>Pilcon Wayfarer 1500 + Comacchio MC300</b>	Drilled By: <b>JW + LH</b>	Logged By: <b>BSaimen + SStanley</b>	Checked By: <b>Az</b>	
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Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH2</b>
Contract Ref: <b>729873</b>	Start: <b>16.06.15</b> End: <b>18.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353106.0 N:181222.0</b>	Sheet: <b>9 of 9</b>

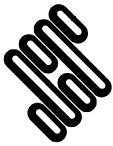
BH2 23.60-25.10m



CONTRACT: AVONMOUTH BIOENERGY  
 FACILITIES  
 CONTRACT NO: 729873  
 CLIENT: BALFOUR BEATTY  
 BOREHOLE: BH02  
 DEPTH: 23.60m - 25.10m  
 Structural Soils Ltd, Head Office - Bristol - The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.structuralsoil.co.uk, Email: ask@soils.co.uk

GINT LIBRARY v8.05.GLB LibVersion: v8.05 - Core+Full Bristol SI - 0003 | Log COMPOSITE LOG 729873 ESTUARY PARK AVONMOUTH.GPJ - v8.05 | 07/08/15 - 10:00 | AC.  
 Structural Soils Ltd, Head Office - Bristol - The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.structuralsoil.co.uk, Email: ask@soils.co.uk

Method Used:	<b>Cable Percussion + Rotary Cored</b>	Plant Used:	<b>Pilcon Wayfarer 1500 + Comacchio MC300</b>	Drilled By:	<b>JW + LH</b>	Logged By:	<b>BSaimen + SStanley</b>	Checked By:	<i>Az</i>	
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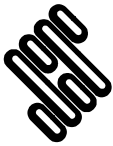


Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH3</b>
Contract Ref: <b>729873</b>	Start: <b>18.06.15</b> End: <b>22.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353121.0 N:181184.0</b>	Sheet: <b>1 of 8</b>

Depth (m)	Samples & Testing			Mechanical Log				Flush Returns & Details	Backfill & Instrumentation	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend
	No	Type	Results	TCR (%)	SCR (%)	RQD (%)	If (mm)						
0.00-0.45	1	B									MADE GROUND: Pinkish grey sandy silty GRAVEL with frequent rootlets. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of limestone.	(0.45)	
0.45-1.20	2	B									Very soft brown slightly sandy silty CLAY. Sand is fine to coarse. (TIDAL FLAT DEPOSITS)	0.45	
1.20-1.65	3	SPT	N=6										
1.40-1.90	4	B											
2.00-2.45	5	SPT	N=4										
2.40-2.90	6	B											
3.00-3.45	7	SPT	N=4										
3.40-3.90	8	B											
4.00-4.45	9	SPT	N=4								Very soft grey silty CLAY with black fibrous peat pockets. (TIDAL FLAT DEPOSITS)	4.00	
4.40-4.90	10	B										(1.30)	
5.00-5.45	11	SPT	N=4									5.30	
Description on next sheet													

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Boring Progress and Water Observations						Chiselling / Slow Progress			General Remarks			
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	From	To	Duration (hh:mm)				
19/06/15	10:40	6.50	6.50	150	6.50	16.80	17.00	00:30	1. Position CAT and Genny scanned prior to hand dug pit to 1.20m depth. 2. Groundwater/gas monitoring pipe installed as shown. 3. SPT hammer EQU1070-2014 ( $E_r = 67.40\%$ ) used.			
All dimensions in metres								Scale:	<b>1:31</b>			
Method Used:	<b>Cable Percussion + Rotary Cored</b>		Plant Used:	<b>Dando 2000 + Comacchio MC300</b>		Drilled By:	<b>MG + LH</b>	Logged By:	<b>BSaimen + SStanley</b>	Checked By:		



Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH3</b>
Contract Ref: <b>729873</b>	Start: <b>18.06.15</b> End: <b>22.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353121.0 N:181184.0</b>	Sheet: <b>2 of 8</b>

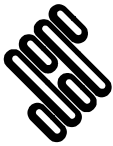
Depth (m)	Samples & Testing			Mechanical Log				Flush Returns & Details & Backfill & Instrumentation	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend
	No	Type	Results	TCR (%)	SCR (%)	RQD (%)	If (mm)					
5.90-6.40	12	B							↓	Very loose to medium dense grey clayey SAND. Sand is fine to medium. (ESTUARINE ALLUVIUM) (stratum copied from 5.30m from previous sheet)		
6.50-6.95	13	SPT	N=4						↓			
7.40-7.90	14	B										
8.00-8.45	15	SPT	N=8									
8.90-9.40	16	B										
9.50-9.95	17	SPT	N=13								(8.20)	
10.40-10.90	18	B										

GINT LIBRARY v8.05.GLB LibVersion: v8.05 - Core+Full Bristol SI - 0003 | Log COMPOSITE LOG | 729873 ESTUARY PARK AVONMOUTH.GPJ - v8.05 | 07/08/15 - 10:00 | AC. Structural Soils Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.structuralsoils.co.uk, Email: ask@structuralsoils.co.uk

Boring Progress and Water Observations						Chiselling / Slow Progress			General Remarks		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	From	To	Duration (hh:mm)			
Method Used: <b>Cable Percussion + Rotary Cored</b>								Plant Used: <b>Dando 2000 + Comacchio MC300</b>		Drilled By: <b>MG + LH</b>	
Logged By: <b>BSaimen + SStanley</b>								Checked By: <i>AS</i>		Scale: <b>1:31</b>	







Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH3</b>
Contract Ref: <b>729873</b>	Start: <b>18.06.15</b> End: <b>22.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353121.0 N:181184.0</b>	Sheet: <b>3 of 8</b>

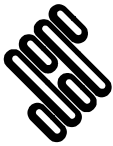
Depth (m)	Samples & Testing			Mechanical Log				Flush Returns & Details & Backfill & Instrumentation	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend
	No	Type	Results	TCR (%)	SCR (%)	RQD (%)	If (mm)					
11.00-11.45	19	SPT	N=18							Very loose to medium dense grey clayey SAND. Sand is fine to medium. (ESTUARINE ALLUVIUM) (stratum copied from 5.30m from previous sheet)		
11.90-12.40 12.00-12.45	20 21	B SPT	N=17									
13.40-13.90	22	B									13.50	
14.00-14.45	23	SPT	N=15							Hard reddish brown sandy CLAY. (MERCIA MUDSTONE GROUP)		
14.90-15.40	24	B										(3.50)
15.50-15.95	25	SPT	N=13									
16.40-16.90	26	B										

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Boring Progress and Water Observations						Chiselling / Slow Progress			General Remarks		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	From	To	Duration (hh:mm)			
Method Used: <b>Cable Percussion + Rotary Cored</b>								Plant Used: <b>Dando 2000 + Comacchio MC300</b>		Drilled By: <b>MG + LH</b>	
Logged By: <b>BSaimen + SStanley</b>								Checked By: <b>AS</b>		Scale: <b>1:31</b>	





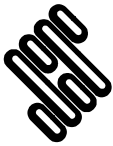


Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH3</b>
Contract Ref: <b>729873</b>	Start: <b>18.06.15</b> End: <b>22.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353121.0 N:181184.0</b>	Sheet: <b>4 of 8</b>

Depth (m)	Samples & Testing			Mechanical Log				Flush Returns & Details & Backfill & Instrumentation	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend
	No	Type	Results	TCR (%)	SCR (%)	RQD (%)	If (mm)					
17.00-18.20	27	SPT	N=93	↑	↑	↑		100% return Water		Hard reddish brown sandy CLAY. (MERCIA MUDSTONE GROUP) <i>(stratum copied from 13.50m from previous sheet)</i>	17.00	
17.00-17.45				75	62	54						Weak greenish grey calcareous SILTSTONE recovered non-intact as angular fine to coarse gravel of green siltstone with a loss of 250 mm. (MERCIA MUDSTONE GROUP)
18.20-19.70				↑	↑	↑		100% return Water		Extremely weak very thinly to thinly bedded reddish brown silty MUDSTONE with occasional greenish grey patchy fine grained sandstone. Fractures are sub-horizontal very closely to closely spaced undulating rough infilled with reddish brown clay up to 2cm. (MERCIA MUDSTONE GROUP Zone I) . . . between 18.20m and 19.00m greenish grey mottling.	(1.55)	
				93	83	77	NI 150 350					
19.70-21.20				↑	↑	↑		100% return Water		Very weak very thinly bedded reddish brown and silty MUDSTONE with occasional patchy green fine sandstone. (MERCIA MUDSTONE GROUP Zone I)	(0.70)	
				87	80	47	NI 150 300					
21.20-22.70				↑	↑	↑		100% return Water		Extremely weak very thinly to thinly bedded reddish brown MUDSTONE with closely to medium spaced weak reddish brown sandstone. Fractures are subhorizontal very closely to widely spaced undulating rough with smears of red clay or reddish clay. (MERCIA MUDSTONE GROUP Zone I) . . . between 19.90m and 19.98m weak reddish brown sandstone. . . . between 20.00m and 20.10m band of stiff reddish brown clay. . . . at 20.50m mudstone is highly weakened and recovered non-intact. . . . between 20.95m and 21.04m band of weak sandstone.	(1.65)	
				97	87	83	NI 130 210					
										Medium strong thinly laminated greenish grey fine to medium grained calcareous SANDSTONE. (MERCIA MUDSTONE GROUP) <i>Description on next sheet</i>	(0.35)	
											21.70	

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Boring Progress and Water Observations						Chiselling / Slow Progress			General Remarks		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	From	To	Duration (hh:mm)			
Method Used:	Cable Percussion + Rotary Cored		Plant Used:	Dando 2000 + Comacchio MC300		Drilled By:	MG + LH	Logged By:	BSaimen + SStanley	Checked By:	AGS
All dimensions in metres										Scale: 1:31	

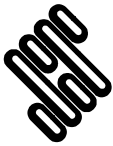


Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH3</b>
Contract Ref: <b>729873</b>	Start: <b>18.06.15</b> End: <b>22.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353121.0 N:181184.0</b>	Sheet: <b>5 of 8</b>

Depth (m)	Samples & Testing			Mechanical Log				Flush Returns & Details & Backfill & Instrumentation	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend
	No	Type	Results	TCR (%)	SCR (%)	RQD (%)	If (mm)					
22.70-24.20				97	87	83				Very weak very thinly bedded reddish brown MUDSTONE with extremely to very closely spaced lenticular shaped brown siltstone and green sandstone and occasional dissolution cavities. Fractures are subhorizontal very closely to widely spaced undulating rough open to moderately wide infilled with fine to medium fragments of green siltstone or fine to coarse clayey sand. (MERCIA MUDSTONE GROUP Zone I) <i>(stratum copied from 21.70m from previous sheet)</i> ... between 22.40m and 22.70m reddish brown mudstone contains occasional fine to coarse dissolution cavities. ... between 22.50m and 22.70m extremely to very closely spaced lenticular shaped brown siltstone.	(1.00)	
				100	97	60	NI 130 210	100% return Water				(2.30)
24.20-25.00				100	88	68		100% return Water		Weak very thinly to thinly bedded greenish grey silty MUDSTONE with rare dissolution cavities. Fractures are 15° to 70° very closely to medium spaced planar rough/undulating rough infilled with red clay/smears of red clay. (MERCIA MUDSTONE GROUP Zone I) ... between 22.70m and 22.90m dissolution cavities. ... at 24.10m dissolution cavity up to 30mm.	25.00	
Rotary core terminated at 25.00m depth.												

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Boring Progress and Water Observations						Chiselling / Slow Progress			General Remarks	
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	From	To	Duration (hh:mm)		
Method Used: <b>Cable Percussion + Rotary Cored</b>		Plant Used: <b>Dando 2000 + Comacchio MC300</b>		Drilled By: <b>MG + LH</b>		Logged By: <b>BSaimen + SStanley</b>		Checked By: <i>Az</i>		
All dimensions in metres								Scale: <b>1:31</b>		



Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH3</b>
Contract Ref: <b>729873</b>	Start: <b>18.06.15</b> End: <b>22.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353121.0 N:181184.0</b>	Sheet: <b>6 of 8</b>

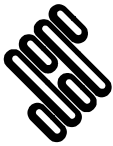
BH3 17.90-19.70m



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Method Used: <b>Cable Percussion + Rotary Cored</b>	Plant Used: <b>Dando 2000 + Comacchio MC300</b>	Drilled By: <b>MG + LH</b>	Logged By: <b>BSaimen + SStanley</b>	Checked By: <b>Az</b>	
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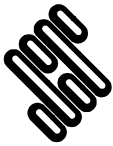
Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH3</b>
Contract Ref: <b>729873</b>	Start: <b>18.06.15</b> End: <b>22.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353121.0 N:181184.0</b>	Sheet: <b>7 of 8</b>

BH3 19.70-22.70m



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Method Used: <b>Cable Percussion + Rotary Cored</b>	Plant Used: <b>Dando 2000 + Comacchio MC300</b>	Drilled By: <b>MG + LH</b>	Logged By: <b>BSaimen + SStanley</b>	Checked By: <i>Az</i>	
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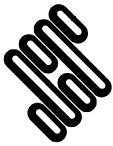
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Contract Ref: <b>729873</b>	Start: <b>18.06.15</b> End: <b>22.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353121.0 N:181184.0</b>	Sheet: <b>8 of 8</b>

BH3 22.70-25.00m



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Method Used: <b>Cable Percussion + Rotary Cored</b>	Plant Used: <b>Dando 2000 + Comacchio MC300</b>	Drilled By: <b>MG + LH</b>	Logged By: <b>BSaimen + SStanley</b>	Checked By: <b>Az</b>	
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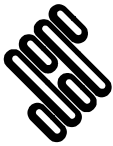
Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH4</b>
Contract Ref: <b>729873</b>	Start: <b>24.06.15</b> End: <b>25.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353195.0 N:181244.0</b>	Sheet: <b>1 of 8</b>

Depth (m)	Samples & Testing			Mechanical Log				Flush Returns & Details	Backfill & Instrumentation	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend
	No	Type	Results	TCR (%)	SCR (%)	RQD (%)	If (mm)						
0.00-0.40	1	B									MADE GROUND: Dark brown sandy slightly gravelly SILT. Sand is fine to coarse. Gravel is angular to subrounded fine to coarse of limestone.	0.20	
0.40-1.20	2	B									MADE GROUND: Grey and brown mottled silty sandy GRAVEL with a low cobble content. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of limestone. Cobbles of limestone.	0.45	
1.20-1.65	3	SPT	N=7								Very stiff orangish brown mottled grey slightly sandy CLAY. Sand is fine to medium.	1.20	
1.40-1.90	4	B									(TIDAL FLAT DEPOSITS) Firm light grey mottled orange silty CLAY.	(2.00)	
2.00-2.45	5	U	8 blows								50% recovery	(2.00)	
2.00		V	$c_u=44$										
2.40-2.90	7	B											
2.45-2.65	6	D											
3.00-3.45	8	U	0% recovery										
3.40-3.90	9	B									Very soft grey silty CLAY.	3.20	
											(TIDAL FLAT DEPOSITS)		
4.00-4.45	10	SPT	N=0										
4.40-4.90	11	B									... at 4.40m black pseudo-fibrous peat.	(2.90)	
5.00-5.45	12	SPT	N=1								... at 5.30m becoming sandy.		

Boring Progress and Water Observations						Chiselling / Slow Progress			General Remarks	
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	From	To	Duration (hh:mm)		
24/06/15	09:50	6.50	6.00	150	6.50	16.70	17.00	00:30	1. Position CAT and Genny scanned prior to hand dug pit to 1.20m depth. 2. Groundwater/gas monitoring pipe installed as shown. 3. SPT hammer EQU1070-2014 ( $E_r = 67.40\%$ ) used.	
25/06/15	08:10	17.00	17.00	121	1.80					
Method Used: <b>Cable Percussion + Rotary Cored</b>		Plant Used: <b>Pilcon Wayfarer 1500 + Comacchio MC200</b>		Drilled By: <b>MG + LH</b>		Logged By: <b>SStanley</b>		Checked By: <b>AGS</b>		
All dimensions in metres								Scale: <b>1:31</b>		

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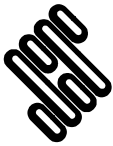
Contract: <b>Estuary Park, Avonmouth</b>			Client: <b>Balfour Beatty</b>			Borehole: <b>BH4</b>		
Contract Ref: <b>729873</b>		Start: <b>24.06.15</b>	Ground Level (m AOD): <b>7.00</b>		National Grid Co-ordinate: <b>E:353195.0 N:181244.0</b>		Sheet: <b>2 of 8</b>	

Depth (m)	Samples & Testing			Mechanical Log				Flush Returns & Details & Backfill & Instrumentation	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend
	No	Type	Results	TCR (%)	SCR (%)	RQD (%)	If (mm)					
5.90-6.40	13	B							↓	Very soft grey silty CLAY. (TIDAL FLAT DEPOSITS) (stratum copied from 3.20m from previous sheet)	6.10	
6.50-6.95	14	U	11 blows 100% recovery						↓	Medium dense grey silty SAND. Sand is fine to medium. (ESTUARINE ALLUVIUM)	(2.40)	
6.95-7.15	15	D										
7.40-7.90	16	B										
8.00-8.45	17	SPT	N=10								8.50	
8.90-9.40	18	B								Very loose to medium dense brownish grey SAND. Sand is fine to medium. (ESTUARINE ALLUVIUM)		
9.50-9.95	19	U	95% recovery									
10.40-10.90	20	B										

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Boring Progress and Water Observations						Chiselling / Slow Progress			General Remarks		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	From	To	Duration (hh:mm)			
Method Used: <b>Cable Percussion + Rotary Cored</b>								Plant Used: <b>Pilcon Wayfarer 1500 + Comacchio MC200</b>		Drilled By: <b>MG + LH</b>	
Logged By: <b>SStanley</b>								Checked By: <b>AS</b>		Scale: <b>1:31</b>	





Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH4</b>
Contract Ref: <b>729873</b>	Start: <b>24.06.15</b> End: <b>25.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353195.0 N:181244.0</b>	Sheet: <b>3 of 8</b>

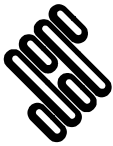
Depth (m)	Samples & Testing			Mechanical Log				Flush Returns & Details & Backfill & Instrumentation	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend
	No	Type	Results	TCR (%)	SCR (%)	RQD (%)	If (mm)					
11.00-11.45	21	SPT	N=3							Very loose to medium dense brownish grey SAND. Sand is fine to medium. (ESTUARINE ALLUVIUM) <i>(stratum copied from 8.50m from previous sheet)</i>	(6.60)	
11.90-12.40	22	B										
12.50-12.95	23	SPT	N=13									
13.40-13.90	24	B								... at 13.70m black peat.		
14.00-14.45	25	SPT	N=1									
14.90-15.40	26	B									15.10	
15.50-15.95	27	SPT	N=6							Very soft grey slightly sandy silty CLAY. (ESTUARINE ALLUVIUM)	(1.30)	
16.40-16.90	28	B								<i>Description on next sheet</i>	16.40	

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Boring Progress and Water Observations						Chiselling / Slow Progress			General Remarks		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	From	To	Duration (hh:mm)			
Method Used: <b>Cable Percussion + Rotary Cored</b>								Plant Used: <b>Pilcon Wayfarer 1500 + Comacchio MC200</b>		Drilled By: <b>MG + LH</b>	
Logged By: <b>SStanley</b>								Checked By: <i>AS</i>		Scale: <b>1:31</b>	







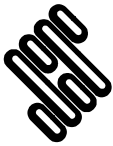
Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH4</b>
Contract Ref: <b>729873</b>	Start: <b>24.06.15</b> End: <b>25.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353195.0 N:181244.0</b>	Sheet: <b>4 of 8</b>

Depth (m)	Samples & Testing			Mechanical Log				Flush Returns & Details & Backfill & Instrumentation	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend
	No	Type	Results	TCR (%)	SCR (%)	RQD (%)	If (mm)					
17.00-17.70	29	SPT	N=100	↑	↑	↑		100% return Polymer-Mud		Extremely weak reddish brown slightly sandy MUDSTONE with lithorelics of sandstone. (MERCIA MUDSTONE GROUP) (stratum copied from 16.40m from previous sheet)	(0.60)	
17.00-17.45				186	186	186						
17.70-19.20				↑	↑	↑		100% return Polymer-Mud		... from 18.06m to 18.17m band of very weak greenish grey sandstone. ... between 18.17m to 18.76m very weak. ... from 18.20m to 18.56m joint fracture subvertical stepped rough.	(2.45)	
				100	67	51						
19.20-20.70				↑	↑	↑		100% return Polymer-Mud		... from 19.25m to 19.33m band of extremely weak thinly laminated purple brown mudstone.	19.45	
				100	100	77						Hard reddish brown slightly sandy silty CLAY/extremely weak slightly sandy MUDSTONE with lithorelics of greenish grey SANDSTONE. Sand is fine. (MERCIA MUDSTONE GROUP) ... from 20.10m to 20.17m weak strength.
20.70-22.20				↑	↑	↑		80% return Polymer-Mud		Very thinly interbedded hard reddish brown fine to coarse sandy CLAY/extremely weak sandy MUDSTONE with greenish grey lithorelics of sandstone with weak greenish grey SANDSTONE. (MERCIA MUDSTONE GROUP)	(0.48)	
				100	100	100						Extremely weak thinly laminated reddish brown MUDSTONE. (MERCIA MUDSTONE GROUP)
										Strong greenish grey SANDSTONE. (MERCIA MUDSTONE GROUP) ... at 21.16m joint fracture 15° planar rough.	(0.73)	
										Description on next sheet		
											22.01	

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Boring Progress and Water Observations						Chiselling / Slow Progress			General Remarks	
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	From	To	Duration (hh:mm)		
Method Used: <b>Cable Percussion + Rotary Cored</b>		Plant Used: <b>Pilcon Wayfarer 1500 + Comacchio MC200</b>		Drilled By: <b>MG + LH</b>		Logged By: <b>SStanley</b>		Checked By: <i>AS</i>		
All dimensions in metres								Scale: <b>1:31</b>		





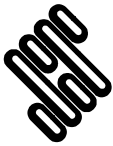
Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH4</b>
Contract Ref: <b>729873</b>	Start: <b>24.06.15</b> End: <b>25.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353195.0 N:181244.0</b>	Sheet: <b>5 of 8</b>

Depth (m)	Samples & Testing			Mechanical Log				Flush Returns & Details & Backfill & Instrumentation	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend
	No	Type	Results	TCR (%)	SCR (%)	RQD (%)	If (mm)					
22.20-23.70				100	100	100		80% return Polymer-Mud		Very weak reddish brown silty MUDSTONE with greenish grey lenses of sandstone. Sandstone is medium strong. (MERCIA MUDSTONE GROUP) <i>(stratum copied from 21.28m from previous sheet)</i>	(0.55)	[Graphic Legend]
				93	93	77				Medium strong greenish grey mottled reddish brown SANDSTONE. (MERCIA MUDSTONE GROUP)		
23.70-25.20								80% return Polymer-Mud		Medium strong reddish brown MUDSTONE with rare grey lithorelics of sandstone. (MERCIA MUDSTONE GROUP) ... from 22.58m to 22.59m joint fracture 40° planar smooth. ... from 22.66m to 22.77m joint fracture 80° undulated smooth. ... from 22.77m to 22.80m joint fracture 60° planar. ... from 22.92m to 22.94m joint fracture 45° planar smooth. ... from 23.07m to 23.20m joint fracture 60° planar smooth. ... from 23.38m to 23.40m joint fracture 20° undulating smooth. ... from 23.88m to 23.93m joint fracture 50° planar smooth. ... from 23.97m to 24.00m joint fracture 30° undulating smooth. ... 24.00m to 24.03m joint fracture 45° planar smooth. ... from 24.13m to 24.18m soft clay.	(1.66)	[Graphic Legend]
				97	97	87				Medium strong reddish brown MUDSTONE with greenish grey lithorelics of SANDSTONE. (MERCIA MUDSTONE GROUP) ... from 24.26m to 24.30m joint fractures are 40° planar tight. ... from 24.75m to 24.79m joint fractures 40° planar smooth.	24.22	
										Very weak reddish brown MUDSTONE. (MERCIA MUDSTONE GROUP) ... at 25.09m becoming extremely weak and sandy. Rotary coring terminated at 25.20m depth.	(0.57)	[Graphic Legend]
											24.79	
											(0.41)	[Graphic Legend]
											25.20	[Graphic Legend]

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Boring Progress and Water Observations						Chiselling / Slow Progress			General Remarks	
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	From	To	Duration (hh:mm)		
All dimensions in metres										
Method Used:	Cable Percussion + Rotary Cored		Plant Used:	Pilcon Wayfarer 1500 + Comacchio MC200		Drilled By:	MG + LH	Logged By:	SStanley	Checked By: <i>AS</i>





Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH4</b>
Contract Ref: <b>729873</b>	Start: <b>24.06.15</b> End: <b>25.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353195.0 N:181244.0</b>	Sheet: <b>6 of 8</b>

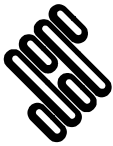
BH4 17.00-19.20m



GINT LIBRARY v8.05 - LibVersion: v8.05 - Core+Full Bristol SI - 0003 | Log COMPOSITE LOG 729873 ESTUARY PARK AVONMOUTH.GPJ - v8.05 | 07/08/15 - 10:01 | AC.  
 Structural Soils Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.structuralsoils.co.uk, Email: ask@soils.co.uk

Method Used: <b>Cable Percussion + Rotary Cored</b>	Plant Used: <b>Pilcon Wayfarer 1500 + Comacchio MC200</b>	Drilled By: <b>MG + LH</b>	Logged By: <b>SStanley</b>	Checked By: <i>Az</i>	
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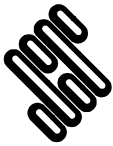
Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH4</b>
Contract Ref: <b>729873</b>	Start: <b>24.06.15</b> End: <b>25.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353195.0 N:181244.0</b>	Sheet: <b>7 of 8</b>

BH4 19.20-22.20m



GINT LIBRARY v8.05.GLB LibVersion: v8.05 - Lib0004 PdfVersion: v8.05 - Core+Full Bristol SI - 0003 | Log COMPOSITE LOG 729873 ESTUARY PARK AVONMOUTH.GPJ - v8.05 | 07/08/15 - 10:02 | AC.  
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Method Used: <b>Cable Percussion + Rotary Cored</b>	Plant Used: <b>Pilcon Wayfarer 1500 + Comacchio MC200</b>	Drilled By: <b>MG + LH</b>	Logged By: <b>SStanley</b>	Checked By: <i>Az</i>	
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Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH4</b>
Contract Ref: <b>729873</b>	Start: <b>24.06.15</b> End: <b>25.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353195.0 N:181244.0</b>	Sheet: <b>8 of 8</b>

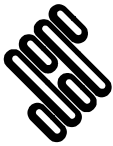
BH4 22.20-25.20m



GINT LIBRARY v8.05.GI.B.LibVersion: v8.05 - Lib0004.PrfVersion: v8.05 - Core+Full Bristol SI - 0003 | Log COMPOSITE LOG 729873 ESTUARY PARK AVONMOUTH.GPJ - v8.05 | 07/08/15 - 10:02 | AC.  
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Method Used: <b>Cable Percussion + Rotary Cored</b>	Plant Used: <b>Pilcon Wayfarer 1500 + Comacchio MC200</b>	Drilled By: <b>MG + LH</b>	Logged By: <b>SStanley</b>	Checked By: <i>Az</i>	
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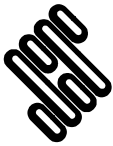


Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH5</b>
Contract Ref: <b>729873</b>	Start: <b>22.06.15</b> End: <b>24.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353145.0 N:181191.0</b>	Sheet: <b>1 of 8</b>

Depth (m)	Samples & Testing			Mechanical Log				Flush Returns & Details	Backfill & Instrumentation	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend
	No	Type	Results	TCR (%)	SCR (%)	RQD (%)	If (mm)						
											MADE GROUND: Asphalt.	0.08	
											MADE GROUND: Asphalt sub-base.	0.26	
0.50-0.90	2	B									MADE GROUND: Pinkish grey slightly clayey sandy GRAVEL with a low cobble content. Sand is fine to coarse. Gravel is angular fine to coarse of limestone with angular cobbles of limestone.	0.50	
0.70	1	ES										(0.40)	
0.90-1.20	3	B									MADE GROUND: Very soft dark grey sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of limestone, charcoal and possible asbestos.	0.90	
1.20-1.65	4	U	7 blows 45% recovery									(1.00)	
1.40-1.90	6	B									MADE GROUND: Very soft dark grey very sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of limestone, slate, lime and charcoal. ... at 1.50m wood recovered.	1.90	
1.65-1.85	5	D											
2.00-2.45	7	U	7 blows 0% recovery								Soft brownish grey slightly sandy silty CLAY. Sand is fine to medium. (TIDAL FLAT DEPOSITS)		
2.40-2.90	8	B										(2.10)	
3.00-3.45	9	U	8 blows 100% recovery										
3.00	V		$c_u=40$										
3.40-3.90	11	B											
3.45-3.65	10	D											
4.00-4.45	12	U	8 blows 100% recovery								Soft grey silty CLAY with occasional black rootlets. (TIDAL FLAT DEPOSITS)	4.00	
4.00	V		$c_u=18$										
4.40-4.90	14	B											
4.45-4.65	13	D											
5.00-5.45	15	U	7 blows 100% recovery								... at 4.80m black amorphous peat.		
5.00	V		$c_u=20$									(2.50)	

Boring Progress and Water Observations						Chiselling / Slow Progress			General Remarks	
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	From	To	Duration (hh:mm)		
22/06/15	10:30	6.00	6.00	150	6.00	16.80	17.00	00:30	1. SPT hammer EQU1070-2014 ( $E_r = 67.40\%$ ) used.	
Method Used: <b>Cable Percussion + Rotary Cored</b>						Plant Used: <b>Pilcon Wayfarer 1500 + Comacchio MC300</b>			All dimensions in metres Scale: <b>1:31</b>	
Drilled By: <b>LH</b>						Logged By: <b>BSaimen</b>			Checked By: <b>Az</b>	

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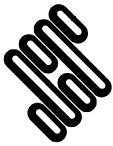


Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH5</b>
Contract Ref: <b>729873</b>	Start: <b>22.06.15</b> End: <b>24.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353145.0 N:181191.0</b>	Sheet: <b>2 of 8</b>

Depth (m)	Samples & Testing			Mechanical Log				Flush Returns & Details & Backfill & Instrumentation	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend
	No	Type	Results	TCR (%)	SCR (%)	RQD (%)	If (mm)					
5.45-5.65	16	D							↓	... at 5.40m becomes very sandy. Soft grey silty CLAY with occasional black rootlets. (TIDAL FLAT DEPOSITS) (stratum copied from 4.00m from previous sheet)		
5.90-6.40	17	B							↓		6.50	
6.50-6.95	18	SPT	N=10							Medium dense grey silty SAND. Sand is fine to medium. (ESTUARINE ALLUVIUM)		
7.40-7.90	19	B										
8.00-8.45	20	SPT	N=8									
8.90-9.40	21	B										
9.50-9.95	22	SPT	N=14								(7.10)	
10.40-10.90	23	B										

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Boring Progress and Water Observations						Chiselling / Slow Progress			General Remarks		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	From	To	Duration (hh:mm)			
Method Used: <b>Cable Percussion + Rotary Cored</b>								Plant Used: <b>Pilcon Wayfarer 1500 + Comacchio MC300</b>		Drilled By: <b>LH</b>	
All dimensions in metres								Scale: <b>1:31</b>		Logged By: <b>BSaimen</b>	
Checked By: <i>Az</i>											



Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH5</b>
Contract Ref: <b>729873</b>	Start: <b>22.06.15</b> End: <b>24.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353145.0 N:181191.0</b>	Sheet: <b>3 of 8</b>

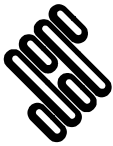
Depth (m)	Samples & Testing			Mechanical Log				Flush Returns & Details & Backfill & Instrumentation	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend
	No	Type	Results	TCR (%)	SCR (%)	RQD (%)	If (mm)					
11.00-11.45	24	SPT	N=14							Medium dense grey silty SAND. Sand is fine to medium. (ESTUARINE ALLUVIUM) (stratum copied from 6.50m from previous sheet) . . . at 11.00m becomes brownish grey in colour.		
11.90-12.45	25	B										
12.50-12.95	26	SPT	N=13									
13.40-13.90	27	B									13.60	
14.00-14.45	28	SPT	N=13							Soft grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded to rounded fine to coarse of quartz. (TIDAL FLAT DEPOSITS)	(1.30)	
14.90-15.40	29	B									14.90	
15.50-15.95	30	SPT	N=9							Soft grey silty CLAY with black pseudo-fibrous peat. (TIDAL FLAT DEPOSITS)	(1.00)	
16.40-16.90	31	B								Hard reddish brown slightly sandy CLAY/extremely weak mudstone. (MERCIA MUDSTONE GROUP)	(1.10)	

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Boring Progress and Water Observations						Chiselling / Slow Progress			General Remarks	
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	From	To	Duration (hh:mm)		
Method Used: <b>Cable Percussion + Rotary Cored</b>		Plant Used: <b>Pilcon Wayfarer 1500 + Comacchio MC300</b>		Drilled By: <b>LH</b>		Logged By: <b>BSaimen</b>		Checked By: <b>Az</b>		

All dimensions in metres Scale: **1:31**



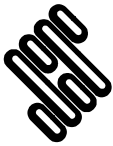


Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH5</b>
Contract Ref: <b>729873</b>	Start: <b>22.06.15</b> End: <b>24.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353145.0 N:181191.0</b>	Sheet: <b>4 of 8</b>

Depth (m)	Samples & Testing			Mechanical Log				Flush Returns & Details & Backfill & Instrumentation	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend
	No	Type	Results	TCR (%)	SCR (%)	RQD (%)	If (mm)					
17.00-17.70	32	SPT HP	N=63 c <sub>u</sub> =137/137/137	↑	↑	↑	↑	100% return Water	Water	Hard reddish brown slightly sandy CLAY/extremely weak mudstone. (MERCIA MUDSTONE GROUP) (stratum copied from 15.90m from previous sheet)	17.00	
17.00-17.45				100	79	57	17.15					
17.10				↓	↓	↓	↓			↓		
17.70-19.00				↑	↑	↑	NI 150 550	100% return Water	Water	Extremely weak thickly to very thinly bedded reddish brown silty MUDSTONE with occasional greenish grey patches/bands of sandstone and fractures are subhorizontal very closely to widely spaced undulating rough open to medium wide infilled with red clay up to 3mm/highly weakened/weathered wallrock. (MERCIA MUDSTONE GROUP) . . . at 17.40m stiff red silty clay formed by the weathering of wallrocks. . . . from 17.90m to 18.00m greenish grey fine to medium sandstone recorded non-intact as angular fine to coarse fragments of green sandstone. . . . from 18.30m to 18.60m incipient fracture at 85° undulating rough with highly weakened wallrock.	(3.05)	
19.20-20.70	↑	↑	↑	↑	↑	↑	↑	↑	↑	. . . from 19.45m to 19.60m highly weathered and weakened wallrock into stiff red clay.		
19.45	HP	c <sub>u</sub> =125	100	73	53	100% return Water	Water	. . . from 19.70m to 19.80m very weak reddish silty mudstone. . . . at 19.85m fracture is 10° with highly weakened foot wallrock.				
19.75	HP	c <sub>e</sub> =200								. . . at 20.10m greenish grey weak sandstone. . . . from 20.10m to 20.25m very weak mudstone recovered non-intact.	20.20	
20.30	HP	c <sub>u</sub> =137								Very weak to weak very thinly to thinly bedded reddish brown silty MUDSTONE with occasional gravel sized patchy greenish grey siltstone/silty mudstone.	(0.70)	
20.70-22.20				↑	↑	↑	NI 200 600	80% return Water	Water	Weak greenish grey medium to coarse SANDSTONE. . . . at 20.90m greenish grey weak sandstone.	20.90	
21.20	HP	c <sub>u</sub> =150/150/150	100	83	61					Very weak to weak very thinly to thinly bedded reddish brown silty MUDSTONE with occasional gravel sized patchy greenish grey siltstone/silty mudstone. . . . at 21.20m foot wallrock of fractures weathered into stiff red clay.	(1.10)	

Boring Progress and Water Observations						Chiselling / Slow Progress			General Remarks			
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	From	To	Duration (hh:mm)				
Method Used:	Cable Percussion + Rotary Cored		Plant Used:	Pilcon Wayfarer 1500 + Comacchio MC300		Drilled By:	LH	Logged By:	BSaimen	Checked By:	Az	
All dimensions in metres										Scale: 1:31		

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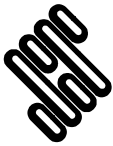
Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH5</b>
Contract Ref: <b>729873</b>	Start: <b>22.06.15</b> End: <b>24.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353145.0 N:181191.0</b>	Sheet: <b>5 of 8</b>

Depth (m)	Samples & Testing			Mechanical Log				Flush Returns & Details & Backfill & Instrumentation	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend
	No	Type	Results	TCR (%)	SCR (%)	RQD (%)	If (mm)					
22.20-23.70				100	83	61				. . . from 21.30m to 21.35m red mudstone is weak. . . . from 21.90m to 22.20m red mudstone is weak. Weak greenish grey calcareous SILTSTONE. . . . from 22.20m to 22.35m greenish grey calcareous siltstone with occasional dissolution cavities. Very weak to weak very thinly to thinly bedded reddish brown silty MUDSTONE with occasional gravel sized patchy greenish grey siltstone/silty mudstone. (MERCIA MUDSTONE GROUP Zone I) . . . at 23.25m dissolution cavity up to 40cm.	22.20	
22.80		HP	$c_u=150/150/150$	97	67	50		80% return Water				
23.70-25.20							NI 250 400	100% return Water			(2.70)	
				100	80	60						
											25.20	
										. . . at 25.19m mudstone becomes extremely weak. Borehole terminated at 25.20m depth.		

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Boring Progress and Water Observations						Chiselling / Slow Progress			General Remarks	
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	From	To	Duration (hh:mm)		
Method Used: <b>Cable Percussion + Rotary Cored</b>		Plant Used: <b>Pilcon Wayfarer 1500 + Comacchio MC300</b>		Drilled By: <b>LH</b>		Logged By: <b>BSaimen</b>		Checked By: <i>Az</i>		
All dimensions in metres								Scale: <b>1:31</b>		





Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH5</b>
Contract Ref: <b>729873</b>	Start: <b>22.06.15</b> End: <b>24.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353145.0 N:181191.0</b>	Sheet: <b>6 of 8</b>

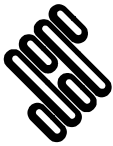
BH5 17.20-19.20m



GINT LIBRARY v8.05.GLB LibVersion: v8.05 - Lib0004 ProjVersion: v8.05 - Core+Full Bristol SI - 0003 | Log COMPOSITE LOG 729873 ESTUARY PARK AVONMOUTH.GPJ - v8.05 | 07/08/15 - 10:03 | AC.  
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Method Used: <b>Cable Percussion + Rotary Cored</b>	Plant Used: <b>Pilcon Wayfarer 1500 + Comacchio MC300</b>	Drilled By: <b>LH</b>	Logged By: <b>BSaimen</b>	Checked By: <i>Az</i>	
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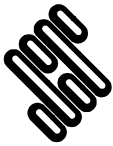
Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH5</b>
Contract Ref: <b>729873</b>	Start: <b>22.06.15</b> End: <b>24.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353145.0 N:181191.0</b>	Sheet: <b>7 of 8</b>

BH5 19.2022.20m



GINT LIBRARY v8.05.GLB LibVersion: v8.05 - Lib0004 ProjVersion: v8.05 - Core+Full Bristol SI - 0003 | Log COMPOSITE LOG 729873 ESTUARY PARK AVONMOUTH.GPJ - v8.05 | 07/08/15 - 10:03 | AC.  
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Method Used: <b>Cable Percussion + Rotary Cored</b>	Plant Used: <b>Pilcon Wayfarer 1500 + Comacchio MC300</b>	Drilled By: <b>LH</b>	Logged By: <b>BSaimen</b>	Checked By: <b>Az</b>	
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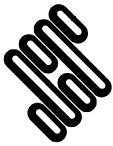
Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH5</b>
Contract Ref: <b>729873</b>	Start: <b>22.06.15</b> End: <b>24.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353145.0 N:181191.0</b>	Sheet: <b>8 of 8</b>

BH5 22.20-25.20m



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Method Used: <b>Cable Percussion + Rotary Cored</b>	Plant Used: <b>Pilcon Wayfarer 1500 + Comacchio MC300</b>	Drilled By: <b>LH</b>	Logged By: <b>BSaimen</b>	Checked By: <b>Az</b>	
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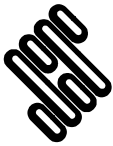


Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH6</b>
Contract Ref: <b>729873</b>	Start: <b>18.06.15</b> End: <b>19.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353151.0 N:181220.0</b>	Sheet: <b>1 of 8</b>

Depth (m)	Samples & Testing			Mechanical Log				Flush Returns & Details	Backfill & Instrumentation	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend
	No	Type	Results	TCR (%)	SCR (%)	RQD (%)	If (mm)						
0.10-0.50	1	B									MADE GROUND: Asphalt. MADE GROUND: Pinkish grey sandy silty GRAVEL. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of limestone.	0.10 (0.40) 0.50	
0.50-1.20	2	B									Stiff to very stiff brown mottled orange slightly sandy silty CLAY. (TIDAL FLAT DEPOSITS)	(2.40)	
1.20-1.65	3	SPT	N=7										
1.40-1.90	4	B											
2.00-2.45	5	U <sub>(100)</sub>	24 blows 100% recovery c <sub>u</sub> =130										
2.00		V											
2.40-2.90	7	B											
2.45-2.65	6	D											
3.00-3.45	8	U <sub>(100)</sub>	7 blows 100% recovery c <sub>u</sub> =32								Very soft bluish grey silty CLAY with frequent organic content. (TIDAL FLAT DEPOSITS)	2.90	
3.00		V											
3.40-3.90	10	B											
3.45-3.65	9	D											
4.00-4.45	11	SPT	N=1										
4.40-4.90	12	B											
5.00-5.45	13	U <sub>(100)</sub>	6 blows 100% recovery c <sub>u</sub> =54								... at 4.80m black pseudo fibrous peat.	(3.70)	
5.00		V											

Boring Progress and Water Observations						Chiselling / Slow Progress			General Remarks										
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	From	To	Duration (hh:mm)											
18/06/15	11:10	5.00	5.00	150	5.00	16.80 17.00	17.00 17.10	00:30 00:30	1. Position CAT and Genny scanned prior to hand dug pit to 1.20m depth. 2. Groundwater/gas monitoring pipe installed as shown. 3. SPT hammer EQU1070-2014 (E <sub>r</sub> = 67.40%) used.										
Method Used: <b>Cable Percussion + Rotary Cored</b>								Plant Used: <b>Pilcon Wayfarer 1500 + Comacchio MC300</b>		Drilled By: <b>JW + LH</b>		Logged By: <b>BSaimen + SStanley</b>		Checked By: <i>AC</i>		Scale: <b>1:31</b>			

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Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH6</b>
Contract Ref: <b>729873</b>	Start: <b>18.06.15</b> End: <b>19.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353151.0 N:181220.0</b>	Sheet: <b>2 of 8</b>

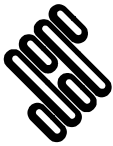
Depth (m)	Samples & Testing			Mechanical Log				Flush Returns & Details & Backfill & Instrumentation	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend
	No	Type	Results	TCR (%)	SCR (%)	RQD (%)	If (mm)					
5.90-6.40	14	B								Very soft bluish grey silty CLAY with frequent organic content. (TIDAL FLAT DEPOSITS) (stratum copied from 2.90m from previous sheet)		
6.50-6.95	15	SPT	N=7							Loose brownish grey silty SAND. Sand is fine to medium. (ESTUARINE ALLUVIUM)	6.60 (0.80)	
7.40-7.90	16	B								Loose grey silty SAND. Sand is fine to medium. (ESTUARINE ALLUVIUM)	7.40	
8.00-8.45	17	SPT	N=6									
8.90-9.40	18	B										
9.50-9.95	19	SPT	N=8									
10.40-10.90	20	B									(6.10)	

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Boring Progress and Water Observations						Chiselling / Slow Progress			General Remarks		
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	From	To	Duration (hh:mm)			
Method Used: <b>Cable Percussion + Rotary Cored</b>								Plant Used: <b>Pilcon Wayfarer 1500 + Comacchio MC300</b>		Drilled By: <b>JW + LH</b>	
Logged By: <b>BSaimen + SStanley</b>								Checked By: <b>AS</b>		Scale: <b>1:31</b>	







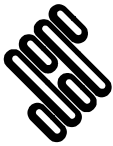
Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH6</b>
Contract Ref: <b>729873</b>	Start: <b>18.06.15</b> End: <b>19.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353151.0 N:181220.0</b>	Sheet: <b>3 of 8</b>

Depth (m)	Samples & Testing			Mechanical Log				Flush Returns & Details & Backfill & Instrumentation	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend
	No	Type	Results	TCR (%)	SCR (%)	RQD (%)	If (mm)					
11.00-11.45	21	SPT	N=10							Loose grey silty SAND. Sand is fine to medium. (ESTUARINE ALLUVIUM) <i>(stratum copied from 7.40m from previous sheet)</i>		
11.90-12.40	22	B									13.50	
12.50-12.95	23	SPT	N=9							Loose grey sandy CLAY. Sand is fine to medium. (ESTUARINE ALLUVIUM)	(1.20)	
13.40-13.90	24	B									14.70	
14.00-14.45	25	SPT	N=9							Hard reddish brown sandy CLAY. (MERCIA MUDSTONE GROUP)	(2.30)	
14.90-15.40	26	B										
15.50-15.95	27	SPT	N=36									
16.40-16.90	28	B										

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Boring Progress and Water Observations						Chiselling / Slow Progress			General Remarks			
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	From	To	Duration (hh:mm)				
								All dimensions in metres	Scale: <b>1:31</b>			
Method Used:	<b>Cable Percussion + Rotary Cored</b>		Plant Used:	<b>Pilcon Wayfarer 1500 + Comacchio MC300</b>		Drilled By:	<b>JW + LH</b>	Logged By:	<b>BSaimen + SStanley</b>	Checked By:	<i>Az</i>	



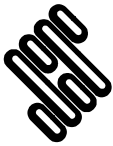


Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH6</b>
Contract Ref: <b>729873</b>	Start: <b>18.06.15</b> End: <b>19.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353151.0 N:181220.0</b>	Sheet: <b>4 of 8</b>

Depth (m)	Samples & Testing			Mechanical Log				Flush Returns & Details & Backfill & Instrumentation	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend
	No	Type	Results	TCR (%)	SCR (%)	RQD (%)	If (mm)					
17.00-17.70	29	SPT	N=68	↑	↑	↑		100% return Water		Hard reddish brown sandy CLAY. (MERCIA MUDSTONE GROUP) (stratum copied from 14.70m from previous sheet)	17.00	
17.00-17.45				71	26	23						
17.60	HP	c <sub>u</sub> =50		↓	↓	↓		100% return Water		Firm reddish brown slightly sandy CLAY with occasional fine to medium angular fragments of extremely weak mudstone up to 5mm. (MERCIA MUDSTONE GROUP) ... at 17.00m possible loss of recovery due to SPT action.	17.60	
17.70-19.20				97	93	90	NI 150 500					
19.20-20.70				↑	↑	↑		100% return Water		Extremely very weak thinly laminated to very thinly bedded reddish brown silty MUDSTONE with occasional patches of greenish grey siltstone/fine sandstone. Fractures are subhorizontal very closely to medium spaced undulating rough open/medium wide with red clay/fine to medium gravel of mudstone. (MERCIA MUDSTONE GROUP) ... at 18.20m fractures in 5° with weathering penetrates downward along the fracture causing lower wall to disintegrated/weathered to extremely weak rock. ... from 18.30m to 18.70m frequent patches up to 10mm of greenish grey siltstone. ... from 18.72m to 19.00m joint is 80° undulating rough open with fractures lower wall. ... from 19.84m to 19.93m mudstone is very weak.	20.40	
20.70-22.20				↑	↑	↑		100% return Water		Very weak reddish brown silty MUDSTONE. (MERCIA MUDSTONE GROUP) ... from 20.40m to 20.70m joint fracture subvertical undulating smooth.	21.20	
				↑	↑	↑		100% return Water		Extremely weak greenish silty MUDSTONE very thinly interbedded extremely weak reddish brown mudstone. Very thinly laminated. (MERCIA MUDSTONE GROUP)	21.55	
				↑	↑	↑		100% return Water		Very weak to weak greenish grey SANDSTONE. (MERCIA MUDSTONE GROUP)	21.73	
				↑	↑	↑		100% return Water			21.80	
				↑	↑	↑		100% return Water			21.85	

Boring Progress and Water Observations						Chiselling / Slow Progress			General Remarks			
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	From	To	Duration (hh:mm)				
All dimensions in metres												
Method Used:	Cable Percussion + Rotary Cored		Plant Used:	Pilcon Wayfarer 1500 + Comacchio MC300		Drilled By:	JW + LH		Logged By:	BSaimen + SStanley	Checked By:	AGS

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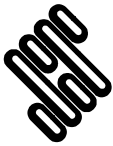


Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH6</b>
Contract Ref: <b>729873</b>	Start: <b>18.06.15</b> End: <b>19.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353151.0 N:181220.0</b>	Sheet: <b>5 of 8</b>

Depth (m)	Samples & Testing			Mechanical Log				Flush Returns & Details & Backfill & Instrumentation	Water	Description of Strata	Depth (Thickness)	Material Graphic Legend
	No	Type	Results	TCR (%)	SCR (%)	RQD (%)	If (mm)					
22.20-23.70				83	77	26		50% return Water	[Redacted]	Extremely weak reddish brown silty MUDSTONE with fine to medium gravel sized greenish grey sandstone patches. (MERCIA MUDSTONE GROUP)	(0.75)	
										Weak greenish grey SANDSTONE. (MERCIA MUDSTONE GROUP)	22.60	
23.70-25.00				87	82	38		50% return Water	[Redacted]	Very weak and weak thinly bedded reddish brown MUDSTONE. (MERCIA MUDSTONE GROUP) <i>(stratum copied from 21.85m from previous sheet)</i>	(0.37)	
										Weak reddish brown MUDSTONE with gravel to cobbles sized weak greenish grey siltstone/sandstone inclusions. (MERCIA MUDSTONE GROUP)	23.34	
										Very weak greenish grey mottled reddish brown MUDSTONE. (MERCIA MUDSTONE GROUP) . . . from 23.06m to 23.30m joint fracture subvertical stepped rough.	(1.26)	
					100	100	98				Weak reddish brown silty MUDSTONE with rare greenish grey gravel sized siltstone inclusions. (MERCIA MUDSTONE GROUP)	24.60
									Medium strong silty MUDSTONE. (MERCIA MUDSTONE GROUP)	(0.40)		
										25.00		
Borehole terminated at 25.00m depth.												

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Boring Progress and Water Observations						Chiselling / Slow Progress			General Remarks				
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	From	To	Duration (hh:mm)					
All dimensions in metres										Scale: <b>1:31</b>			
Method Used:	<b>Cable Percussion + Rotary Cored</b>		Plant Used:	<b>Pilcon Wayfarer 1500 + Comacchio MC300</b>		Drilled By:	<b>JW + LH</b>		Logged By:	<b>BSaimen + SStanley</b>	Checked By:	<i>Az</i>	



Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH6</b>
Contract Ref: <b>729873</b>	Start: <b>18.06.15</b> End: <b>19.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353151.0 N:181220.0</b>	Sheet: <b>6 of 8</b>

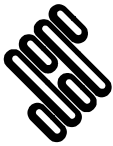
BH6 17.20-19.20m



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Method Used: <b>Cable Percussion + Rotary Cored</b>	Plant Used: <b>Pilcon Wayfarer 1500 + Comacchio MC300</b>	Drilled By: <b>JW + LH</b>	Logged By: <b>BSaimen + SStanley</b>	Checked By: <i>Az</i>	
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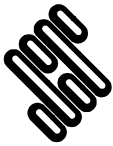
Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH6</b>
Contract Ref: <b>729873</b>	Start: <b>18.06.15</b> End: <b>19.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353151.0 N:181220.0</b>	Sheet: <b>7 of 8</b>

BH6 19.20-22.20m



GINT LIBRARY v8.05.GLB LibVersion: v8.05 - Lib0004 ProjVersion: v8.05 - Core+Full Bristol SI - 0003 | Log COMPOSITE LOG: 729873 ESTUARY PARK AVONMOUTH.GPJ - v8.05 | 07/08/15 - 10:06 | AC. Structural Soils Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.structuralsoils.co.uk, Email: ask@soils.co.uk

Method Used: <b>Cable Percussion + Rotary Cored</b>	Plant Used: <b>Pilcon Wayfarer 1500 + Comacchio MC300</b>	Drilled By: <b>JW + LH</b>	Logged By: <b>BSaimen + SStanley</b>	Checked By: <i>Az</i>	
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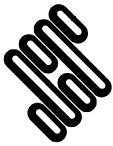
Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Borehole: <b>BH6</b>
Contract Ref: <b>729873</b>	Start: <b>18.06.15</b> End: <b>19.06.15</b>	Ground Level (m AOD): <b>7.00</b>	National Grid Co-ordinate: <b>E:353151.0 N:181220.0</b>	Sheet: <b>8 of 8</b>

BH6 22.20-25.00m



GINT LIBRARY v8.05.GLB LibVersion: v8.05 - Lib0004 ProjVersion: v8.05 - Core+Full Bristol SI - 0003 | Log COMPOSITE LOG 729873 ESTUARY PARK AVONMOUTH.GPJ - v8.05 | 07/08/15 - 10:06 | AC.  
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Method Used:	<b>Cable Percussion + Rotary Cored</b>	Plant Used:	<b>Pilcon Wayfarer 1500 + Comacchio MC300</b>	Drilled By:	<b>JW + LH</b>	Logged By:	<b>BSaimen + SStanley</b>	Checked By:	<i>Az</i>	
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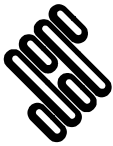
Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Trail Pit: <b>TP1</b>
Contract Ref: <b>729873</b>	Start: <b>18.06.15</b> End: <b>18.06.15</b>	Ground Level (m AOD): ---	National Grid Co-ordinate: ---	Sheet: <b>1 of 1</b>

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
0.34	1	ES	c <sub>u</sub> =75			MADE GROUND: Asphalt.	0.08	
0.34	1	D				MADE GROUND: Pinkish grey very sandy silty GRAVEL with frequent rootlets. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of limestone.	0.34	
0.60	2	D	c <sub>u</sub> =75			MADE GROUND: Orangish grey very sandy GRAVEL. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of limestone.	0.60	
0.60	2	V				Stiff to very stiff dark bluish grey silty CLAY with occasional rootlets. (TIDAL FLAT DEPOSITS)	(0.80)	
1.40	3	D	c <sub>u</sub> =52			Very soft to firm brown mottled orange slightly sandy silty CLAY. Sand is fine to coarse. (TIDAL FLAT DEPOSITS)	1.40	
1.40	3	V					(0.50)	
						Trial pit terminated at 1.90m depth.	1.90	

GINT LIBRARY v8.05 - Lib0004 PpfVersion: v8.05 - Core+Full Bristol SI - 0003 | Log TRIAL PIT LOG | 729873 ESTUARY PARK AVONMOUTH.GPJ - v8.05 | 07/08/15 - 10:07 | AC.  
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Plan (Not to Scale)		General Remarks		
		<ol style="list-style-type: none"> <li>Position CAT and Genny scanned prior to excavation.</li> <li>Ground water encountered at 1.30m depth.</li> <li>Pit walls are stable.</li> </ol>		
All dimensions in metres		Scale: <b>1:25</b>		
Method Used: <b>Machine dug</b>	Plant Used: <b>JCB-3CX</b>	Logged By: <b>SStanley</b>	Checked By: <i>Az</i>	



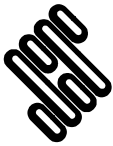


Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Trial Pit: <b>TP2</b>	
Contract Ref: <b>729873</b>		Start: <b>18.06.15</b> End: <b>18.06.15</b>	Ground Level (m AOD): <b>---</b>	National Grid Co-ordinate: <b>---</b>	Sheet: <b>1 of 1</b>

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
0.20	1	ES				MADE GROUND: Asphalt.	0.10	
0.20	1	D				MADE GROUND: Pinkish grey sandy silty GRAVEL with frequent rootlets. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of limestone.	(0.50)	
						MADE GROUND: Orangish brown COBBLES with much sandy GRAVEL with some boulders. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of brick, limestone. Cobbles and boulders of limestone, brick and concrete. Boulders up to 0.50m x 0.30m.	0.60	
							(0.80)	
1.40	2	ES				MADE GROUND: Soft to firm dark grey slightly sandy slightly gravelly CLAY with occasional rootlets. Sand is fine to coarse. Gravel is angular to rounded fine to coarse of brick, limestone and lime.	1.40	
1.40	2	D				Soft dark bluish grey silty CLAY with occasional rootlets. (TIDAL FLAT DEPOSITS)	1.60	
1.60	3	D			(0.40)			
					2.00			
Trial pit terminated at 2.00m depth.								

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Plan (Not to Scale) 		<b>General Remarks</b> 1. Position CAT and Genny scanned prior to excavation. 2. Ground water encountered at 1.40m depth. 3. Pit walls are stable. 4. No cobble layer at north west end of pit (pinches out).	
Method Used: <b>Machine dug</b>		Plant Used: <b>JCB-3CX</b>	
All dimensions in metres		Scale: <b>1:25</b>	
Logged By: <b>SStanley</b>		Checked By: <i>Az</i>	



Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Trial Pit: <b>TP3</b>	
Contract Ref: <b>729873</b>		Start: <b>18.06.15</b> End: <b>18.06.15</b>	Ground Level (m AOD): ---	National Grid Co-ordinate: ---	Sheet: <b>1 of 1</b>

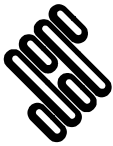
Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
0.35	1	ES				MADE GROUND: Asphalt.	0.09	
0.35	1	D				MADE GROUND: Pinkish grey sandy silty GRAVEL with frequent rootlets. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of limestone.	0.35	
						MADE GROUND: Orangish grey very sandy GRAVEL. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of limestone.	(0.45)	
1.00	2	ES	$c_u=110$			MADE GROUND: Hardstanding area of red brick and mortar, probably foundation (see Archaeologists report).	0.80	
1.00	2	D				Firm to stiff grey mottled orange silty CLAY. (TIDAL FLAT DEPOSITS)	1.05	
1.20		V				(1.15)		
1.90	3	D	$c_u=125$					
1.90		V						
2.20		V	$c_u=66$			Trial pit terminated at 2.20m depth.		

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Plan (Not to Scale) 		<b>General Remarks</b> 1. Position CAT and Genny scanned prior to excavation. 2. Ground water encountered at 2.10m depth. 3. Pit walls are stable.					
Method Used: <b>Machine dug</b>		Plant Used: <b>JCB-3CX</b>		Logged By: <b>SStanley</b>		Checked By: <i>Az</i>	
All dimensions in metres				Scale: <b>1:25</b>			





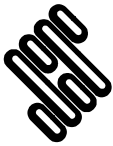


Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Trial Pit: <b>TP4</b>	
Contract Ref: <b>729873</b>		Start: <b>18.06.15</b> End: <b>18.06.15</b>	Ground Level (m AOD): <b>---</b>	National Grid Co-ordinate: <b>---</b>	Sheet: <b>1 of 1</b>

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
0.07					MADE GROUND: Asphalt.	0.07		
0.22	1	ES			MADE GROUND: Pinkish grey sandy silty GRAVEL with frequent rootlets. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of limestone.	0.22		
0.22	1	D						
(0.38)					MADE GROUND: Orangish grey very sandy GRAVEL. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of limestone.	(0.38)		
0.60	2	ES			MADE GROUND: Very stiff slightly sandy slightly gravelly silty CLAY. Sand is fine to coarse. Gravel is angular to rounded fine to coarse of pottery, animal bone, quartz and ash.	0.60		
0.60	2	D						
(0.70)						(0.70)		
1.30	3	D	$c_u=68$		Firm brown mottled orange slightly sandy silty CLAY. Sand is fine to coarse. (TIDAL FLAT DEPOSITS)	1.30		
1.30		V						
(0.80)						(0.80)		
2.00	4	D			Trial pit terminated at 2.10m depth.	2.10		
2.10		V	$c_u=84$					

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Plan (Not to Scale) 		<b>General Remarks</b> 1. Position CAT and Genny scanned prior to excavation. 2. Ground water encountered at 1.20m depth. 3. Pit walls are stable.	
Method Used: <b>Machine dug</b>		Plant Used: <b>JCB-3CX</b>	
All dimensions in metres		Scale: <b>1:25</b>	
Logged By: <b>SStanley</b>		Checked By: <i>Az</i>	



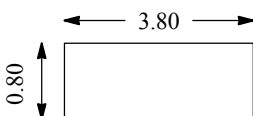
# STRUCTURAL SOILS

# TRIAL PIT LOG

Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Trial Pit: <b>TP5</b>	
Contract Ref: <b>729873</b>		Start: <b>17.06.15</b> End: <b>17.06.15</b>	Ground Level (m AOD): ---	National Grid Co-ordinate: ---	Sheet: <b>1 of 1</b>

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend	
Depth	No	Type	Results						
0.10 0.10	1 1	ES D				MADE GROUND: Pinkish very sandy silty GRAVEL with frequent rootlets. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of limestone.	0.25		
0.35 0.35	2 2	D ES				MADE GROUND: Firm dark brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to rounded fine to coarse of ceramic, brick, quartz and charcoal.	(0.35) 0.60		
0.80 0.80	3 3	ES D				MADE GROUND: Soft brown slightly sandy slightly gravelly CLAY with rare cobbles of brick. Sand is fine to coarse. Gravel is angular to rounded fine to coarse of animal bone, flint, quartz, limestone and brick.	(0.50) 1.10		
1.10	4	D				MADE GROUND: Firm brownish grey slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is angular to rounded fine to coarse of quartz, limestone and cobbles of limestone.	(0.40) 1.50		
1.60		V	$c_u=54$			Firm grey and orange mottled silty CLAY. (TIDAL FLAT DEPOSITS)			
2.00		V	$c_u=58$				(1.20)		
2.40		V	$c_u=60$						
2.70		V	$c_u=56$				2.70		
3.70		V	$c_u=20$				Very soft dark bluish grey mottled yellow CLAY with frequent lenses of black fibrous organic material with strong organic odour. (TIDAL FLAT DEPOSITS)		(1.60)
4.30		V	$c_u=20$						4.30
Trial pit terminated at 4.30m depth. Trial pit collapsed.									

Plan (Not to Scale)



## General Remarks

1. Position CAT and Genny scanned prior to excavation.
2. Ground water encountered at 1.50m depth.
3. Pit walls are unstable under water level.

All dimensions in metres

Scale: **1:25**

Method Used:

**Machine dug**

Plant Used:

**JCB-3CX**

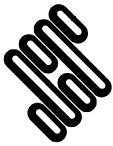
Logged By:

**SStanley**

Checked By:

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# STRUCTURAL SOILS

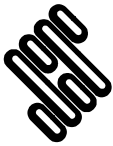
# TRIAL PIT LOG

Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Trial Pit: <b>TP6</b>	
Contract Ref: <b>729873</b>		Start: <b>17.06.15</b> End: <b>17.06.15</b>	Ground Level (m AOD): ---	National Grid Co-ordinate: ---	Sheet: <b>1 of 1</b>

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend	
Depth	No	Type	Results						
0.40	1	ES			MADE GROUND: Pinkish grey sandy silty GRAVEL with frequent rootlets. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of limestone.	(0.40)			
0.40	1	D				Very stiff dark brown slightly sandy CLAY. (TIDAL FLAT DEPOSITS)		(0.60)	
1.00	2	D	$c_u=75$		Soft to stiff brown and orange mottled slightly sandy CLAY. Sand is fine to coarse. (TIDAL FLAT DEPOSITS)	1.00			
1.00		HP				(0.60)			
1.80	3	D	$c_u=94$			Stiff grey mottled orange slightly sandy CLAY with pockets of black amorphous organic material. (TIDAL FLAT DEPOSITS)		1.60	
1.80		V						(1.30)	
2.10		V	$c_u=64$						
2.40		V	$c_u=32$	... at 2.40m becoming soft.	2.90				
2.90	4	D		Very soft dark bluish grey mottled yellow CLAY with frequent lenses of black fibrous organic material. Frequent fibrous brown organic matter throughout. (TIDAL FLAT DEPOSITS)	... at 2.90m thin black pseudo fibrous peat pocket.	(1.60)			
3.50		V	$c_u=22$					4.50	
4.40	5	D			Trial pit terminated at 4.50m depth.				

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Plan (Not to Scale)		General Remarks			
		<ol style="list-style-type: none"> <li>Position CAT and Genny scanned prior to excavation.</li> <li>Ground water encountered at 1.60m depth, flowing in 2.90m depth.</li> <li>Pit walls are stable.</li> </ol>			
		All dimensions in metres		Scale: <b>1:30</b>	
Method Used:	<b>Machine dug</b>	Plant Used:	<b>JCB-3CX</b>	Logged By:	<b>SStanley</b>
			Checked By:		



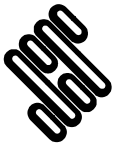
Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Trial Pit: <b>TP7</b>	
Contract Ref: <b>729873</b>		Start: <b>17.06.15</b> End: <b>17.06.15</b>	Ground Level (m AOD): ---	National Grid Co-ordinate: ---	Sheet: <b>1 of 1</b>

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
0.10	1	ES	$c_u=100$			MADE GROUND: Pinkish grey sandy silty GRAVEL with frequent rootlets. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of limestone.	(0.50)	
0.90	2	ES				MADE GROUND: Stiff greyish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to subangular of limestone and brick. Rare cobbles of limestone and brick.	(0.70)	
0.90		V					1.20	
1.50	1	D	$c_u=78$			Soft brown and orange mottled slightly sandy CLAY. Sand is fine to coarse. (TIDAL FLAT DEPOSITS)	(1.10)	
2.30	2	D				Stiff grey and orange mottled silty CLAY. (TIDAL FLAT DEPOSITS)	(0.60)	
2.30		V					2.90	
2.90	3	D	$c_u=22$			Very soft dark bluish grey mottled yellow CLAY with frequent lenses of black fibrous organic material. (TIDAL FLAT DEPOSITS)	(1.60)	
2.90		V						
3.20		V	$c_u=30$				4.50	
4.50		V	$c_u=32$			Trial pit terminated at 4.50m depth.		

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Plan (Not to Scale) 	<b>General Remarks</b>	
	1. Position CAT and Genny scanned prior to excavation. 2. Ground water encountered at 2.30m depth. 3. Pit walls are stable.	
All dimensions in metres		Scale: <b>1:30</b>
Method Used: <b>Machine dug</b>	Plant Used: <b>JCB-3CX</b>	Logged By: <b>SStanley</b> Checked By: <i>Az</i>



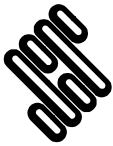


Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Trial Pit: <b>TP8</b>
Contract Ref: <b>729873</b>	Start: <b>17.06.15</b> End: <b>17.06.15</b>	Ground Level (m AOD): ---	National Grid Co-ordinate: ---	Sheet: <b>1 of 1</b>

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
				 		MADE GROUND: Pinkish grey sandy GRAVEL with high cobble content. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of limestone. Cobbles of limestone.	(0.70)	
						Trial pit terminated at 0.70m due to instability and water ingress.	0.70	

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Plan (Not to Scale)		<b>General Remarks</b>		
		<ol style="list-style-type: none"> <li>Position CAT and Genny scanned prior to excavation.</li> <li>Water encountered at 0.60m depth, possible water supply pipe leakage.</li> <li>Pit walls are unstable.</li> </ol>		
		All dimensions in metres		Scale: <b>1:25</b>
Method Used: <b>Machine dug</b>	Plant Used: <b>JCB-3CX</b>	Logged By: <b>SStanley</b>	Checked By: <i>Az</i>	

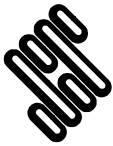


Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Trial Pit: <b>TP9</b>
Contract Ref: <b>729873</b>	Start: <b>17.06.15</b> End: <b>17.06.15</b>	Ground Level (m AOD): ---	National Grid Co-ordinate: ---	Sheet: <b>1 of 1</b>

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
0.20	1	ES				Vegetation over MADE GROUND: Dark brown and grey mottled silty sandy GRAVEL with a high rootlet content. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of limestone.	0.30	
1.00	1	D	$c_u \Rightarrow 225$			Very stiff orangish brown slightly sandy CLAY with frequent orange coloured rootlets. (TIDAL FLAT DEPOSITS)	(1.10)	
1.00		V					1.40	
1.40	2	V	$c_u = 75$			Soft to stiff blue grey mottled orange slightly sandy silty CLAY. Sand is fine. (TIDAL FLAT DEPOSITS)	(0.70)	
1.50		D					2.10	
2.30	3	D	$c_u = 30$			Very soft light grey mottled orange silty CLAY. (TIDAL FLAT DEPOSITS)	(0.60)	
2.30		V					2.70	
2.80	4	D	$c_u = 20$			Very soft dark bluish grey mottled yellow CLAY with frequent lenses of black fibrous organic material. (TIDAL FLAT DEPOSITS)	(1.80)	
2.80		V					4.50	
4.00		V	$c_u = 40$					
4.50	5	D	$c_u = 15$			Trial pit terminated at 4.50m depth.		
4.50		V						

Plan (Not to Scale)		General Remarks		
		<ol style="list-style-type: none"> <li>Position CAT and Genny scanned prior to excavation.</li> <li>Ground water encountered at 2.30m depth.</li> <li>Pit walls are unstable under water level.</li> </ol>		
All dimensions in metres		Scale: <b>1:30</b>		
Method Used: <b>Machine dug</b>	Plant Used: <b>JCB-3CX</b>	Logged By: <b>SStanley</b>	Checked By: <i>Az</i>	

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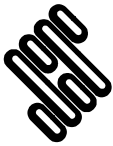
Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Trial Pit: <b>TP10</b>
Contract Ref: <b>729873</b>	Start: <b>17.06.15</b> End: <b>17.06.15</b>	Ground Level (m AOD): <b>---</b>	National Grid Co-ordinate: <b>---</b>	Sheet: <b>1 of 1</b>

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
0.10	1	ES				MADE GROUND: Brown very sandy silty GRAVEL with a low cobble content. Sand is fine to coarse. Gravel and cobbles are angular to subangular of limestone and ceramics. Gravel is fine to coarse.	(0.40)	
0.50	2	ES				MADE GROUND: Dark grey mottled orange slightly sandy slightly gravelly CLAY with a low cobble content. Sand is fine to coarse. Gravel and cobbles are angular to subangular of limestone and brick. Gravel is fine to coarse.	(0.60)	
						Trial pit terminated at 1.00m depth due to presence of water supply pipe.	1.00	

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Plan (Not to Scale) 	<b>General Remarks</b> 1. Position CAT and Genny scanned prior to excavation. 2. No ground water encountered. 3. Pit walls are stable.		
	All dimensions in metres		Scale: <b>1:25</b>
Method Used: <b>Machine dug</b>	Plant Used: <b>JCB-3CX</b>	Logged By: <b>SStanley</b>	Checked By: <i>Az</i>





Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Trial Pit: <b>TP11</b>
Contract Ref: <b>729873</b>	Start: <b>18.06.15</b> End: <b>18.06.15</b>	Ground Level (m AOD): <b>---</b>	National Grid Co-ordinate: <b>---</b>	Sheet: <b>1 of 1</b>

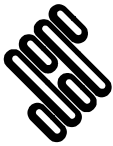
Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
						MADE GROUND: Asphalt.	0.08	
0.24	1	ES	$c_u \Rightarrow 225$			MADE GROUND: Pinkish grey sandy silty GRAVEL. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of limestone. Underlain by hessian.	0.24	
0.24	1	D					(0.36)	
0.30		V					0.60	
0.60	2	D	$c_u = 90$			Stiff brown mottled orange slightly sandy silty CLAY. Sand is fine to coarse. (TIDAL FLAT DEPOSITS)	(1.40)	
0.60		V						
1.20		V	$c_u = 70$			Firm to stiff grey mottled orange silty CLAY. (TIDAL FLAT DEPOSITS)	(0.70)	
1.40	3	D	$c_u = 70$					
1.40		V						
1.80		V	$c_u = 75$			Trial pit terminated at 2.70m depth.	2.70	
2.30		V	$c_u = 56$					
2.70	4	D	$c_u = 56$					
2.70		V						

GINT LIBRARY v8.05.GLB LibVersion: v8.05 - Core+Full Bristol SI - 0003 | Log TRIAL PIT LOG | 729873 ESTUARY PARK AVONMOUTH.GPJ - v8.05 | 07/08/15 - 10:07 | AC.  
 Structural Soils Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.structuralsoils.co.uk, Email: ask@soils.co.uk

Plan (Not to Scale) 	<b>General Remarks</b>	
	1. Position CAT and Genny scanned prior to excavation. 2. Ground water encountered at 1.20m depth. 3. Pit walls are stable.	
All dimensions in metres		Scale: <b>1:25</b>
Method Used: <b>Machine dug</b>	Plant Used: <b>JCB-3CX</b>	Logged By: <b>SStanley</b> Checked By: <i>Az</i>







Contract: <b>Estuary Park, Avonmouth</b>		Client: <b>Balfour Beatty</b>		Trial Pit: <b>TP12</b>	
Contract Ref: <b>729873</b>		Start: <b>19.06.15</b> End: <b>19.06.15</b>	Ground Level (m AOD): ---	National Grid Co-ordinate: ---	Sheet: <b>1 of 1</b>

Samples and In-situ Tests				Water	Backfill	Description of Strata	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results					
						MADE GROUND: Asphalt.	0.11	
						MADE GROUND: Pinkish grey sandy silty GRAVEL. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of limestone.	0.24	
						MADE GROUND: Orangish grey very sandy GRAVEL. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of limestone.	0.47	
0.47 0.47 0.50	1 1 1	ES D V	$c_u=120$			Very stiff dark brown slightly sandy CLAY. Sand is fine to coarse. (TIDAL FLAT DEPOSITS)	(0.93)	
1.40		V	$c_u=90$			Stiff brown and orange mottled slightly sandy silty CLAY. Sand is fine to coarse. (TIDAL FLAT DEPOSITS)	1.40 (0.70)	
1.90		V	$c_u=60$				2.10	
2.10 2.10	2	D V	$c_u=96$			Firm bluish grey mottled orange silty CLAY with occasional rootlets. (TIDAL FLAT DEPOSITS) Trial pit terminated at 2.20m depth.	2.20	

GINT LIBRARY v8.05.GLB LibVersion: v8.05 - Core+Full Bristol SI - 0003 | Log TRIAL PIT LOG | 729873 ESTUARY PARK AVONMOUTH.GPJ - v8.05 | 07/08/15 - 10:07 | AC.  
 Structural Soils Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1004, Web: www.structuralsoil.co.uk, Email: ask@soils.co.uk

Plan (Not to Scale)  	<b>General Remarks</b>	
	1. Position CAT and Genny scanned prior to excavation. 2. Groundwater seepage at 1.40m depth. 3. Pit walls are stable.	
All dimensions in metres		Scale: <b>1:25</b>
Method Used: <b>Machine dug</b>	Plant Used: <b>JCB-3CX</b>	Logged By: <b>SStanley</b> Checked By: <i>Az</i>



## APPENDIX C

- (i) Standard Penetration Test (SPT) Summary Sheet
  - (ii) SPT Hammer Calibration Records
  - (iii) SPT N value versus Depth Plot
  - (iv) SPT  $N_{(60)}$  Value versus Depth Plot
  - (v) Cross-section
- (vi) Undrained Shear Strength from In-situ Hand Vane (Peak) Testing vs Depth


# STANDARD PENETRATION TEST SUMMARY TABLE

Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N <sub>60</sub>	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
BH1	3.70	150	3.00	2.50	1,1	150	1,1,1,1		N=4	TD0765-2014	09/10/2015	62.36	4	
	7.50	150	7.50	3.50	1,1	150	1,1,1,0		N=3	TD0765-2014	09/10/2015	62.36	3	
	9.00	150	7.50	3.80	1,2	150	1,2,2,2		N=7	TD0765-2014	09/10/2015	62.36	7	
	10.50	150	10.50	3.80	2,1	150	2,3,3,2		N=10	TD0765-2014	09/10/2015	62.36	10	
	12.00	150	12.00	3.80	1,1	150	2,2,3,3		N=10	TD0765-2014	09/10/2015	62.36	10	
	13.50	150	13.50	4.00	3,3	150	7,10,11,15		N=43	TD0765-2014	09/10/2015	62.36	45	
	14.30	150	13.50	4.00	6,9	150	10,12,14,14+	290	N=52*	TD0765-2014	09/10/2015	62.36	54	
	15.00	150	13.50	4.00	7,10	150	12,14,17,7+	245	N=61*	TD0765-2014	09/10/2015	62.36	63	
BH2	1.20	150		Dry	1,0	150	1,1,2,2		N=6	TD0765-2014	09/10/2015	62.36	6	
	5.20	150	13.50	Dry	1,0	150	1,1,1,1		N=4	TD0765-2014	09/10/2015	62.36	4	
	6.20	150	4.50	4.80	1,2	150	1,3,4,4		N=12	TD0765-2014	09/10/2015	62.36	12	
	7.50	150	13.50	3.50	3,4	150	1,2,2,2		N=7	TD0765-2014	09/10/2015	62.36	7	
	9.00	150	13.50	4.00	2,1	150	2,1,2,2		N=7	TD0765-2014	09/10/2015	62.36	7	
	10.50	150	10.50	4.00	2,2	150	2,1,2,3		N=8	TD0765-2014	09/10/2015	62.36	8	
	12.00	150	12.00	3.50	2,1	150	2,2,2,2		N=8	TD0765-2014	09/10/2015	62.36	8	
	13.50	150	12.00	3.50	2,3	150	2,2,3,3		N=10	TD0765-2014	09/10/2015	62.36	10	
	15.00	150	13.50	5.50	4,5	150	12,15,15,8+	255	N=59*	TD0765-2014	09/10/2015	62.36	61	

**Notes:**

1. Tests carried out in general accordance with BS EN ISO 22476-3:2005, including amendment A1 (2011).
2. Reported blows are for 75mm penetration unless indicated "+".
3. Where full test drive was not achieved, actual penetration (R) and extrapolated N value (N\*) reported.
4. Tests carried out using a split spoon sampler unless noted as SPT(c) (denotes use of solid cone method) in the comments column.
5. Entries in the water depth column reflects the measured water depth at time of test.

$$N_{60} = (\text{Measured hammer energy ratio} / 60) \times N \text{ value}$$

 <p><b>STRUCTURAL SOILS</b> The Old School Stillhouse Lane Bedminster Bristol BS3 4EB</p>	Compiled By		Date	Contract Ref:	
	<b>SSTANLEY</b>		<b>29.7.15</b>	<b>729873</b>	
	Contract: <b>Estuary Park, Avonmouth</b>			Page: <b>1 of 4</b>	



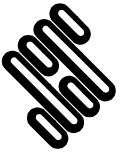
## STANDARD PENETRATION TEST SUMMARY TABLE

Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N <sub>60</sub>	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
BH2	15.50	150	13.50	5.50	2,10	150	12,14,18,6+	245	N=61*	TD0765-2014	09/10/2015	62.36	63	
BH3	1.20	150		Dry	1,1	150	1,1,2,2		N=6	EQU1070-2014	21/10/2014	67.4	7	
	2.00	150	1.70	Dry	1,1	150	1,1,1,1		N=4	EQU1070-2014	21/10/2014	67.4	4	
	3.00	150	3.00	Dry	1,1	150	1,1,1,1		N=4	EQU1070-2014	21/10/2014	67.4	4	
	4.00	150	4.00	Dry	1,1	150	1,1,1,1		N=4	EQU1070-2014	21/10/2014	67.4	4	
	5.00	150	5.00	Dry	1,1	150	1,1,1,1		N=4	EQU1070-2014	21/10/2014	67.4	4	
	6.50	150	6.50	6.30	1,1	150	1,1,1,1		N=4	EQU1070-2014	21/10/2014	67.4	4	
	8.00	150	8.00	6.30	1,1	150	2,2,2,2		N=8	EQU1070-2014	21/10/2014	67.4	9	
	9.50	150	9.50	6.40	1,2	150	2,3,4,4		N=13	EQU1070-2014	21/10/2014	67.4	15	
	11.00	150	11.00	8.10	2,2	150	4,4,5,5		N=18	EQU1070-2014	21/10/2014	67.4	20	
	12.00	150	12.50	8.00	2,3	150	3,4,4,6		N=17	EQU1070-2014	21/10/2014	67.4	19	
	14.00	150	14.00	8.00	2,2	150	3,3,4,5		N=15	EQU1070-2014	21/10/2014	67.4	17	
	15.50	150	15.50	8.00	1,2	150	2,3,4,4		N=13	EQU1070-2014	21/10/2014	67.4	15	
	17.00	150	16.50	6.40	10,12	150	15,23,27,28		N=93	EQU1070-2014	21/10/2014	67.4	104	
BH4	1.20	150		Dry	1,1	150	1,2,2,2		N=7	EQU1070-2014	21/10/2014	67.4	8	
	4.00	150	4.00	Dry	0,0	150	0,0,0,0		N=0	EQU1070-2014	21/10/2014	67.4	0	

**Notes:**

1. Tests carried out in general accordance with BS EN ISO 22476-3:2005, including amendment A1 (2011).
2. Reported blows are for 75mm penetration unless indicated "+".
3. Where full test drive was not achieved, actual penetration (R) and extrapolated N value (N\*) reported.
4. Tests carried out using a split spoon sampler unless noted as SPT(c) (denotes use of solid cone method) in the comments column.
5. Entries in the water depth column reflects the measured water depth at time of test.

$$N_{60} = (\text{Measured hammer energy ratio} / 60) \times N \text{ value}$$

 <b>STRUCTURAL SOILS</b> The Old School Stillhouse Lane Bedminster Bristol BS3 4EB	Compiled By		Date	Contract Ref:	
	<b>SSTANLEY</b>		<b>29.7.15</b>	<b>729873</b>	
Contract: <b>Estuary Park, Avonmouth</b>			Page: <b>2</b> of <b>4</b>		




# STANDARD PENETRATION TEST SUMMARY TABLE

Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N <sub>60</sub>	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
BH4	5.00	150	5.00	Dry	1,0	150	0,1,0,0		N=1	EQU1070-2014	21/10/2014	67.4	1	
	8.00	150	8.00	4.60	1,2	150	2,2,2,4		N=10	EQU1070-2014	21/10/2014	67.4	11	
	11.00	150	5.80	11.00	1,2	150	3,0,0,0		N=3	EQU1070-2014	21/10/2014	67.4	3	
	12.50	150	12.50	9.50	3,3	150	3,3,3,4		N=13	EQU1070-2014	21/10/2014	67.4	15	
	14.00	150	14.00	8.60	1,0	150	0,1,0,0		N=1	EQU1070-2014	21/10/2014	67.4	1	
	15.50	150	15.50	9.40	1,1	150	1,2,1,2		N=6	EQU1070-2014	21/10/2014	67.4	7	
	17.00	150	16.50	9.50	7,17	150	19,23,30,28		N=100	EQU1070-2014	21/10/2014	67.4	112	
BH5	6.50	150	6.00	5.60	1,1	150	2,2,3,3		N=10	EQU1070-2014	21/10/2014	67.4	11	
	8.00	150	8.00	6.80	1,0	150	2,2,2,2		N=8	EQU1070-2014	21/10/2014	67.4	9	
	9.50	150	9.50	6.50	1,2	150	2,5,3,4		N=14	EQU1070-2014	21/10/2014	67.4	16	
	11.00	150	11.00	7.30	1,1	150	3,3,4,4		N=14	EQU1070-2014	21/10/2014	67.4	16	
	12.50	150	12.50	8.00	1,1	150	2,3,4,4		N=13	EQU1070-2014	21/10/2014	67.4	15	
	14.00	150	14.00	9.00	1,2	150	2,3,4,4		N=13	EQU1070-2014	21/10/2014	67.4	15	
	15.50	150	15.00	9.00	2,1	150	2,2,2,3		N=9	EQU1070-2014	21/10/2014	67.4	10	
	17.00	150	16.50	10.50	6,9	150	10,15,15,23		N=63	EQU1070-2014	21/10/2014	67.4	71	
BH6	1.20	150		DRY	1,0	150	2,2,1,2		N=7	EQU1070-2014	21/10/2014	67.4	8	

**Notes:**

1. Tests carried out in general accordance with BS EN ISO 22476-3:2005, including amendment A1 (2011).
2. Reported blows are for 75mm penetration unless indicated "+".
3. Where full test drive was not achieved, actual penetration (R) and extrapolated N value (N\*) reported.
4. Tests carried out using a split spoon sampler unless noted as SPT(c) (denotes use of solid cone method) in the comments column.
5. Entries in the water depth column reflects the measured water depth at time of test.

$$N_{60} = (\text{Measured hammer energy ratio} / 60) \times N \text{ value}$$

 <p><b>STRUCTURAL SOILS</b> The Old School Stillhouse Lane Bedminster Bristol BS3 4EB</p>	Compiled By		Date	Contract Ref: <b>729873</b>
	<b>SSTANLEY</b>		<b>29.7.15</b>	
	Contract: <b>Estuary Park, Avonmouth</b>			Page: <b>3 of 4</b>




## STANDARD PENETRATION TEST SUMMARY TABLE

Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N <sub>60</sub>	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
BH6	4.00	150	4.00	DRY	1,0	150	0,1,0,0		N=1	EQU1070-2014	21/10/2014	67.4	1	
	6.50	150	6.20	3.10	1,0	150	1,0,3,3		N=7	EQU1070-2014	21/10/2014	67.4	8	
	8.00	150	8.00	4.10	0,0	150	1,1,2,2		N=6	EQU1070-2014	21/10/2014	67.4	7	
	9.50	150	9.50	4.50	1,1	150	1,2,2,3		N=8	EQU1070-2014	21/10/2014	67.4	9	
	11.00	150	11.00	7.10	1,1	150	2,2,3,3		N=10	EQU1070-2014	21/10/2014	67.4	11	
	12.50	150	12.50	5.90	1,1	150	1,2,2,4		N=9	EQU1070-2014	21/10/2014	67.4	10	
	14.00	150	14.00	6.30	2,2	150	2,2,2,3		N=9	EQU1070-2014	21/10/2014	67.4	10	
	15.50	150	15.00	8.30	4,4	150	7,7,10,12		N=36	EQU1070-2014	21/10/2014	67.4	40	
	17.00	150	16.50	10.50	11,11	150	15,15,17,21		N=68	EQU1070-2014	21/10/2014	67.4	76	

**Notes:**

1. Tests carried out in general accordance with BS EN ISO 22476-3:2005, including amendment A1 (2011).
2. Reported blows are for 75mm penetration unless indicated "+".
3. Where full test drive was not achieved, actual penetration (R) and extrapolated N value (N\*) reported.
4. Tests carried out using a split spoon sampler unless noted as SPT(c) (denotes use of solid cone method) in the comments column.
5. Entries in the water depth column reflects the measured water depth at time of test.

$$N_{60} = (\text{Measured hammer energy ratio} / 60) \times N \text{ value}$$

 <b>STRUCTURAL SOILS</b> The Old School Stillhouse Lane Bedminster Bristol BS3 4EB	Compiled By		Date	Contract Ref:	
	<b>SSTANLEY</b>		<b>29.7.15</b>	<b>729873</b>	
Contract: <b>Estuary Park, Avonmouth</b>			Page: <b>4 of 4</b>		





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# SPT Calibration Report

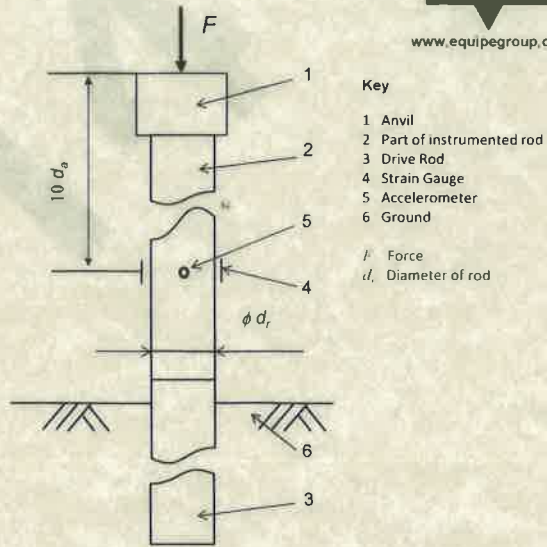
## Hammer Energy Measurement Report

Type of Hammer: SPT HAMMER  
 Client: STRUCTURAL SOILS  
 Test No: EQU1117  
 Test Depth (m): 7.00  
 Date of Test: 21 October 2014  
 Valid until: 21 October 2015  
 Hammer ID: EQU1070

Mass of the hammer  $m = 63.5\text{kg}$   
 Falling height  $h = 0.76\text{m}$   
 $E_{\text{theor}} = m \times g \times h = 473\text{J}$

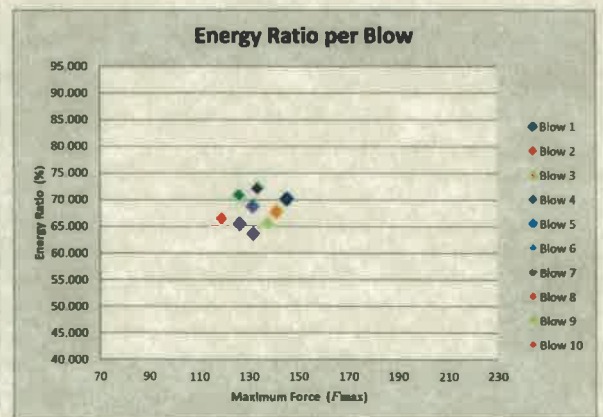
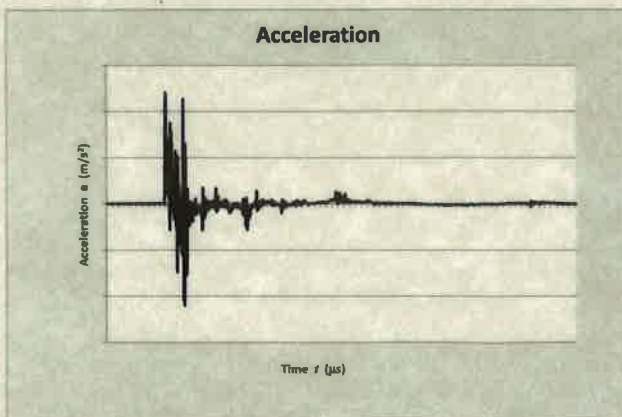
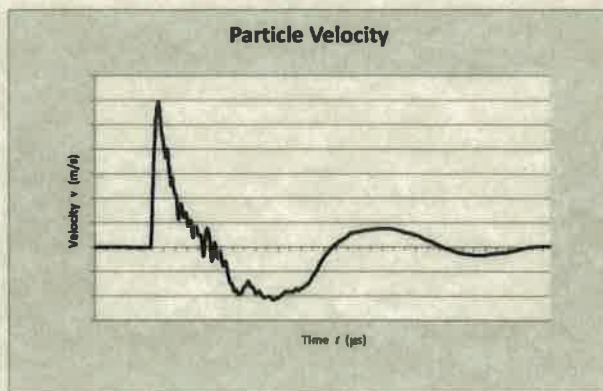
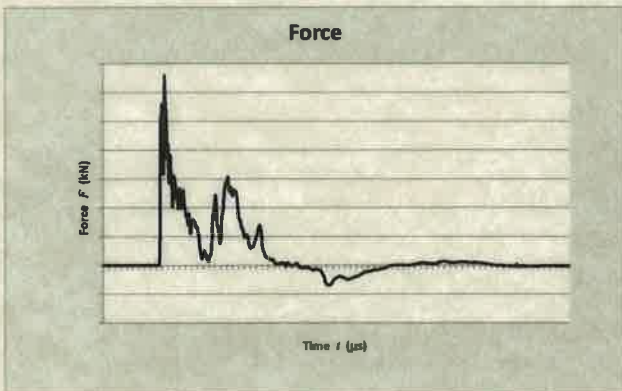
### Characteristics of the instrumented rod

Diameter  $d_r = 0.052\text{ m}$   
 Length of the instrumented rod  $0.558\text{ m}$   
 Area  $A = 11.61\text{ cm}^2$   
 Modulus  $E_a = 206843\text{ MPa}$



**Key**  
 1 Anvil  
 2 Part of instrumented rod  
 3 Drive Rod  
 4 Strain Gauge  
 5 Accelerometer  
 6 Ground  
 $F$  Force  
 $d_r$  Diameter of rod

Fig B 1 and B 2 BS EN ISO 22476-3 : 2005 + A1 : 2011



Observations:

1.

$E_{\text{meas}} = 0.319\text{ kN-m}$

$E_{\text{theor}} = 0.473\text{ kN-m}$

Energy Ratio =  $\frac{E_{\text{meas}}}{E_{\text{theor}}} = 67.40\%$

Equip SPT Analyzer Operators: MH

Prepared by: *[Signature]* Checked by: *[Signature]* Date: 21/10/2014





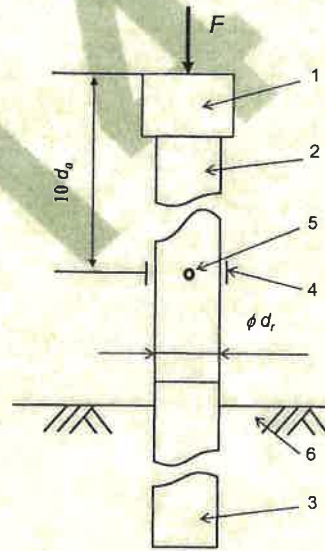
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# SPT Calibration Report

## Hammer Energy Measurement Report

Type of Hammer: TERRIER  
 Client: JOHN WHITE  
 Test No: EQU1103  
 Test Depth (m): 8.32  
 Date of Test: 09 October 2014  
 Valid until: 09 October 2015  
 Hammer ID: TD0765

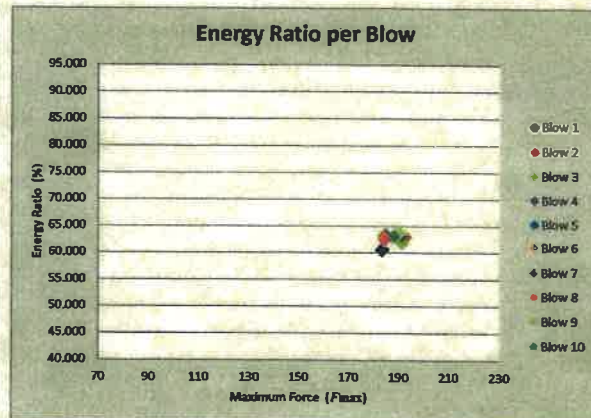
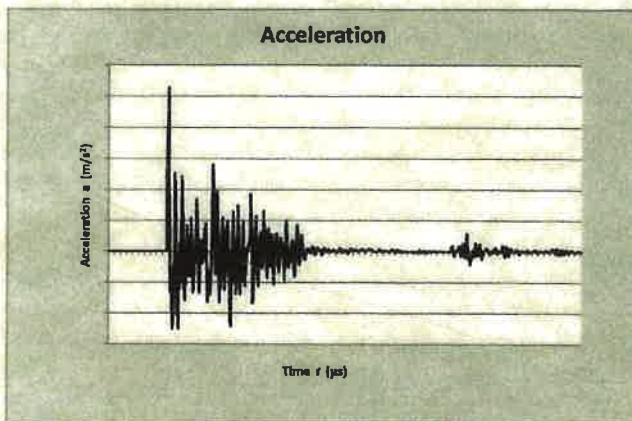
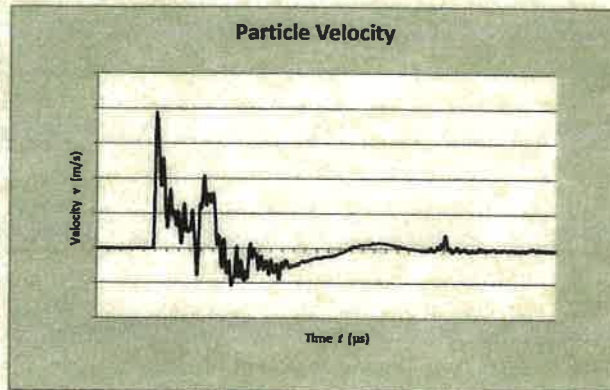
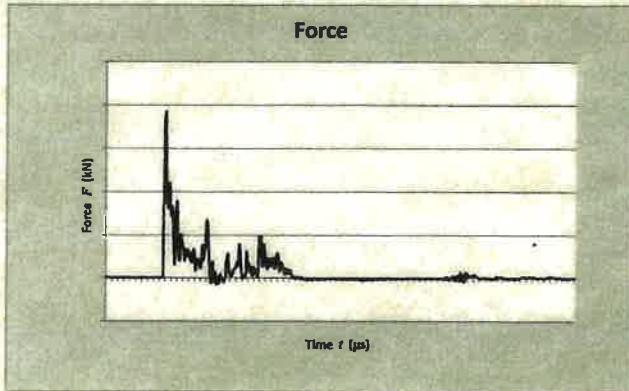
136/NR/SH  
 17 FEB 2015



Key  
 1 Anvil  
 2 Part of instrumented rod  
 3 Drive Rod  
 4 Strain Gauge  
 5 Accelerometer  
 6 Ground  
 F Force  
 d<sub>r</sub> Diameter of rod

Mass of the hammer  $m = 63.5\text{kg}$   
 Falling height  $h = 0.76\text{m}$   
 $E_{\text{theor}} = m \times g \times h = 473\text{J}$   
**Characteristics of the instrumented rod**  
 Diameter  $d_r = 0.052\text{ m}$   
 Length of the instrumented rod  $0.558\text{ m}$   
 Area  $A = 11.61\text{ cm}^2$   
 Modulus  $E_a = 206843\text{ MPa}$

Fig. B.1 and B.2 BS EN ISO 22476-3 : 2005 + A1 : 2011



Observations:  
 1.

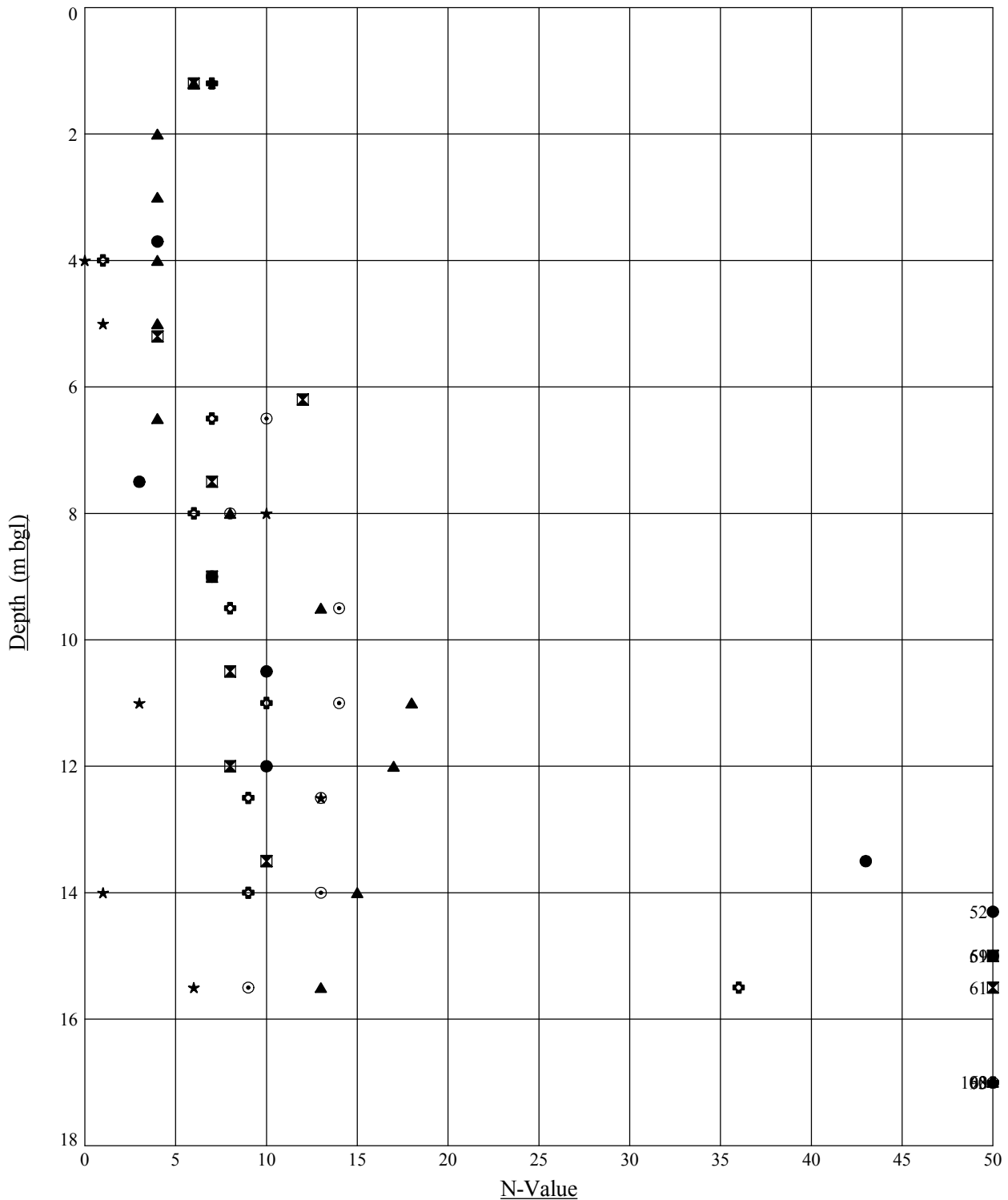
$E_{\text{meas}} = 0.295\text{ kN-m}$   
 $E_{\text{theor}} = 0.473\text{ kN-m}$

$$\text{Energy Ratio } (E_r) = \frac{E_{\text{meas}}}{E_{\text{theor}}} = 62.36\%$$

Equipe SPT Analyzer Operators: MH

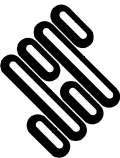

Prepared by: *Spies* Checked by: *HSpies* Date: 14/10/2014

# STANDARD PENETRATION TEST (SPT N-Value) vs DEPTH

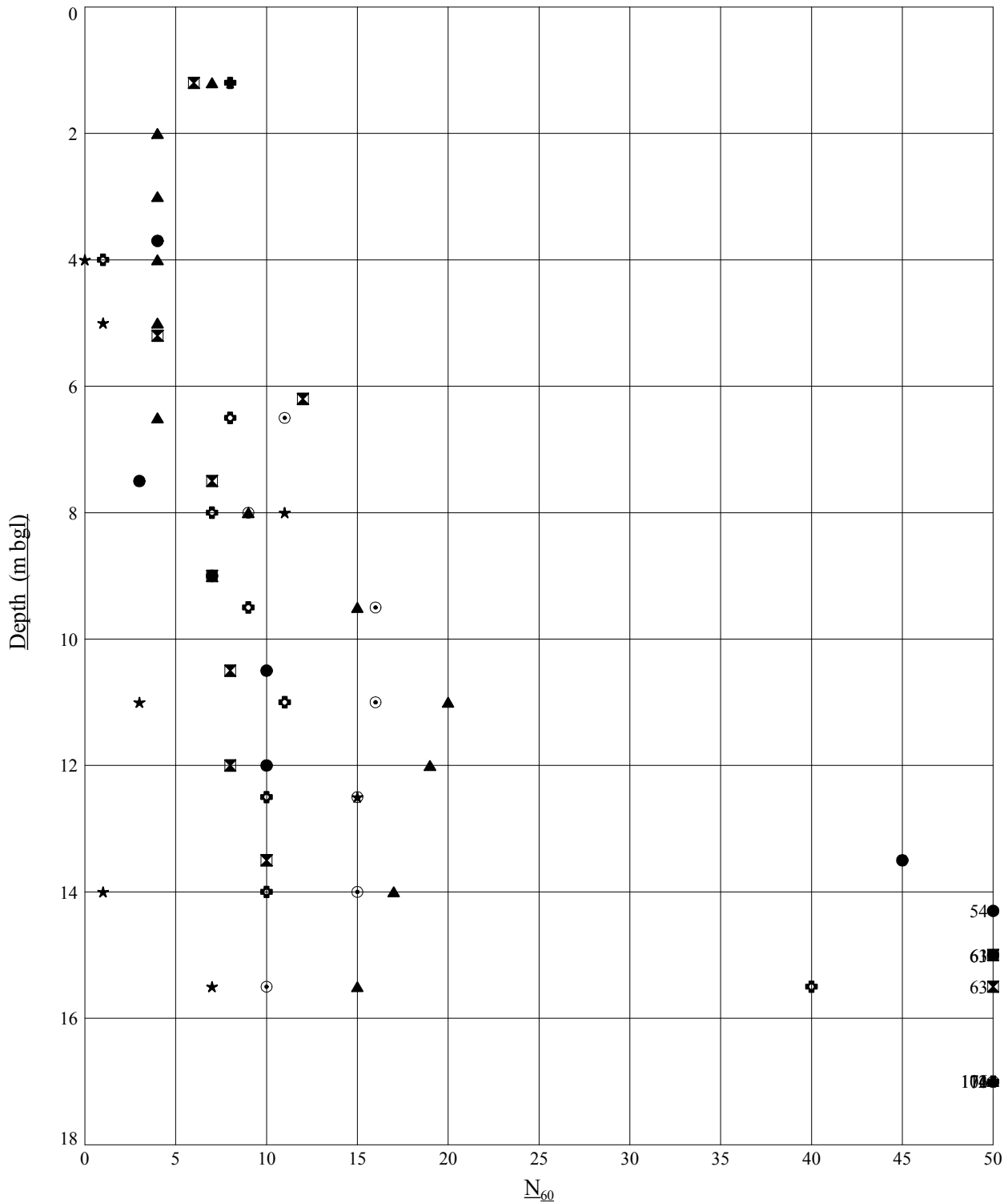


Key: ● = BH1, ⊠ = BH2, ▲ = BH3, ★ = BH4, ⊙ = BH5, ⊕ = BH6

GINT\_LIBRARY\_V8\_GLB LibVersion: v8\_05 - Lib0004 PjVersion: v8\_05 - Core+Full Bristol Sl - 0003 | Graph G - PLOTS - SITE - GENERAL | 729873\_ESTUARY\_PARK\_AVONMOUTH.GPJ - v8\_05 | 24/07/15 - 09:28 | AC.

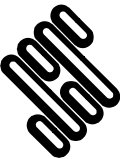

 <p><b>STRUCTURAL SOILS</b> The Old School Stillhouse Lane Bedminster Bristol BS3 4EB</p>	Contract		Date	Compiled By
	<b>Estuary Park, Avonmouth</b>		24.07.15	<i>AC</i>
	Client		Contract Ref:	
<b>Balfour Beatty</b>		729873 		

# STANDARD PENETRATION TEST (SPT $N_{60}$ ) vs DEPTH

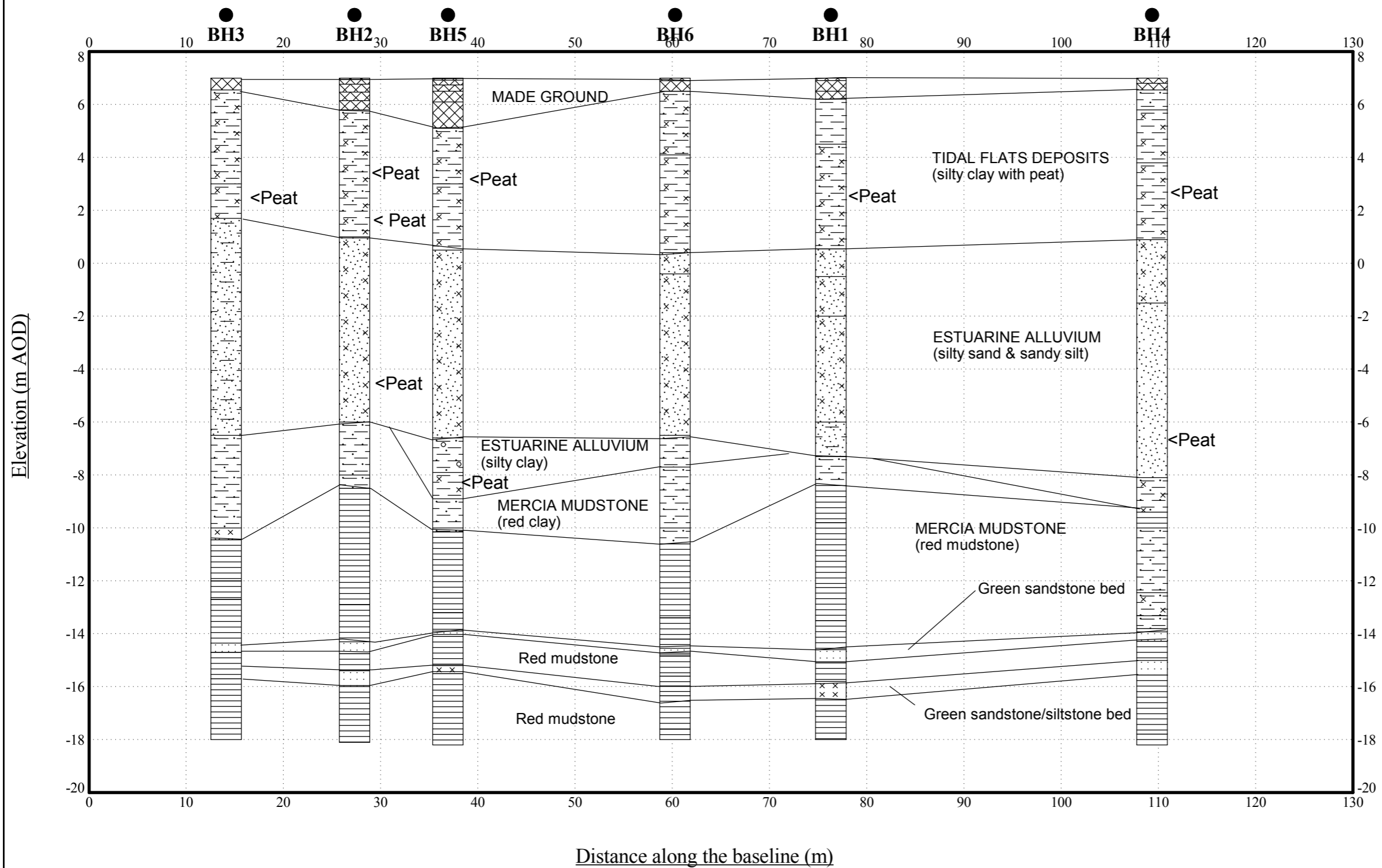


Key: ● = BH1, ⊠ = BH2, ▲ = BH3, ★ = BH4, ⊙ = BH5, ⊕ = BH6

GINT\_LIBRARY\_V8\_GLB LibVersion: v8\_05 - Lib0004 ProjVersion: v8\_05 - Core+Full Bristol S1 - 0003 | Graph G - PLOTS - SITE - GENERAL | 729873\_ESTUARY\_PARK\_AVONMOUTH.GPJ - v8\_05 | 29/7/15 - 14:17 | SS.

 <p>STRUCTURAL SOILS The Old School Stillhouse Lane Bedminster Bristol BS3 4EB</p>	Contract		Date	Compiled By
	Estuary Park, Avonmouth		29.7.15	
	Client		Contract Ref:	
	Balfour Beatty		729873	

# CROSS SECTION FROM SW TO NE (note BH1 & BH2 projected onto section)

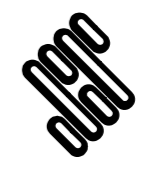


## HOLE TYPE MARKER LEGENDS:

● = ???

REV.	DATE	DESCRIPTION	BY	CHD.	APR.

Dimensions: m Scale: Scale X = 1:448 Scale Y = 1:165



**STRUCTURAL SOILS**  
The Old School  
Stillhouse Lane  
Bedminster  
Bristol BS3 4EB

CLIENT: **Balfour Beatty**

PROJECT: **Estuary Park, Avonmouth**

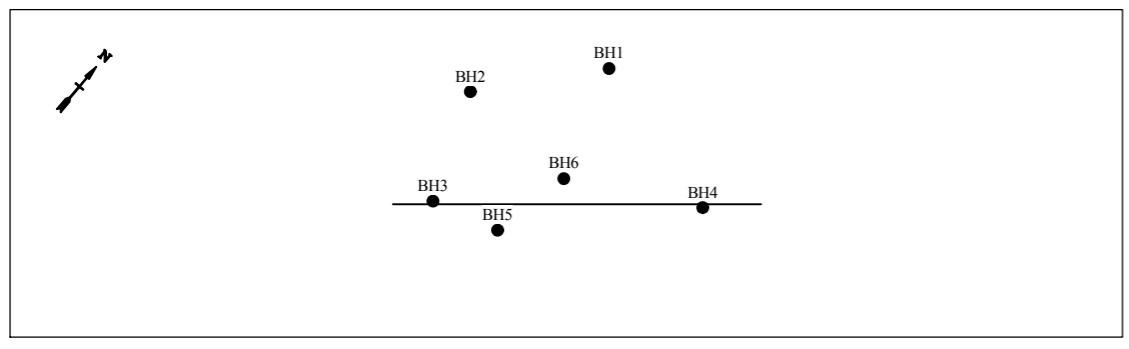
TITLE:

CONTRACT REF: **729873** DRAWING REF: **of**

DRAWING STATUS: FIGURE

DRAWING TRACK CODE: GINT\_LIBRARY\_V8\_05.GLB : STANDARD : A3 : LANDSCAPE : ELEV : 729873\_ESTUARY\_PARK\_AVONMOUTH.GPJ : 24/07/15 10:15 : AC

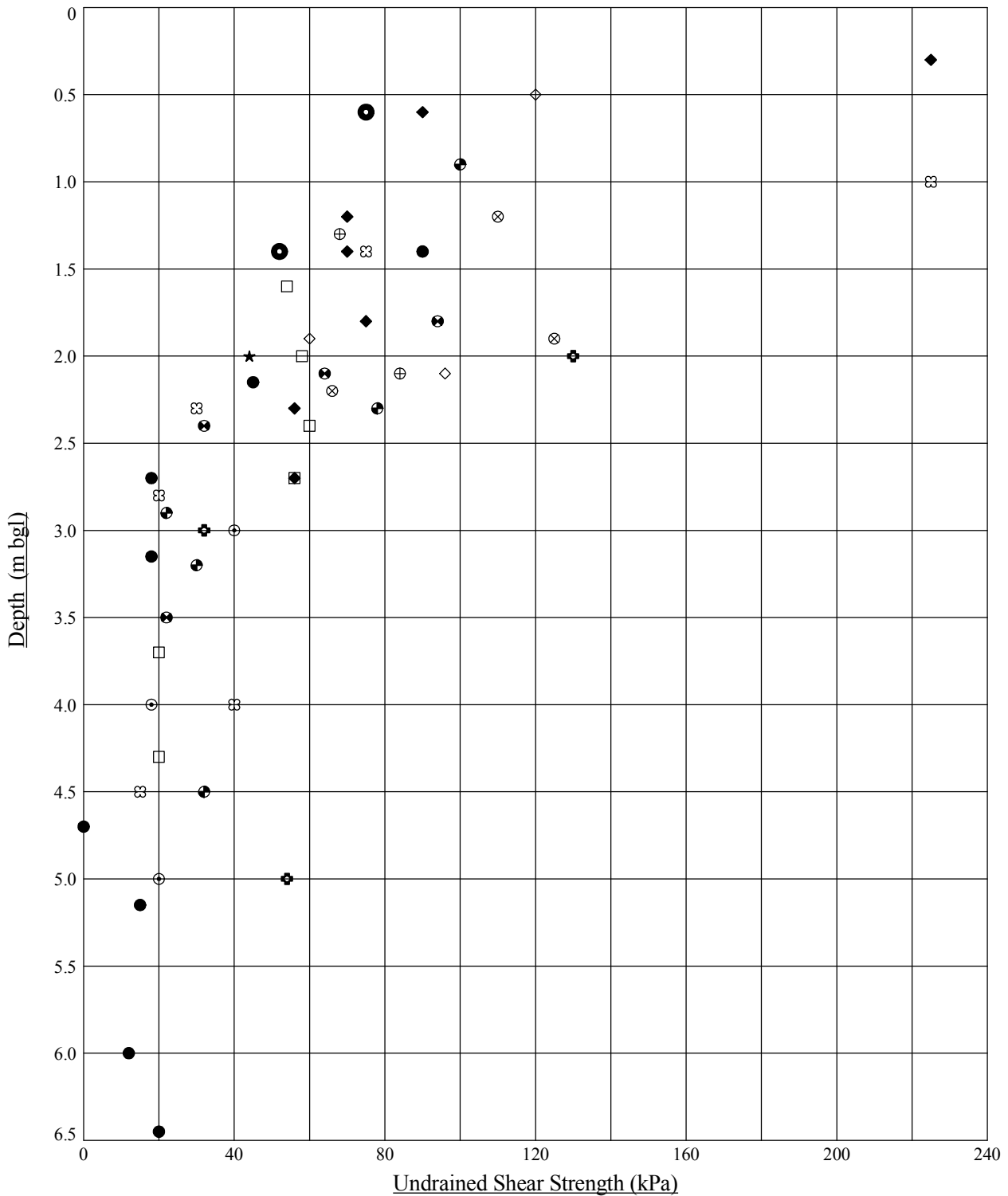
### SITEMAP AND SECTION BASELINE



### MATERIAL LEGENDS

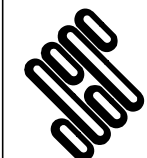
- |                     |             |             |                  |
|---------------------|-------------|-------------|------------------|
| CLAY                | Clayey SAND | MADE GROUND | Mudstone         |
| SAND                | Sandstone   | Sandy CLAY  | Sandy silty CLAY |
| Sandy gravelly CLAY | Siltstone   | Silty CLAY  | Silty SAND       |

# UNDRAINED SHEAR STRENGTH FROM IN-SITU HAND VANE (PEAK) TESTING vs DEPTH



Key: ● = BH1, ★ = BH4, ⊙ = BH5, ⊕ = BH6, ● = TP1, ◆ = TP11, ◇ = TP12, ⊗ = TP3, ⊕ = TP4, □ = TP5, ⊗ = TP6, ⊕ = TP7, ⊗ = TP9

GINT\_LIBRARY\_V8\_GLB LibVersion: v8\_05 - Lib0004 PjVersion: v8\_05 - Core+Full Bristol SI - 0003 | Graph G - PLOTS - SITE - GENERAL | 729873\_ESTUARY\_PARK\_AVONMOUTH.GPJ - v8\_05 | 24/07/15 - 09:28 | A.C.



**STRUCTURAL SOILS**  
The Old School  
Stillhouse Lane  
Bedminster  
Bristol BS3 4EB

Contract

**Estuary Park, Avonmouth**

Client

**Balfour Beatty**

Date

24.07.15

Compiled By

*AC*

Contract Ref:

729873



## **APPENDIX D**

- (i) Geotechnical Laboratory Test Verification Sheet
- (ii) Geotechnical Laboratory Test Results

# TESTING VERIFICATION CERTIFICATE



1774

The test results included in this report are certified as:-

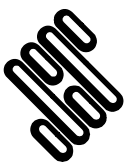
ISSUE STATUS: **FINAL**

In accordance with Structural Soils Ltd Laboratory Quality Assurance Manual, Issue 6, January 2010 all results sheets and summaries of results issued by the laboratory are checked by an approved signatory. This check will also involve checking of at least 10% of calculations for each test type to ensure that data has been correctly entered into the computer and calculated. The integrity of the test data and results are ensured by control of the computer system employed by the laboratory as part of the Software Verification Program as detailed in the Laboratory Quality Assurance Manual.

This testing verification certificate covers all testing compiled on or before the following datetime: **25/07/2015 09:52:58**.

Testing reported after this date is not covered by this Verification Certificate.

Approved Signatory  
**Justin Barrett (Laboratory Manager)**



**STRUCTURAL SOILS**  
1a Princess Street  
Bedminster  
Bristol  
BS3 4AG

Contract:

**Estuary Park, Avonmouth**

Job No:

**729873**







## SUMMARY OF POINT LOAD INDEX TEST RESULTS

(International Society for Rock Mechanics : 1985)

Exploratory Position ID	Depth (m)	Type of Test	Width or Length (W or L) (mm)	Platen Separation (D) (mm)	Failure Load (P) (kN)	Equivalent Diameter (D <sub>e</sub> ) (mm)	Point Load (I <sub>s</sub> ) (MN/m <sup>2</sup> )	Size Factor (F)	Point Load Index (I <sub>s(50)</sub> ) (MN/m <sup>2</sup> )	Moisture Content (%)	Rock Type
BH1	15.50	D	73	89	1.000	89	0.13	1.30	0.16	21	MUDSTONE
BH1	15.50	A	89	69	0.950	88	0.12	1.29	0.16	21	MUDSTONE
BH1	16.50	D	70	88	0.125	88	0.02	1.29	0.02	22	MUDSTONE
BH1	16.50	A	88	63	0.085	84	0.01	1.26	0.02	22	MUDSTONE
BH1	17.80	D	73	89	0.100	89	0.01	1.30	0.02	12	MUDSTONE
BH1	17.80	A	89	33	0.450	61	0.12	1.09	0.13	12	MUDSTONE
BH1	18.60	D	90	88	0.135	88	0.02	1.29	0.02	14	MUDSTONE
BH1	18.60	A	88	49	0.050	74	0.01	1.19	0.01	14	MUDSTONE

Key : A = Axial, D = Diametral, I = Irregular, B = Block, L = Parallel to planes of weakness, P = Perpendicular to planes of weakness. [NS] denotes Non Standard Test.

Approved Signatories: J.BARRETT A.FROST M.STOKES S.HANDCOCK S.PHILP J.SHALLCROSS M.STROWGER J.MAJOR

 <p><b>STRUCTURAL SOILS</b> 1a Princess Street Bedminster Bristol BS3 4AG</p>	Compiled By		Date	Contract Ref:  <b>729873</b> 	
	<i>A.S. Frost</i>		<b>ALAN FROST</b>		<b>23.07.15</b>
	Contract:		<b>Estuary Park, Avonmouth</b>		



## SUMMARY OF POINT LOAD INDEX TEST RESULTS

(International Society for Rock Mechanics : 1985)

Exploratory Position ID	Depth (m)	Type of Test	Width or Length (W or L) (mm)	Platen Separation (D) (mm)	Failure Load (P) (kN)	Equivalent Diameter (D <sub>e</sub> ) (mm)	Point Load (I <sub>s</sub> ) (MN/m <sup>2</sup> )	Size Factor (F)	Point Load Index (I <sub>s(50)</sub> ) (MN/m <sup>2</sup> )	Moisture Content (%)	Rock Type
BH1	19.80	D	64	89	0.185	89	0.02	1.30	0.03	8.3	MUDSTONE
BH1	19.80	A	89	51	0.120	76	0.02	1.21	0.03	8.3	MUDSTONE
BH1	20.80	D	46	89	0.125	89	0.02	1.30	0.02	12	MUDSTONE
BH1	20.80	A	89	70	0.070	89	0.01	1.30	0.01	12	MUDSTONE
BH1	22.00	D	57	90	3.365	90	0.42	1.30	0.54	2.3	SANDSTONE
BH1	22.00	A	90	65	6.015	86	0.81	1.28	1.03	2.3	SANDSTONE
BH1	22.60	D	47	89	0.900	89	0.11	1.30	0.15	10	MUDSTONE
BH1	22.60	A	89	54	0.155	78	0.03	1.22	0.03	10	MUDSTONE

Key : A = Axial, D = Diametral, I = Irregular, B = Block, L = Parallel to planes of weakness, P = Perpendicular to planes of weakness. [NS] denotes Non Standard Test.

Approved Signatories: J.BARRETT A.FROST M.STOKES S.HANDCOCK S.PHILP J.SHALLCROSS M.STROWGER J.MAJOR

 <p><b>STRUCTURAL SOILS</b> 1a Princess Street Bedminster Bristol BS3 4AG</p>	Compiled By		Date	Contract Ref:  <b>729873</b> 	
	<i>A.S. Frost</i>		<b>ALAN FROST</b>		<b>23.07.15</b>
	Contract:		<b>Estuary Park, Avonmouth</b>		

## SUMMARY OF POINT LOAD INDEX TEST RESULTS

(International Society for Rock Mechanics : 1985)

Exploratory Position ID	Depth (m)	Type of Test	Width or Length (W or L) (mm)	Platen Separation (D) (mm)	Failure Load (P) (kN)	Equivalent Diameter (D <sub>e</sub> ) (mm)	Point Load (I <sub>s</sub> ) (MN/m <sup>2</sup> )	Size Factor (F)	Point Load Index (I <sub>st(50)</sub> ) (MN/m <sup>2</sup> )	Moisture Content (%)	Rock Type
BH1	23.50	D	52	89	4.690	89	0.59	1.30	0.77	6.9	MUDSTONE
BH1	23.50	A	89	57	4.770	80	0.74	1.24	0.91	6.9	MUDSTONE
BH1	24.50	A	88	57	3.940	80	0.62	1.23	0.76	7.2	MUDSTONE
BH1	24.50	I	65	78	3.385	80	0.52	1.24	0.65	7.2	MUDSTONE

Key : A = Axial, D = Diametral, I = Irregular, B = Block, L = Parallel to planes of weakness, P = Perpendicular to planes of weakness. [NS] denotes Non Standard Test.

Approved Signatories: J.BARRETT A.FROST M.STOKES S.HANDCOCK S.PHILP J.SHALLCROSS M.STROWGER J.MAJOR




<b>STRUCTURAL SOILS</b> 1a Princess Street Bedminster Bristol BS3 4AG	Compiled By		Date	Contract Ref:  <h2 style="margin: 0;">729873</h2>
	<b>ALAN FROST</b>		<b>23.07.15</b>	
	Contract: <b>Estuary Park, Avonmouth</b>			

# SUMMARY OF CHEMICAL ANALYSES

Exploratory Position ID	Sample Ref	Sample Type	Depth (m)	Aqueous Extract Sulphate (mg/l SO <sub>4</sub> )	pH	Description
BH5	8	B	2.40	64	8.99	Brownish grey slightly sandy silty CLAY
BH5	14	B	4.40	886	7.94	Grey silty CLAY with occasional organic matter

NOTES:- All chemical tests were undertaken by Envirolab.

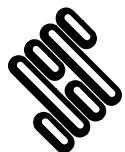
Approved Signatories: J.BARRETT A.FROST M.STOKES S.HANDCOCK S.PHILP J.SHALLCROSS M.STROWGER J.MAJOR

 <p><b>STRUCTURAL SOILS</b> 1a Princess Street Bedminster Bristol BS3 4AG</p>	Compiled By		Date	Contract Ref:  <h2 style="margin: 0;">729873</h2> 
	 <b>ALAN FROST</b>		<b>23.07.15</b>	
	Contract: <h3 style="margin: 0;">Estuary Park, Avonmouth</h3>			

# SUMMARY OF SOIL CLASSIFICATION TESTS

In accordance with clauses 3.2,4.3,4.4,5.3,5.4,7.2,8.2,8.3 of BS1377:Part 2:1990

Exploratory Position ID	Sample Ref	Sample Type	Depth (m)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index %	% <425um	Description of Sample
BH4	4	B	1.40	30	64	23	41	100	Brown mottled grey slightly sandy CLAY
BH4	5	U	2.00	27	38	20	18	100	Grey mottled brown silty CLAY
BH4	9	B	3.40	41	61	25	36	100	Brown mottled grey CLAY
BH4	11	B	4.40	67	67	31	36	100	Grey silty CLAY with occasional peat
BH4	13	B	5.90	41	40	20	20	100	Grey slightly sandy silty CLAY



**STRUCTURAL  
SOILS LTD**

Contract:

**Estuary Park, Avonmouth**

Contract Ref:

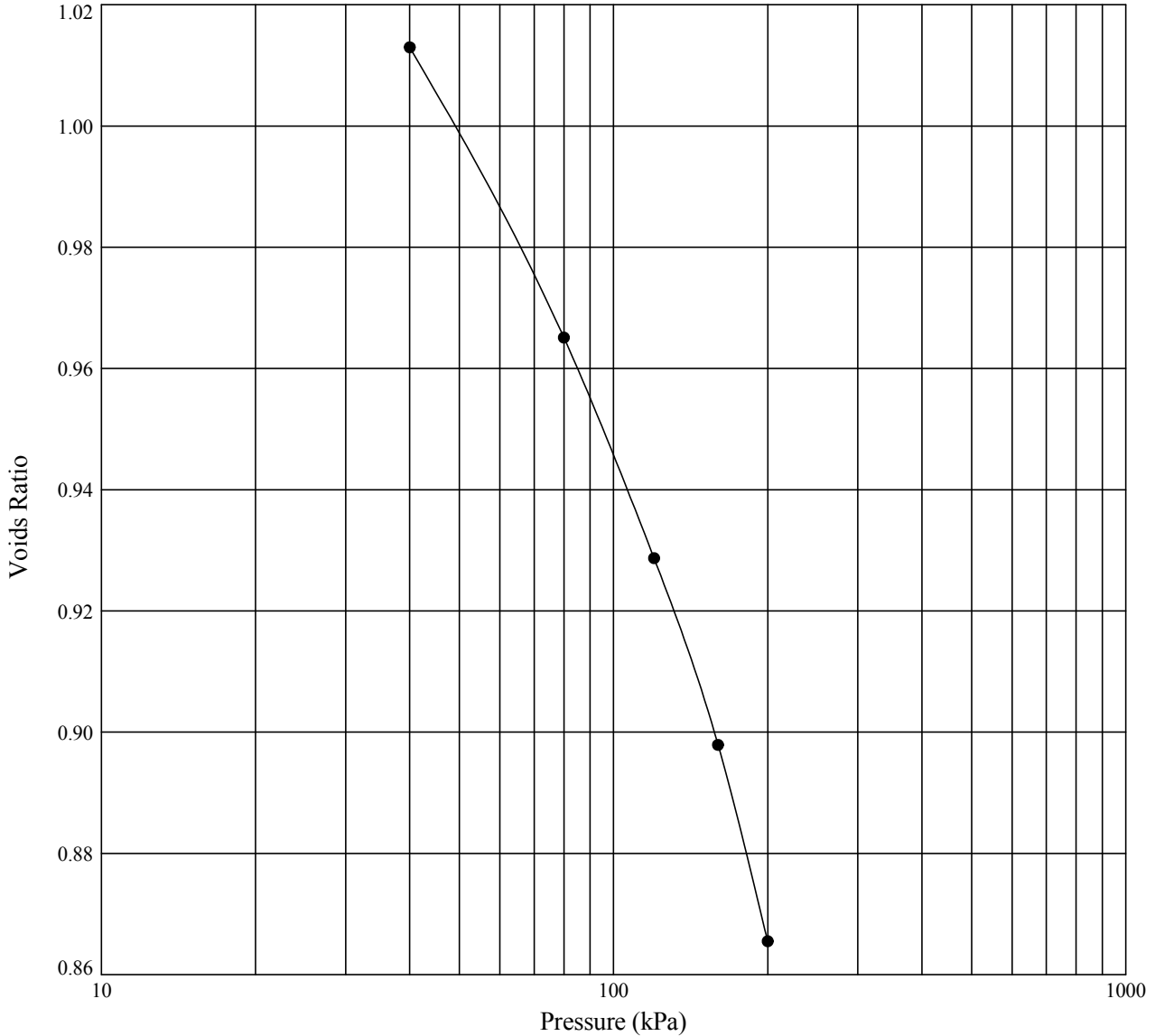
**729873**



# ONE DIMENSIONAL CONSOLIDATION TEST

In accordance with BS1377:Part 5:1990

Borehole: **BH2**    Sample Ref: **8**    Sample Type: **U**    Depth (m): **2.32**



Initial Specimen Condition		Final Specimen Condition		Test Results		
Moisture Content (%)	44	Moisture Content (%)	37	Pressure Range (kPa)	Mv (m <sup>2</sup> /MN)	Cv (m <sup>2</sup> /yr)
Bulk Density (Mg/m <sup>3</sup> )	1.71	Bulk Density (Mg/m <sup>3</sup> )	1.91	0 - 40	2.0	1.1
Dry Density (Mg/m <sup>3</sup> )	1.19	Dry Density (Mg/m <sup>3</sup> )	1.40	40 - 80	0.60	1.0
Void Ratio	1.184	Void Ratio	0.8655	80 - 120	0.46	0.79
<b>Specimen Details</b>				120 - 160	0.40	0.67
Description		Height (mm)	19.39	160 - 200	0.43	0.40
<b>Brownish grey slightly gravelly slightly sandy silty CLAY</b>		Diameter (mm)	74.93			
		Particle Density (Mg/m <sup>3</sup> ) (assumed)	2.60			
		Swelling Pressure (kPa)	NA			

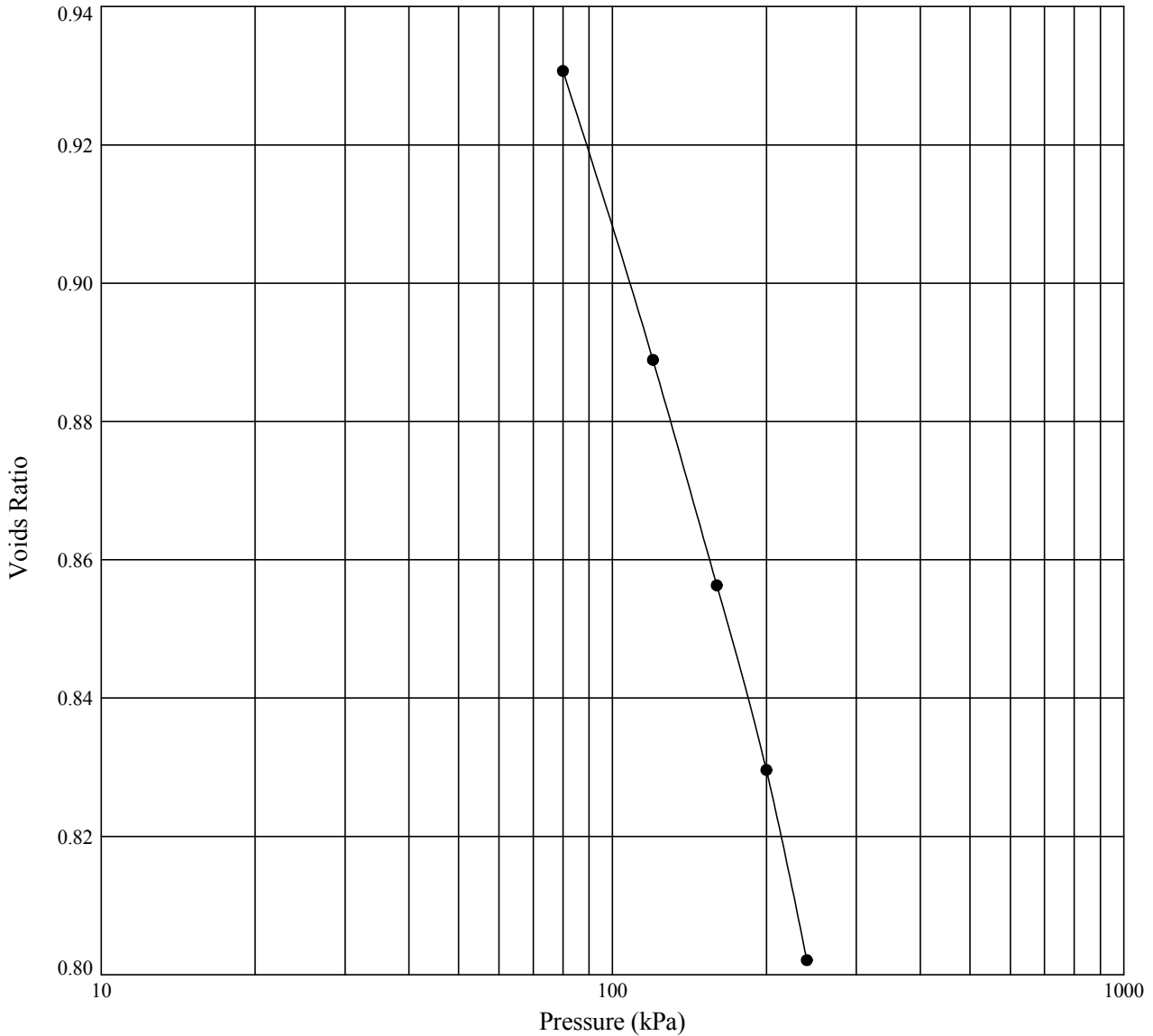
Approved Signatories: J.BARRETT A.FROST M.STOKES S.HANDCOCK S.PHILP J.SHALLCROSS M.STROWGER J.MAJOR

<b>STRUCTURAL SOILS</b> 1a Princess Street Bedminster Bristol BS3 4AG	Compiled By		Date
			23/07/15
	<b>ALAN FROST</b>		
Contract		Contract Ref:	
<b>Estuary Park, Avonmouth</b>		<b>729873</b>	

# ONE DIMENSIONAL CONSOLIDATION TEST

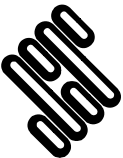

In accordance with BS1377:Part 5:1990

Borehole: **BH2** Sample Ref: **14** Sample Type: **U** Depth (m): **4.27**



Initial Specimen Condition		Final Specimen Condition		Test Results		
Moisture Content (%)	: 45	Moisture Content (%)	: 35	Pressure Range (kPa)	Mv (m <sup>2</sup> /MN)	Cv (m <sup>2</sup> /yr)
Bulk Density (Mg/m <sup>3</sup> )	: 1.78	Bulk Density (Mg/m <sup>3</sup> )	: 1.94	0 - 80	1.1	2.3
Dry Density (Mg/m <sup>3</sup> )	: 1.23	Dry Density (Mg/m <sup>3</sup> )	: 1.44	80 - 120	0.54	1.2
Void Ratio	: 1.112	Void Ratio	: 0.8021	120 - 160	0.43	1.2
<b>Specimen Details</b>						
Description <b>Grey slightly sandy silty CLAY</b>		Height (mm)	: 19.05	160 - 200	0.36	1.3
		Diameter (mm)	: 74.90	200 - 240	0.38	0.49
		Particle Density (Mg/m <sup>3</sup> ) (assumed)	: 2.60			
		Swelling Pressure (kPa)	: NA			

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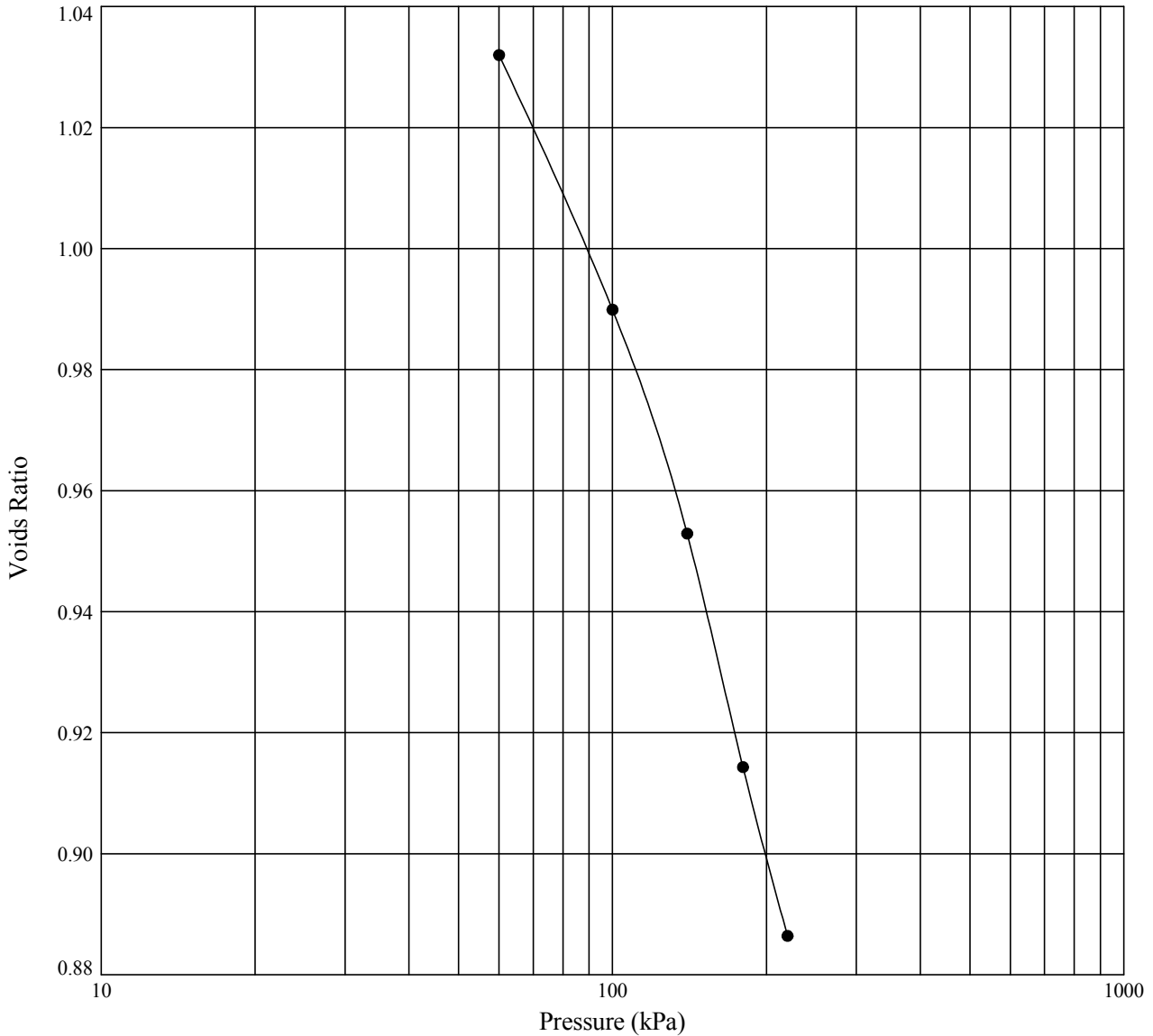
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	<i>A.S. Frost</i>		23/07/15
	<b>ALAN FROST</b>		
Contract		Contract Ref:	
<b>Estuary Park, Avonmouth</b>		<b>729873</b>	
			



# ONE DIMENSIONAL CONSOLIDATION TEST

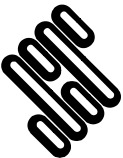
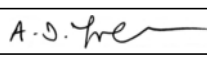
In accordance with BS1377:Part 5:1990

Borehole: **BH5**    Sample Ref: **9**    Sample Type: **U**    Depth (m): **3.34**



Initial Specimen Condition		Final Specimen Condition		Test Results		
Moisture Content (%)	: 43	Moisture Content (%)	: 37	Pressure Range (kPa)	Mv (m <sup>2</sup> /MN)	Cv (m <sup>2</sup> /yr)
Bulk Density (Mg/m <sup>3</sup> )	: 1.76	Bulk Density (Mg/m <sup>3</sup> )	: 1.89	0 - 60	0.64	4.5
Dry Density (Mg/m <sup>3</sup> )	: 1.23	Dry Density (Mg/m <sup>3</sup> )	: 1.38	60 - 100	0.51	1.8
Void Ratio	: 1.113	Void Ratio	: 0.8864	100 - 140	0.46	1.4
<b>Specimen Details</b>				140 - 180	0.49	1.1
Description		Height (mm)	: 18.96	180 - 220	0.36	0.095
<b>Brownish grey slightly sandy silty CLAY</b>		Diameter (mm)	: 74.90			
		Particle Density (Mg/m <sup>3</sup> ) (assumed)	: 2.60			
		Swelling Pressure (kPa)	: NA			

Approved Signatories: J.BARRETT A.FROST M.STOKES S.HANDCOCK S.PHILP J.SHALLCROSS M.STROWGER J.MAJOR

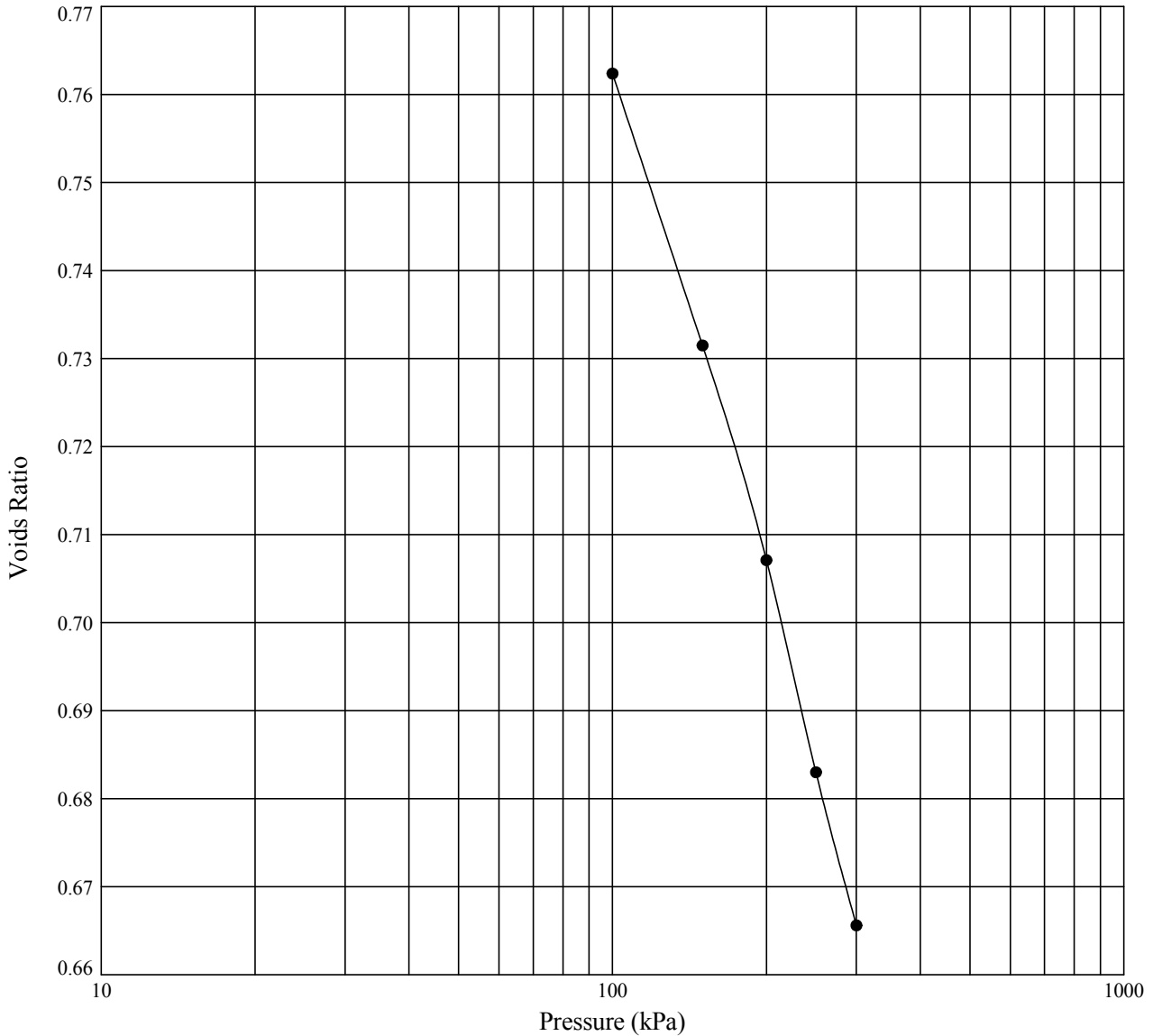
 <b>STRUCTURAL SOILS</b> 1a Princess Street Bedminster Bristol BS3 4AG	Compiled By		Date
	 <b>ALAN FROST</b>		23/07/15
	Contract <b>Estuary Park, Avonmouth</b>		Contract Ref: <b>729873</b>



# ONE DIMENSIONAL CONSOLIDATION TEST



In accordance with BS1377:Part 5:1990

Borehole: **BH5** Sample Ref: **15** Sample Type: **U** Depth (m): **5.10**



Initial Specimen Condition		Final Specimen Condition		Test Results		
Moisture Content (%)	: 35	Moisture Content (%)	: 28	Pressure Range (kPa)	Mv (m <sup>2</sup> /MN)	Cv (m <sup>2</sup> /yr)
Bulk Density (Mg/m <sup>3</sup> )	: 1.88	Bulk Density (Mg/m <sup>3</sup> )	: 2.04	0 - 100	0.78	5.9
Dry Density (Mg/m <sup>3</sup> )	: 1.39	Dry Density (Mg/m <sup>3</sup> )	: 1.59	100 - 150	0.35	3.6
Void Ratio	: 0.9106	Void Ratio	: 0.6656	150 - 200	0.28	3.2
<b>Specimen Details</b>				200 - 250	0.28	1.6
Description		Height (mm)	: 19.05	250 - 300	0.21	0.090
<b>Bluish grey silty CLAY</b>		Diameter (mm)	: 75.84			
		Particle Density (Mg/m <sup>3</sup> )	: 2.65			
		(assumed)				
		Swelling Pressure (kPa)	: NA			

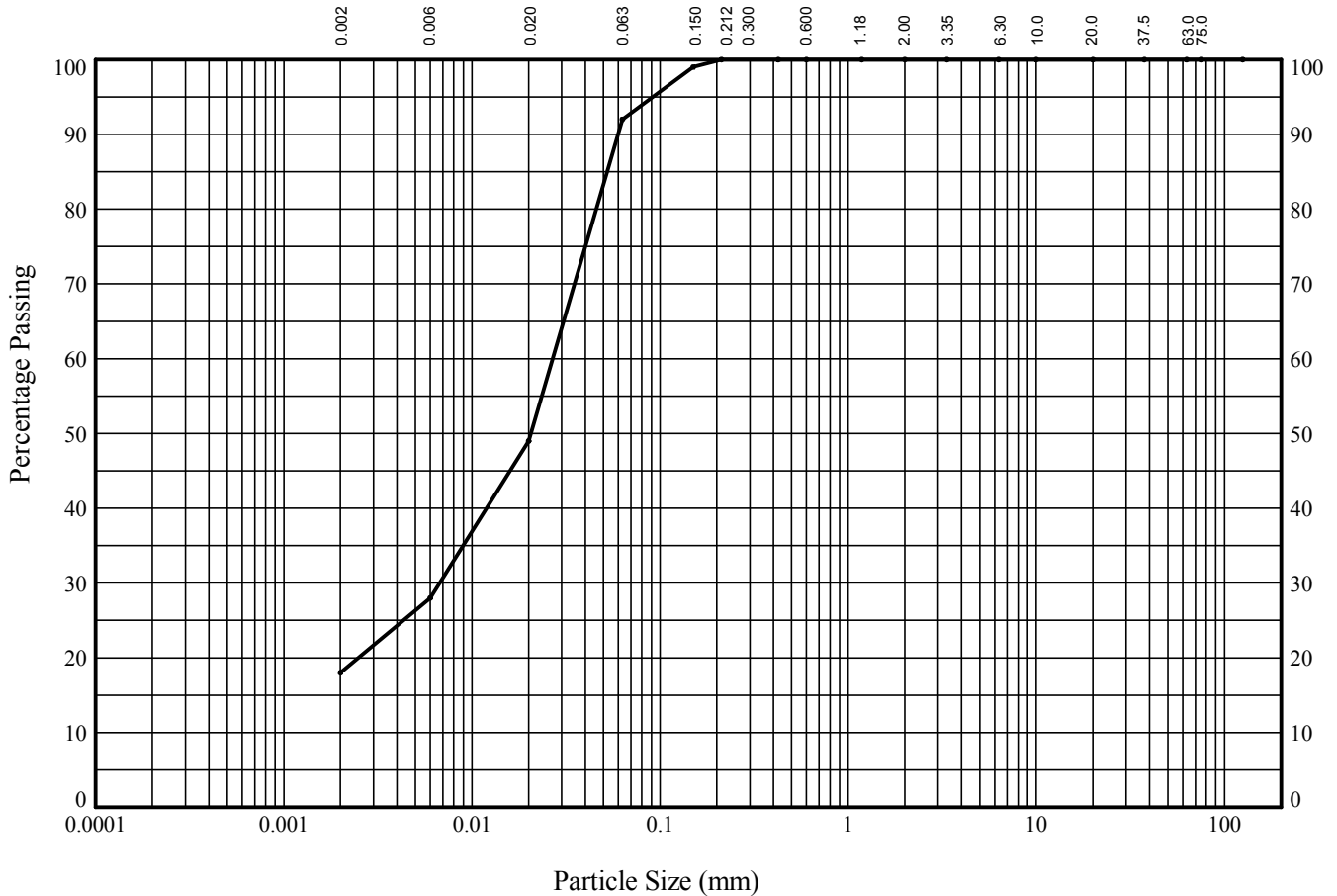
Approved Signatories: J.BARRETT A.FROST M.STOKES S.HANDCOCK S.PHILP J.SHALLCROSS M.STROWGER J.MAJOR

 <b>STRUCTURAL SOILS</b> 1a Princess Street Bedminster Bristol BS3 4AG	Compiled By		Date
	<i>A.S. Frost</i>		23/07/15
	<b>ALAN FROST</b>		
Contract		Contract Ref:	
<b>Estuary Park, Avonmouth</b>		<b>729873</b>	
			

# PARTICLE SIZE DISTRIBUTION TEST

In accordance with clauses 9.2,9.5 of BS1377:Part 2:1990

Borehole: **BH4**    Sample Ref: **13**    Sample Type: **B**    Depth (m): **5.90**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	SILT			SAND			GRAVEL			

BS Test Sieve (mm)	Percentage Passing
125.0	100
75.0	100
63.0	100
37.5	100
20.0	100
10.0	100
6.30	100
3.35	100
2.00	100
1.18	100
0.600	100
0.425	100
0.212	100
0.150	99
0.063	92

Particle Diameter	Percentage Passing
0.02	<b>49</b>
0.006	<b>28</b>
0.002	<b>18</b>

Soil Fraction	Sieve Percentage
GRAVEL	<b>0</b>
SAND	<b>8</b>
SILT	<b>74</b>
CLAY	<b>18</b>

Soil Description:  
**Grey slightly sandy silty CLAY**

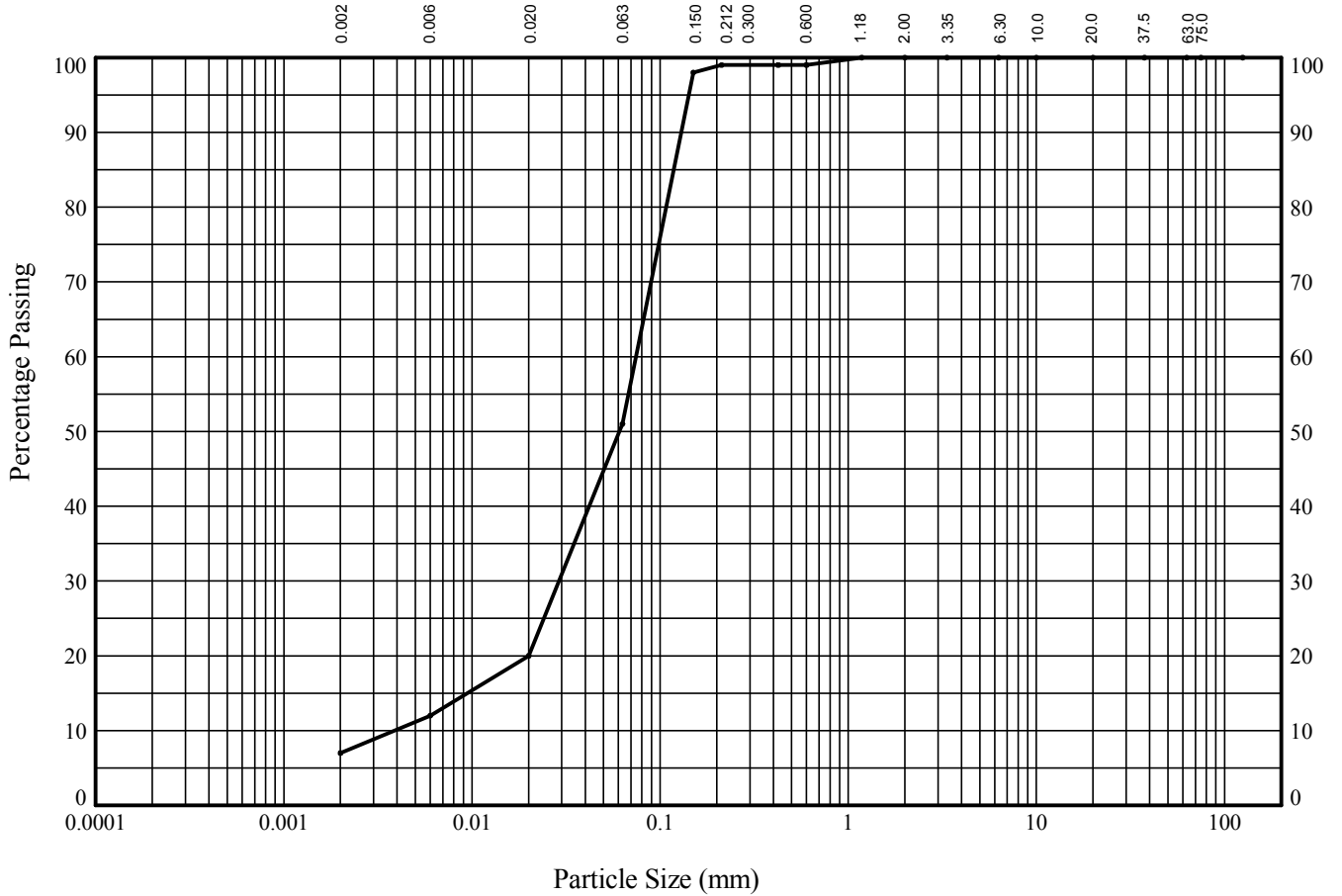
Approved Signatories: J.BARRETT A.FROST M.STOKES S.HANDCOCK S.PHILP J.SHALLCROSS M.STROWGER J.MAJOR

	<b>STRUCTURAL SOILS</b> 1a Princess Street Bedminster Bristol BS3 4AG	Compiled By 	Date <b>23/07/15</b>	
			<b>ALAN FROST</b>	
			Contract Ref: <b>729873</b>	
		Contract <b>Estuary Park, Avonmouth</b>		

# PARTICLE SIZE DISTRIBUTION TEST

In accordance with clauses 9.2,9.5 of BS1377:Part 2:1990

Borehole: **BH4**    Sample Ref: **14**    Sample Type: **U**    Depth (m): **6.50**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	SILT			SAND			GRAVEL			

BS Test Sieve (mm)	Percentage Passing
125.0	100
75.0	100
63.0	100
37.5	100
20.0	100
10.0	100
6.30	100
3.35	100
2.00	100
1.18	100
0.600	99
0.425	99
0.212	99
0.150	98
0.063	51

Particle Diameter	Percentage Passing
0.02	<b>20</b>
0.006	<b>12</b>
0.002	<b>7</b>

Soil Fraction	Sieve Percentage
GRAVEL	<b>0</b>
SAND	<b>49</b>
SILT	<b>44</b>
CLAY	<b>7</b>

Soil Description:  
**Grey sandy SILT**

Approved Signatories: J.BARRETT A.FROST M.STOKES S.SHANDCOCK S.PHILP J.SHALLCROSS M.STROWGER J.MAJOR

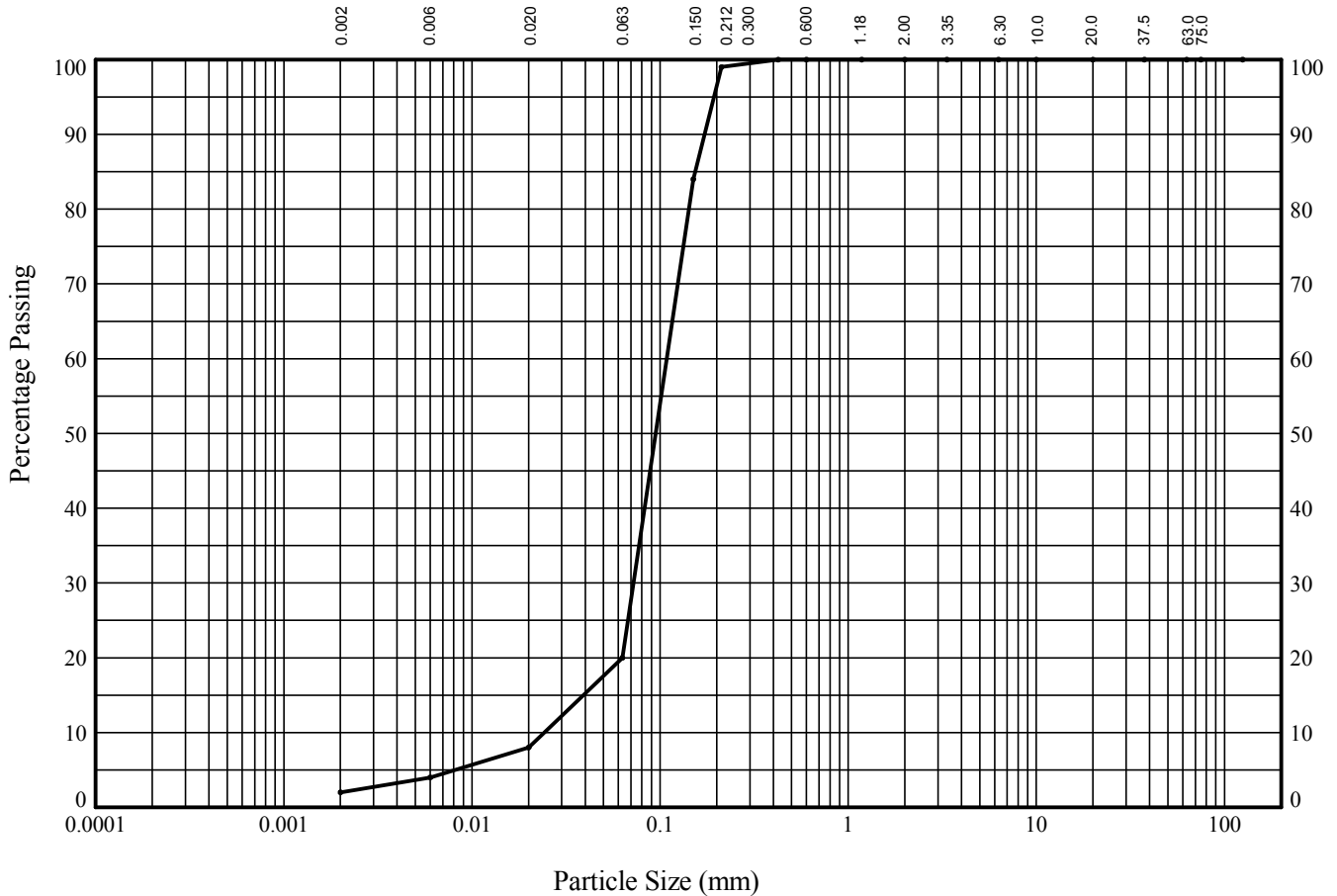
	<b>STRUCTURAL SOILS</b> 1a Princess Street Bedminster Bristol BS3 4AG	Compiled By  <b>ALAN FROST</b>	Date <b>23/07/15</b>	
	Contract <b>Estuary Park, Avonmouth</b>		Contract Ref: <b>729873</b>	

GINT\_LIBRARY V8\_05 GLB LibVersion: v8\_05 - Lib0004 PjVersion: v8\_05 - Core+Full Bristol SI - 0003 | Graph L - PSD - EC71 729873 ESTUARY\_PARK\_AVONMOUTH.GPJ - v8\_05 | 23/07/15 - 14:47 | AF.  
 Structural Soils Ltd, Branch Office - Bristol Lab: 1a Princess Street, Bedminster, Bristol, BS3 4AG, Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.soils.co.uk, Email: ask@soils.co.uk

# PARTICLE SIZE DISTRIBUTION TEST

In accordance with clauses 9.2,9.5 of BS1377:Part 2:1990

Borehole: **BH4**    Sample Ref: **16**    Sample Type: **B**    Depth (m): **7.40**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	SILT			SAND			GRAVEL			

BS Test Sieve (mm)	Percentage Passing
125.0	100
75.0	100
63.0	100
37.5	100
20.0	100
10.0	100
6.30	100
3.35	100
2.00	100
1.18	100
0.600	100
0.425	100
0.212	99
0.150	84
0.063	20

Particle Diameter	Percentage Passing
0.02	8
0.006	4
0.002	2

Soil Fraction	Sieve Percentage
GRAVEL	0
SAND	80
SILT	18
CLAY	2

Soil Description:  
**Grey silty SAND**

Approved Signatories: J.BARRETT A.FROST M.STOKES S.HANDCOCK S.PHILP J.SHALLCROSS M.STROWGER J.MAJOR

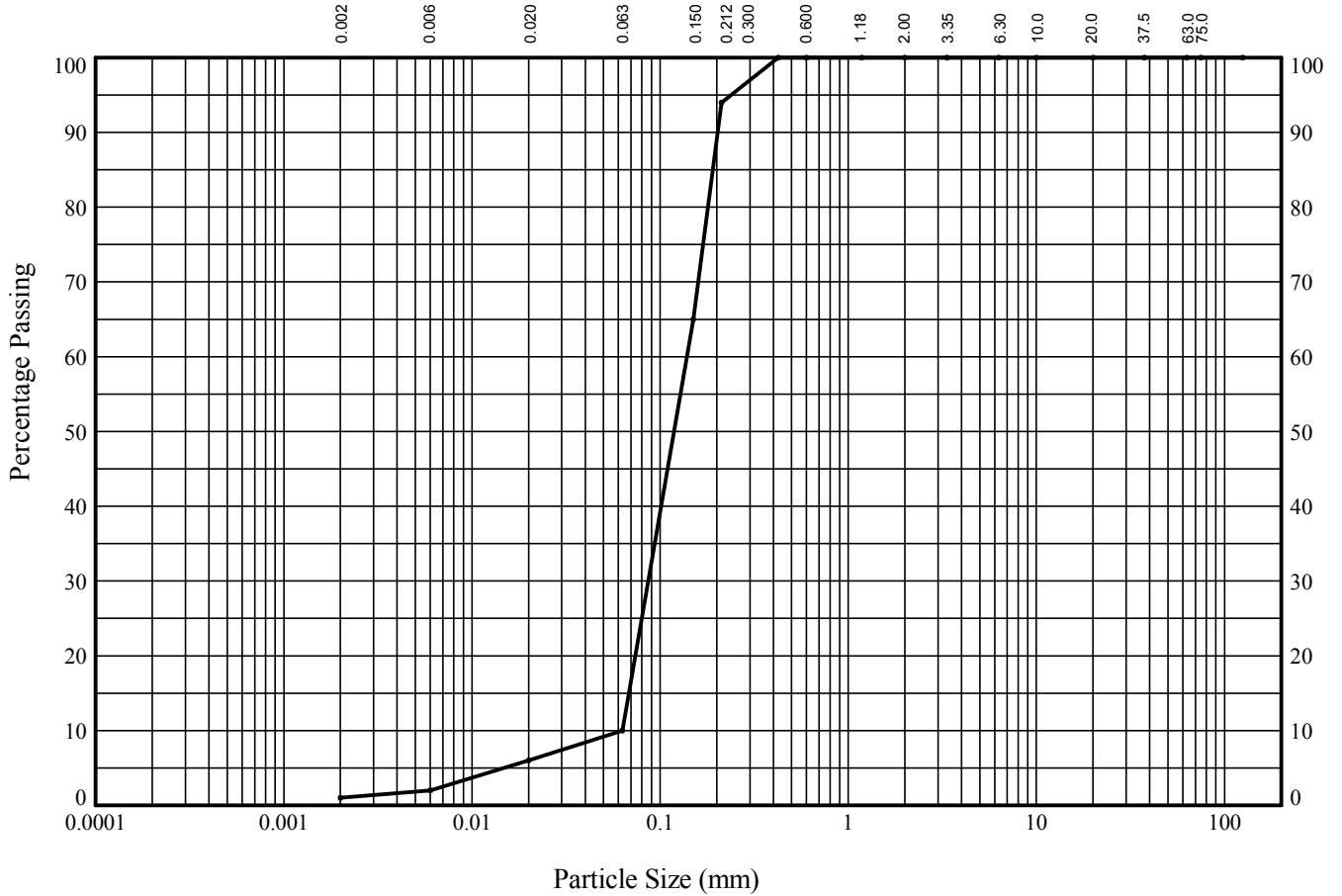
	<b>STRUCTURAL SOILS</b> 1a Princess Street Bedminster Bristol BS3 4AG	Compiled By 	Date	
		Contract	Contract Ref:	23/07/15
	<b>Estuary Park, Avonmouth</b>	<b>729873</b>		

GINT\_LIBRARY\_V8\_05\_GLB\_LibVersion: v8\_05 - Lib0004 PjVersion: v8\_05 - Core+Full Bristol SI - 0003 | Graph L - PSD - EC71 729873 ESTUARY\_PARK\_AVONMOUTH.GPJ - v8\_05 | 23/07/15 - 14:47 | AF.  
 Structural Soils Ltd, Branch Office - Bristol Lab: 1a Princess Street, Bedminster, Bristol, BS3 4AG, Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.soils.co.uk, Email: ask@soils.co.uk

# PARTICLE SIZE DISTRIBUTION TEST

In accordance with clauses 9.2,9.5 of BS1377:Part 2:1990

Borehole: **BH4**    Sample Ref: **18**    Sample Type: **B**    Depth (m): **8.90**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	SILT			SAND			GRAVEL			

BS Test Sieve (mm)	Percentage Passing
125.0	100
75.0	100
63.0	100
37.5	100
20.0	100
10.0	100
6.30	100
3.35	100
2.00	100
1.18	100
0.600	100
0.425	100
0.212	94
0.150	65
0.063	10

Particle Diameter	Percentage Passing
0.02	6
0.006	2
0.002	1

Soil Fraction	Sieve Percentage
GRAVEL	0
SAND	90
SILT	9
CLAY	1

Soil Description:  
**Grey silty SAND**

Approved Signatories: J.BARRETT A.FROST M.STOKES S.HANDCOCK S.PHILP J.SHALLCROSS M.STROWGER J.MAJOR

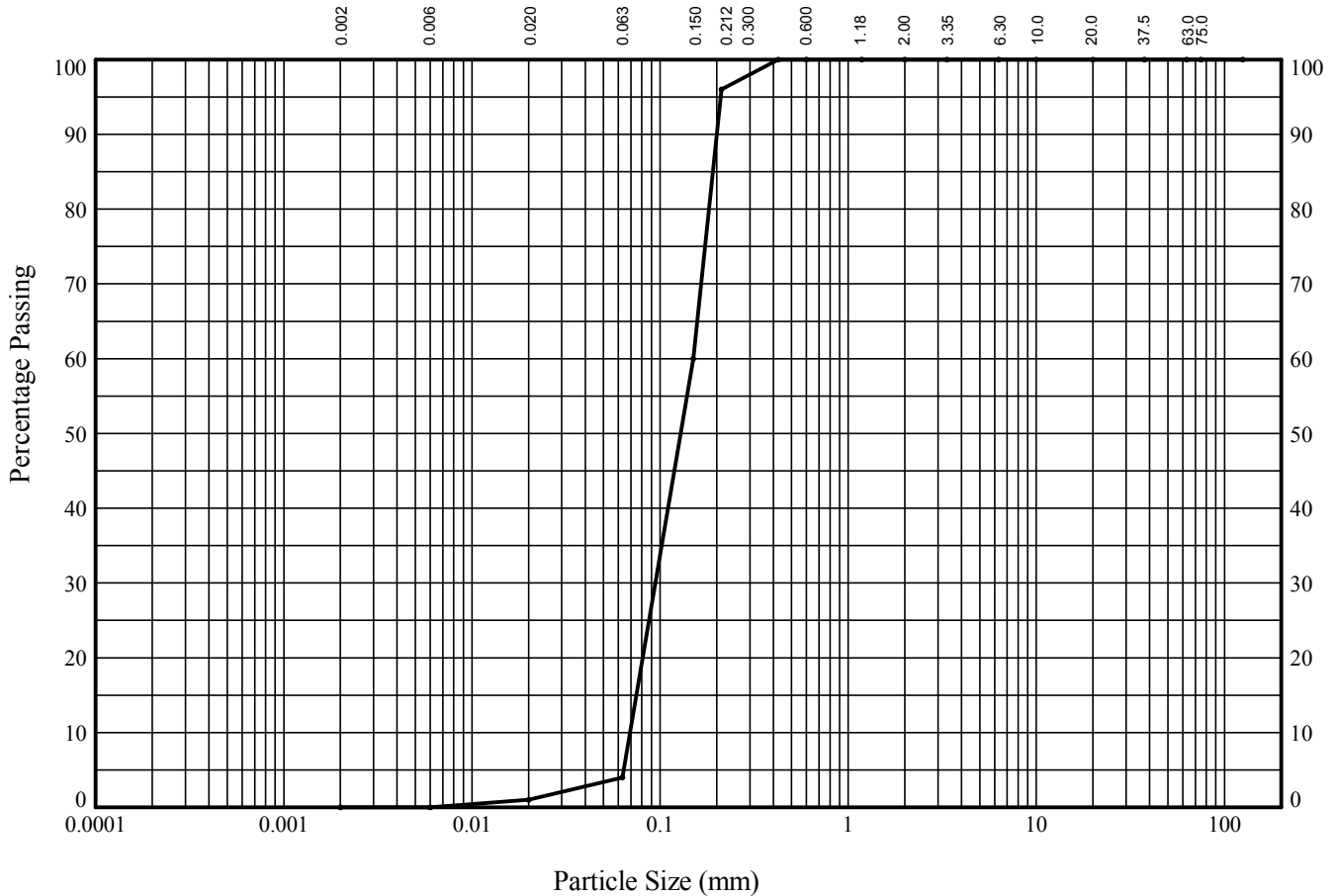
	<b>STRUCTURAL SOILS</b> 1a Princess Street Bedminster Bristol BS3 4AG	Compiled By  <b>ALAN FROST</b>	Date <b>23/07/15</b>	
	Contract <b>Estuary Park, Avonmouth</b>		Contract Ref: <b>729873</b>	

GINT\_LIBRARY\_V8\_05\_GLB\_LibVersion: v8\_05 - Lib0004 ProjVersion: v8\_05 - Core+Full Bristol SI - 0003 | Graph L - PSD - EC71 729873 ESTUARY\_PARK\_AVONMOUTH.GPJ - v8\_05 | 23/07/15 - 14:48 | AF.  
 Structural Soils Ltd, Branch Office - Bristol Lab: 1a Princess Street, Bedminster, Bristol, BS3 4AG, Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.soils.co.uk, Email: ask@soils.co.uk

# PARTICLE SIZE DISTRIBUTION TEST

In accordance with clauses 9.2,9.5 of BS1377:Part 2:1990

Borehole: **BH4**    Sample Ref: **22**    Sample Type: **B**    Depth (m): **11.90**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	SILT			SAND			GRAVEL			

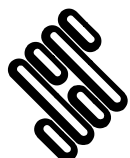
BS Test Sieve (mm)	Percentage Passing
125.0	100
75.0	100
63.0	100
37.5	100
20.0	100
10.0	100
6.30	100
3.35	100
2.00	100
1.18	100
0.600	100
0.425	100
0.212	96
0.150	60
0.063	4

Particle Diameter	Percentage Passing
0.02	1
0.006	0
0.002	0

Soil Fraction	Sieve Percentage
GRAVEL	0
SAND	96
SILT	4
CLAY	0

Soil Description:  
**Brownish grey slightly silty SAND**

Approved Signatories: J.BARRETT A.FROST M.STOKES S.HANDCOCK S.PHILP J.SHALLCROSS M.STROWGER J.MAJOR



**STRUCTURAL SOILS**  
 1a Princess Street  
 Bedminster  
 Bristol  
 BS3 4AG

Compiled By		Date
<i>A.S. Frost</i>		23/07/15
Contract		Contract Ref:
<b>Estuary Park, Avonmouth</b>		<b>729873</b>





## **APPENDIX E**

- (i) Contamination Laboratory Test Results
- (ii) Laboratory UKAS Accreditation Certificate

## FINAL ANALYTICAL TEST REPORT

**Envirolab Job Number:** 15/04680  
**Issue Number:** 1  
**Date:** 30 July, 2015

**Client:** Structural Soils Limited (Bristol)  
The Old School  
Stillhouse Lane  
Bedminster  
Bristol  
UK  
BS3 4EB

**Project Manager:** enviro@soils.co.uk/Stephanie Stanley  
**Project Name:** Estuary Park, Avonmouth  
**Project Ref:** 729873  
**Order No:** N/A  
**Date Samples Received:** 14/07/15  
**Date Instructions Received:** 15/07/15  
**Date Analysis Completed:** 30/07/15

**Prepared by:**

A handwritten signature in blue ink, appearing to read "Lianne Bromiley".

Lianne Bromiley  
Senior Client Manager

**Approved by:**

A handwritten signature in blue ink, appearing to read "John Gustafson".

John Gustafson  
Director

Envirolab Job Number: 15/04680

Client Project Name: Estuary Park, Avonmouth

Client Project Ref: 729873

Lab Sample ID	15/04680/1	15/04680/2	15/04680/3	15/04680/4	15/04680/5				Units	Method ref
Client Sample No										
Client Sample ID	BH1	BH2	BH3	BH5	BH6					
Depth to Top	3.00	3.70	2.00	2.80	4.50					
Depth To Bottom										
Date Sampled	10-Jul-15	10-Jul-15	10-Jul-15	10-Jul-15	10-Jul-15					
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW					
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A					
pH (w) <sub>A</sub> <sup>#</sup>	8.16	8.53	8.67	7.38	8.62				pH	A-T-031w
Hardness Total <sub>A</sub> <sup>#</sup>	430	591	299	614	300				mg/l Ca CO3	A-T-049w
Sulphate (w) <sub>A</sub> <sup>#</sup>	42	72	91	6	32				mg/l	A-T-026w
Arsenic (dissolved) <sub>A</sub> <sup>#</sup>	2	40	15	18	13				µg/l	A-T-025w
Cadmium (dissolved) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-025w
Copper (dissolved) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-025w
Chromium (dissolved) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-025w
Lead (dissolved) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-025w
Mercury (dissolved) <sub>A</sub> <sup>#</sup>	<0.1	<0.1	<0.1	<0.1	<0.1				µg/l	A-T-025w
Nickel (dissolved) <sub>A</sub> <sup>#</sup>	3	4	6	3	5				µg/l	A-T-025w
Selenium (dissolved) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-025w
Zinc (dissolved) <sub>A</sub> <sup>#</sup>	1	2	3	1	5				µg/l	A-T-025w

Envirolab Job Number: 15/04680

Client Project Name: Estuary Park, Avonmouth

Client Project Ref: 729873

Lab Sample ID	15/04680/1	15/04680/2	15/04680/3	15/04680/4	15/04680/5				Units	Method ref
Client Sample No										
Client Sample ID	BH1	BH2	BH3	BH5	BH6					
Depth to Top	3.00	3.70	2.00	2.80	4.50					
Depth To Bottom										
Date Sampled	10-Jul-15	10-Jul-15	10-Jul-15	10-Jul-15	10-Jul-15					
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW					
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A					
PAH 16MS (w)										
Acenaphthene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01				µg/l	A-T-019w
Acenaphthylene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01				µg/l	A-T-019w
Anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01				µg/l	A-T-019w
Benzo(a)anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01				µg/l	A-T-019w
Benzo(a)pyrene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01				µg/l	A-T-019w
Benzo(b)fluoranthene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01				µg/l	A-T-019w
Benzo(ghi)perylene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01				µg/l	A-T-019w
Benzo(k)fluoranthene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01				µg/l	A-T-019w
Chrysene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01				µg/l	A-T-019w
Dibenzo(ah)anthracene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01				µg/l	A-T-019w
Fluoranthene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01				µg/l	A-T-019w
Fluorene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01				µg/l	A-T-019w
Indeno(123-cd)pyrene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01				µg/l	A-T-019w
Naphthalene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	0.20	<0.01	<0.01				µg/l	A-T-019w
Phenanthrene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	0.03	<0.01	<0.01				µg/l	A-T-019w
Pyrene (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	<0.01	<0.01	<0.01				µg/l	A-T-019w
PAH (total 16) (w) <sub>A</sub> <sup>#</sup>	<0.01	<0.01	0.23	<0.01	<0.01				µg/l	A-T-019w

Envirolab Job Number: 15/04680

Client Project Name: Estuary Park, Avonmouth

Client Project Ref: 729873

Lab Sample ID	15/04680/1	15/04680/2	15/04680/3	15/04680/4	15/04680/5				Units	Method ref
Client Sample No										
Client Sample ID	BH1	BH2	BH3	BH5	BH6					
Depth to Top	3.00	3.70	2.00	2.80	4.50					
Depth To Bottom										
Date Sampled	10-Jul-15	10-Jul-15	10-Jul-15	10-Jul-15	10-Jul-15					
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW					
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A					
TPH CWG										
Ali >C5-C6 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-022w
Ali >C6-C8 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-022w
Ali >C8-C10 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-022w
Ali >C10-C12 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5				µg/l	A-T-023w
Ali >C12-C16 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5				µg/l	A-T-023w
Ali >C16-C21 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5				µg/l	A-T-023w
Ali >C21-C35 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5				µg/l	A-T-023w
Total Aliphatics (w) <sub>A</sub>	<5	<5	<5	<5	<5				µg/l	A-T-022+23w
Aro >C5-C7 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-022w
Aro >C7-C8 (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-022w
Aro >C8-C9 (w) <sub>A</sub> <sup>#</sup>	<1	<1	1	<1	<1				µg/l	A-T-022w
Aro >C9-C10 (w) <sub>A</sub> <sup>#</sup>	<1	<1	1	<1	<1				µg/l	A-T-022w
Aro >C10-C12 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5				µg/l	A-T-023w
Aro >C12-C16 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5				µg/l	A-T-023w
Aro >C16-C21 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5				µg/l	A-T-023w
Aro >C21-C35 (w) <sub>A</sub> <sup>#</sup>	<5	<5	<5	<5	<5				µg/l	A-T-023w
Total Aromatics (w) <sub>A</sub>	<5	<5	<5	<5	<5				µg/l	A-T-022+23w
TPH (Ali & Aro) (w) <sub>A</sub>	<5	<5	<5	<5	<5				µg/l	A-T-022+23w
BTEX - Benzene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-022w
BTEX - Toluene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-022w
BTEX - Ethyl Benzene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-022w
BTEX - m & p Xylene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-022w
BTEX - o Xylene (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-022w
MTBE (w) <sub>A</sub> <sup>#</sup>	<1	<1	<1	<1	<1				µg/l	A-T-022w

## **REPORT NOTES**

### **Notes - Soil chemical analysis**

All results are reported as dry weight (<40 °C).

For samples with Matrix Codes 1 - 6 natural stones >10mm are removed or excluded from the sample prior to analysis and reported results corrected to a whole sample basis. For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis.

### **Notes - General**

This report shall not be reproduced, except in full, without written approval from Envirolab.

Subscript "A" indicates analysis performed on the sample as received. "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve, unless asbestos is found to be present in which case all analysis is performed on the sample as received.

All analysis is performed on the dried and crushed sample for samples with Matrix Code 7 and this supercedes any "A" subscripts.

All analysis is performed on the sample as received for soil samples from outside the European Union and this supercedes any "D" subscripts.

Superscript "M" indicates method accredited to MCERTS.

If results are in italic font they are associated with an AQC failure. These are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **TPH analysis of water by method A-T-007**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Asbestos in soil**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if present as discrete fibres/fragments. Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed.

Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample. Samples with Matrix Code 7 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

IS indicates Insufficient sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Analytical results reflect the quality of the sample at the time of analysis only. Opinions and interpretations expressed are outside the scope of our accreditation.

Please contact us if you need any further information.

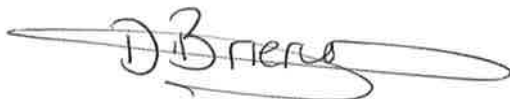
## FINAL ANALYTICAL TEST REPORT SUPPLEMENT TO TEST REPORT 15/04243/2

**Envirolab Job Number:** 15/04243  
**Issue Number:** 3  
**Date:** 03 August, 2015

**Client:** Structural Soils Limited (Bristol)  
The Old School  
Stillhouse Lane  
Bedminster  
Bristol  
UK  
BS3 4EB

**Project Manager:** enviro@soils.co.uk/Stephanie Stanley  
**Project Name:** Estuary Park, Avonmouth  
**Project Ref:** 729873  
**Order No:** N/A  
**Date Samples Received:** 29/06/15  
**Date Instructions Received:** 29/06/15  
**Date Analysis Completed:** 31/07/15

**Prepared by:**



Danielle Brierley  
Administrative Assistant

**Approved by:**



Lianne Bromiley  
Senior Client Manager

Envirolab Job Number: 15/04243

Client Project Name: Estuary Park, Avonmouth

Client Project Ref: 729873

Lab Sample ID	15/04243/1	15/04243/2	15/04243/3	15/04243/4	15/04243/5	15/04243/6	15/04243/7	15/04243/8	Units	Method ref		
Client Sample No	1	1	1		1	2	1	2				
Client Sample ID	BH1	BH5	TP1	TP1	TP2	TP2	TP3	TP3				
Depth to Top	0.20	0.70	0.34	0.60	0.20	1.40	0.35	1.00				
Depth To Bottom	0.40											
Date Sampled	15-Jun-15	22-Jun-15	18-Jun-15	18-Jun-15	18-Jun-15	18-Jun-15	18-Jun-15	18-Jun-15				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	1AB	6A	6A	5	1A	6A	1A	6A				
% Moisture <sub>A</sub>	2.5	-	5.6	10.4	3.5	27.9	7.3	11.0			% w/w	A-T-044
% Stones >10mm <sub>A</sub> <sup>#</sup>	<0.1	-	26.3	<0.1	40.4	11.6	<0.1	30.0	% w/w	A-T-044		
pH <sub>D</sub> <sup>M#</sup>	9.63	-	-	7.78	-	8.26	-	8.36	pH	A-T-031s		
Sulphate (water sol 2:1) <sub>D</sub> <sup>M#</sup>	0.01	-	-	<0.01	-	0.13	-	0.09	g/l	A-T-026s		
Organic matter <sub>D</sub> <sup>M#</sup>	1.5	-	-	1.4	-	1.6	-	1.1	% w/w	A-T-032 OM		
Arsenic <sub>D</sub> <sup>M#</sup>	45	-	345	6	142	8	99	6	mg/kg	A-T-024s		
Cadmium <sub>D</sub> <sup>M#</sup>	1.4	-	66.2	0.9	9.5	0.7	6.7	1.0	mg/kg	A-T-024s		
Copper <sub>D</sub> <sup>M#</sup>	2	-	7	10	4	9	4	8	mg/kg	A-T-024s		
Chromium <sub>D</sub> <sup>M#</sup>	8	-	8	39	5	34	7	16	mg/kg	A-T-024s		
Lead <sub>D</sub> <sup>M#</sup>	48	-	1090	26	651	34	266	28	mg/kg	A-T-024s		
Mercury <sub>D</sub>	0.87	-	4.76	<0.17	1.94	<0.17	1.94	<0.17	mg/kg	A-T-024s		
Nickel <sub>D</sub> <sup>M#</sup>	6	-	13	29	7	26	20	18	mg/kg	A-T-024s		
Selenium <sub>D</sub> <sup>M#</sup>	4	-	3	<1	2	<1	3	<1	mg/kg	A-T-024s		
Zinc <sub>D</sub> <sup>M#</sup>	137	-	9730	101	989	89	513	91	mg/kg	A-T-024s		



Envirolab Job Number: 15/04243

Client Project Name: Estuary Park, Avonmouth

Client Project Ref: 729873

Lab Sample ID	15/04243/1	15/04243/2	15/04243/3	15/04243/4	15/04243/5	15/04243/6	15/04243/7	15/04243/8	Units	Method ref		
Client Sample No	1	1	1		1	2	1	2				
Client Sample ID	BH1	BH5	TP1	TP1	TP2	TP2	TP3	TP3				
Depth to Top	0.20	0.70	0.34	0.60	0.20	1.40	0.35	1.00				
Depth To Bottom	0.40											
Date Sampled	15-Jun-15	22-Jun-15	18-Jun-15	18-Jun-15	18-Jun-15	18-Jun-15	18-Jun-15	18-Jun-15				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	1AB	6A	6A	5	1A	6A	1A	6A				
Asbestos in Soil (inc. matrix)												
Asbestos in soil <sub>A</sub> <sup>#</sup>	Chrysotile	NAD	NAD	-	NAD	-	Chrysotile	-		A-T-045		
Asbestos Matrix (microscope) <sub>A</sub>	Cement	-	-	-	-	-	Loose Fibres	-		A-T-045		
Asbestos ACM - Suitable for Water Absorption Test? <sub>D</sub>	NO	N/A	N/A	-	N/A	-	N/A	-		Gravimetry		
Asbestos in Soil Quantification % Composition (Hand Picking & Weighing)												
Asbestos in soil % composition (hand picking and weighing) <sub>D</sub>	0.013	-	-	-	-	-	0.001	-	% w/w	A-T-054		

Envirolab Job Number: 15/04243

Client Project Name: Estuary Park, Avonmouth

Client Project Ref: 729873

Lab Sample ID	15/04243/1	15/04243/2	15/04243/3	15/04243/4	15/04243/5	15/04243/6	15/04243/7	15/04243/8	Units	Method ref		
Client Sample No	1	1	1		1	2	1	2				
Client Sample ID	BH1	BH5	TP1	TP1	TP2	TP2	TP3	TP3				
Depth to Top	0.20	0.70	0.34	0.60	0.20	1.40	0.35	1.00				
Depth To Bottom	0.40											
Date Sampled	15-Jun-15	22-Jun-15	18-Jun-15	18-Jun-15	18-Jun-15	18-Jun-15	18-Jun-15	18-Jun-15				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	1AB	6A	6A	5	1A	6A	1A	6A				
<b>PAH 16</b>												
Acenaphthene <sub>A</sub> <sup>M#</sup>	<0.01	-	-	<0.01	-	<0.01	-	<0.01	mg/kg	A-T-019s		
Acenaphthylene <sub>A</sub> <sup>M#</sup>	<0.01	-	-	<0.01	-	<0.01	-	<0.01	mg/kg	A-T-019s		
Anthracene <sub>A</sub> <sup>M#</sup>	<0.02	-	-	<0.02	-	<0.02	-	<0.02	mg/kg	A-T-019s		
Benzo(a)anthracene <sub>A</sub> <sup>M#</sup>	<0.04	-	-	<0.04	-	<0.04	-	<0.04	mg/kg	A-T-019s		
Benzo(a)pyrene <sub>A</sub> <sup>M#</sup>	0.10	-	-	<0.04	-	<0.04	-	<0.04	mg/kg	A-T-019s		
Benzo(b)fluoranthene <sub>A</sub> <sup>M#</sup>	0.14	-	-	<0.05	-	<0.05	-	<0.05	mg/kg	A-T-019s		
Benzo(ghi)perylene <sub>A</sub> <sup>M#</sup>	0.08	-	-	<0.05	-	<0.05	-	<0.05	mg/kg	A-T-019s		
Benzo(k)fluoranthene <sub>A</sub> <sup>M#</sup>	<0.07	-	-	<0.07	-	<0.07	-	<0.07	mg/kg	A-T-019s		
Chrysene <sub>A</sub> <sup>M#</sup>	0.10	-	-	<0.06	-	<0.06	-	<0.06	mg/kg	A-T-019s		
Dibenzo(ah)anthracene <sub>A</sub> <sup>M#</sup>	<0.04	-	-	<0.04	-	<0.04	-	<0.04	mg/kg	A-T-019s		
Fluoranthene <sub>A</sub> <sup>M#</sup>	<0.08	-	-	<0.08	-	<0.08	-	<0.08	mg/kg	A-T-019s		
Fluorene <sub>A</sub> <sup>M#</sup>	<0.01	-	-	<0.01	-	<0.01	-	<0.01	mg/kg	A-T-019s		
Indeno(123-cd)pyrene <sub>A</sub> <sup>M#</sup>	0.09	-	-	<0.03	-	<0.03	-	<0.03	mg/kg	A-T-019s		
Naphthalene <sub>A</sub> <sup>M#</sup>	<0.03	-	-	<0.03	-	<0.03	-	<0.03	mg/kg	A-T-019s		
Phenanthrene <sub>A</sub> <sup>M#</sup>	<0.03	-	-	<0.03	-	<0.03	-	<0.03	mg/kg	A-T-019s		
Pyrene <sub>A</sub> <sup>M#</sup>	0.37	-	-	<0.07	-	<0.07	-	<0.07	mg/kg	A-T-019s		
PAH (total 16) <sub>A</sub> <sup>M#</sup>	0.89	-	-	<0.08	-	<0.08	-	<0.08	mg/kg	A-T-019s		
<b>TPH Banded 1 with ID</b>												
>C6-C8 <sub>A</sub> <sup>#</sup>	<10	-	-	<10	-	<10	-	<10	mg/kg	A-T-007s		
>C8-C10 <sub>A</sub> <sup>#</sup>	<10	-	-	<10	-	<10	-	<10	mg/kg	A-T-007s		
>C10-C12 <sub>A</sub> <sup>#</sup>	<10	-	-	<10	-	<10	-	<10	mg/kg	A-T-007s		
>C12-C16 <sub>A</sub> <sup>#</sup>	<10	-	-	<10	-	<10	-	<10	mg/kg	A-T-007s		
>C16-C21 <sub>A</sub> <sup>#</sup>	<10	-	-	<10	-	<10	-	<10	mg/kg	A-T-007s		
>C21-C40 <sub>A</sub>	137	-	-	<10	-	<10	-	<10	mg/kg	A-T-007s		
TPH Total (sum of bands) <sub>A</sub>	137	-	-	<10	-	<10	-	<10	mg/kg	A-T-007s		
TPH ID (for FID characterisations) <sub>A</sub>	Possible Lube Oil	-	-	N/A	-	N/A	-	N/A		A-T-007s		

Envirolab Job Number: 15/04243

Client Project Name: Estuary Park, Avonmouth

Client Project Ref: 729873

Lab Sample ID	15/04243/9	15/04243/10	15/04243/11	15/04243/12	15/04243/13	15/04243/14	15/04243/15	15/04243/16	Units	Method ref		
Client Sample No	1	2	1	2	3	1	1	2				
Client Sample ID	TP4	TP4	TP5	TP5	TP5	TP6	TP7	TP7				
Depth to Top	0.22	0.60	0.10	0.35	0.80	0.40	0.10	0.90				
Depth To Bottom												
Date Sampled	18-Jun-15	18-Jun-15	17-Jun-15	17-Jun-15	17-Jun-15	17-Jun-15	17-Jun-15	17-Jun-15				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	1A	6A	6AE	6A	6A	6A	4AE	6A				
% Moisture <sub>A</sub>	3.7	15.0	5.1	22.3	21.3	20.0	3.9	-			% w/w	A-T-044
% Stones >10mm <sub>A</sub> <sup>#</sup>	45.1	4.2	41.8	<0.1	7.9	5.8	<0.1	-	% w/w	A-T-044		
pH <sub>D</sub> <sup>M#</sup>	-	8.36	-	7.92	-	7.94	-	-	pH	A-T-031s		
Sulphate (water sol 2:1) <sub>D</sub> <sup>M#</sup>	-	<0.01	-	<0.01	-	0.06	-	-	g/l	A-T-026s		
Organic matter <sub>D</sub> <sup>M#</sup>	-	1.7	-	10.2	-	2.3	-	-	% w/w	A-T-032 OM		
Arsenic <sub>D</sub> <sup>M#</sup>	61	5	6	15	7	6	10	-	mg/kg	A-T-024s		
Cadmium <sub>D</sub> <sup>M#</sup>	3.8	0.6	0.9	13.6	0.9	0.9	1.0	-	mg/kg	A-T-024s		
Copper <sub>D</sub> <sup>M#</sup>	2	22	4	43	17	23	18	-	mg/kg	A-T-024s		
Chromium <sub>D</sub> <sup>M#</sup>	4	24	5	28	25	28	7	-	mg/kg	A-T-024s		
Lead <sub>D</sub> <sup>M#</sup>	129	27	22	223	82	42	46	-	mg/kg	A-T-024s		
Mercury <sub>D</sub>	0.78	<0.17	0.43	0.34	<0.17	<0.17	0.67	-	mg/kg	A-T-024s		
Nickel <sub>D</sub> <sup>M#</sup>	8	24	3	34	25	24	6	-	mg/kg	A-T-024s		
Selenium <sub>D</sub> <sup>M#</sup>	2	2	2	<1	<1	<1	2	-	mg/kg	A-T-024s		
Zinc <sub>D</sub> <sup>M#</sup>	418	103	58	795	111	135	161	-	mg/kg	A-T-024s		

Envirolab Job Number: 15/04243

Client Project Name: Estuary Park, Avonmouth

Client Project Ref: 729873

Lab Sample ID	15/04243/9	15/04243/10	15/04243/11	15/04243/12	15/04243/13	15/04243/14	15/04243/15	15/04243/16	Units	Method ref		
Client Sample No	1	2	1	2	3	1	1	2				
Client Sample ID	TP4	TP4	TP5	TP5	TP5	TP6	TP7	TP7				
Depth to Top	0.22	0.60	0.10	0.35	0.80	0.40	0.10	0.90				
Depth To Bottom												
Date Sampled	18-Jun-15	18-Jun-15	17-Jun-15	17-Jun-15	17-Jun-15	17-Jun-15	17-Jun-15	17-Jun-15				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	1A	6A	6AE	6A	6A	6A	4AE	6A				
Asbestos in Soil (inc. matrix)												
Asbestos in soil <sub>A</sub> <sup>#</sup>	NAD	NAD	NAD	-	-	-	Chrysotile	NAD		A-T-045		
Asbestos Matrix (microscope) <sub>A</sub>	-	-	-	-	-	-	Loose Fibres	-		A-T-045		
Asbestos ACM - Suitable for Water Absorption Test? <sub>D</sub>	N/A	N/A	N/A	-	-	-	N/A	N/A		Gravimetry		
Asbestos in Soil Quantification % Composition (Hand Picking & Weighing)												
Asbestos in soil % composition (hand picking and weighing) <sub>D</sub>	-	-	-	-	-	-	0.001	-	% w/w	A-T-054		

Envirolab Job Number: 15/04243

Client Project Name: Estuary Park, Avonmouth

Client Project Ref: 729873

Lab Sample ID	15/04243/9	15/04243/10	15/04243/11	15/04243/12	15/04243/13	15/04243/14	15/04243/15	15/04243/16	Units	Method ref		
Client Sample No	1	2	1	2	3	1	1	2				
Client Sample ID	TP4	TP4	TP5	TP5	TP5	TP6	TP7	TP7				
Depth to Top	0.22	0.60	0.10	0.35	0.80	0.40	0.10	0.90				
Depth To Bottom												
Date Sampled	18-Jun-15	18-Jun-15	17-Jun-15	17-Jun-15	17-Jun-15	17-Jun-15	17-Jun-15	17-Jun-15				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	1A	6A	6AE	6A	6A	6A	4AE	6A				
PAH 16												
Acenaphthene <sub>A</sub> <sup>M#</sup>	-	<0.01	-	0.01	-	0.01	-	-	mg/kg	A-T-019s		
Acenaphthylene <sub>A</sub> <sup>M#</sup>	-	<0.01	-	<0.01	-	<0.01	-	-	mg/kg	A-T-019s		
Anthracene <sub>A</sub> <sup>M#</sup>	-	<0.02	-	0.03	-	<0.02	-	-	mg/kg	A-T-019s		
Benzo(a)anthracene <sub>A</sub> <sup>M#</sup>	-	<0.04	-	0.14	-	<0.04	-	-	mg/kg	A-T-019s		
Benzo(a)pyrene <sub>A</sub> <sup>M#</sup>	-	<0.04	-	0.08	-	<0.04	-	-	mg/kg	A-T-019s		
Benzo(b)fluoranthene <sub>A</sub> <sup>M#</sup>	-	<0.05	-	0.19	-	<0.05	-	-	mg/kg	A-T-019s		
Benzo(ghi)perylene <sub>A</sub> <sup>M#</sup>	-	<0.05	-	0.08	-	<0.05	-	-	mg/kg	A-T-019s		
Benzo(k)fluoranthene <sub>A</sub> <sup>M#</sup>	-	<0.07	-	<0.07	-	<0.07	-	-	mg/kg	A-T-019s		
Chrysene <sub>A</sub> <sup>M#</sup>	-	<0.06	-	0.23	-	<0.06	-	-	mg/kg	A-T-019s		
Dibenzo(ah)anthracene <sub>A</sub> <sup>M#</sup>	-	<0.04	-	<0.04	-	<0.04	-	-	mg/kg	A-T-019s		
Fluoranthene <sub>A</sub> <sup>M#</sup>	-	<0.08	-	0.42	-	<0.08	-	-	mg/kg	A-T-019s		
Fluorene <sub>A</sub> <sup>M#</sup>	-	<0.01	-	<0.01	-	<0.01	-	-	mg/kg	A-T-019s		
Indeno(123-cd)pyrene <sub>A</sub> <sup>M#</sup>	-	<0.03	-	0.09	-	<0.03	-	-	mg/kg	A-T-019s		
Naphthalene <sub>A</sub> <sup>M#</sup>	-	<0.03	-	<0.03	-	<0.03	-	-	mg/kg	A-T-019s		
Phenanthrene <sub>A</sub> <sup>M#</sup>	-	<0.03	-	0.30	-	0.04	-	-	mg/kg	A-T-019s		
Pyrene <sub>A</sub> <sup>M#</sup>	-	<0.07	-	0.33	-	<0.07	-	-	mg/kg	A-T-019s		
PAH (total 16) <sub>A</sub> <sup>M#</sup>	-	<0.08	-	1.89	-	<0.08	-	-	mg/kg	A-T-019s		
TPH Banded 1 with ID												
>C6-C8 <sub>A</sub> <sup>#</sup>	-	<10	-	<10	-	<10	-	-	mg/kg	A-T-007s		
>C8-C10 <sub>A</sub> <sup>#</sup>	-	<10	-	<10	-	<10	-	-	mg/kg	A-T-007s		
>C10-C12 <sub>A</sub> <sup>#</sup>	-	<10	-	<10	-	<10	-	-	mg/kg	A-T-007s		
>C12-C16 <sub>A</sub> <sup>#</sup>	-	<10	-	<10	-	<10	-	-	mg/kg	A-T-007s		
>C16-C21 <sub>A</sub> <sup>#</sup>	-	<10	-	<10	-	<10	-	-	mg/kg	A-T-007s		
>C21-C40 <sub>A</sub>	-	<10	-	<10	-	<10	-	-	mg/kg	A-T-007s		
TPH Total (sum of bands) <sub>A</sub>	-	<10	-	<10	-	<10	-	-	mg/kg	A-T-007s		
TPH ID (for FID characterisations) <sub>A</sub>	-	N/A	-	N/A	-	N/A	-	-		A-T-007s		

Envirolab Job Number: 15/04243

Client Project Name: Estuary Park, Avonmouth

Client Project Ref: 729873

Lab Sample ID	15/04243/17	15/04243/18	15/04243/19	15/04243/20	15/04243/21	15/04243/22			Units	Method ref
Client Sample No	1	1	2	1	3	1				
Client Sample ID	TP9	TP10	TP10	TP11	TP11	TP12				
Depth to Top	0.20	0.10	0.50	0.24	1.40	0.47				
Depth To Bottom										
Date Sampled	17-Jun-15	17-Jun-15	17-Jun-15	18-Jun-15	18-Jun-15	19-Jun-15				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	4AE	4AE	6A	6	5	6A				
% Moisture <sub>A</sub>	4.2	4.9	19.9	-	19.8	20.0			% w/w	A-T-044
% Stones >10mm <sub>A</sub> <sup>#</sup>	29.1	32.5	16.4	-	<0.1	14.9			% w/w	A-T-044
pH <sub>D</sub> <sup>M#</sup>	9.55	-	8.18	-	8.55	-			pH	A-T-031s
Sulphate (water sol 2:1) <sub>D</sub> <sup>M#</sup>	0.04	-	0.13	-	<0.01	-			g/l	A-T-026s
Organic matter <sub>D</sub> <sup>M#</sup>	8.4	-	2.1	-	0.9	-			% w/w	A-T-032 OM
Arsenic <sub>D</sub> <sup>M#</sup>	3	8	8	-	8	6			mg/kg	A-T-024s
Cadmium <sub>D</sub> <sup>M#</sup>	0.6	1.1	2.4	-	0.7	0.6			mg/kg	A-T-024s
Copper <sub>D</sub> <sup>M#</sup>	8	5	10	-	8	9			mg/kg	A-T-024s
Chromium <sub>D</sub> <sup>M#</sup>	6	5	24	-	36	31			mg/kg	A-T-024s
Lead <sub>D</sub> <sup>M#</sup>	38	27	59	-	22	20			mg/kg	A-T-024s
Mercury <sub>D</sub>	0.25	0.24	<0.17	-	<0.17	<0.17			mg/kg	A-T-024s
Nickel <sub>D</sub> <sup>M#</sup>	4	5	22	-	30	25			mg/kg	A-T-024s
Selenium <sub>D</sub> <sup>M#</sup>	2	<1	<1	-	<1	<1			mg/kg	A-T-024s
Zinc <sub>D</sub> <sup>M#</sup>	52	92	174	-	94	79			mg/kg	A-T-024s

Envirolab Job Number: 15/04243

Client Project Name: Estuary Park, Avonmouth

Client Project Ref: 729873

Lab Sample ID	15/04243/17	15/04243/18	15/04243/19	15/04243/20	15/04243/21	15/04243/22			Units	Method ref
Client Sample No	1	1	2	1	3	1				
Client Sample ID	TP9	TP10	TP10	TP11	TP11	TP12				
Depth to Top	0.20	0.10	0.50	0.24	1.40	0.47				
Depth To Bottom										
Date Sampled	17-Jun-15	17-Jun-15	17-Jun-15	18-Jun-15	18-Jun-15	19-Jun-15				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	4AE	4AE	6A	6	5	6A				
Asbestos in Soil (inc. matrix)										
Asbestos in soil <sub>A</sub> <sup>#</sup>	-	NAD	NAD	NAD	-	-				A-T-045
Asbestos ACM - Suitable for Water Absorption Test? <sub>D</sub>	-	N/A	N/A	N/A	-	-				Gravimetry

Envirolab Job Number: 15/04243

Client Project Name: Estuary Park, Avonmouth

Client Project Ref: 729873

Lab Sample ID	15/04243/17	15/04243/18	15/04243/19	15/04243/20	15/04243/21	15/04243/22			Units	Method ref
Client Sample No	1	1	2	1	3	1				
Client Sample ID	TP9	TP10	TP10	TP11	TP11	TP12				
Depth to Top	0.20	0.10	0.50	0.24	1.40	0.47				
Depth To Bottom										
Date Sampled	17-Jun-15	17-Jun-15	17-Jun-15	18-Jun-15	18-Jun-15	19-Jun-15				
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES	Soil - ES				
Sample Matrix Code	4AE	4AE	6A	6	5	6A				
PAH 16										
Acenaphthene <sub>A</sub> <sup>M#</sup>	6.92	-	0.04	-	<0.01	-		mg/kg	A-T-019s	
Acenaphthylene <sub>A</sub> <sup>M#</sup>	0.07	-	<0.01	-	<0.01	-		mg/kg	A-T-019s	
Anthracene <sub>A</sub> <sup>M#</sup>	3.54	-	<0.02	-	<0.02	-		mg/kg	A-T-019s	
Benzo(a)anthracene <sub>A</sub> <sup>M#</sup>	15.1	-	0.06	-	<0.04	-		mg/kg	A-T-019s	
Benzo(a)pyrene <sub>A</sub> <sup>M#</sup>	14.2	-	<0.04	-	<0.04	-		mg/kg	A-T-019s	
Benzo(b)fluoranthene <sub>A</sub> <sup>M#</sup>	20.1	-	0.07	-	<0.05	-		mg/kg	A-T-019s	
Benzo(ghi)perylene <sub>A</sub> <sup>M#</sup>	8.42	-	<0.05	-	<0.05	-		mg/kg	A-T-019s	
Benzo(k)fluoranthene <sub>A</sub> <sup>M#</sup>	6.22	-	<0.07	-	<0.07	-		mg/kg	A-T-019s	
Chrysene <sub>A</sub> <sup>M#</sup>	15.9	-	0.09	-	<0.06	-		mg/kg	A-T-019s	
Dibenzo(ah)anthracene <sub>A</sub> <sup>M#</sup>	3.20	-	<0.04	-	<0.04	-		mg/kg	A-T-019s	
Fluoranthene <sub>A</sub> <sup>M#</sup>	22.1	-	0.13	-	<0.08	-		mg/kg	A-T-019s	
Fluorene <sub>A</sub> <sup>M#</sup>	4.80	-	0.02	-	<0.01	-		mg/kg	A-T-019s	
Indeno(123-cd)pyrene <sub>A</sub> <sup>M#</sup>	10.2	-	<0.03	-	<0.03	-		mg/kg	A-T-019s	
Naphthalene <sub>A</sub> <sup>M#</sup>	0.09	-	<0.03	-	<0.03	-		mg/kg	A-T-019s	
Phenanthrene <sub>A</sub> <sup>M#</sup>	14.8	-	0.09	-	<0.03	-		mg/kg	A-T-019s	
Pyrene <sub>A</sub> <sup>M#</sup>	15	-	0.10	-	<0.07	-		mg/kg	A-T-019s	
PAH (total 16) <sub>A</sub> <sup>M#</sup>	161	-	0.63	-	<0.08	-		mg/kg	A-T-019s	
TPH Banded 1 with ID										
>C6-C8 <sub>A</sub> <sup>#</sup>	<10	-	<10	-	<10	-		mg/kg	A-T-007s	
>C8-C10 <sub>A</sub> <sup>#</sup>	<10	-	<10	-	<10	-		mg/kg	A-T-007s	
>C10-C12 <sub>A</sub> <sup>#</sup>	<10	-	<10	-	<10	-		mg/kg	A-T-007s	
>C12-C16 <sub>A</sub> <sup>#</sup>	20	-	<10	-	<10	-		mg/kg	A-T-007s	
>C16-C21 <sub>A</sub> <sup>#</sup>	64	-	<10	-	<10	-		mg/kg	A-T-007s	
>C21-C40 <sub>A</sub>	1160	-	<10	-	<10	-		mg/kg	A-T-007s	
TPH Total (sum of bands) <sub>A</sub>	1240	-	<10	-	<10	-		mg/kg	A-T-007s	
TPH ID (for FID characterisations) <sub>A</sub>	Unknown profile	-	N/A	-	N/A	-			A-T-007s	



## **REPORT NOTES**

### **Notes - Soil chemical analysis**

All results are reported as dry weight (<40 °C).

For samples with Matrix Codes 1 - 6 natural stones >10mm are removed or excluded from the sample prior to analysis and reported results corrected to a whole sample basis. For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis.

### **Notes - General**

This report shall not be reproduced, except in full, without written approval from Envirolab.

Subscript "A" indicates analysis performed on the sample as received. "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve, unless asbestos is found to be present in which case all analysis is performed on the sample as received.

All analysis is performed on the dried and crushed sample for samples with Matrix Code 7 and this supercedes any "A" subscripts.

All analysis is performed on the sample as received for soil samples from outside the European Union and this supercedes any "D" subscripts.

Superscript "M" indicates method accredited to MCERTS.

If results are in italic font they are associated with an AQC failure. These are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

### **TPH analysis of water by method A-T-007**

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

### **Asbestos in soil**

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if present as discrete fibres/fragments. Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified a being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed.

Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

### **Predominant Matrix Codes:**

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample. Samples with Matrix Code 7 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations.

### **Secondary Matrix Codes:**

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

IS indicates Insufficient sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Analytical results reflect the quality of the sample at the time of analysis only. Opinions and interpretations expressed are outside the scope of our accreditation.

Please contact us if you need any further information.

## Final Test Report

Envirolab Job Number: 15/04243  
Issue Number: 1

Date: 10-Jul-15

Client: Structural Soils Limited (Bristol)  
The Old School  
Stillhouse Lane  
Bedminster  
Bristol  
UK, BS3 4EB

Project Manager: enviro@soils.co.uk/Stephanie Star  
Project Name: Estuary Park, Avonmouth  
Project Ref: 729873  
Order No: N/A

Date Samples Received: 29-Jun-15  
Date Instructions Received: 29-Jun-15  
Date Analysis Completed: 10-Jul-15

### Notes - Soil analysis

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones >10mm are removed or excluded from the sample prior to analysis and reported results corrected to a whole sample basis.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis.

### Notes - General

This report shall not be reproduced, except in full, without written approval from Envirolab.

Subscript "A" indicates analysis performed on the sample as received. "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve, unless asbestos is found to be present in which case all analysis is performed on the sample as received.

All analysis is performed on the dried and crushed sample for samples with Matrix Code 7 and this supercedes any "A" subscripts.

All analysis is performed on the sample as received for soil samples from outside the European Union and this supercedes any "D" subscripts

Superscript "M" indicates method accredited to MCERTS.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid

**Predominant Matrix Codes:** 1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER.

Samples with Matrix Code 7 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations.

**Secondary Matrix Codes:** A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

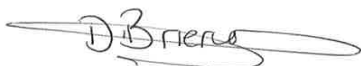
IS indicates Insufficient sample for analysis, NDP indicates No Determination Possible and NAD indicates No Asbestos Detected.

Superscript # indicates method accredited to ISO 17025.

Analytical results reflect the quality of the sample at the time of analysis only. Opinions and interpretations expressed are outside the scope of our accreditation.

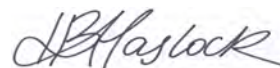
Please contact us if you need any further information.

Prepared by:



Danielle Brierley  
Administrative Assistant

Approved by:



Iain Haslock  
Analytical Consultant



Sample Details					Landfill Waste Acceptance Criteria Limits		
Lab Sample ID	Method	ISO17025	MCERTS	15/04243/6	Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
Client Sample Number				2			
Client Sample ID				TP2			
Depth to Top				1.4			
Depth to Bottom							
Date Sampled				18/06/2015			
Sample Type				Soil - ES			
Sample Matrix Code				6A			
<b>Solid Waste Analysis</b>							
pH (pH Units) <sub>D</sub>	A-T-031	Y	Y	8.26	-	>6	-
ANC to pH 4 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.16	-	to be evaluated	to be evaluated
ANC to pH 6 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.06	-	to be evaluated	to be evaluated
Loss on Ignition (%) <sub>D</sub>	A-T-030	Y	N	1.3	-	-	10
Total Organic Carbon (%) <sub>D</sub>	A-T-032	Y	Y	0.93	3	5	6
PAH Sum of 17 (mg/kg) <sub>A</sub>	A-T-019	N	N	<0.08	100	-	-
Mineral Oil (mg/kg) <sub>A</sub>	A-T-007	N	N	<10	500	-	-
Sum of 7 PCBs (mg/kg) <sub>D</sub>	A-T-004	N	N	<0.007	1	-	-
Sum of BTEX (mg/kg) <sub>A</sub>	A-T-022	N	N	<0.01	6	-	-
<b>Eluate Analysis</b>					10:1 mg/l	10:1 mg/kg	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)
Arsenic	A-T-025	Y	N	0.002	0.020	0.5	25
Barium	A-T-025	Y	N	0.024	0.210	20	300
Cadmium	A-T-025	Y	N	<0.001	<0.01	0.04	5
Chromium	A-T-025	Y	N	<0.001	<0.01	0.5	70
Copper	A-T-025	Y	N	0.002	0.020	2	100
Mercury	A-T-025	Y	N	<0.0001	<0.001	0.01	2
Molybdenum	A-T-025	Y	N	0.029	0.260	0.5	30
Nickel	A-T-025	Y	N	<0.001	<0.01	0.4	40
Lead	A-T-025	Y	N	<0.001	<0.01	0.5	50
Antimony	A-T-025	Y	N	<0.001	<0.01	0.06	5
Selenium	A-T-025	Y	N	<0.001	<0.01	0.1	7
Zinc	A-T-025	Y	N	0.008	0.070	4	200
Chloride	A-T-026	Y	N	1	11	800	25000
Fluoride	A-T-026	Y	N	0.7	6.0	10	500
Sulphate as SO <sub>4</sub>	A-T-026	Y	N	28	246	1000	50000
Total Dissolved Solids	A-T-035	N	N	111	981	4000	100000
Phenol Index	A-T-050	N	N	<0.01	<0.1	1	-
Dissolved Organic Carbon	A-T-032	N	N	<0.2	<200	500	1000
<b>Leach Test Information</b>							
pH (pH Units)	A-T-031	N	Y	7.5			
Conductivity (µS/cm)	A-T-037	N	N	222			
Mass Sample (kg)				0.215			
Dry Matter (%)	A-T-044	N	N	63.7			
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation							

Sample Details					Landfill Waste Acceptance Criteria Limits		
Lab Sample ID	Method	ISO17025	MCERTS	15/04243/21	Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
Client Sample Number				3			
Client Sample ID				TP11			
Depth to Top				1.4			
Depth to Bottom							
Date Sampled				18/06/2015			
Sample Type				Soil - ES			
Sample Matrix Code				5			
<b>Solid Waste Analysis</b>							
pH (pH Units) <sub>D</sub>	A-T-031	Y	Y	8.55	-	>6	-
ANC to pH 4 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.14	-	to be evaluated	to be evaluated
ANC to pH 6 (mol/kg) <sub>D</sub>	A-T-ANC	N	N	0.01	-	to be evaluated	to be evaluated
Loss on Ignition (%) <sub>D</sub>	A-T-030	Y	N	4.5	-	-	10
Total Organic Carbon (%) <sub>D</sub>	A-T-032	Y	Y	0.54	3	5	6
PAH Sum of 17 (mg/kg) <sub>A</sub>	A-T-019	N	N	<0.08	100	-	-
Mineral Oil (mg/kg) <sub>A</sub>	A-T-007	N	N	136	500	-	-
Sum of 7 PCBs (mg/kg) <sub>D</sub>	A-T-004	N	N	<0.007	1	-	-
Sum of BTEX (mg/kg) <sub>A</sub>	A-T-022	N	N	<0.01	6	-	-
<b>Eluate Analysis</b>					10:1	10:1	Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)
					mg/l	mg/kg	
Arsenic	A-T-025	Y	N	0.001	0.010	0.5	25
Barium	A-T-025	Y	N	0.008	0.080	20	300
Cadmium	A-T-025	Y	N	<0.001	<0.01	0.04	5
Chromium	A-T-025	Y	N	<0.001	<0.01	0.5	70
Copper	A-T-025	Y	N	0.001	0.010	2	100
Mercury	A-T-025	Y	N	<0.0001	<0.001	0.01	2
Molybdenum	A-T-025	Y	N	0.041	0.410	0.5	30
Nickel	A-T-025	Y	N	0.001	0.010	0.4	40
Lead	A-T-025	Y	N	0.001	0.010	0.5	50
Antimony	A-T-025	Y	N	<0.001	<0.01	0.06	5
Selenium	A-T-025	Y	N	0.001	0.010	0.1	7
Zinc	A-T-025	Y	N	0.018	0.170	4	200
Chloride	A-T-026	Y	N	2	21	800	25000
Fluoride	A-T-026	Y	N	0.7	7.0	10	500
Sulphate as SO <sub>4</sub>	A-T-026	Y	N	14	142	1000	50000
Total Dissolved Solids	A-T-035	N	N	57	570	4000	100000
Phenol Index	A-T-050	N	N	<0.01	<0.1	1	-
Dissolved Organic Carbon	A-T-032	N	N	<0.2	<200	500	1000
<b>Leach Test Information</b>							
pH (pH Units)	A-T-031	N	Y	7.1			
Conductivity (µS/cm)	A-T-037	N	N	114			
Mass Sample (kg)				0.218			
Dry Matter (%)	A-T-044	N	N	80.2			
Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation							

# United Kingdom Accreditation Service

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## ACCREDITATION CERTIFICATE



**TESTING LABORATORY  
No. 1247**

**Envirolab**

is accredited in accordance with the recognised International Standard ISO/IEC 17025:2005  
*General Requirements for the competence of testing and calibration laboratories.*

This accreditation demonstrates technical competence for a defined scope as detailed in and at the locations specified in the schedule to this certificate, and the operation of a laboratory quality management system (refer joint ISO-ILAC-IAF Communiqué dated 18 June 2005).

The schedule to this certificate is an essential accreditation document and from time to time may be revised and reissued by the United Kingdom Accreditation Service. The most recent issue of the schedule of accreditation, which bears the same accreditation number as this certificate, is available from the UKAS website [www.ukas.org](http://www.ukas.org).

This accreditation is subject to continuing conformity with United Kingdom Accreditation Service requirements. The absence of a schedule on the UKAS website indicates that the accreditation is no longer in force.

*R. Belton*

\_\_\_\_\_  
Accreditation Manager, United Kingdom Accreditation Service

**Initial Accreditation date  
02 December 1992**

**This certificate issued on  
11 August 2006**

The Department of Trade and Industry (DTI) has entered into a memorandum of understanding with the United Kingdom Accreditation Service (UKAS) through which UKAS is recognised as the national body responsible for assessing and accrediting the competence of organisations in the fields of calibration, testing, inspection and certification of systems, products and persons

## **APPENDIX F**

- (i) Soil Guideline Value Derivation
- (ii) RSK Group Generic Assessment Criteria (GAC)
  - (iii) UKWIR Guidelines
- (iv) Risk Assessment Methodology

## **Soil Guideline Value Derivation**

The Soil Guideline Values (SGVs) derived from the CLEA model and published by DEFRA provide initial screening criteria to establish whether sources of contamination are significant. These can then be compared with the site-specific analytical data to establish whether the hazards have the potential to cause unacceptable health risks.

In August 2008 the Environment Agency and the Department of Environment, Food and Rural Affairs (Defra) withdrew Contaminated Land Reports CLR7 to CLR10, together with the previously published Soil Guideline Values (SGVs) and CLEA UK software. In September 2009 version 1.06 of the CLEA model was issued and in May 2010 RSK released screening values (Generic Assessment Criteria (GAC)) derived in accordance with this model. RSK Group Plc has followed the same approach as CLEA to derive GAC for relevant contaminants for which SGVs are as yet not published.

The CLEA system also introduces some statistical testing of the test results. In principle, the mean (average) of the results for a given contaminant could be compared with the SGV. However, the measured mean could differ significantly from the true mean if only a limited number of results were available. Therefore in the mean value test, the value below which the true mean value for the site lies (US95), is calculated at the 95% confidence limit. Therefore if the US95 is below the SGV then there is 95% confidence that the true mean is below the SGV and that there is no significant risk to health. If the mean value exceeds the SGV then this may indicate a requirement for remediation or further investigation.

If the mean value lies below the SGV, then remediation is not likely to be required. This may be the case even if some individual results exceed the SGV, as long as the elevated results fall within the same sample population, as discussed below. There is also a maximum value test and this determines whether individual results which exceed a SGV fall within the range that can be expected from the sample population, or whether they are indicative of an area of greater contaminant concentrations (e.g. a hotspot). In this latter case such elevated results are called “outliers” and such outliers may indicate a requirement for remediation or further investigation.



## Generic assessment criteria for human health: commercial scenario

### Background

RSK's generic assessment criteria (GAC) were initially prepared following the publication by the Environment Agency (EA) of soil guideline value (SGV) and toxicological (TOX) reports, and associated publications in 2009<sup>(1)</sup>. RSK GAC were updated following the publication of GAC by LQM/CIEH in 2009<sup>(2)</sup>. RSK GAC are periodically revised when updated information on toxicological, land use or receptor parameters is published.

### Updates to the RSK GAC: 2015

In 2014, the publication of Category 4 Screening Levels (C4SL)<sup>(3,4)</sup>, as part of the Defra-funded research project SP1010, included modifications to certain exposure assumptions documented within EA Science Report SC050221/SR3 (herein after referred to as SR3)<sup>(5)</sup> used in the generation of SGVs.

C4SL were published for six substances (cadmium, arsenic, benzene, benzo(a)pyrene, chromium VI and lead) for a sandy loam soil type with 6% soil organic matter, based on a low level of toxicological concern (LLTC; see Section 2.3 of research project report SP1010<sup>(3)</sup>). Where a C4SL has been published, the RSK GAC duplicates the C4SL published values using all input parameters within the SP1010 final project report<sup>(3)</sup> and associated appendices<sup>(6)</sup>, and adopts them as GAC for these six substances.

For all other substances the only C4SL exposure modification relevant to a commercial end use are daily inhalation rates.

The RSK GAC have also been revised with updated toxicology published by LQM/CIEH in 2015<sup>(7)</sup>, where a C4SL has not been published.

### RSK GAC derivation for metals and organic compounds

#### *Model selection*

Soil assessment criteria (SAC) were calculated using the Contaminated Land Exposure Assessment (CLEA) tool v1.06, supporting EA guidance<sup>(5,8,9)</sup> and revised exposure scenarios published for the C4SL<sup>(3)</sup>. Groundwater assessment criteria (GrAC) protective of human health via the inhalation pathway were derived using the RBCA 1.3b model. RSK has updated the inputs within RBCA to reflect EA guidance<sup>(1,5,8,9)</sup>. The SAC and GrAC collectively are termed GAC.

#### *Pathway selection*

In accordance with SR3<sup>(5)</sup> the commercial scenario considers risks to a female worker who works from the age of 16 to 65 years. It should be noted that this end use is not suitable for a workplace nursery but may be appropriate for a sports centre or shopping centre where children are present. In accordance with Box 3.5, SR3<sup>(5)</sup> the pathways considered for production of the SAC in the commercial scenario are

- direct soil and dust ingestion
- dermal contact with soil both indoors and outdoors



- indoor air inhalation from soil and vapour and outdoor inhalation of soil and vapour.

The pathway considered in production of the GrAC is the volatilisation of compounds from groundwater and subsequent vapour inhalation by residents while indoors. Figure 2 illustrates this linkage. Although the outdoor air inhalation pathway is also valid, this contributes little to the overall risks owing to the dilution in outdoor air. Within RBCA, the solubility limit of the chemical restricts the extent of volatilisation, which in turn drives the indoor air inhalation pathway. While the same restriction is not built into the CLEA model, the CLEA model output cells are flagged red where the soil saturation limit has been exceeded.

With respect to volatilisation, the CLEA model assumes a simple linear partitioning of a chemical in the soil between the sorbed, dissolved and vapour phase<sup>(9)</sup>. The upper boundaries of this partitioning are represented by the maximum aqueous solubility and pure saturated vapour concentration of the chemical. The CLEA model estimates saturated soil concentrations where these limits are reached<sup>(9)</sup>. The CLEA software uses a traffic light system to identify when individual and/or combined assessment criteria exceed the lower of either the aqueous- or vapour-based soil saturation limits. Model output cells are flagged red where the saturated soil concentration has been exceeded and the contribution of the indoor and outdoor vapour pathway to total exposure is greater than 10%. In this case, further consideration of the following is required<sup>(9)</sup>:

- Free phase contamination may be present.
- Exposure from the vapour pathways will be over-predicted by the model, as in reality the vapour phase concentration will not increase at concentrations above saturation limits
- Where the vapour pathway contribution is greater than 90%, it is unlikely the relevant health criteria value (HCV) will be exceeded at soil concentrations at least a factor of ten higher than the relevant HCV.

Where the vapour pathway is the predominant pathway (contributes greater than 90% of exposure) or the only exposure route considered and the cell is highlighted red (SAC exceeds saturation limit), the risk based on the assumed conceptual model is likely to be negligible as the vapour risk is assumed to be tolerable at maximum possible soil concentrations. In such circumstances, the vapour pathway exposure should be considered based on the presence of free phase or non-aqueous phase liquid sources and the measured concentrations of volatile organic compounds (VOC) in the vapour phase. Screening could be considered based on setting the SAC as the modelled soil saturation limits. However, as stated within the CLEA handbook<sup>(9)</sup>, this is likely to not be practical in many cases because of the very low saturation limits and, in any case, is highly conservative.

It should also be noted that for mixtures of compounds, free phase may be present where soil (or groundwater) concentrations are well below saturation limits for individual compounds.

Where the vapour pathway is only one of the exposure pathways considered, an additional approach can then be utilised as detailed within Section 4.12 of the CLEA model handbook<sup>(9)</sup>, which explains how to calculate an effective assessment criterion manually.

SR3<sup>(5)</sup> states that, as a general rule of thumb, it is recognised that estimating vapour phase concentrations from dissolved and sorbed phase contamination by petroleum hydrocarbons are at least a factor of ten higher than those likely to be measured on-site. RSK has therefore applied an empirical subsurface to indoor air correction factor of 10 into the CLEA model chemical database for all petroleum hydrocarbon fractions (including BTEX, trimethylbenzenes and the

polycyclic aromatic hydrocarbons (PAH) naphthalene, acenaphthene and acenaphthylene) to reduce this conservatism.

### *Input selection*

The most up-to-date published chemical and toxicological data was obtained from EA Report SC050021/SR7<sup>(10)</sup>, the EA TOX<sup>(1)</sup> reports, the C4SL SP1010 project report and associated appendices<sup>(3,6)</sup> or the 2015 LQM/CIEH report<sup>(7)</sup>. Where a C4SL has been published, the RSK GAC have duplicated the C4SL published values using all input parameters within the SP1010 final project report<sup>(3)</sup> and associated appendices<sup>(6)</sup>, and has adopted them as GAC for these six substances. Toxicological and specific chemical parameters for aromatic hydrocarbon C<sub>8</sub>–C<sub>9</sub> (styrene), 1,2,4-trimethylbenzene and methyl tertiary-butyl ether (MTBE) were obtained from the CL:AIRE Soil Generic Assessment Criteria report<sup>(11)</sup>.

For TPH, aromatic hydrocarbons C<sub>5</sub>–C<sub>8</sub> were not modelled, as this range comprises benzene and toluene, which are modelled separately. The aromatic C<sub>8</sub>–C<sub>9</sub> hydrocarbon fraction comprises ethylbenzene, xylene and styrene. As ethylbenzene and xylene are being modelled separately, the physical, chemical and toxicological data for aromatic C<sub>8</sub>–C<sub>9</sub> have been taken from styrene.

Owing to the lack of UK-specific data, default information in the RBCA model was used to evaluate MTBE. No published UK data was available for 1,3,5-trimethylbenzene, so information was obtained from the RBCA model. RBCA uses toxicity data for the inhalation pathway in different units to the CLEA model and cannot consider separately the mean daily intake (MDI), occupancy periods or breathing rates. Therefore, the HCV in RBCA was amended to take account of

- amendments to the MDI using Table 3.4 of SR2<sup>(8)</sup>
- an adult weighing 70kg and breathing 14.8m<sup>3</sup> air per day in accordance with the UK TOX reports<sup>(12)</sup> and SR3<sup>(5)</sup>. Inhalation rates used in the derivation of the GrAC have not been updated in line with the 2011 USEPA published values<sup>(12)</sup>; these will be updated in subsequent revisions of the RSK GAC.
- the 50% rule (for petroleum hydrocarbons, trimethylbenzenes and MTBE)<sup>(8,9)</sup> where MDI data is not available but background exposure is considered important in the overall exposure.

### *Physical parameters*

For the commercial end use, the CLEA default pre-1970s three-storey office building was used. SR3<sup>(5)</sup> notes this commercial building type to be the most conservative in terms of protection from vapour intrusion. The default input building parameters presented in Table 3.10 of SR3<sup>(5)</sup> have been used.

The parameters for a sandy loam soil type were used in line with Table 4.4 of SR3<sup>(5)</sup>. This includes a value of 6% for the percentage of soil organic matter (SOM) within the soil. In RSK's experience, this is rather high for many sites. To avoid undertaking site-specific risk assessments for this SOM, RSK has produced an additional set of GAC for SOM of 1% and 2.5% for all substances using the CLEA tool.

For the GrAC, the depth to groundwater was taken as 2.5m based on RSK's experience of assessing the volatilisation pathway from groundwater. The GrAC were produced using the input parameters in Table 3. Inhalation rates have not been updated.

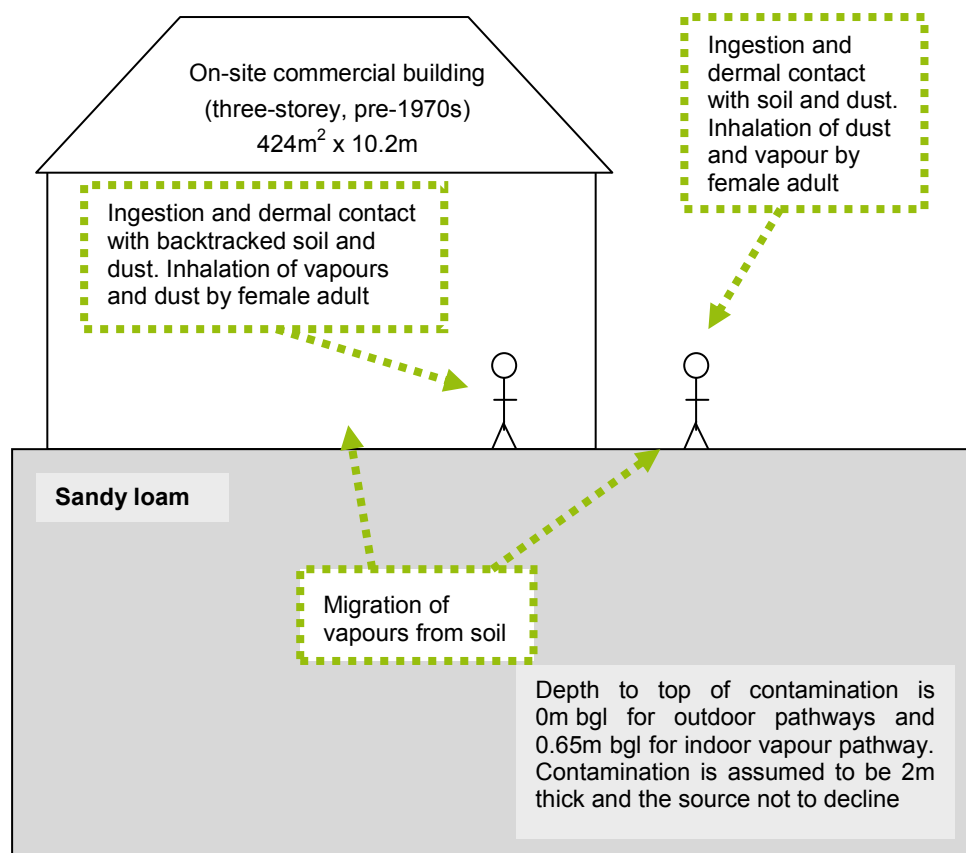


*Summary of modifications to the default CLEA 1.06/SR3<sup>(5)</sup> input parameters for a commercial land use*

In summary, the RSK commercial GAC were produced using the default input parameters for soil properties, the air dispersion model, building properties and the vapour model detailed in SR3<sup>(5)</sup>. Modifications to the default SR3<sup>(5)</sup> exposure scenarios based on the C4SL exposure scenarios<sup>(3)</sup> are presented in Table 2 below. The sole modification to the default commercial input parameters is the updated inhalation rate.

The final selected GAC are presented by pathway in Table 4 with the combined GAC in Table 5.

**Figure 1: Conceptual model for CLEA commercial scenario**



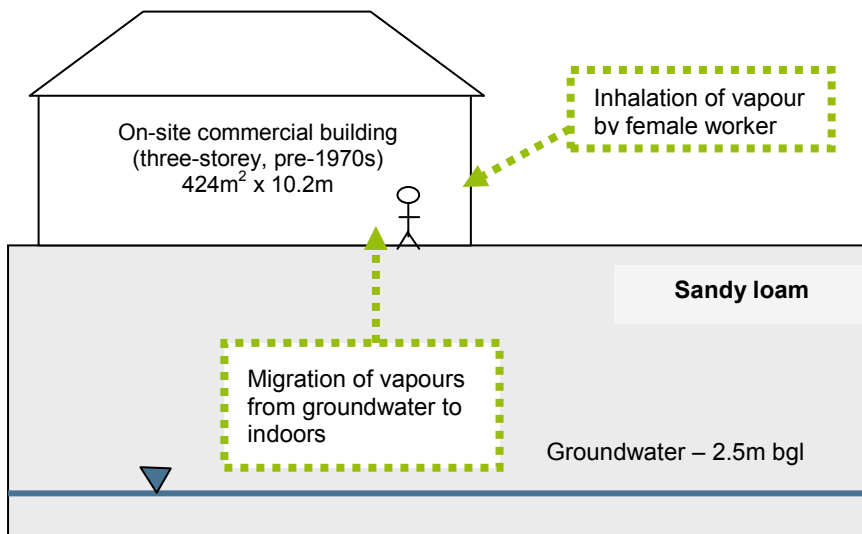
**Table 1: Exposure assessment parameters for commercial scenario – inputs for CLEA model**

Parameter	Value	Justification
Land use	Commercial	Chosen land use
Receptor	Female worker	Taken as female adult exposed over 49 years from age 16 to 65 years, Box 3.5, SR3 <sup>(5)</sup>
Building	Office (pre-1970)	Key generic assumption given in Box 3.5, SR3 <sup>(5)</sup> . Pre-1970s three-storey office building chosen as it is the most conservative in terms of protection from vapour intrusion (Section 3.4.6, SR3 <sup>(5)</sup> )
Soil type	Sandy loam	Most common UK soil type (Section 4.3.1, Table 4.4, SR3 <sup>(5)</sup> )
Start age class (AC)	17	AC corresponding to key generic assumption that the critical receptor is a working female adult exposed over a 49-year period from age 16 to 65 years. Assumption given in Box 3.5, SR3 <sup>(5)</sup>
End AC	17	
SOM (%)	6	Representative of sandy loam according to EA guidance note dated January 2009 entitled 'Changes We Have Made to the CLEA Framework Documents' <sup>(13)</sup>
	1	To provide SAC for sites where SOM < 6% as often observed by RSK
	2.5	
pH	7	Model default

**Table 2: Commercial – modified receptor inputs**

Parameter	Unit	Value	Justification
Inhalation rate (AC17)	m <sup>3</sup> day <sup>-1</sup>	15.7	Mean value USEPA, 2011 <sup>(12)</sup> ; Table 3.2, SP1010 <sup>(3)</sup>

**Figure 2: GrAC conceptual model for RBCA commercial scenario**



**Table 3: Commercial – RBCA inputs**

Parameter	Unit	Value	Justification
Receptor			
Averaging time	Years	49	From Box 3.5, SR3 <sup>(5)</sup>
Receptor weight	kg	70	Female adult, Table 4.6, SR3 <sup>(5)</sup>
Exposure duration	Years	49	From Box 3.5, SR3 <sup>(5)</sup>
Exposure frequency	Days/yr	86.25	Weighted using occupancy period of 9 hours per day for 230 days of the year ((9hours x 230 days)/24 hours)
Soil type – sandy loam			
Total porosity	-	0.53	CLEA value for sandy loam. Parameters for sandy loam from Table 4.4, SR3 <sup>(5)</sup>
Volumetric water content	-	0.33	
Volumetric air content	-	0.20	

Parameter	Unit	Value	Justification
Dry bulk density	g cm <sup>-3</sup>	1.21	
Vertical hydraulic conductivity	cm s <sup>-1</sup>	3.56E-3	CLEA value for saturated conductivity of sandy loam, Table 4.4, SR3 <sup>(5)</sup>
Vapour permeability	m <sup>2</sup>	3.05E-12	Calculated for sandy loam using equations in Appendix 1, SR3 <sup>(5)</sup>
Capillary zone thickness	m	0.1	Professional judgement
<b>Building</b>			
Building volume/area ratio	m	9.6	Table 3.10, SR3 <sup>(5)</sup>
Foundation area	m <sup>2</sup>	424	Table 3.10, SR3 <sup>(5)</sup>
Foundation perimeter	m	82.40	Based on square root of building area being 20.59m
Building air exchange rate	d <sup>-1</sup>	24	Table 3.10, SR3 <sup>(5)</sup>
Depth to bottom of foundation slab	m	0.15	
Foundation thickness	m	0.15	Table 3.10, SR3 <sup>(5)</sup>
Foundation crack fraction	-	3.89E-04	Calculated from floor crack area of 0.165m <sup>2</sup> and building footprint of 424m <sup>2</sup> in Table 4.21, SR3 <sup>(5)</sup>
Volumetric water content of cracks	-	0.33	Assumed equal to underlying soil type in assumption that cracks become filled with soil over time. Parameters for sandy loam from Table 4.4, SR3 <sup>(5)</sup>
Volumetric air content of cracks	-	0.2	
Indoor/outdoor differential pressure	Pa	4.4	From Table 3.10, SR3 <sup>(5)</sup>

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**GENERIC ASSESSMENT CRITERIA FOR HUMAN HEALTH - COMMERCIAL**



**Table 4**  
Human health generic assessment criteria by pathway for commercial scenario

Compound	Notes	GrAC (mg/l)	SAC appropriate to pathway SOM 1% (mg/kg)				Soil saturation limit (mg/kg)	SAC appropriate to pathway SOM 2.5% (mg/kg)				Soil saturation limit (mg/kg)	SAC appropriate to pathway SOM 6% (mg/kg)			Soil saturation limit (mg/kg)
			Oral	Inhalation	Combined			Oral	Inhalation	Combined			Oral	Inhalation	Combined	
<b>Metals</b>																
Arsenic	(a,b)	-	6.40E+02	NR	NR	NR	NR	6.40E+02	NR	NR	NR	NR	6.40E+02	NR	NR	NR
Cadmium	(a)	-	NR	NR	4.10E+02	NR	NR	NR	NR	4.10E+02	NR	NR	NR	NR	4.10E+02	NR
Chromium (III) - trivalent	(c)	-	3.31E+05	8.57E+03	8.35E+03	NR	NR	3.31E+05	8.57E+03	8.35E+03	NR	NR	3.31E+05	8.57E+03	8.35E+03	NR
Chromium (VI) - hexavalent	(a,d)	-	NR	4.90E+01	NR	NR	NR	NR	4.90E+01	NR	NR	NR	NR	4.90E+01	NR	NR
Copper	-	-	1.89E+05	8.96E+04	6.83E+04	NR	NR	1.89E+05	8.96E+04	6.83E+04	NR	NR	1.89E+05	8.96E+04	6.83E+04	NR
Lead	(a)	-	NR	NR	2.33E+03	NR	NR	NR	NR	2.33E+03	NR	NR	NR	NR	2.33E+03	NR
Elemental Mercury (Hg <sup>0</sup> )	(d)	5.60E-02	NR	1.54E+01	NR	4.31E+00	NR	NR	3.26E+01	NR	1.07E+01	NR	NR	5.80E+01	NR	2.58E+01
Inorganic Mercury (Hg <sup>2+</sup> )	-	-	1.18E+03	1.97E+04	1.12E+03	NR	NR	1.18E+03	1.97E+04	1.12E+03	NR	NR	1.18E+03	1.97E+04	1.12E+03	NR
Methyl Mercury (Hg <sup>4+</sup> )	-	1.00E+02	3.38E+02	2.13E+03	2.92E+02	7.33E+01	NR	3.38E+02	3.87E+03	3.11E+02	1.42E+02	NR	3.38E+02	7.33E+03	3.23E+02	3.04E+02
Nickel	(d)	-	2.21E+04	9.83E+02	9.64E+02	NR	NR	2.21E+04	9.83E+02	9.64E+02	NR	NR	2.21E+04	9.83E+02	9.64E+02	NR
Selenium	(b)	-	1.23E+04	NR	NR	NR	NR	1.23E+04	NR	NR	NR	NR	1.23E+04	NR	NR	NR
Zinc	(b)	-	7.35E+05	1.97E+08	NR	NR	NR	7.35E+05	1.97E+08	NR	NR	NR	7.35E+05	1.97E+08	NR	NR
Cyanide	-	-	1.69E+04	1.95E+03	1.81E+03	NR	NR	1.69E+04	1.95E+03	1.81E+03	NR	NR	1.69E+04	1.95E+03	1.81E+03	NR
<b>Volatile Organic Compounds</b>																
Benzene	(a)	1.40E+02	1.09E+03	2.79E+01	2.72E+01	1.22E+03	NR	1.09E+03	5.19E+01	4.96E+01	2.26E+03	NR	1.09E+03	1.08E+02	9.80E+01	4.71E+03
Toluene	-	5.90E+02	4.24E+05	6.49E+04	5.63E+04	8.69E+02	NR	4.24E+05	1.43E+05	1.07E+05	1.92E+03	NR	4.24E+05	3.24E+05	1.84E+05	4.36E+03
Ethylbenzene	-	1.80E+02	1.91E+05	5.89E+03	5.71E+03	5.18E+02	NR	1.91E+05	1.38E+04	1.28E+04	1.22E+03	NR	1.91E+05	3.21E+04	2.75E+04	2.84E+03
Xylene - m	-	2.00E+02	3.43E+05	6.26E+03	6.15E+03	6.25E+02	NR	3.43E+05	1.47E+04	1.41E+04	1.47E+03	NR	3.43E+05	3.44E+04	3.12E+04	3.46E+03
Xylene - o	-	1.70E+02	3.43E+05	6.73E+03	6.60E+03	4.78E+02	NR	3.43E+05	1.57E+04	1.50E+04	1.12E+03	NR	3.43E+05	3.65E+04	3.30E+04	2.62E+03
Xylene - p	-	2.00E+02	3.43E+05	6.03E+03	5.92E+03	5.76E+02	NR	3.43E+05	1.41E+04	1.36E+04	1.35E+03	NR	3.43E+05	3.28E+04	3.00E+04	3.17E+03
Total xylene	-	2.00E+02	3.43E+05	6.03E+03	5.92E+03	6.25E+02	NR	3.43E+05	1.41E+04	1.36E+04	1.47E+03	NR	3.43E+05	3.28E+04	3.00E+04	3.46E+03
Methyl tertiary-Butyl ether (MTBE)	-	4.80E+04	5.72E+05	7.54E+04	6.66E+04	2.04E+04	NR	5.72E+05	1.22E+05	1.01E+05	3.31E+04	NR	5.72E+05	2.31E+05	1.65E+05	6.27E+04
Trichloroethene	-	3.60E+01	9.53E+02	1.23E+00	1.23E+00	1.54E+03	NR	9.53E+02	2.58E+00	2.57E+00	3.22E+03	NR	9.53E+02	5.72E+00	5.69E+00	7.14E+03
Tetrachloroethene	-	2.30E+02	1.12E+04	1.86E+01	1.86E+01	4.24E+02	NR	1.12E+04	4.17E+01	4.16E+01	9.51E+02	NR	1.12E+04	9.57E+01	9.49E+01	2.18E+03
1,1,1-Trichloroethane	-	1.30E+03	1.14E+06	6.60E+02	6.60E+02	1.43E+03	NR	1.14E+06	1.35E+03	1.35E+03	2.92E+03	NR	1.14E+06	2.96E+03	2.95E+03	6.39E+03
1,1,1,2-Tetrachloroethane	-	1.10E+03	1.10E+04	1.09E+02	1.08E+02	2.60E+03	NR	1.10E+04	2.53E+02	2.47E+02	6.02E+03	NR	1.10E+04	5.88E+02	5.59E+02	1.40E+04
1,1,2,2-Tetrachloroethane	-	1.10E+03	1.10E+04	2.81E+02	2.74E+02	2.67E+03	NR	1.10E+04	5.75E+02	5.46E+02	5.46E+03	NR	1.10E+04	1.26E+03	1.13E+03	1.20E+04
Carbon Tetrachloride	-	5.70E+00	7.62E+03	2.87E+00	2.87E+00	1.52E+03	NR	7.62E+03	6.29E+00	6.28E+00	3.32E+03	NR	7.62E+03	1.43E+01	1.42E+01	7.54E+03
1,2-Dichloroethane	-	6.10E+00	2.29E+02	6.79E-01	6.71E-01	3.41E+03	NR	2.29E+02	9.71E-01	9.67E-01	4.91E+03	NR	2.29E+02	1.67E+00	1.65E+00	8.43E+03
Vinyl Chloride	-	4.10E-01	2.67E+01	5.95E-02	5.94E-02	1.36E+03	NR	2.67E+01	7.70E-02	7.67E-02	1.76E+03	NR	2.67E+01	1.18E-01	1.17E-01	2.69E+03
1,2,4-Trimethylbenzene	-	5.70E+01	NR	3.29E+02	NR	4.74E+02	NR	6.41E+02	NR	NR	1.16E+03	NR	1.04E+03	NR	NR	2.76E+03
1,3,5-Trimethylbenzene	(e)	3.80E+01	NR	NR	NR	2.30E+02	NR	NR	NR	NR	5.52E+02	NR	NR	NR	NR	1.30E+03
<b>Semi-Volatile Organic Compounds</b>																
Acenaphthene	-	3.20E+00	1.10E+05	2.75E+06	1.06E+05	5.70E+01	NR	1.10E+05	5.36E+06	1.08E+05	1.41E+02	NR	1.10E+05	8.83E+06	1.08E+05	3.36E+02
Acenaphthylene	-	1.61E+01	1.10E+05	2.68E+06	1.05E+05	8.61E+01	NR	1.10E+05	5.23E+06	1.07E+05	2.12E+02	NR	1.10E+05	8.65E+06	1.08E+05	5.06E+02
Anthracene	-	2.10E-02	5.49E+05	1.13E+07	5.23E+05	1.17E+00	NR	5.49E+05	2.35E+07	5.36E+05	2.91E+00	NR	5.49E+05	4.13E+07	5.42E+05	6.96E+00
Benzo(a)anthracene	-	3.80E-03	2.84E+02	4.08E+02	1.67E+02	1.71E+00	NR	2.84E+02	4.47E+02	1.74E+02	4.28E+00	NR	2.84E+02	4.67E+02	1.76E+02	1.03E+01
Benzo(b)fluoranthene	-	2.00E-03	7.13E+01	1.17E+02	4.43E+01	1.22E+00	NR	7.13E+01	1.20E+02	4.47E+01	3.04E+00	NR	7.13E+01	1.21E+02	4.49E+01	7.29E+00
Benzo(g,h,i)perylene	-	2.60E-04	6.29E+03	1.05E+04	3.93E+03	1.54E-02	NR	6.29E+03	1.06E+04	3.95E+03	3.85E-02	NR	6.29E+03	1.07E+04	3.96E+03	9.23E-02
Benzo(k)fluoranthene	-	8.00E-04	1.88E+03	3.11E+03	1.17E+03	6.87E-01	NR	1.88E+03	3.17E+03	1.18E+03	1.72E+00	NR	1.88E+03	3.21E+03	1.19E+03	4.12E+00
Chrysene	-	2.00E-03	5.67E+02	8.89E+02	3.46E+02	4.40E-01	NR	5.67E+02	9.25E+02	3.52E+02	1.10E+00	NR	5.67E+02	9.47E+02	3.55E+02	2.64E+00
Dibenzo(a,h)anthracene	-	6.00E-04	5.67E+00	9.32E+00	3.53E+00	3.93E-03	NR	5.67E+00	9.52E+00	3.55E+00	9.82E-03	NR	5.67E+00	9.64E+00	3.57E+00	2.36E-02
Fluoranthene	-	2.30E-01	2.29E+04	2.26E+04	1.89E+04	2.29E+04	NR	2.29E+04	2.27E+06	2.27E+04	4.73E+01	NR	2.29E+04	3.32E+06	2.27E+04	1.13E+02
Fluorene	-	1.90E+00	7.31E+04	4.55E+05	6.30E+04	3.09E+01	NR	7.31E+04	1.06E+06	6.84E+04	7.65E+01	NR	7.31E+04	2.24E+06	7.08E+04	1.83E+02
Indeno(1,2,3-cd)pyrene	-	2.00E-04	8.10E+02	1.31E+03	5.01E+02	6.13E-02	NR	8.10E+02	1.35E+03	5.06E+02	1.53E-01	NR	8.10E+02	1.37E+03	5.09E+02	3.68E-01
Phenanthrene	-	5.30E-01	2.28E+04	5.35E+05	2.19E+04	3.60E+01	NR	2.28E+04	1.09E+06	2.24E+04	8.96E+01	NR	2.28E+04	1.86E+06	2.25E+04	2.14E+02
Pyrene	-	1.30E-01	5.49E+04	4.47E+06	5.42E+04	2.20E+00	NR	5.49E+04	6.46E+06	5.44E+04	5.49E+00	NR	5.49E+04	7.91E+06	5.45E+04	1.32E+01
Benzo(a)pyrene	(a)	3.80E-03	7.68E+01	2.04E+02	5.58E+01	9.11E-01	NR	7.68E+01	2.09E+02	5.61E+01	2.28E+00	NR	7.68E+01	2.11E+02	5.63E+01	5.46E+00
Naphthalene	-	1.90E+01	3.64E+04	1.87E+03	1.78E+03	7.64E+01	NR	3.64E+04	4.39E+03	3.92E+03	1.83E+02	NR	3.64E+04	9.94E+03	7.81E+03	4.32E+02
Phenol	-	-	1.10E+06	2.65E+04	2.59E+04	2.42E+04	NR	1.10E+06	3.04E+04	2.96E+04	3.81E+04	NR	1.10E+06	3.46E+04	3.35E+04	7.03E+04



GENERIC ASSESSMENT CRITERIA FOR HUMAN HEALTH - COMMERCIAL



Table 4  
Human health generic assessment criteria by pathway for commercial scenario

Compound	Notes	GrAC (mg/l)	SAC appropriate to pathway SOM 1% (mg/kg)			Soil saturation limit (mg/kg)	SAC appropriate to pathway SOM 2.5% (mg/kg)			Soil saturation limit (mg/kg)	SAC appropriate to pathway SOM 6% (mg/kg)			Soil saturation limit (mg/kg)
			Oral	Inhalation	Combined		Oral	Inhalation	Combined		Oral	Inhalation	Combined	
<b>Total petroleum hydrocarbons</b>														
Aliphatic hydrocarbons EC5-EC6		3.60E+01	4.77E+06	3.19E+03	3.19E+03	3.04E+02	4.77E+06	5.86E+03	5.86E+03	5.58E+02	4.77E+06	1.21E+04	1.21E+04	1.15E+03
Aliphatic hydrocarbons >EC6-EC8		5.40E+00	4.77E+06	7.79E+03	7.78E+03	1.44E+02	4.77E+06	1.74E+04	1.74E+04	3.22E+02	4.77E+06	3.97E+04	3.96E+04	7.36E+02
Aliphatic hydrocarbons >EC8-EC10		4.30E-01	9.53E+04	2.02E+03	2.00E+03	7.77E+01	9.53E+04	4.91E+03	4.85E+03	1.90E+02	9.53E+04	1.17E+04	1.13E+04	4.51E+02
Aliphatic hydrocarbons >EC10-EC12		3.40E-02	9.53E+04	9.97E+03	9.69E+03	4.75E+01	9.53E+04	2.47E+04	2.29E+04	1.18E+02	9.53E+04	5.89E+04	4.73E+04	2.83E+02
Aliphatic hydrocarbons >EC12-EC16		7.60E-04	9.53E+04	8.26E+04	5.88E+04	2.37E+01	9.53E+04	2.04E+05	8.17E+04	5.91E+01	9.53E+04	4.81E+05	9.02E+04	1.42E+02
Aliphatic hydrocarbons >EC16-EC35	(b)	-	1.58E+06	NR	NR	8.48E+00	1.75E+06	NR	NR	2.12E+01	1.83E+06	NR	NR	5.09E+01
Aliphatic hydrocarbons >EC35-EC44	(b)	-	1.58E+06	NR	NR	8.48E+00	1.75E+06	NR	NR	2.12E+01	1.83E+06	NR	NR	5.09E+01
Aromatic hydrocarbons >EC8-EC9 (styrene)		6.50E+01	2.29E+04	3.66E+04	1.41E+04	6.26E+02	2.29E+04	8.39E+04	1.80E+04	1.44E+03	2.29E+04	1.93E+05	2.04E+04	3.35E+03
Aromatic hydrocarbons >EC9-EC10		6.50E+01	3.81E+04	3.55E+03	3.46E+03	6.13E+02	3.81E+04	8.66E+03	8.11E+03	1.50E+03	3.81E+04	2.05E+04	1.70E+04	3.58E+03
Aromatic hydrocarbons >EC10-EC12		2.50E+01	3.81E+04	1.92E+04	1.62E+04	3.64E+02	3.81E+04	4.69E+04	2.79E+04	8.99E+02	3.81E+04	1.10E+05	3.42E+04	2.15E+03
Aromatic hydrocarbons >EC12-EC16		5.80E+00	3.81E+04	2.02E+05	3.62E+04	1.69E+02	3.81E+04	4.76E+05	3.73E+04	4.19E+02	3.81E+04	1.03E+06	3.78E+04	1.00E+03
Aromatic hydrocarbons >EC16-EC21	(b)	-	2.82E+04	NR	NR	5.37E+01	2.83E+04	NR	NR	1.34E+02	2.84E+04	NR	NR	3.21E+02
Aromatic hydrocarbons >EC21-EC35	(b)	-	2.84E+04	NR	NR	4.83E+00	2.84E+04	NR	NR	1.21E+01	2.84E+04	NR	NR	2.90E+01
Aromatic hydrocarbons >EC35-EC44	(b)	-	2.84E+04	NR	NR	4.83E+00	2.84E+04	NR	NR	1.21E+01	2.84E+04	NR	NR	2.90E+01

Notes:

EC - equivalent carbon. GrAC - groundwater screening value. SAC - soil screening value.  
The CLEA model output is colour coded depending upon whether the soil saturation limit has been exceeded.



Calculated SAC exceeds soil saturation limit and may significantly affect the interpretation of any exceedances as the contribution of the indoor and outdoor vapour pathway to total exposure is >10%. This shading has also been used for the RBCA output where the theoretical solubility limit has been exceeded. The SAC has been set as the model calculated SAC with the saturation limits shown in brackets.  
Calculated SAC exceeds soil saturation limit but the exceedance will not affect the SAC significantly as the contribution of the indoor and outdoor vapour pathway to total exposure is <10%.  
Calculated SAC does not exceed the soil saturation limit.

For consistency where the theoretical solubility limit within RBCA has been exceeded in production of the GrAC, these cells have also been hatched red and the GrAC set at the solubility limit.

The SAC for organic compounds are dependant upon soil organic matter (SOM) (%) content. To obtain SOM from total organic carbon (TOC) (%) divide by 0.58. 1% SOM is 0.58% TOC. DL Rowell Soil Science: Methods and Applications, Longmans, 1994.  
SAC for TPH fractions, polycyclic aromatic hydrocarbons, MTBE, BTEX and trimethylbenzene compounds were produced using an attenuation factor for the indoor air inhalation pathway of 10 to reduce conservatism associated with the vapour inhalation pathway (Section 10.1.1, SR3)

- (a) SAC for arsenic, benzene, benzo(a)pyrene, cadmium, chromium VI and lead are derived using the C4SL toxicology data.
- (b) SAC for selenium should not include the inhalation pathway as no expert group HCV has been derived; aliphatic and aromatic hydrocarbons >EC16 should not include inhalation pathway due to their non-volatile nature and inhalation exposure being minimal (oral, dermal and inhalation exposure is compared to the oral HCV); arsenic should only be based on oral contribution (rather than combined) owing to the relative small contribution from inhalation in accordance with the SGV report. The Oral SAC should be adopted for zinc and benzo(a)pyrene.
- (c) SAC for CrIII should be based on the lower of the oral and inhalation SAC (see LQM/CIEH 2015 Section 6.8)
- (d) SAC for elemental mercury, chromium VI and nickel should be based on the inhalation pathway only.
- (e) SAC for 1,3,5-trimethylbenzene is not recorded owing to the lack of toxicological data, SAC for 1,2,4 trimethylbenzene may be used.



**Table 5**  
Human Health Generic Assessment Criteria for Commercial Scenario

Compound	GrAC for Groundwater (mg/l)	SAC for Soil SOM 1% (mg/kg)	SAC for Soil SOM 2.5% (mg/kg)	SAC for Soil SOM 6% (mg/kg)
<b>Metals</b>				
Arsenic	-	640	640	640
Cadmium	-	410	410	410
Chromium (III) - trivalent	-	8,600	8,600	8,600
Chromium (VI) - hexavalent	-	49	49	49
Copper	-	68,000	68,000	68,000
Lead	-	2,300	2,300	2,300
Elemental Mercury (Hg <sup>0</sup> )	0.056	15 (4)	33 (11)	58 (26)
Inorganic Mercury (Hg <sup>2+</sup> )	-	1,120	1,120	1,120
Methyl Mercury (Hg <sup>4+</sup> )	100	290 (73)	310	320
Nickel	-	1,000	1,000	1,000
Selenium	-	12,000	12,000	12,000
Zinc	-	740,000	740,000	740,000
Cyanide	-	1,800	1,800	1,800
<b>Volatile Organic Compounds</b>				
Benzene	140	27	50	98
Toluene	590	56,000 (869)	107,000 (1,916)	184,000 (4,357)
Ethylbenzene	180	6,000 (518)	13,000 (1,216)	27,000 (2,844)
Xylene - m	200	6,200 (625)	14,100 (1,474)	31,200 (3,457)
Xylene - o	170	6,600 (478)	15,000 (1,120)	33,000 (2,618)
Xylene - p	200	5,900 (576)	13,600 (1,353)	30,000 (3,167)
Total xylene	200	5,900 (625)	13,600 (1,474)	30,000 (3,457)
Methyl tertiary-Butyl ether (MTBE)	48000	67,000 (20,400)	101,000 (33,100)	165,000 (62,700)
Trichloroethene	36	1	3	6
Tetrachloroethene	230	20	40	90
1,1,1-Trichloroethane	1300	700	1,300	3,000
1,1,1,2-Tetrachloroethane	1100	110	250	560
1,1,2,2-Tetrachloroethane	1100	270	550	1,130
Carbon Tetrachloride	5.7	2.9	6.3	14.2
1,2-Dichloroethane	6.1	0.67	0.97	1.65
Vinyl Chloride	0.41	0.06	0.08	0.12
1,2,4-Trimethylbenzene	57	330	640	1,040
1,3,5-Trimethylbenzene	38	NR	NR	NR
<b>Semi-Volatile Organic Compounds</b>				
Acenaphthene	3.2	110,000	110,000	110,000
Acenaphthylene	16	110,000	110,000	110,000
Anthracene	0.021	520,000	540,000	540,000
Benzo(a)anthracene	0.0038	170	170	180
Benzo(b)fluoranthene	0.002	44	45	45
Benzo(g,h,i)perylene	0.00026	3,900	3,900	4,000
Benzo(k)fluoranthene	0.0008	1,200	1,200	1,200
Chrysene	0.002	350	350	350
Dibenzo(a,h)anthracene	0.0006	3.5	3.6	3.6
Fluoranthene	0.23	23,000	23,000	23,000
Fluorene	1.9	63,000	68,000	71,000
Indeno(1,2,3-cd)pyrene	0.0002	500	510	510
Phenanthrene	0.53	22,000	22,000	23,000
Pyrene	0.13	54,000	54,000	54,000
Benzo(a)pyrene	0.0038	77	77	77
Naphthalene	19	1,800 (76)	3,900 (183)	7,800 (432)
Phenol	-	440*	690*	1,300*
<b>Total Petroleum Hydrocarbons</b>				
Aliphatic hydrocarbons EC <sub>5</sub> -EC <sub>6</sub>	36	3,200 (304)	5,900 (558)	12,100 (1,150)
Aliphatic hydrocarbons >EC <sub>6</sub> -EC <sub>8</sub>	5.4	7,800 (144)	17,400 (322)	39,600 (736)
Aliphatic hydrocarbons >EC <sub>8</sub> -EC <sub>10</sub>	0.43	2,000 (78)	4,800 (190)	11,300 (451)
Aliphatic hydrocarbons >EC <sub>10</sub> -EC <sub>12</sub>	0.034	9,700 (48)	22,900 (118)	47,300 (283)
Aliphatic hydrocarbons >EC <sub>12</sub> -EC <sub>16</sub>	0.00076	59,000 (24)	82,000 (59)	90,000 (142)
Aliphatic hydrocarbons >EC <sub>16</sub> -EC <sub>35</sub>	-	1,000,000**	1,000,000**	1,000,000**
Aliphatic hydrocarbons >EC <sub>35</sub> -EC <sub>44</sub>	-	1,000,000**	1,000,000**	1,000,000**
Aromatic hydrocarbons >EC <sub>8</sub> -EC <sub>9</sub> (styrene)	65	14,000 (626)	18,000 (1,440)	20,000 (3,350)
Aromatic hydrocarbons >EC <sub>9</sub> -EC <sub>10</sub>	65	3,500 (613)	8,100 (1,503)	17,000 (3,580)
Aromatic hydrocarbons >EC <sub>10</sub> -EC <sub>12</sub>	25	16,000 (364)	28,000 (899)	34,000 (2,150)
Aromatic hydrocarbons >EC <sub>12</sub> -EC <sub>16</sub>	5.8	36,000 (169)	37,000	38,000
Aromatic hydrocarbons >EC <sub>16</sub> -EC <sub>21</sub>	-	28,000	28,000	28,000
Aromatic hydrocarbons >EC <sub>21</sub> -EC <sub>35</sub>	-	28,000	28,000	28,000
Aromatic hydrocarbons >EC <sub>35</sub> -EC <sub>44</sub>	-	28,000	28,000	28,000

**Notes:**

\* - Generic assessment criteria not calculated owing to low volatility of substance and therefore no pathway, or an absence of toxicological data.

NR - SAC for 1,3,5-trimethylbenzene is not recorded owing to the lack of toxicological data, SAC for 1,2,4 trimethylbenzene may be used

EC - equivalent carbon. GrAC - groundwater assessment criteria. SAC - soil assessment criteria.

\* The GAC for Phenol is based on a threshold which is protective of direct contact (SC050021/Phenol SGV report)

\*\* Denoted SAC calculated exceeds 100% contaminant, hence 100% (1,000,000mg/kg) has been taken as SAC

The SAC for organic compounds are dependent on Soil Organic Matter (SOM) (%) content. To obtain SOM from total organic carbon (TOC) (%) divide by 0.58.

1% SOM is 0.58% TOC. DL Rowell Soil Science: Methods and Applications, Longmans, 1994.

SAC for TPH fractions, polycyclic aromatic hydrocarbons, MTBE, BTEX and trimethylbenzene compounds were produced using an attenuation factor for the indoor air inhalation pathway of 10 to reduce conservatism associated with the vapour inhalation pathway, section 10.1.1, SR3.

(VALUE IN BRACKETS) The SAC has been set as the model calculated SAC with the saturation limit shown in brackets.

RSK has adopted an approach for petroleum hydrocarbons in accordance with LQM/CI/EH whereby the concentration modelled for each petroleum hydrocarbon fraction has been tabulated as the SAC with the corresponding solubility or vapour saturation limits given in brackets.

(VALUE IN BRACKETS) For consistency where the GrAC exceeds the solubility limit, GrAC has been set at the solubility limit. The GrAC is conservative since concentrations of the chemical are very unlikely to be at sufficient concentration to result in an exceedance of the health criteria value at the point of exposure (i.e. indoor air) provided free-phase product is absent.

# GENERIC ASSESSMENT CRITERIA FOR CONTROLLED WATERS

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The water environment in the United Kingdom is protected under a number of regulatory regimes. The relevant environmental regulator is consulted where there may be a risk that pollution of 'controlled waters' may occur or may have occurred in the past. Controlled waters are coastal waters, inland freshwaters and groundwater. The EU Water Framework Directive (WFD) (2000/60/EC) is implemented via domestic regulations and guidance, covering aspects of groundwater, surface water and drinking water supply policy. Domestic legislation and guidance will vary across the United Kingdom. Therefore, the relevant legislation for England, Wales, Northern Ireland and Scotland should be reviewed, alongside guidance provided by the Environment Agency (EA), Natural Resource Wales (NRW), the Scottish Environmental Protection Agency (SEPA) or the Northern Ireland Environment Agency (NIEA), as appropriate.

The main objectives of the protection and remediation of groundwater under threat from land contamination are set out in the Environment Agency's Groundwater Protection: Principles and Practice (GP3) document<sup>(1)</sup>. When assessing risks to groundwater the following need to be taken into consideration:

- Where pollutants have not yet entered groundwater, all necessary and reasonable measures must be taken to
  - *prevent the input of hazardous substances into groundwater (see description of hazardous substances below)*
  - *limit the entry of other (non-hazardous) pollutants into groundwater so as to avoid pollution, and to avoid deterioration of the status of groundwater bodies or sustained, upward trends in pollutant concentration.*
- Where hazardous substances or non-hazardous pollutants have already entered groundwater, the priority is to
  - *minimise further entry of hazardous substances and non-hazardous pollutants into groundwater*
  - *take necessary and reasonable measures to limit the pollution of groundwater or impact on the status of the groundwater body from the future expansion of a contaminant 'plume', if necessary by actively reducing its extent if the economic, social and environmental benefits of doing so outweigh the costs.*

## DEFINITIONS

**Hazardous substances** are defined in the Water Framework Directive 2000/60/EC as 'substances or groups of substances that are toxic, persistent and liable to bio-accumulate, and other substances or groups of substances that give rise to an equivalent level of concern.' All List 1 substances under the old Groundwater Directive (80/68/EEC) are hazardous substances, all radioactive substances are hazardous substances.

**Non-hazardous substances** are defined as 'substances capable of causing pollution that have not been classified as hazardous substances'. The non-hazardous list of pollutants does not simply replace the old WFD List II but includes a wider range of pollutants.

For the current list of classified substances please visit the UKTAG website [www.wfduk.org./jagdag/](http://www.wfduk.org./jagdag/)

When assessing the risks to surface waters, various standards apply, including Environmental Quality Standards (EQS) which are protective of the water ecology.

The Water Supply (Water Quality) Regulations<sup>(2)</sup> are the primary source for assessing water bodies that may be used for public water supplies. The Private Water Supplies Regulations<sup>(3)</sup> may be applicable in some cases.

This appendix presents the generic assessment criteria (GAC) that RSK considers are suitable for assessing risks to controlled waters.

The RSK GAC for controlled waters are presented in Table 1. In line with the Environment Agency's Remedial Targets Methodology, the GAC for controlled waters are termed 'target concentrations'.

The target concentration can be derived by several means with consideration to

- whether the substance is classified as hazardous or non-hazardous by the EU under the WFD (2000/60/EC) and Groundwater Daughter Directive (2006/118/EC) implemented through the Environmental Permitting Regulations 2010
- background concentrations in the aquifer
- published guidance such as EQS that are protective of ecology or The Water Supply (Water Quality) Regulations 2010 that are protective of drinking water
- minimum reporting values (MRV) (or method detection limits if MRV are not provided).

It is important to remember that the WFD and GP3<sup>(1)</sup> guidance allow a risk-based and a cost-benefit approach to be applied to groundwater contamination. Exceedance of any target concentration does not necessarily imply that an unacceptable risk exists or that remediation is required either on a technical or cost-benefit basis. If pollutant concentrations at a site exceed target concentrations please speak to a member of the QRA group who will assist in making an appropriate assessment and recommendations.

**Table 1: Target concentrations for controlled waters**

**Analytes in bold are hazardous**, *analytes in italics are non-hazardous*, analytes in plain text are unclassified; according to JAGDAG Determination List June 2010 (revised June 2012).

Target concentrations shaded in

GREEN are statutory values usually for drinking water or a surface watercourse

ORANGE are non-statutory values

Determinant	Target concentrations (mg/l)			
	Minimum reporting value	UK drinking water standard or best equivalent	EQS or best equivalent	
			Freshwater	Transitional (estuaries) and coastal waters
<b>Metals</b>				
<b>Arsenic</b>	-	0.01 <sup>(2)</sup>	0.05 <sup>(5a)</sup>	0.025 <sup>(5a)</sup>
<b>Cadmium</b>	0.0001 <sup>(6)</sup>	0.005 <sup>(2)</sup>	≤0.00008, 0.00008, 0.00009, 0.00015, 0.00025 <sup>(5b)</sup>	0.0002 <sup>(15c)</sup>
Chromium (total)	-	0.05 <sup>(2)</sup>	Sum values for chromium III and VI	
Chromium (III)	-	Use value for total chromium	0.0047 <sup>(5a)</sup>	-
Chromium (VI)			0.0034 <sup>(5a)</sup>	0.0006 <sup>(5a)</sup>
<i>Copper</i>	-	2.0 <sup>(2)</sup>	0.001 bioavailable <sup>(7)</sup>	0.00376 dissolved, where DOC ≤1mg/l <sup>(7)</sup> 0.00376 + (0.002677 x ((DOC/2) – 0.0005)) µg/l dissolved, where DOC >1mg/l <sup>(7)</sup>
Lead	-	0.025 (before 25/12/2013), 0.01 (after 25/12/2013) <sup>(2)</sup>	0.0072 <sup>(5c)</sup>	0.0072 <sup>(5c)</sup>



Determinant	Target concentrations (mg/l)			
	Minimum reporting value	UK drinking water standard or best equivalent	EQS or best equivalent	
			Freshwater	Transitional (estuaries) and coastal waters
<b>Mercury</b>	0.00001 <sup>(6)</sup>	0.001 <sup>(2)</sup>	0.00005 <sup>(5c)</sup>	0.00005 <sup>(5c)</sup>
Nickel	-	0.02 <sup>(2)</sup>	0.02 <sup>(5c)</sup>	0.02 <sup>(5c)</sup>
Selenium	-	0.01 <sup>(2)</sup>	-	-
<i>Zinc</i>	-	3 <sup>(4)</sup>	0.0109 bioavailable plus ambient background concentration (dissolved) <sup>(7)</sup>	0.0068 dissolved plus ambient background concentration <sup>(7)</sup>
<b>Chlorinated solvents</b>				
<b>Trichloroethene</b>	0.0001 <sup>(6)</sup>	0.01 <sup>(2)</sup>	0.01 <sup>(5c)</sup>	0.01 <sup>(5c)</sup>
<b>Tetrachloroethene</b>	0.0001 <sup>(6)</sup>	0.01 <sup>(2)</sup>	0.01 <sup>(5c)</sup>	0.01 <sup>(5c)</sup>
<b>Tetrachloroethane</b>	-	-	0.14 <sup>(17)</sup>	-
<b>1,1,1-Trichloroethane</b>	0.0001 <sup>(6)</sup>	-	0.1 <sup>(5c)</sup>	0.1 <sup>(5c)</sup>
<b>1,1,2-Trichloroethane</b>	0.0001 <sup>(6)</sup>	-	0.4 <sup>(5c)</sup>	0.3 <sup>(5c)</sup>
<b>Carbon tetrachloride (tetrachloromethane)</b>	0.0001 <sup>(6)</sup>	0.003 <sup>(2)</sup>	0.012 <sup>(5c)</sup>	0.012 <sup>(5c)</sup>
<b>1,2-Dichloroethane</b>	0.001 <sup>(6)</sup>	0.003 <sup>(2)</sup>	0.01 <sup>(5c)</sup>	0.01 <sup>(5c)</sup>
<b>Vinyl chloride (chloroethene)</b>	-	0.0005 <sup>(2)</sup>	-	-
<b>Trihalomethanes</b>	-	0.1 <sup>(2, 8)</sup>	-	-
<b>Chloroform (trichloromethane)</b> (one of the trihalomethanes included above)	0.0001 <sup>(6)</sup>	0.1 <sup>(2, 8)</sup>	0.0025 <sup>(5c)</sup>	0.0025 <sup>(5c)</sup>



Determinant	Target concentrations (mg/l)			
	Minimum reporting value	UK drinking water standard or best equivalent	EQS or best equivalent	
			Freshwater	Transitional (estuaries) and coastal waters
<b>Polycyclic aromatic hydrocarbons</b>				
Acenaphthene	-	-	0.0058 <sup>(9)</sup>	
Acenaphthylene	-	-	0.0058 <sup>(9)</sup>	
Anthracene	-	-	0.0001 <sup>(5c)</sup>	0.0001 <sup>(15c)</sup>
Benzo(a)anthracene	-	-	0.000018 <sup>(9)</sup>	
Benzo(b)fluoranthene	-	0.0001 <sup>(2)</sup>	0.00003 <sup>(15f)</sup>	0.00003 <sup>(5f)</sup>
Benzo(k)fluoranthene	-		0.000002 <sup>(15g)</sup>	0.000002 <sup>(5g)</sup>
Benzo(g,h,i)perylene	-			
Indeno(1,2,3-cd)pyrene	-			
Chrysene	-	-	0.00001 <sup>(9)</sup>	
Dibenzo(a,h)anthracene	-	-	0.00001 <sup>(9)</sup>	
Fluoranthene	-	-	0.0001 <sup>(5c)</sup>	0.0001 <sup>(5c)</sup>
Fluorene	-	-	0.0021 <sup>(9)</sup>	
Phenanthrene	-	-	0.003 <sup>(9)</sup>	
Pyrene	-	-	0.00004 <sup>(9)</sup>	
Benzo(a)pyrene	-	0.00001 <sup>(2)</sup>	0.00005 <sup>(5c)</sup>	0.00005 <sup>(5c)</sup>
Naphthalene	-	-	0.0024 <sup>(5c)</sup>	0.0012 <sup>(15c)</sup>
<b>Petroleum hydrocarbons</b>				
Total petroleum hydrocarbons	-	0.01 <sup>(11)</sup>	0.01 <sup>(10,11)</sup>	
Benzene	0.001 <sup>(6)</sup>	0.001 <sup>(2)</sup>	0.01 <sup>(5c)</sup>	0.008 <sup>(5c)</sup>



Determinant	Target concentrations (mg/l)			
	Minimum reporting value	UK drinking water standard or best equivalent	EQS or best equivalent	
			Freshwater	Transitional (estuaries) and coastal waters
<b>Toluene</b>	0.004 <sup>(6)</sup>	0.7 <sup>(12)</sup>	0.074 <sup>(7)</sup>	0.074 <sup>(7)</sup>
<b>Ethylbenzene</b>	-	0.3 <sup>(12)</sup>	0.02 <sup>(14)</sup>	0.02 <sup>(14)</sup>
<b>Xylene</b>	0.003 <sup>(6)</sup>	0.5 <sup>(12)</sup>	0.03 <sup>(5c)</sup>	0.03 <sup>(15c)</sup>
<i>Methyl tertiary butyl ether (MTBE)</i>	-	0.015 <sup>(13)</sup>		
<b>Pesticides and herbicides</b>				
<b>Aldrin</b>	0.000003 <sup>(6)</sup>	0.00003 <sup>(2)</sup>	0.00001 <sup>(5d)</sup>	0.000005 <sup>(5d)</sup>
<b>Dieldrin</b>	0.003 <sup>(6)</sup>	0.00003 <sup>(2)</sup>		
<b>Endrin</b>	0.000003 <sup>(6)</sup>	0.0006 <sup>(12)</sup>		
<b>Isodrin</b>	0.000003 <sup>(6)</sup>	-		
<b>Heptachlor</b>	-	0.00003 <sup>(2)</sup>		
Heptachlor epoxide	-	0.00003 <sup>(2)</sup>		
Other individual pesticides	-	0.0001 <sup>(2)</sup>		
<b>Total pesticides</b>	-	0.0005 <sup>(2)</sup>		
<b>Total DDT</b>	0.000006 <sup>(6)</sup>	0.001 <sup>(12)</sup>	0.000025 <sup>(5c)</sup>	0.000025 <sup>(15c)</sup>
<b>Azinphos – methyl</b>	0.000001 <sup>(6)</sup>	-	0.00001 <sup>(1)</sup>	
Cyfluthrin	0.0001 <sup>(6)</sup>	-	0.000001 <sup>(14)</sup>	
<b>Demetons</b>	0.00005 <sup>(6)</sup>	-	0.0005 <sup>(14)</sup>	
<b>Dichlorvos</b>	-	-	0.000001 <sup>(5c)</sup>	0.00004 <sup>(5c)</sup>
<b>Dimethoate</b>	0.00001 <sup>(6)</sup>	-	0.00048 <sup>(5a)</sup>	0.00048 <sup>(5a)</sup>
<b>Endosulphan</b>	0.000005 <sup>(6)</sup>	-	0.000005 <sup>(5c)</sup>	0.0000005 <sup>(5c)</sup>





Determinant	Target concentrations (mg/l)			
	Minimum reporting value	UK drinking water standard or best equivalent	EQS or best equivalent	
			Freshwater	Transitional (estuaries) and coastal waters
<b>Fenitrothion</b>	0.000001 <sup>(6)</sup>	-	0.00001 <sup>(5c)</sup>	0.00001 <sup>(5c)</sup>
Flucofuron	0.0001 <sup>(6)</sup>	-	0.001 <sup>(14)</sup>	
<b>Malathion</b>	0.000001 <sup>(6)</sup>	-	0.00001 <sup>(5c)</sup>	0.00002 <sup>(5c)</sup>
<b>Mevinphos</b>	0.000005 <sup>(6)</sup>	-	0.00002 <sup>(14)</sup>	-
<b>Omethoate</b>	0.0001 <sup>(6)</sup>	-	0.00001 <sup>(14)</sup>	
PCSDs (cyfluthrin, sulcofuron, flucofuron and permethrin)	-	-	0.00005 <sup>(14)</sup>	
<b>Permethrin</b>	0.000001 <sup>(6)</sup>	-	0.00001 <sup>(5a)</sup>	0.00001 <sup>(5)</sup>
Sulcofuron	0.0001 <sup>(6)</sup>	-	0.025 <sup>(14)</sup>	
<b>Triazaphos</b>	0.0001 <sup>(6)</sup>	-	0.000005 <sup>(15)</sup>	
<b>Atrazine</b>	0.00003 <sup>(6)</sup>	-	0.0006 <sup>(5c)</sup>	0.0006 <sup>(5c)</sup>
<b>Simazine</b>	0.00003 <sup>(6)</sup>	-	0.001 <sup>(5c)</sup>	0.001 <sup>(5c)</sup>
<i>Bentazone</i>	0.1 <sup>(6)</sup>	-	0.5 <sup>(5c)</sup>	0.5 <sup>(5a)</sup>
<b>Linuron</b>	0.0001 <sup>(6)</sup>	-	0.0005 <sup>(5a)</sup>	0.0005 <sup>(5a)</sup>
Mecoprop	0.00004 <sup>(6)</sup>	-	0.018 <sup>(5a)</sup>	0.018 <sup>(5a)</sup>
<b>Trifluralin</b>	0.00001 <sup>(6)</sup>	-	0.00003 <sup>(5c)</sup>	0.00003 <sup>(5c)</sup>
<b>Miscellaneous</b>				
Cyanide (Hydrogen cyanide)	-	0.05 <sup>(2)</sup>	0.001 <sup>(5a)</sup>	0.001 <sup>(5a)</sup>
Phenol	0.0005 <sup>(6)</sup>	-	0.0077 <sup>(5a)</sup>	0.0077 <sup>(5a)</sup>
Sodium	-	200 <sup>(2)</sup>	-	

Determinant	Target concentrations (mg/l)			
	Minimum reporting value	UK drinking water standard or best equivalent	EQS or best equivalent	
			Freshwater	Transitional (estuaries) and coastal waters
Chloride	-	250 <sup>(2)</sup>	250 <sup>(14)</sup>	-
Total ammonia <sup>§</sup> (ammonium (as NH <sub>4</sub> <sup>+</sup> ) plus ammonia (NH <sub>3</sub> ))	-	0.5 <sup>(2)</sup>	0.3 <sup>(16)</sup>	-
Ammonia un-ionised (NH <sub>3</sub> )	-	-	-	0.021 <sup>(7)</sup>
Sulphate	-	250 <sup>(2)</sup>	400 <sup>(14)</sup>	-
Iron	-	0.20 <sup>(2)</sup>	1 <sup>(5a)</sup>	1 <sup>(5a)</sup>
Manganese	-	0.05 <sup>(2)</sup>	0.123 bioavailable <sup>(7)</sup>	No EQS required
<i>Aluminium</i>	-	0.2 <sup>(2)</sup>	-	-
Nitrate (as NO <sub>3</sub> )	-	50 <sup>(2)</sup>	-	-
Nitrite (as NO <sub>2</sub> )	-	0.1 <sup>(2)</sup>	0.01 <sup>(17)</sup>	-

**Analytes in bold are hazardous**, *analytes in italics are non hazardous*, analytes in plain text are unclassified. According to JAGDAG Determination List June 2010

Note: '-' A target concentration is not available.

<sup>§</sup>Please note that total ammonia (NH<sub>4</sub><sup>+</sup> and NH<sub>3</sub>) is equivalent to ammoniacal nitrogen in laboratory reports

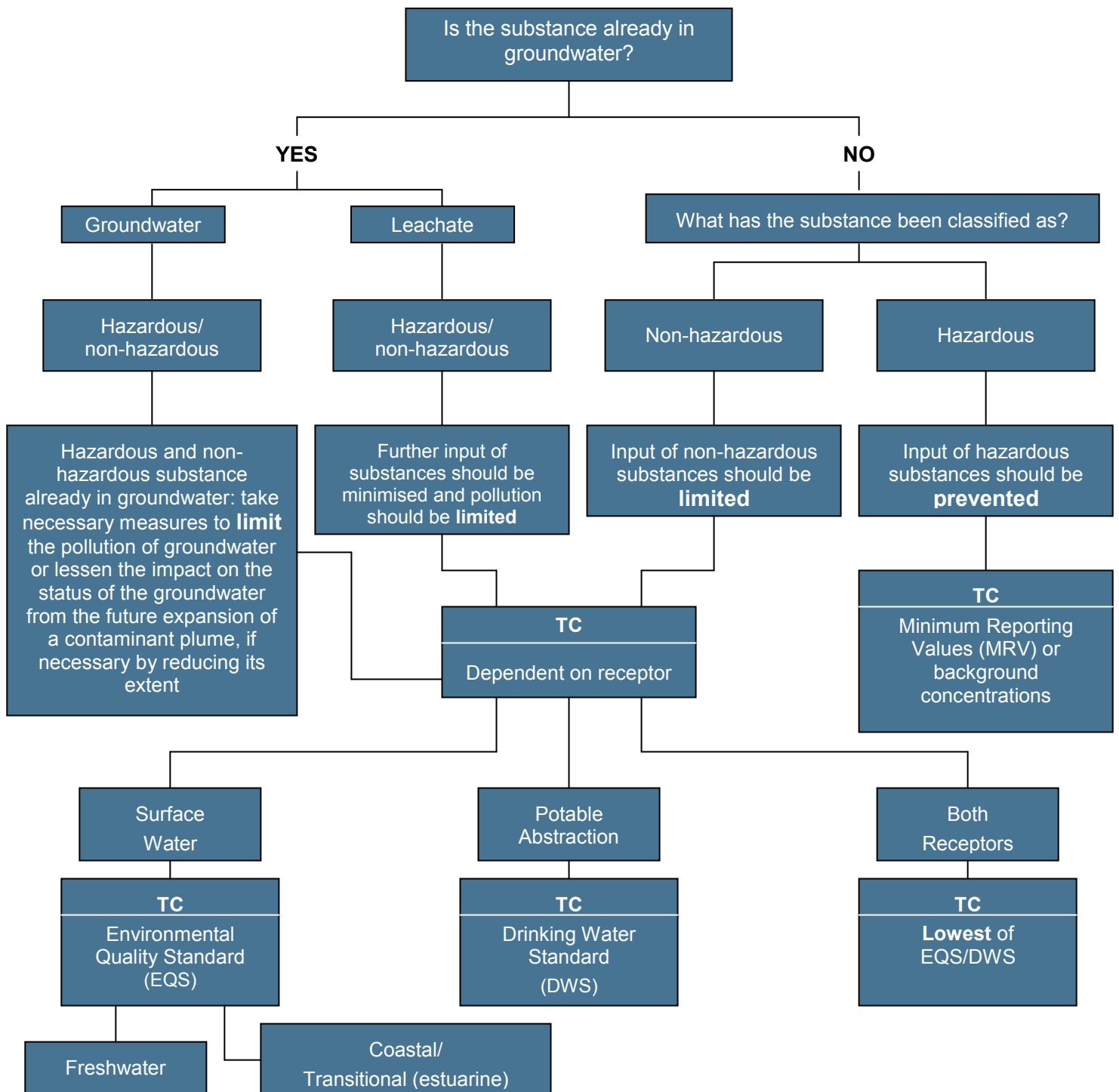
"Bioavailable" in relation to copper, zinc and manganese is the generic EQS<sub>bioavailable</sub><sup>7</sup> derived from the Metal Bioavailability Assessment Tool (M-BAT) developed by the Water Framework Directive UK Technical Advisory Group (WFDTAG). Exceedance of this value should prompt a site-specific assessment using the M-BAT with pH, DOC and Ca to derive a site-specific EQS termed the PNEC<sub>dissolved</sub>. <http://www.wfduk.org/resources/rivers-lakes-metal-bioavailability-assessment-tool-m-bat>

## Notes

1. Environment Agency (2013), 'Groundwater Protection: Principles and Policy (GP3) v1.1'.
2. The Water Supply (Water Quality) Regulations 2000 (SI 2000/3184), as amended by SI 2001/2885, SI 2002/2469, SI 2005/2035, SI 2007/2734 and SI 2010/991.
3. The Private Water Supplies Regulations 1991. SI 1991 / 2790.
4. The Surface Waters (Abstraction for Drinking Water) (Classification) Regulations 1996 (as amended). SI 1996 / 3001.
5. The River Basin Districts Typology, Standards and Groundwater Threshold Values (Water Framework Directive) (England and Wales) Directions 2010.
- 5a. Annual mean concentration (mg/l) for 'Good' standard
- 5b. Applies to hardness ranges of <40mg/l CaCO<sub>3</sub>, 40–<50mg/l CaCO<sub>3</sub>, 50–<100mg/l CaCO<sub>3</sub>, 100–<200mg/l CaCO<sub>3</sub> and ≥200mg/l CaCO<sub>3</sub>. The target concentrations included in Table 1 are listed in order of increasing calcium carbonate concentrations.
- 5c. Annual average EQS (surface waters)
- 5d. Sum of aldrin, dieldrin, endrin and isodrin
- 5e. Applies to hardness ranges of 0–50mg/l CaCO<sub>3</sub>, 50–100mg/l CaCO<sub>3</sub>, 100–250mg/l CaCO<sub>3</sub> and >250mg/l CaCO<sub>3</sub>. The target concentrations included in Table 1 are listed in order of increasing calcium carbonate concentrations; applies to annual mean concentration (mg/l) of CaCO<sub>3</sub>. Applies to annual mean concentration of metal (mg/l) for 'Good' standard.
- 5f. Sum of benzo(b)fluoranthene and benzo(k)fluoranthene
- 5g. Sum of benzo(g,h,i)perylene and indeno(1,2,3-cd)pyrene
6. Minimum reporting values listed in Annex (J) of Horizontal Guidance Note H1 (H1 Environmental Risk Assessment Framework, Environment Agency, April 2010 v2.0). Note target concentration for xylenes is 0.003mg/l each for o-xylene and m/p xylene.
7. DEFRA (2014). Water Framework Directive implementation in England and Wales: new and updated standards to protect the water environment. Table 5.2a: Proposed standards for 29 specific pollutants – long-term mean value. Additional information on the Metal Bioavailability Assessment Tool (M-BAT) is available at <http://www.wfduk.org/resources/rivers-lakes-metal-bioavailability-assessment-tool-m-bat>.
8. The Water Supply (Water Quality) Regulations 2000. (SI 2000 / 3184) – sum of chloroform, bromoform, dibromochloromethane and bromodichloromethane.
9. WRc plc (2002), R&D Technical Report P45. Where predicted no-effect concentration is below the laboratory method detection limit (LMDL) for chrysene, dibenzo(a,h)anthracene and fluoranthene, the target concentration has been set at the LMDL of 0.00001mg/l.
10. Please note this is a very conservative value. If necessary please refer to EA (2009). *Petroleum hydrocarbons in Groundwater Supplementary Guidance for Hydrogeological Risk Assessment*, which provides advice on risk rankings of TPH CWG fractions. It may be possible to eliminate low risk fractions and/or those not detected above LMDL from concern.
11. Environment Agency (2009), 'Petroleum hydrocarbons in groundwater: supplementary guidance for hydrogeological risk assessment'.
12. WHO (2004), *Guidelines for drinking-water quality*, 3rd edn.

13. Drinking Water Inspectorate (London, UK). Environmental Information Request on MTBE in drinking water. Ref. DWI 1/10/18; dated 28 November 2006. Value is based on the odour threshold for MTBE, which is lower than a health-based guideline value.
14. Council Directive on Pollution Caused by Certain Dangerous Substances Discharged into the Aquatic Environment of the Community (Dangerous Substances Directive) - List II Substances (76/464/EEC).
15. The Water Framework Directive (200/60/EC). Freshwater Environmental Quality Standards.
16. UK TAG January 2008. Proposals for Environmental Quality standards for Annex VIII Substances. Long term 90%ile for upland low alkalinity water. The value for lowland high alkalinity waters is 0.6mg/l. (UKTAG recommends the adoption of the total ammonia standard from the UK Environmental Standards and Conditions (Phase 1) report dated August 2006. UKTAG believes that this approach will provide an effective level of protection for both total and unionised ammonia in freshwaters).
17. Council Directive on the Quality of Fresh Waters Needing Protection or Improvement in Order to Support Fish Life (Freshwater Fish Directive) (78/659/EEC)

# FLOW CHART TO ASSIST WITH SELECTION OF TARGET CONCENTRATIONS



TC = Target concentration

When leachate is being assessed the 'compliance point' is the groundwater body. Therefore dilution within the groundwater body may be applied with caution before comparing with the TC.

When directly assessing a receptor, e.g., a river, the appropriate TC should be selected.

## UKWIR Guidelines



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A range of pipe materials are available and careful selection, design and installation is required to ensure that water supply pipes are satisfactorily installed and meet the requirements of the Water Supply (Water Fittings) Regulations 1999 in England and Wales, the Byelaws 2000 in Scotland and the Northern Ireland Water Regulations. The regulations include a requirement to use only suitable materials when laying water pipes, and laying water pipes without protection is not permitted at contaminated sites. The water supply company has a statutory duty to enforce the regulations.

Contaminants in the ground can pose a risk to potable water supply by permeating plastic water supply pipes. To fulfil their statutory obligations, UK water supply companies require robust evidence from developers to demonstrate either that the ground in which new plastic supply pipes will be laid is free from specific contaminants, or that a remedial strategy is proposed that will mitigate any existing risk. If these requirements cannot be demonstrated to the satisfaction of the relevant water company, it becomes necessary to specify an alternative pipe material on the whole development or in specific zones.

In 2010, UK Water Industry Research (UKWIR) published Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites (Report Ref. No. 10/WM/03/21). This report reviewed previously published industry guidelines and threshold concentrations adopted by individual water supply companies.

The focus of the UKWIR project was to develop clear and concise procedures, which provide consistency in the pipe selection decision process. It was also to provide guidance that can be used to ensure compliance with current regulations and to prevent water supply pipes failing prematurely due to the presence of contamination.

Report 10/WM/03/21 concluded that in most circumstances only organic contaminants pose a potential risk to plastic pipe materials and Table 3.1 of the report provides threshold concentrations for PE and PVC pipes for the organic contaminants of concern. The report also makes recommendations for the procedures to be adopted in the design of site investigations and sampling strategies, and the assessment of data, to ensure that the ground through which water supply pipes will be laid is adequately characterised.

Risks to water supply pipes have therefore been assessed against the threshold concentrations for PE and PVC pipe specified in Table 3.1 of Report 10/WM/03/21, which have been adopted as the GACs for this linkage and are reproduced in the table on the following page.



Since water supply pipes are typically laid at a minimum depth of 750mm below finished ground levels, sample results from depths between 0.5m and 1.5m below finished ground level are generally considered suitable for assessing risks to water supply. Samples outside these depths can be used provided that they are considered representative of the strata within those depths. Report 10/WM/03/21 also specifies that sampling should characterise the ground conditions to a minimum of 0.5m below the proposed depth of the pipe and to 15m either side of it.

It should be noted that the assessment provided in this report is a guide only and the method of assessment and recommendations should be checked with the relevant water supply company.

Where a water main and/or service pipe is to be laid close to fuel or chemical storage tanks (e.g. petrol filling stations) then the local water company may require the pipe materials laid within a designated distance of the facility to take account of future contamination risk.

Generic assessment criteria (GAC) for water supply pipes

		Pipe material	
		GAC (mg/kg)	
	Parameter group	PE	PVC
1	Extended VOC suite by purge and trap or head space and GC-MS with TIC	0.5#	0.125#
1a	• BTEX + MTBE	0.1	0.03
2	SVOCs TIC by purge and trap or head space and GC-MS with TIC (aliphatic and aromatic C <sub>5</sub> -C <sub>10</sub> )	2##	1.4##
2e	• Phenols	2	0.4
2f	• Cresols and chlorinated phenols	2	0.04
3	Mineral oil C <sub>11</sub> -C <sub>20</sub>	10	Suitable
4	Mineral oil C <sub>21</sub> -C <sub>40</sub>	500	Suitable
5	Corrosive (conductivity, redox and pH)	Suitable	Suitable
<b>Further parameters identified as relevant following site investigation</b>			
2a	Ethers	0.5	1
2b	Nitrobenzene	0.5	0.4
2c	Ketones	0.5	0.02
2d	Aldehydes	0.5	0.02
6	Amines	Not suitable	Suitable

Notes: where indicated as 'suitable', the material is considered resistant to permeation or degradation and no threshold concentration has been specified by UKWIR.

#: Total VOC result minus BTEX and MTBE results

##: Total SVOC result minus total phenols/cresols/chlorinated phenols results

### *Risk Assessment Methodology*

Risk is a combination of the ‘likelihood’ of an event occurring and the magnitude of its ‘consequences’. Therefore, in order to assess risk, both the likelihood and the consequences of an event must be taken into account. RSK Group Plc has adopted guidance provided in CIRIA C552 for use in the production of risk assessments.

The likelihood of an event can be classified on a four point system using the following terms and definitions based on CIRIA C552:

**Highly likely:** The event appears very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution;

**Likely:** It is probable that an event will occur, or circumstances are such that the event is not inevitable, but possible in the short term and likely over the long term;

**Low likelihood:** Circumstances are possible under which an event could occur, but it is not certain even in the long term that an event would occur and it is less likely in the short term;

**Unlikely:** Circumstances are such that it is improbable the event would occur even in the long term.

The severity can be classified using a similar system also based on CIRIA C552. The terms and definitions relating to severity are:

**Severe:** 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 sensitive water resources. Catastrophic damage to buildings or property. Short term risk to an ecosystem or organism forming part of that ecosystem (note definition of ecosystem in ‘Draft Circular on Contaminated Land’, DETR 2000);





**Medium:** Chronic damage to human health ('significant harm' as defined in 'Draft Circular on Contaminated Land', DETR 2000), pollution of sensitive water resources, significant change in an ecosystem or organism forming part of that ecosystem (note definition of ecosystem in 'Draft Circular on Contaminated Land', DETR 2000);

**Mild:** Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services ('significant harm' as defined in 'Draft Circular on Contaminated Land', DETR 2000). Damage to sensitive buildings, structures or the environment; and

**Minor:** Harm, not necessarily significant, but that could result in financial loss or expenditure to resolve. Non-permanent human health effects easily prevented by use of personal protective clothing. Easily repairable damage to buildings, structures and services.

Once the likelihood of an event occurring and its severity have been classified, a risk category can be assigned the table below.

		<b>RISK CLASSIFICATION SYSTEM (CIRIA 552)</b>			
		<b>Consequence</b>			
		<b>Severe</b>	<b>Medium</b>	<b>Mild</b>	<b>Minor</b>
<b>Probability</b>	<b>Highly likely</b>	Very high	High	Moderate	Moderate/Low
	<b>Likely</b>	High	Moderate	Moderate/Low	Low
	<b>Low likelihood</b>	Moderate	Moderate/Low	Low	Very Low
	<b>Unlikely</b>	Moderate/Low	Low	Very Low	Very Low

## **APPENDIX G**


### **(i) Gas/Groundwater Monitoring Results**

# IN-SITU GAS MONITORING RESULTS

[Pressures]	Previous	During	Start	End	Equipment Used & Remarks
Round 1	Fluctuating	Falling	1025	1021	Ground: Dry + Wind: Light + Air Temp: 15DegC
Round 2	Constant	Falling	1020	1015	Ground: Dry + Wind: Light + Air Temp: 15DegC
Round 3	Constant	Falling	1016	1015	Ground: Dry + Wind: None + Air Temp: 16DegC

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	PID (ppm)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
BH1	1	50	1	5.00	---	1.00 to 5.00	03/07/2015 09:55:00	1025	1025	0.0 <sub>(I)</sub>	-	-	-	-	-	-	-	-
BH1	1	50	1		---	1.00 to 5.00	30 secs	-	-	0.0 <sub>(SS)</sub>	-	-	-	-	-	-	-	-
BH1	1	50	1 (2)	5.00	---	1.00 to 5.00	03/07/2015 09:56:00	-	-	-	-	0.0	0.0	20.8	0.0	0.5	0.0	0.0
BH1	1	50	1 (2)		---	1.00 to 5.00	15 secs	-	-	-	-	2.8	0.0	16.6	0.0	-	0.0	0.0
BH1	1	50	1 (2)		---	1.00 to 5.00	30 secs	-	-	-	-	2.9	0.2	15.5	3.0	-	0.0	0.0
BH1	1	50	1 (2)		---	1.00 to 5.00	60 secs	-	-	-	-	2.9	0.2	15.5	3.0	-	0.0	0.0
BH1	1	50	1 (2)		---	1.00 to 5.00	90 secs	-	-	-	-	3.0	0.2	15.3	4.0	-	0.0	0.0
BH1	1	50	1 (2)		---	1.00 to 5.00	120 secs	-	-	-	-	3.1	0.2	15.1	4.0	-	0.0	0.0
BH1	1	50	1 (2)		---	1.00 to 5.00	180 secs	-	-	-	-	3.3	0.2	14.7	4.0	-	0.0	0.0
BH1	1	50	1 (2)		---	1.00 to 5.00	240 secs	-	-	-	-	3.4	0.2	14.5	4.0	-	0.0	0.0
BH1	1	50	1 (2)		---	1.00 to 5.00	300 secs	-	-	-	-	3.5	0.2	14.4	4.0	-	0.0	0.0
BH1	1	50	1 (3)	5.00	4.74	1.00 to 5.00	03/07/2015 10:02:00	-	-	-	1.56	-	-	-	-	-	-	-
BH1	1	50	2	5.00	---	1.00 to 5.00	10/07/2015 10:55:00	1020	1020	0.0 <sub>(I)</sub>	-	-	-	-	-	-	-	-
BH1	1	50	2		---	1.00 to 5.00	30 secs	-	-	0.0 <sub>(SS)</sub>	-	-	-	-	-	-	-	-
BH1	1	50	2 (2)	5.00	---	1.00 to 5.00	10/07/2015 10:56:00	-	-	-	-	0.0	0.0	20.8	0.0	1.4	0.0	0.0
BH1	1	50	2 (2)		---	1.00 to 5.00	15 secs	-	-	-	-	3.2	0.0	17.4	0.0	0.4	0.0	0.0
BH1	1	50	2 (2)		---	1.00 to 5.00	30 secs	-	-	-	-	3.3	0.0	16.1	0.0	-	0.0	0.0
BH1	1	50	2 (2)		---	1.00 to 5.00	60 secs	-	-	-	-	3.3	0.0	15.7	0.0	-	0.0	0.0

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.




 <p><b>STRUCTURAL SOILS</b> The Old School Stillhouse Lane Bedminster Bristol BS3 4EB</p>	Compiled By	Date	Checked By	Date	Contract Ref:
	<i>Au Collier</i>	<b>07/08/15</b>	<i>Au Collier</i>	<b>07/08/15</b>	<b>729873</b>
	Contract: <b>Estuary Park, Avonmouth</b>				Page: <b>1 of 9</b>



# IN-SITU GAS MONITORING RESULTS

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	PID (ppm)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
BH1	1	50	2 (2)		---	1.00 to 5.00	90 secs	-	-	-	-	3.5	0.0	15.3	0.0	-	0.0	0.0
BH1	1	50	2 (2)		---	1.00 to 5.00	120 secs	-	-	-	-	3.6	0.0	15.2	0.0	-	0.0	0.0
BH1	1	50	2 (2)		---	1.00 to 5.00	180 secs	-	-	-	-	3.9	0.0	14.6	0.0	-	0.0	0.0
BH1	1	50	2 (2)		---	1.00 to 5.00	240 secs	-	-	-	-	4.0	0.0	14.4	0.0	-	0.0	0.0
BH1	1	50	2 (2)		---	1.00 to 5.00	300 secs	-	-	-	-	4.1	0.4	14.4	7.0	-	0.0	0.0
BH1	1	50	2 (2)		---	1.00 to 5.00	360 secs	-	-	-	-	4.2	0.5	14.3	9.0	-	0.0	0.0
BH1	1	50	2 (2)		---	1.00 to 5.00	420 secs	-	-	-	-	4.2	0.3	14.2	6.0	-	0.0	0.0
BH1	1	50	2 (3)	5.00	4.70	1.00 to 5.00	10/07/2015 11:03:30	-	-	-	1.70	-	-	-	-	-	-	-
BH1	1	50	3	5.00	---	1.00 to 5.00	16/07/2015 11:20:00	1016	1016	0.0 <sub>(I)</sub>	-	-	-	-	-	-	-	-
BH1	1	50	3		---	1.00 to 5.00	30 secs	-	-	0.0 <sub>(SS)</sub>	-	-	-	-	-	-	-	-
BH1	1	50	3 (2)	5.00	---	1.00 to 5.00	16/07/2015 11:21:00	-	-	-	-	0.0	0.0	20.8	0.0	1.2	0.0	0.0
BH1	1	50	3 (2)		---	1.00 to 5.00	15 secs	-	-	-	-	2.1	0.0	17.2	0.0	-	0.0	0.0
BH1	1	50	3 (2)		---	1.00 to 5.00	30 secs	-	-	-	-	2.1	0.1	15.5	1.0	-	0.0	0.0
BH1	1	50	3 (2)		---	1.00 to 5.00	60 secs	-	-	-	-	2.2	0.1	18.2	1.0	-	0.0	0.0
BH1	1	50	3 (2)		---	1.00 to 5.00	90 secs	-	-	-	-	2.1	0.1	15.0	1.0	-	0.0	0.0
BH1	1	50	3 (2)		---	1.00 to 5.00	120 secs	-	-	-	-	2.2	0.0	14.9	0.0	-	0.0	0.0
BH1	1	50	3 (2)		---	1.00 to 5.00	180 secs	-	-	-	-	2.3	0.3	14.7	6.0	-	0.0	0.0
BH1	1	50	3 (2)		---	1.00 to 5.00	240 secs	-	-	-	-	2.3	0.8	14.8	15.0	-	0.0	0.0
BH1	1	50	3 (2)		---	1.00 to 5.00	300 secs	-	-	-	-	2.3	0.5	14.8	9.0	-	0.0	0.0
BH1	1	50	3 (3)	5.00	4.63	1.00 to 5.00	16/07/2015 11:26:30	-	-	-	1.69	-	-	-	-	-	-	-
BH2	1	50	1	5.00	---	1.30 to 5.00	03/07/2015 10:20:00	1024	1024	0.0 <sub>(I)</sub>	-	-	-	-	-	-	-	-
BH2	1	50	1		---	1.30 to 5.00	30 secs	-	-	0.0 <sub>(SS)</sub>	-	-	-	-	-	-	-	-
BH2	1	50	1 (2)	5.00	---	1.30 to 5.00	03/07/2015 10:21:00	-	-	-	-	0.0	0.0	20.8	0.0	1.5	0.0	0.0
BH2	1	50	1 (2)		---	1.30 to 5.00	15 secs	-	-	-	-	3.3	0.0	16.6	0.0	-	0.0	0.0

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.


 <b>STRUCTURAL SOILS</b> The Old School Stillhouse Lane Bedminster Bristol BS3 4EB	Compiled By	Date	Checked By	Date	Contract Ref:  <b>729873</b>
	 Contract:	<b>07/08/15</b>		<b>07/08/15</b>	
<b>Estuary Park, Avonmouth</b>					Page:  <b>2 of 9</b>



# IN-SITU GAS MONITORING RESULTS

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	PID (ppm)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
BH2	1	50	1 (2)		---	1.30 to 5.00	30 secs	-	-	-	-	3.4	0.0	15.2	0.0	-	0.0	0.0
BH2	1	50	1 (2)		---	1.30 to 5.00	60 secs	-	-	-	-	3.4	0.0	14.9	0.0	-	0.0	0.0
BH2	1	50	1 (2)		---	1.30 to 5.00	90 secs	-	-	-	-	3.5	0.0	14.7	0.0	-	0.0	0.0
BH2	1	50	1 (2)		---	1.30 to 5.00	120 secs	-	-	-	-	3.6	0.0	14.4	0.0	-	0.0	0.0
BH2	1	50	1 (2)		---	1.30 to 5.00	180 secs	-	-	-	-	3.8	0.0	13.8	0.0	-	0.0	0.0
BH2	1	50	1 (2)		---	1.30 to 5.00	240 secs	-	-	-	-	4.1	0.0	13.1	0.0	-	0.0	0.0
BH2	1	50	1 (2)		---	1.30 to 5.00	300 secs	-	-	-	-	4.3	0.0	12.7	0.0	-	0.0	0.0
BH2	1	50	1 (3)	5.00	4.32	1.30 to 5.00	03/07/2015 10:27:00	-	-	-	2.10	-	-	-	-	-	-	-
BH2	1	50	1 (3)		4.32	1.30 to 5.00	420 secs	-	-	-	2.64	-	-	-	-	-	-	-
BH2	1	50	2	5.00	---	1.30 to 5.00	10/07/2015 12:00:00	1018	1018	0.1 <sub>(I)</sub>	-	-	-	-	-	-	-	-
BH2	1	50	2		---	1.30 to 5.00	30 secs	-	-	0.0 <sub>(SS)</sub>	-	-	-	-	-	-	-	-
BH2	1	50	2 (2)	5.00	---	1.30 to 5.00	10/07/2015 12:01:00	-	-	-	-	0.0	0.0	20.8	0.0	-	0.0	0.0
BH2	1	50	2 (2)		---	1.30 to 5.00	15 secs	-	-	-	-	2.5	0.0	16.6	0.0	-	0.0	0.0
BH2	1	50	2 (2)		---	1.30 to 5.00	30 secs	-	-	-	-	3.4	0.1	14.9	1.0	-	0.0	0.0
BH2	1	50	2 (2)		---	1.30 to 5.00	60 secs	-	-	-	-	3.7	0.1	14.0	1.0	-	0.0	0.0
BH2	1	50	2 (2)		---	1.30 to 5.00	90 secs	-	-	-	-	3.8	0.1	13.8	1.0	-	0.0	0.0
BH2	1	50	2 (2)		---	1.30 to 5.00	120 secs	-	-	-	-	3.9	0.1	13.6	1.0	-	0.0	0.0
BH2	1	50	2 (2)		---	1.30 to 5.00	180 secs	-	-	-	-	4.2	0.1	13.5	1.0	-	0.0	0.0
BH2	1	50	2 (2)		---	1.30 to 5.00	240 secs	-	-	-	-	4.4	0.1	13.2	1.0	-	0.0	0.0
BH2	1	50	2 (2)		---	1.30 to 5.00	300 secs	-	-	-	-	4.5	0.1	13.1	1.0	-	0.0	0.0
BH2	1	50	2 (3)	5.00	4.32	1.30 to 5.00	10/07/2015 12:06:30	-	-	-	1.94	-	-	-	-	-	-	-
BH2	1	50	3	5.00	---	1.30 to 5.00	16/07/2015 11:30:00	1016	1016	0.0 <sub>(I)</sub>	-	-	-	-	-	-	-	-
BH2	1	50	3		---	1.30 to 5.00	30 secs	-	-	0.0 <sub>(SS)</sub>	-	-	-	-	-	-	-	-
BH2	1	50	3 (2)	5.00	---	1.30 to 5.00	16/07/2015 11:31:00	-	-	-	-	0.0	0.0	20.8	0.0	4.3	0.0	0.0
BH2	1	50	3 (2)		---	1.30 to 5.00	15 secs	-	-	-	-	0.9	0.0	19.5	0.0	-	0.0	0.0

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.


 <b>STRUCTURAL SOILS</b> The Old School Stillhouse Lane Bedminster Bristol BS3 4EB	Compiled By	Date	Checked By	Date	Contract Ref: <b>729873</b>
	<i>Au Colton</i>	<b>07/08/15</b>	<i>Au Colton</i>	<b>07/08/15</b>	
	Contract:	<b>Estuary Park, Avonmouth</b>			Page:



# IN-SITU GAS MONITORING RESULTS

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	PID (ppm)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
BH2	1	50	3 (2)		---	1.30 to 5.00	30 secs	-	-	-	-	1.0	0.0	19.3	0.0	-	0.0	0.0
BH2	1	50	3 (2)		---	1.30 to 5.00	60 secs	-	-	-	-	1.2	0.0	19.1	0.0	-	0.0	0.0
BH2	1	50	3 (2)		---	1.30 to 5.00	90 secs	-	-	-	-	1.4	0.0	19.0	0.0	-	0.0	0.0
BH2	1	50	3 (2)		---	1.30 to 5.00	120 secs	-	-	-	-	1.7	0.0	18.7	0.0	-	0.0	0.0
BH2	1	50	3 (2)		---	1.30 to 5.00	180 secs	-	-	-	-	2.5	0.0	17.8	0.0	-	0.0	0.0
BH2	1	50	3 (2)		---	1.30 to 5.00	240 secs	-	-	-	-	3.5	0.0	16.5	0.0	-	0.0	0.0
BH2	1	50	3 (2)		---	1.30 to 5.00	300 secs	-	-	-	-	4.2	0.2	15.6	4.0	-	0.0	0.0
BH2	1	50	3 (2)		---	1.30 to 5.00	360 secs	-	-	-	-	4.3	0.3	15.5	6.0	-	0.0	0.0
BH2	1	50	3 (2)		---	1.30 to 5.00	420 secs	-	-	-	-	4.2	0.1	15.5	1.0	-	0.0	0.0
BH2	1	50	3 (2)		---	1.30 to 5.00	480 secs	-	-	-	-	4.0	0.0	15.5	0.0	-	0.0	0.0
BH2	1	50	3 (3)	5.00	4.33	1.30 to 5.00	16/07/2015 11:39:40	-	-	-	1.91	-	-	-	-	-	-	-
BH3	1	50	1	3.00	---	1.00 to 3.00	03/07/2015 11:10:00	1023	1023	-3.9 <sub>(I)</sub>	-	-	-	-	-	-	-	-
BH3	1	50	1		---	1.00 to 3.00	30 secs	-	-	0.0 <sub>(SS)</sub>	-	-	-	-	-	-	-	-
BH3	1	50	1 (2)	3.00	---	1.00 to 3.00	03/07/2015 11:11:00	-	-	-	-	0.0	0.0	20.8	0.0	0.5	0.0	0.0
BH3	1	50	1 (2)		---	1.00 to 3.00	15 secs	-	-	-	-	0.0	0.0	20.7	0.0	-	0.0	0.0
BH3	1	50	1 (2)		---	1.00 to 3.00	30 secs	-	-	-	-	0.0	0.0	20.6	0.0	-	0.0	0.0
BH3	1	50	1 (2)		---	1.00 to 3.00	60 secs	-	-	-	-	0.0	0.0	20.5	0.0	-	0.0	0.0
BH3	1	50	1 (2)		---	1.00 to 3.00	90 secs	-	-	-	-	0.0	0.0	20.5	0.0	-	0.0	0.0
BH3	1	50	1 (2)		---	1.00 to 3.00	120 secs	-	-	-	-	0.0	0.0	20.5	0.0	-	0.0	0.0
BH3	1	50	1 (2)		---	1.00 to 3.00	180 secs	-	-	-	-	0.0	0.0	20.4	0.0	-	1.0	0.0
BH3	1	50	1 (2)		---	1.00 to 3.00	240 secs	-	-	-	-	0.0	0.0	19.4	0.0	-	1.0	0.0
BH3	1	50	1 (2)		---	1.00 to 3.00	300 secs	-	-	-	-	0.8	0.0	16.9	0.0	-	1.0	0.0
BH3	1	50	1 (2)		---	1.00 to 3.00	360 secs	-	-	-	-	2.2	0.0	15.8	0.0	-	1.0	0.0
BH3	1	50	1 (2)		---	1.00 to 3.00	420 secs	-	-	-	-	2.5	0.0	15.8	0.0	-	1.0	0.0

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.


 <b>STRUCTURAL SOILS</b> The Old School Stillhouse Lane Bedminster Bristol BS3 4EB	Compiled By	Date	Checked By	Date	Contract Ref: <b>729873</b>
	Contract:	<b>Estuary Park, Avonmouth</b>			



# IN-SITU GAS MONITORING RESULTS

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	PID (ppm)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
BH3	1	50	1 (2)		---	1.00 to 3.00	520 secs	-	-	-	-	2.5	0.0	15.9	0.0	-	1.0	0.0
BH3	1	50	1 (2)		---	1.00 to 3.00	600 secs	-	-	-	-	2.4	0.0	16.2	0.0	-	1.0	0.0
BH3	1	50	1 (2)		---	1.00 to 3.00	700 secs	-	-	-	-	2.3	0.0	16.6	0.0	-	1.0	0.0
BH3	1	50	1 (2)		---	1.00 to 3.00	800 secs	-	-	-	-	2.1	0.0	17.2	0.0	-	1.0	0.0
BH3	1	50	1 (2)		---	1.00 to 3.00	860 secs	-	-	-	-	2.0	0.0	17.6	0.0	-	1.0	0.0
BH3	1	50	1 (3)	3.00	2.66	1.00 to 3.00	03/07/2015 11:26:20	-	-	-	1.12	-	-	-	-	-	-	-
BH3	1	50	1 (3)		2.66	1.00 to 3.00	980 secs	-	-	-	2.12	-	-	-	-	-	-	-
BH3	1	50	2	3.00	---	1.00 to 3.00	10/07/2015 13:50:00	1017	1017	0.0 <sub>(I)</sub>	-	-	-	-	-	-	-	-
BH3	1	50	2		---	1.00 to 3.00	30 secs	-	-	0.0 <sub>(SS)</sub>	-	-	-	-	-	-	-	-
BH3	1	50	2 (2)	3.00	---	1.00 to 3.00	10/07/2015 13:51:00	-	-	-	-	0.0	0.0	20.8	0.0	1.0	0.0	0.0
BH3	1	50	2 (2)		---	1.00 to 3.00	15 secs	-	-	-	-	0.0	0.0	20.6	0.0	0.0	2.0	0.0
BH3	1	50	2 (2)		---	1.00 to 3.00	30 secs	-	-	-	-	0.0	0.0	20.6	0.0	-	0.0	0.0
BH3	1	50	2 (2)		---	1.00 to 3.00	60 secs	-	-	-	-	0.0	0.0	20.6	0.0	-	0.0	0.0
BH3	1	50	2 (2)		---	1.00 to 3.00	90 secs	-	-	-	-	0.0	0.0	20.5	0.0	-	0.0	0.0
BH3	1	50	2 (2)		---	1.00 to 3.00	120 secs	-	-	-	-	0.0	0.0	20.5	0.0	-	0.0	0.0
BH3	1	50	2 (2)		---	1.00 to 3.00	180 secs	-	-	-	-	0.0	0.0	20.4	0.0	-	0.0	0.0
BH3	1	50	2 (2)		---	1.00 to 3.00	240 secs	-	-	-	-	0.0	0.0	20.3	0.0	-	0.0	0.0
BH3	1	50	2 (2)		---	1.00 to 3.00	300 secs	-	-	-	-	0.0	0.0	20.3	0.0	-	0.0	0.0
BH3	1	50	2 (3)	3.00	2.85	1.00 to 3.00	10/07/2015 13:56:30	-	-	-	1.22	-	-	-	-	-	-	-
BH3	1	50	3	3.00	---	1.00 to 3.00	16/07/2015 12:00:00	1015	1015	0.0 <sub>(I)</sub>	-	-	-	-	-	-	-	-
BH3	1	50	3		---	1.00 to 3.00	30 secs	-	-	0.0 <sub>(SS)</sub>	-	-	-	-	-	-	-	-
BH3	1	50	3 (2)	3.00	---	1.00 to 3.00	16/07/2015 12:01:00	-	-	-	-	0.0	0.0	20.8	0.0	1.3	0.0	0.0
BH3	1	50	3 (2)		---	1.00 to 3.00	15 secs	-	-	-	-	0.0	0.0	20.8	0.0	0.1	0.0	0.0
BH3	1	50	3 (2)		---	1.00 to 3.00	30 secs	-	-	-	-	0.0	0.0	20.8	0.0	-	0.0	0.0
BH3	1	50	3 (2)		---	1.00 to 3.00	60 secs	-	-	-	-	0.0	0.0	20.8	0.0	-	0.0	0.0

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.


 <b>STRUCTURAL SOILS</b> The Old School Stillhouse Lane Bedminster Bristol BS3 4EB	Compiled By	Date	Checked By	Date	Contract Ref:  <b>729873</b>
	<i>Au Colton</i>	<b>07/08/15</b>	<i>Au Colton</i>	<b>07/08/15</b>	
Contract: <b>Estuary Park, Avonmouth</b>					Page:  <b>5 of 9</b>



# IN-SITU GAS MONITORING RESULTS

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	PID (ppm)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
BH3	1	50	3 (2)		---	1.00 to 3.00	90 secs	-	-	-	-	0.0	0.0	20.8	0.0	-	0.0	0.0
BH3	1	50	3 (2)		---	1.00 to 3.00	120 secs	-	-	-	-	0.0	0.0	20.6	0.0	-	0.0	0.0
BH3	1	50	3 (2)		---	1.00 to 3.00	180 secs	-	-	-	-	0.0	0.0	20.6	0.0	-	0.0	0.0
BH3	1	50	3 (2)		---	1.00 to 3.00	240 secs	-	-	-	-	0.0	0.0	20.6	0.0	-	0.0	0.0
BH3	1	50	3 (2)		---	1.00 to 3.00	300 secs	-	-	-	-	0.0	0.0	20.6	0.0	-	0.0	0.0
BH3	1	50	3 (3)	3.00	2.64	1.00 to 3.00	16/07/2015 12:06:30	-	-	-	1.19	-	-	-	-	-	-	-
BH4	1	50	1	4.00	---	0.70 to 4.00	03/07/2015 12:35:00	1021	1021	0.0 <sub>(I)</sub>	-	-	-	-	-	-	-	-
BH4	1	50	1		---	0.70 to 4.00	30 secs	-	-	0.0 <sub>(SS)</sub>	-	-	-	-	-	-	-	-
BH4	1	50	1 (2)	4.00	---	0.70 to 4.00	03/07/2015 12:36:00	-	-	-	-	0.0	0.0	20.8	0.0	3.6	0.0	0.0
BH4	1	50	1 (2)		---	0.70 to 4.00	15 secs	-	-	-	-	0.3	0.1	19.9	1.0	0.0	1.0	0.0
BH4	1	50	1 (2)		---	0.70 to 4.00	30 secs	-	-	-	-	0.4	0.1	19.8	1.0	-	0.0	0.0
BH4	1	50	1 (2)		---	0.70 to 4.00	60 secs	-	-	-	-	0.5	0.0	19.8	0.0	-	1.0	0.0
BH4	1	50	1 (2)		---	0.70 to 4.00	90 secs	-	-	-	-	0.6	0.0	19.7	0.0	-	1.0	0.0
BH4	1	50	1 (2)		---	0.70 to 4.00	120 secs	-	-	-	-	0.8	0.1	19.5	1.0	-	1.0	0.0
BH4	1	50	1 (2)		---	0.70 to 4.00	180 secs	-	-	-	-	1.1	0.1	19.2	1.0	-	0.0	0.0
BH4	1	50	1 (2)		---	0.70 to 4.00	240 secs	-	-	-	-	1.2	0.1	19.2	1.0	-	0.0	0.0
BH4	1	50	1 (2)		---	0.70 to 4.00	300 secs	-	-	-	-	1.2	0.1	19.2	1.0	-	0.0	0.0
BH4	1	50	1 (3)	4.00	4.06	0.70 to 4.00	03/07/2015 12:42:00	-	-	-	1.90	-	-	-	-	-	-	-
BH4	1	50	1 (3)		4.06	0.70 to 4.00	420 secs	-	-	-	2.36	-	-	-	-	-	-	-
Remarks: The well head of BH4 was destroyed before the second monitoring visit.																		
BH5	1	50	1	4.00	---	0.70 to 4.00	03/07/2015 11:45:00	1023	1023	0.0 <sub>(I)</sub>	-	-	-	-	-	-	-	-
BH5	1	50	1		---	0.70 to 4.00	30 secs	-	-	0.0 <sub>(SS)</sub>	-	-	-	-	-	-	-	-
BH5	1	50	1 (2)	4.00	---	0.70 to 4.00	03/07/2015 11:46:00	-	-	-	-	0.0	0.0	20.8	0.0	4.4	0.0	0.0
BH5	1	50	1 (2)		---	0.70 to 4.00	15 secs	-	-	-	-	6.7	16.7	4.5	Off Scale	0.0	2.0	0.0

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

 <p><b>STRUCTURAL SOILS</b> The Old School Stillhouse Lane Bedminster Bristol BS3 4EB</p>	Compiled By	Date	Checked By	Date	Contract Ref:
	<i>Au Colton</i>	<b>07/08/15</b>	<i>Au Colton</i>	<b>07/08/15</b>	<b>729873</b>
	Contract: <b>Estuary Park, Avonmouth</b>				Page: <b>6 of 9</b>








# IN-SITU GAS MONITORING RESULTS

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	PID (ppm)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
BH5	1	50	1 (2)		---	0.70 to 4.00	30 secs	-	-	-	-	6.5	15.9	4.9	Off Scale	-	2.0	0.0
BH5	1	50	1 (2)		---	0.70 to 4.00	60 secs	-	-	-	-	6.4	13.0	6.9	Off Scale	-	1.0	0.0
BH5	1	50	1 (2)		---	0.70 to 4.00	90 secs	-	-	-	-	4.6	11.7	8.7	Off Scale	-	1.0	0.0
BH5	1	50	1 (2)		---	0.70 to 4.00	120 secs	-	-	-	-	4.6	11.2	8.9	Off Scale	-	1.0	0.0
BH5	1	50	1 (2)		---	0.70 to 4.00	180 secs	-	-	-	-	3.3	7.7	12.3	Off Scale	-	0.0	0.0
BH5	1	50	1 (2)		---	0.70 to 4.00	240 secs	-	-	-	-	3.5	8.3	12.8	Off Scale	-	1.0	0.0
BH5	1	50	1 (2)		---	0.70 to 4.00	300 secs	-	-	-	-	3.9	8.9	11.5	Off Scale	-	0.0	0.0
BH5	1	50	1 (2)		---	0.70 to 4.00	360 secs	-	-	-	-	3.8	8.5	12.0	Off Scale	-	0.0	0.0
BH5	1	50	1 (2)		---	0.70 to 4.00	420 secs	-	-	-	-	3.5	8.3	12.7	Off Scale	-	0.0	0.0
BH5	1	50	1 (3)	4.00	3.18	0.70 to 4.00	03/07/2015 11:54:00	-	-	-	1.84	-	-	-	-	-	-	-
BH5	1	50	1 (3)		3.18	0.70 to 4.00	540 secs	-	-	-	2.09	-	-	-	-	-	-	-
BH5	1	50	2	4.00	---	0.70 to 4.00	10/07/2015 14:20:00	1016	1016	0.0 <sub>(I)</sub>	-	-	-	-	-	-	-	-
BH5	1	50	2		---	0.70 to 4.00	30 secs	-	-	0.0 <sub>(SS)</sub>	-	-	-	-	-	-	-	-
BH5	1	50	2 (2)	4.00	---	0.70 to 4.00	10/07/2015 14:21:00	-	-	-	-	0.0	0.0	20.8	0.0	2.2	0.0	0.0
BH5	1	50	2 (2)		---	0.70 to 4.00	15 secs	-	-	-	-	1.7	0.0	17.6	0.0	0.0	1.0	0.0
BH5	1	50	2 (2)		---	0.70 to 4.00	30 secs	-	-	-	-	1.5	0.0	17.9	0.0	-	0.0	0.0
BH5	1	50	2 (2)		---	0.70 to 4.00	60 secs	-	-	-	-	1.6	0.0	17.5	0.0	-	0.0	0.0
BH5	1	50	2 (2)		---	0.70 to 4.00	90 secs	-	-	-	-	1.8	0.0	17.4	0.0	-	0.0	0.0
BH5	1	50	2 (2)		---	0.70 to 4.00	120 secs	-	-	-	-	2.0	0.0	16.8	0.0	-	0.0	0.0
BH5	1	50	2 (2)		---	0.70 to 4.00	180 secs	-	-	-	-	2.3	0.0	16.4	0.0	-	0.0	0.0
BH5	1	50	2 (2)		---	0.70 to 4.00	240 secs	-	-	-	-	2.5	0.0	15.9	0.0	-	0.0	0.0
BH5	1	50	2 (2)		---	0.70 to 4.00	300 secs	-	-	-	-	2.7	0.0	15.5	0.0	-	0.0	0.0
BH5	1	50	2 (3)	4.00	3.18	0.70 to 4.00	10/07/2015 14:26:30	-	-	-	1.91	-	-	-	-	-	-	-
BH5	1	50	1	4.00	---	0.70 to 4.00	16/07/2015 12:10:00	1015	1015	0.0 <sub>(I)</sub>	-	-	-	-	-	-	-	-
BH5	1	50	1 (2)	4.00	---	0.70 to 4.00	16/07/2015 12:11:00	-	-	-	-	0.0	0.0	20.8	0.0	2.1	0.0	0.0

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.


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<b>Estuary Park, Avonmouth</b>					Page: <b>7 of 9</b>



# IN-SITU GAS MONITORING RESULTS

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	PID (ppm)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
BH5	1	50	1 (2)		---	0.70 to 4.00	15 secs	-	-	-	-	2.0	0.0	17.0	0.0	0.0	0.0	0.0
BH5	1	50	1 (2)		---	0.70 to 4.00	30 secs	-	-	-	-	1.2	0.1	17.8	1.0	-	0.0	0.0
BH5	1	50	1 (2)		---	0.70 to 4.00	60 secs	-	-	-	-	0.8	0.1	18.8	1.0	-	0.0	0.0
BH5	1	50	1 (2)		---	0.70 to 4.00	90 secs	-	-	-	-	0.7	0.1	18.9	1.0	-	0.0	0.0
BH5	1	50	1 (2)		---	0.70 to 4.00	120 secs	-	-	-	-	0.7	0.1	19.0	1.0	-	0.0	0.0
BH5	1	50	1 (2)		---	0.70 to 4.00	180 secs	-	-	-	-	0.7	0.1	19.0	1.0	-	0.0	0.0
BH5	1	50	1 (2)		---	0.70 to 4.00	240 secs	-	-	-	-	0.7	0.1	19.0	1.0	-	0.0	0.0
BH5	1	50	1 (2)		---	0.70 to 4.00	300 secs	-	-	-	-	0.7	0.1	19.0	1.0	-	0.0	0.0
BH5	1	50	1 (3)	4.00	3.18	0.70 to 4.00	16/07/2015 12:16:30	-	-	-	1.88	-	-	-	-	-	-	-
BH6	1	50	1	6.00	---	3.00 to 6.00	03/07/2015 10:45:00	1024	1024	0.0 <sub>(I)</sub>	-	-	-	-	-	-	-	-
BH6	1	50	1		---	3.00 to 6.00	30 secs	-	-	0.0 <sub>(SS)</sub>	-	-	-	-	-	-	-	-
BH6	1	50	1 (2)	6.00	---	3.00 to 6.00	03/07/2015 10:46:00	-	-	-	-	0.0	0.0	20.8	0.0	2.1	0.0	0.0
BH6	1	50	1 (2)		---	3.00 to 6.00	15 secs	-	-	-	-	0.0	0.0	20.7	0.0	0.8	0.0	0.0
BH6	1	50	1 (2)		---	3.00 to 6.00	30 secs	-	-	-	-	0.0	0.0	20.6	0.0	-	0.0	0.0
BH6	1	50	1 (2)		---	3.00 to 6.00	60 secs	-	-	-	-	0.0	0.0	20.6	0.0	-	0.0	0.0
BH6	1	50	1 (2)		---	3.00 to 6.00	90 secs	-	-	-	-	0.0	0.0	20.6	0.0	-	0.0	0.0
BH6	1	50	1 (2)		---	3.00 to 6.00	120 secs	-	-	-	-	0.0	0.0	20.6	0.0	-	0.0	0.0
BH6	1	50	1 (2)		---	3.00 to 6.00	180 secs	-	-	-	-	0.0	0.0	20.6	0.0	-	0.0	0.0
BH6	1	50	1 (2)		---	3.00 to 6.00	240 secs	-	-	-	-	0.0	0.0	20.6	0.0	-	0.0	0.0
BH6	1	50	1 (2)		---	3.00 to 6.00	300 secs	-	-	-	-	0.0	0.0	20.6	0.0	-	0.0	0.0
BH6	1	50	1 (3)	6.00	5.44	3.00 to 6.00	03/07/2015 10:52:00	-	-	-	2.06	-	-	-	-	-	-	-
BH6	1	50	1 (3)		5.44	3.00 to 6.00	420 secs	-	-	-	3.50	-	-	-	-	-	-	-
BH6	1	50	2	6.00	---	3.00 to 6.00	10/07/2015 12:55:00	1018	1018	0.0 <sub>(I)</sub>	-	-	-	-	-	-	-	-
BH6	1	50	2		---	3.00 to 6.00	30 secs	-	-	0.0 <sub>(SS)</sub>	-	-	-	-	-	-	-	-

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.


 <b>STRUCTURAL SOILS</b> The Old School Stillhouse Lane Bedminster Bristol BS3 4EB	Compiled By	Date	Checked By	Date	Contract Ref: <b>729873</b>
	<i>Au Collier</i>	<b>07/08/15</b>	<i>Au Collier</i>	<b>07/08/15</b>	
	Contract:	<b>Estuary Park, Avonmouth</b>			Page:



# IN-SITU GAS MONITORING RESULTS

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	PID (ppm)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
BH6	1	50	2 (2)	6.00	---	3.00 to 6.00	10/07/2015 12:56:00	-	-	-	-	0.0	0.0	20.8	0.0	2.7	0.0	0.0
BH6	1	50	2 (2)		---	3.00 to 6.00	15 secs	-	-	-	-	0.0	0.0	20.9	0.0	0.0	0.0	0.0
BH6	1	50	2 (2)		---	3.00 to 6.00	30 secs	-	-	-	-	0.0	0.0	20.8	0.0	-	0.0	0.0
BH6	1	50	2 (2)		---	3.00 to 6.00	60 secs	-	-	-	-	0.0	0.0	20.7	0.0	-	0.0	0.0
BH6	1	50	2 (2)		---	3.00 to 6.00	90 secs	-	-	-	-	0.0	0.0	20.7	0.0	-	0.0	0.0
BH6	1	50	2 (2)		---	3.00 to 6.00	120 secs	-	-	-	-	0.0	0.0	20.7	0.0	-	0.0	0.0
BH6	1	50	2 (2)		---	3.00 to 6.00	180 secs	-	-	-	-	0.0	0.0	20.7	0.0	-	0.0	0.0
BH6	1	50	2 (2)		---	3.00 to 6.00	240 secs	-	-	-	-	0.0	0.0	20.6	0.0	-	0.0	0.0
BH6	1	50	2 (2)		---	3.00 to 6.00	300 secs	-	-	-	-	0.0	0.0	20.6	0.0	-	0.0	0.0
BH6	1	50	2 (3)	6.00	5.50	3.00 to 6.00	10/07/2015 13:01:30	-	-	-	2.24	-	-	-	-	-	-	-
BH6	1	50	3	6.00	---	3.00 to 6.00	16/07/2015 11:45:00	1016	1016	0.0 <sub>(I)</sub>	-	-	-	-	-	-	-	-
BH6	1	50	3		---	3.00 to 6.00	30 secs	-	-	0.0 <sub>(SS)</sub>	-	-	-	-	-	-	-	-
BH6	1	50	3 (2)	6.00	---	3.00 to 6.00	16/07/2015 11:46:00	-	-	-	-	0.0	0.0	20.8	0.0	2.4	0.0	0.0
BH6	1	50	3 (2)		---	3.00 to 6.00	15 secs	-	-	-	-	0.0	0.0	20.5	0.0	0.0	0.0	0.0
BH6	1	50	3 (2)		---	3.00 to 6.00	30 secs	-	-	-	-	0.0	0.0	20.4	0.0	-	0.0	0.0
BH6	1	50	3 (2)		---	3.00 to 6.00	60 secs	-	-	-	-	0.0	0.0	20.5	0.0	-	0.0	0.0
BH6	1	50	3 (2)		---	3.00 to 6.00	90 secs	-	-	-	-	0.0	0.0	20.5	0.0	-	0.0	0.0
BH6	1	50	3 (2)		---	3.00 to 6.00	120 secs	-	-	-	-	0.0	0.0	20.4	0.0	-	0.0	0.0
BH6	1	50	3 (2)		---	3.00 to 6.00	180 secs	-	-	-	-	0.0	0.0	20.5	0.0	-	0.0	0.0
BH6	1	50	3 (2)		---	3.00 to 6.00	240 secs	-	-	-	-	0.0	0.0	20.5	0.0	-	0.0	0.0
BH6	1	50	3 (2)		---	3.00 to 6.00	300 secs	-	-	-	-	0.0	0.0	20.5	0.0	-	0.0	0.0
BH6	1	50	3 (3)	6.00	5.41	3.00 to 6.00	16/07/2015 11:51:30	-	-	-	2.26	-	-	-	-	-	-	-

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 <b>STRUCTURAL SOILS</b> The Old School Stillhouse Lane Bedminster Bristol BS3 4EB	Compiled By	Date	Checked By	Date	Contract Ref: <b>729873</b>
	Contract:	<b>07/08/15</b>	<b>07/08/15</b>		
	<b>Estuary Park, Avonmouth</b>				Page: <b>9 of 9</b>



# Groundsure Envirosight

**Address:** Estuary Park, Chittening Industrial Estate,  
**Date:** 4 Jun 2015  
**Reference:** EMS-307406\_414939  
**Client:** EmapSite

NW

N

NE

W

E



SW

S

SE

**Aerial Photograph Capture date:** 01-Jun-2009  
**Grid Reference:** 353148,181243  
**Site Size:** 1.75ha

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# Overview of Findings

For further details on each dataset, please refer to each individual section in the main report as listed. Where the database has been searched a numerical result will be recorded. Where the database has not been searched '-' will be recorded.

Section 1: Environmental Permits, Incidents and Registers		On-site	0-50m	51-250	251-500		
1.1 Industrial Sites Holding Environmental Permits and/or Authorisations							
1.1.1	Records of historic IPC Authorisations	0	0	12	0		
1.1.2	Records of Part A(1) and IPPC Authorised Activities	0	0	2	0		
1.1.3	Records of Water Industry Referrals (potentially harmful discharges to the public sewer)	0	0	0	0		
1.1.4	Records of Red List Discharge Consents (potentially harmful discharges to controlled waters)	0	0	0	1		
1.1.5	Records of List 1 Dangerous Substances Inventory sites	0	0	0	0		
1.1.6	Records of List 2 Dangerous Substances Inventory sites	0	0	1	1		
1.1.7	Records of Part A(2) and Part B Activities and Enforcements	0	0	1	0		
1.1.8	Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	0	0		
1.1.9	Records of Licensed Discharge Consents	0	0	3	17		
1.1.10	Records of Planning Hazardous Substance Consents and Enforcements	0	0	2	0		
1.2	Records of COMAH and NIHHS sites	2	0	0	2		
1.3 Environment Agency Recorded Pollution Incidents							
1.3.1	National Incidents Recording System, List 2	0	0	8	4		
1.3.2	National Incidents Recording System, List 1	0	0	0	0		
1.4	Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0		
Section 2: Landfill and Other Waste Sites		On-site	0-50m	51-250	251-500	501-1000	1000-5000
2.1 Landfill Sites							
2.1.1	Environment Agency Registered Landfill Sites	0	0	0	0	1	Not searched
2.1.2	Environment Agency Historic Landfill Sites	0	0	0	0	3	7
2.1.3	BGS/DoE Landfill Site Survey	0	0	0	0	0	3

Section 2: Landfill and Other Waste Sites	On-site	0-50m	51-250	251-500	501-1000	1000-5000
2.1.4 Landfills from Local Authority and Historical Mapping Records	0	0	0	0	0	0
2.2 Landfill and Other Waste Sites Findings						
2.2.1 Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites	0	2	2	2	Not searched	Not searched
2.2.2 Environment Agency Licensed Waste Sites	0	2	4	0	12	29

Section 3: Current Land Use	On-site	0-50m	51-250	251-500
3.1 Current Industrial Sites Data	0	2	24	Not searched
3.2 Records of Petrol and Fuel Sites	0	0	0	0
3.3 National Grid Underground Electricity Cables	0	0	0	0
3.4 National Grid Gas Transmission Pipelines	0	0	0	0

Section 4: Geology	
4.1 Are there any records of Artificial Ground and Made Ground present beneath the study site?	No
4.2 Are there any records of Superficial Ground and Drift Geology present beneath the study site?	Yes
4.3 For records of Bedrock and Solid Geology beneath the study site see the detailed findings section.	

Section 5: Hydrogeology and Hydrology	0-500m					
5.1 Are there any records of Strata Classification in the Superficial Geology within 500m of the study site?	Yes					
5.2 Are there any records of Strata Classification in the Bedrock Geology within 500m of the study site?	Yes					
	On-site	0-50m	51-250	251-500	501-1000	1000-2000
5.3 Groundwater Abstraction Licences (within 2000m of the study site)	0	0	0	0	2	2
5.4 Surface Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
5.5 Potable Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
5.6 Source Protection Zones (within 500m of the study site)	0	0	0	0	Not searched	Not searched
5.7 Source Protection Zones within Confined Aquifer	0	0	0	0	Not searched	Not searched
5.8 Groundwater Vulnerability and Soil Leaching Potential (within 500m of the study site)	0	0	0	0	Not searched	Not searched
	On-site	0-50m	51-250	251-500	501-1000	1000-1500



## Section 5: Hydrogeology and Hydrology

0-500m

5.9 Is there any Environment Agency information on river quality within 1500m of the study site?	No	No	No	No	No	No
5.10 Detailed River Network entries within 500m of the site	0	0	8	21	Not searched	Not searched
5.11 Surface water features within 250m of the study site	No	Yes	Yes	Not searched	Not searched	Not searched

## Section 6: Flooding

6.1 What is the highest risk of flooding within 25m of the centre of the study site?	Low
6.2 Are there any Flood Defences within 250m of the study site?	No
6.3 Are there any areas benefiting from Flood Defences within 250m of the study site?	Yes
6.4 Are there any areas used for Flood Storage within 250m of the study site?	No
6.5 What is the maximum BGS Groundwater Flooding susceptibility within 50m of the study site?	Not Prone
6.6 What is the BGS confidence rating for the Groundwater Flooding susceptibility areas?	Not Applicable

## Section 7: Designated Environmentally Sensitive Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
7.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	0	1	0	1
7.2 Records of National Nature Reserves (NNR)	0	0	0	0	0	0
7.3 Records of Special Areas of Conservation (SAC)	0	0	0	2	0	2
7.4 Records of Special Protection Areas (SPA)	0	0	0	2	0	2
7.5 Records of Ramsar sites	0	0	0	2	0	2
7.6 Records of Ancient Woodlands	0	0	0	0	0	0
7.7 Records of Local Nature Reserves (LNR)	0	0	0	0	0	0
7.8 Records of World Heritage Sites	0	0	0	0	0	0
7.9 Records of Environmentally Sensitive Areas	0	0	0	0	0	0
7.10 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	0	0

Section 7: Designated Environmentally Sensitive Sites	On-site	0-50m	51-250	251-500	501-1000	1000-2000
7.11 Records of National Parks	0	0	0	0	0	0
7.12 Records of Nitrate Sensitive Areas	0	0	0	0	0	0
7.13 Records of Nitrate Vulnerable Zones	0	0	0	0	0	0
7.14 Records of Green Belt Data	0	0	0	0	0	2

## Section 8: Natural Hazards

8.1 What is the maximum risk of natural ground subsidence?	Moderate
8.1.1 What is the maximum Shrink-Swell hazard rating identified on the study site?	Low
8.1.2 What is the maximum Landslides hazard rating identified on the study site?	Very Low
8.1.3 What is the maximum Soluble Rocks hazard rating identified on the study site?	Negligible
8.1.4 What is the maximum Compressible Ground hazard rating identified on the study site?	Moderate
8.1.5 What is the maximum Collapsible Rocks hazard rating identified on the study site?	Negligible
8.1.6 What is the maximum Running Sand hazard rating identified on the study site?	Moderate

## Section 9: Mining

9.1 Are there any coal mining areas within 75m of the study site?	No
9.2 What is the potential for undermining as a result of underground mineral extraction, excluding coal and minerals extracted as a consequence of coal mining?	Unclassified
9.3 Are there any brine affected areas within 75m of the study site?	No

# Using this report

The following report is designed by Environmental Consultants for Environmental Professionals bringing together the most up-to-date market leading environmental data. This report is provided under and subject to the Terms & Conditions agreed between Groundsure and the Client. The document contains the following sections:

## 1. Environmental Permits, Incidents and Registers

Provides information on Regulated Industrial Activities and Pollution Incidents as recorded by Regulatory Authorities, and sites determined as Contaminated Land. This search is conducted using radii up to 500m.

## 2. Landfills and Other Waste Sites

Provides information on landfills and other waste sites that may pose a risk to the study site. This search is conducted using radii up to 1500m.

## 3. Current Land Uses

Provides information on current land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. These searches are conducted using radii of up to 500m. This includes information on potentially contaminative industrial sites, petrol stations and fuel sites as well as high pressure gas pipelines and underground electricity transmission lines.

## 4. Geology

Provides information on artificial and superficial deposits and bedrock beneath the study site.

## 5. Hydrogeology and Hydrology

Provides information on productive strata within the bedrock and superficial geological layers, abstraction licenses, Source Protection Zones (SPZs) and river quality. These searches are conducted using radii of up to 2000m.

## 6. Flooding

Provides information on surface water flooding, flood defences, flood storage areas and groundwater flood areas. This search is conducted using radii of up to 250m.

## 7. Designated Environmentally Sensitive Sites

Provides information on the Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, Local Nature Reserves (LNR), Areas of Outstanding Natural Beauty (AONB), National Parks (NP), Environmentally Sensitive Areas, Nitrate Sensitive Areas, Nitrate Vulnerable Zones and World Heritage Sites and Scheduled Ancient Woodland. These searches are conducted using radii of up to 2000m.

## 8. Natural Hazards

Provides information on a range of natural hazards that may pose a risk to the study site. These factors include natural ground subsidence.

## 9. Mining

Provides information on areas of coal, “non-coal” mining and brine affected areas.

## 10. Contacts

This section of the report provides contact points for statutory bodies and data providers that may be able to provide further information on issues raised within this report. Alternatively, Groundsure provide a free Technical Helpline (08444 159000) for further information and guidance.

### Note: Maps

Only certain features are placed on the maps within the report. All features represented on maps found within this search are given an identification number. This number identifies the feature on the mapping and correlates it to the additional information provided below. This identification number precedes all other information and takes the following format -Id: 1, Id: 2, etc. Where numerous features on the same map are in such close proximity that the numbers would obscure each other a letter identifier is used instead to represent the features. (e.g. Three features which overlap may be given the identifier “A” on the map and would be identified separately as features 1A, 3A, 10A on the data tables provided).

Where a feature is reported in the data tables to a distance greater than the map area, it is noted in the data table as “Not Shown”.



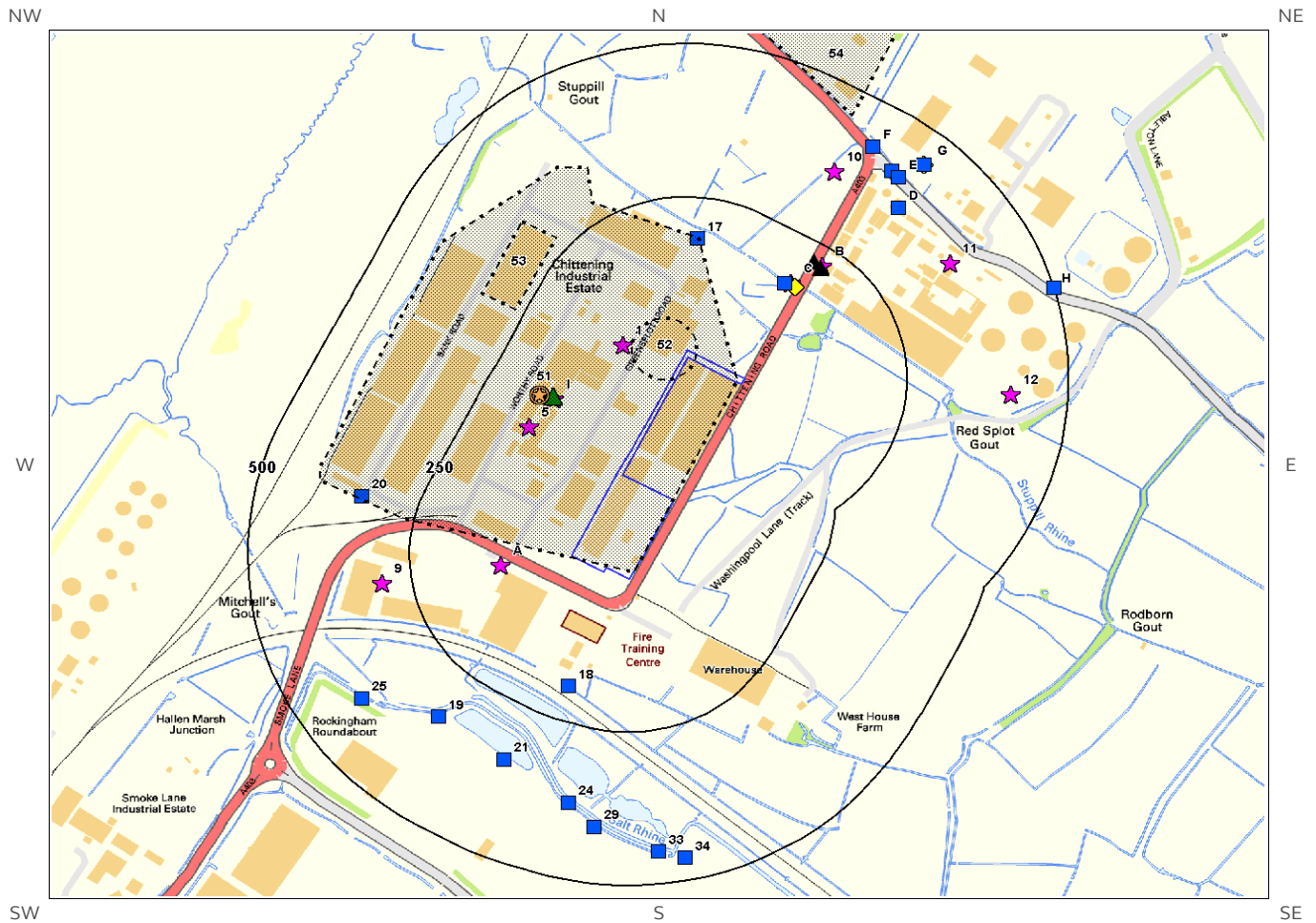
**Groundsure**

LOCATION INTELLIGENCE

**emapsite™**

All distances given in this report are in Metres (m). Directions are given as compass headings such as N: North, E: East, NE: North East from the nearest point of the study site boundary.

# 1. Environmental Permits, Incidents and Registers Map



Environmental Permits, Incidents and Registers Legend

Mapping sourced from **Ordnance Survey**

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- |  |                    |  |                               |  |  |
|--|--------------------|--|-------------------------------|--|--|
|  | Site Outline       |  | Recorded Pollution Incident   |  | Radioactive Consents (Lower Risk)                            |
|  | Search Buffers (m) |  | Dangerous Substances (List 1) |  | Part A(1) Authorised Processes & Historic IPC Authorisations |
|  | 250                |  | Dangerous Substances (List 2) |  | Part A(2) and Part B Authorisations                          |
|  | 500                |  | Water Industry Referrals      |  | Sites Determined as Contaminated Land                        |
|  |                    |  | Licensed Discharge Consents   |  | COMAH / NIHHS Sites  |
|  |                    |  | Red List Discharge Consents   |  | Hazardous Substance Consents & Enforcements                  |

# 1. Environmental Permits, Incidents and Registers

## 1.1 Industrial Sites Holding Licences and/or Authorisations

Searches of information provided by the Environment Agency and Local Authorities reveal the following information:

### 1.1.1 Records of historic IPC Authorisations within 500m of the study site:

12

The following IPC Authorisations are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance	Direction	NGR	Details	
59B	213.0	NE	353440 181630	Operator: Sevalco Ltd Address: Severn Road, Chittening, Bristol, Avon, BS11 0YL Process: Carbonisation And Associated Processes	Permit Number: BD6824 Original Permit Number: IPCMINVAR Date Approved: 24-11-1998 Effective Date: 30-11-1998 Status: Superseded By Variation
60B	213.0	NE	353440 181630	Operator: Sevalco Ltd Address: Severn Road, Chittening, Bristol, Avon, BS11 0YL Process: Carbonisation And Associated Processes	Permit Number: AV3222 Original Permit Number: IPCMINVAR Date Approved: 29-4-1996 Effective Date: 1-6-1996 Status: Superseded By Variation
61B	213.0	NE	353440 181630	Operator: Sevalco Ltd Address: Severn Road, Chittening, Bristol, Avon, BS11 0YL Process: Carbonisation And Associated Processes	Permit Number: BG9854 Original Permit Number: IPCMAJVAR Date Approved: 18-5-2000 Effective Date: 1-6-2000 Status: Superseded By Variation
62B	213.0	NE	353440 181630	Operator: Sevalco Ltd Address: Severn Road, Chittening, Bristol, Avon, BS11 0YL Process: Carbonisation And Associated Processes	Permit Number: AW5034 Original Permit Number: IPCMAJVAR Date Approved: 4-9-1997 Effective Date: 1-10-1997 Status: Superseded By Variation
63B	213.0	NE	353440 181630	Operator: Sevalco Ltd Address: Severn Road, Chittening, Bristol, Avon, BS11 0YL Process: Carbonisation And Associated Processes	Permit Number: AF7916 Original Permit Number: IPCAIRAPP Date Approved: 19-3-1993 Effective Date: 19-3-1993 Status: Superseded By Variation
64B	213.0	NE	353440 181630	Operator: Sevalco Ltd Address: Severn Road, Chittening, Bristol, Avon, BS11 0YL Process: Carbonisation And Associated Processes	Permit Number: BJ0064 Original Permit Number: IPCMINVAR Date Approved: 18-7-2000 Effective Date: 1-8-2000 Status: Superseded By Variation
65B	213.0	NE	353440 181630	Operator: Sevalco Ltd Address: Severn Road, Chittening, Bristol, Avon, BS11 0YL Process: Carbonisation And Associated Processes	Permit Number: BU6662 Original Permit Number: IPCMINVAR Date Approved: 14-4-2003 Effective Date: 21-4-2003 Status: Superseded By Variation
66B	213.0	NE	353440 181630	Operator: Sevalco Ltd Address: Severn Road, Chittening, Bristol, Avon, BS11 0YL Process: Carbonisation And Associated Processes	Permit Number: BV5246 Original Permit Number: IPCMINVAR Date Approved: 4-9-2003 Effective Date: 8-9-2003 Status: Superseded By Variation

ID	Distance	Direction	NGR	Details	
67B	213.0	NE	353440 181630	Operator: Sevalco Ltd Address: Severn Road, Chittening, Bristol, Avon, BS11 0YL Process: Carbonisation And Associated Processes	Permit Number: BW9158 Original Permit Number: IPCMINVAR Date Approved: 16-11-2003 Effective Date: 17-11-2003 Status: Superseded By Variation
68B	213.0	NE	353440 181630	Operator: Sevalco Ltd Address: Severn Road, Chittening, Bristol, Avon, BS11 0YL Process: Carbonisation And Associated Processes	Permit Number: BX8980 Original Permit Number: IPCMINVAR Date Approved: 12-5-2004 Effective Date: 13-5-2004 Status: Superseded By Variation
69B	213.0	NE	353440 181630	Operator: Sevalco Ltd Address: Severn Road, Chittening, Bristol, Avon, BS11 0YL Process: Carbonisation And Associated Processes	Permit Number: BZ2125 Original Permit Number: IPCMINVAR Date Approved: 27-6-2005 Effective Date: 1-7-2005 Status: Superseded By Variation
70B	213.0	NE	353440 181630	Operator: Sevalco Ltd Address: Severn Road, Chittening, Bristol, Avon, BS11 0YL Process: Carbonisation And Associated Processes	Permit Number: CA4714 Original Permit Number: IPCMINVAR Date Approved: 19-5-2006 Effective Date: 24-5-2006 Status: Revoked - Now Ippc

### 1.1.2 Records of Part A(1) and IPPC Authorised Activities within 500m of the study site:

2

The following Part A(1) and IPPC Authorised Activities are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance	Direction	NGR	Details	
57B	217.0	NE	353430 181640	Operator: Sevalco Limited Installation Name: Sevalco Limited Process: COMBUSTION; ANY FUEL =>20MW BUT <50MW (UNLESS 1.1 A(1) B)	Permit Number: MP3035HZ Original Permit Number: YP3538LY EPR Reference: - Issue Date: - Effective Date: 30/11/2011 Last date noted as effective: 2015-01- 01 Status: Surrender Effective
58B	217.0	NE	353430 181640	Operator: Sevalco Limited Installation Name: Sevalco Limited Process: COMBUSTION; ANY FUEL =>20MW BUT <50MW (UNLESS 1.1 A(1) B)	Permit Number: YP3538LY Original Permit Number: YP3538LY EPR Reference: - Issue Date: 1/8/2007 Effective Date: 1/8/2007 Last date noted as effective: 2015-01- 01 Status: Superceded

### 1.1.3 Records of Water Industry Referrals (potentially harmful discharges to the public sewer) within 500m of the study site:

0

Database searched and no data found.

1.1.4 Records of Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of the study site:

1

The following Red List Discharge Consent records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance	Direction	NGR	Details
15H	499.0	E	353800 181600	Address: VIRIDOR WASTE MANAGEMENT LIMITED, SEVERN ROAD RESOURCE RECOVER CENTRE, SEVERN RAOD, CHITTENING, AVONMOUTH, BRISTOL, BS11 0YU Permit Number: EPRZB3934AG Permit Version: 1 Status: NEW ISSUED UNDER EPR 2010 Discharge Type: Industrial waste site Effluent Type: TRADE DISCHARGES - PROCESS EFFLUENT - NOT WATER COMPANY Catchment: Approval Date: 02-Jul-2013

1.1.5 Records of List 1 Dangerous Substances Inventory Sites within 500m of the study site:

0

Database searched and no data found.

1.1.6 Records of List 2 Dangerous Substance Inventory Sites within 500m of the study site:

2

The following List 2 Dangerous Substance Inventory Site records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance	Direction	NGR	Details
13C	167.0	NE	353400 181600	Name: Sevalco Ltd Status: Active Receiving Water: Severn Estuary (upper) Authorised Substances: Chromium, Copper, Lead, pH, Zinc
14G	445.0	NE	353600 181800	Name: Tarmac Bricks And Tiles Status: Not Active Receiving Water: Severn Estuary (upper) Authorised Substances: pH



1.1.7 Records of Part A(2) and Part B Activities and Enforcements within 500m of the study site:

1

The following Part A(2) and Part B Activities are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance	Direction	NGR	Details
50I	147.0	NW	353026 181420	Address: Ross Gordon Engineering Ltd, Worthy Road, Chittening Industrial Estate, BS11 9HL Process: 6.4b Vehicle refinishing Status: Current Permit Permit Type: Part B Enforcement: Data requested, not received. Date of Enforcement: Data requested, not received. Comment: Data requested, not received.

1.1.8 Records of Category 3 or 4 Radioactive Substances Authorisations:

0

Database searched and no data found.

1.1.9 Records of Licensed Discharge Consents within 500m of the study site:

20

The following Licensed Discharge Consents records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance	Direction	NGR	Details
16 C	166.0	NE	353384 181607	Address: RECYCLING DEPOT, CHITTENING IND EST, SEVERN ROAD, CHITTENING, AVONMOUTH, BRISTOL, BS11 0YL Effluent Type: TRADE DISCHARGES - SITE DRAINAGE Permit Number: 103664 Permit Version: 1 Receiving Water: STUPHILL RHYNE Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 19/04/2007 Effective Date: 01-Jun-2007 Revocation Date: -
17	183.0	N	353250 181680	Address: DURSTON PLANT CONTRACTORS LTD, GREENSPLOTT ROAD, CHITTENING INDUSTRIAL ESTATE, AVONMOUTH, BRISTOL, BS11 0YE Effluent Type: TRADE DISCHARGES - PROCESS EFFLUENT - WATER COMPANY (WTW) Permit Number: 013177 Permit Version: 1 Receiving Water: UN-NAMED WATERCOURSE Status: REVOKED (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 09/05/1996 Effective Date: 01-May-1996 Revocation Date: 01/03/2007
18	194.0	S	353050 180950	Address: SOMERSET, AVON & GLOUCESTER JOINT, FIRE TRAINING CENTRE, SMOKE LANE, AVONMOUTH, BRISTOL Effluent Type: SEWAGE & TRADE COMBINED - UNSPECIFIED Permit Number: 101872 Permit Version: 1 Receiving Water: AVONMOUTH RHINE SYSTEM Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 11/07/2002 Effective Date: 10-Jun-2002 Revocation Date: -

ID	Distance	Direction	NGR	Details	
19	333.0	SW	352850 180900	Address: SEVEN GATES, LAWRENCE WESTON ROAD, AVONMOUTH, BRISTOL, -, BS11 0YW Effluent Type: MISCELLANEOUS DISCHARGES - SURFACE WATER Permit Number: 100491 Permit Version: 1	Receiving Water: SALT RHYNE Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 17/02/1998 Effective Date: 17-Feb-1998 Revocation Date: -
20	339.0	W	352730 181260	Address: P B A INDUSTRIAL ESTATE, SMOKE LANE, BRISTOL Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 011196 Permit Version: 1	Receiving Water: RIVER BRISTOL AVON Status: SURRENDERED UNDER EPR 2010 Issue date: - Effective Date: 12-Sep-1989 Revocation Date: 31/07/2014
21	343.0	SW	352950 180830	Address: SEVEN GATES, LAWRENCE WESTON ROAD, AVONMOUTH, BRISTOL, -, BS11 0YW Effluent Type: MISCELLANEOUS DISCHARGES - SURFACE WATER Permit Number: 100492 Permit Version: 1	Receiving Water: SALT RHYNE Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 17/02/1998 Effective Date: 17-Feb-1998 Revocation Date: -
22 D	365.0	NE	353560 181730	Address: SEVERN VALLEY BRICKWORKS, CHITTENING ROAD, AVONMOUTH, BRISTOL, ., BS11 0YB Effluent Type: TRADE DISCHARGES - SITE DRAINAGE (CONTAM SURFACE WATER, NOT WASTE SIT Permit Number: 102159 Permit Version: 1	Receiving Water: STUP PILL RHINE Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 26/02/2004 Effective Date: 22-Apr-2003 Revocation Date: 29/12/2003
23 D	365.0	NE	353560 181730	Address: SEVERN VALLEY BRICKWORKS, CHITTENING ROAD, AVONMOUTH, BRISTOL, ., BS11 0YB Effluent Type: TRADE DISCHARGES - SITE DRAINAGE (CONTAM SURFACE WATER, NOT WASTE SIT Permit Number: 102159 Permit Version: 2	Receiving Water: STUP PILL RHINE Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 30/12/2003 Effective Date: 30-Dec-2003 Revocation Date: -
24	377.0	S	353050 180760	Address: SEVEN GATES, LAWRENCE WESTON ROAD, AVONMOUTH, BRISTOL, -, BS11 0YW Effluent Type: MISCELLANEOUS DISCHARGES - SURFACE WATER Permit Number: 100493 Permit Version: 1	Receiving Water: SALT RHYNE Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 17/02/1998 Effective Date: 17-Feb-1998 Revocation Date: -
25	400.0	SW	352730 180930	Address: SEVEN GATES, LAWRENCE WESTON ROAD, AVONMOUTH, BRISTOL, -, BS11 0YW Effluent Type: MISCELLANEOUS DISCHARGES - SURFACE WATER Permit Number: 100490 Permit Version: 1	Receiving Water: UNNAMED WATERCOURSE Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 17/02/1998 Effective Date: 17-Feb-1998 Revocation Date: -
26 E	405.0	NE	353560 181780	Address: SEVERN VALLEY BRICKWORKS, CHITTENING ROAD, AVONMOUTH, BRISTOL, ., BS11 0YB Effluent Type: TRADE DISCHARGES - UNSPECIFIED Permit Number: 102159 Permit Version: 2	Receiving Water: STUP PILL RHINE Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 30/12/2003 Effective Date: 30-Dec-2003 Revocation Date: -

ID	Distance	Direction	NGR	Details	
27 E	407.0	NE	353550 181790	Address: SEVERN VALLEY BRICKWORKS, CHITTENING ROAD, AVONMOUTH, BRISTOL, ., BS11 0YB Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: 102159 Permit Version: 2	Receiving Water: STUP PILL RHINE Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 30/12/2003 Effective Date: 30-Dec-2003 Revocation Date: -
28 E	407.0	NE	353550 181790	Address: SEVERN VALLEY BRICKWORKS, CHITTENING ROAD, AVONMOUTH, BRISTOL, ., BS11 0YB Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: 102159 Permit Version: 1	Receiving Water: STUP PILL RHINE Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 26/02/2004 Effective Date: 22-Apr-2003 Revocation Date: 29/12/2003
29	409.0	S	353090 180720	Address: SEVEN GATES, LAWRENCE WESTON ROAD, AVONMOUTH, BRISTOL, -, BS11 0YW Effluent Type: MISCELLANEOUS DISCHARGES - SURFACE WATER Permit Number: 100494 Permit Version: 1	Receiving Water: SALT RHYNE Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 17/02/1998 Effective Date: 17-Feb-1998 Revocation Date: -
30 F	427.0	NE	353520 181830	Address: SEVERN VALLEY BRICKWORKS, CHITTENING ROAD, AVONMOUTH, BRISTOL, ., BS11 0YB Effluent Type: TRADE DISCHARGES - SITE DRAINAGE (CONTAM SURFACE WATER, NOT WASTE SIT Permit Number: 102159 Permit Version: 2	Receiving Water: STUP PILL RHINE Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 30/12/2003 Effective Date: 30-Dec-2003 Revocation Date: -
31 F	427.0	NE	353520 181830	Address: SEVERN VALLEY BRICKWORKS, CHITTENING ROAD, AVONMOUTH, BRISTOL, ., BS11 0YB Effluent Type: TRADE DISCHARGES - SITE DRAINAGE (CONTAM SURFACE WATER, NOT WASTE SIT Permit Number: 102159 Permit Version: 1	Receiving Water: STUP PILL RHINE Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 26/02/2004 Effective Date: 22-Apr-2003 Revocation Date: 29/12/2003
32 G	445.0	NE	353600 181800	Address: SEVERN VALLEY BRICKWORKS, CHITTENING ROAD, AVONMOUTH, BRISTOL, ., BS11 0YB Effluent Type: TRADE DISCHARGES - PROCESS EFFLUENT - WATER COMPANY (WTW) Permit Number: 021239 Permit Version: 1	Receiving Water: - Status: REVOKED - APPEAL PERIOD( WATER ACT 1989 SCHED 12, 6 & 8) Issue date: - Effective Date: 11-Feb-1983 Revocation Date: 01/03/1994
33	447.0	S	353190 180680	Address: SEVEN GATES, LAWRENCE WESTON ROAD, AVONMOUTH, BRISTOL, -, BS11 0YW Effluent Type: MISCELLANEOUS DISCHARGES - SURFACE WATER Permit Number: 100495 Permit Version: 1	Receiving Water: SALT RHYNE Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 17/02/1998 Effective Date: 17-Feb-1998 Revocation Date: -
34	463.0	S	353230 180670	Address: SEVEN GATES, LAWRENCE WESTON ROAD, AVONMOUTH, BRISTOL, -, BS11 0YW Effluent Type: MISCELLANEOUS DISCHARGES - SURFACE WATER Permit Number: 100496 Permit Version: 1	Receiving Water: SALT RHYNE Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 17/02/1998 Effective Date: 17-Feb-1998 Revocation Date: -

ID	Distance	Direction	NGR	Details
35 H	499.0	E	353800 181600	Address: SEVERN ROAD RESOURCE RECOVER CENTRE, SEVERN RAOD, CHITTENING, AVONMOUTH, BRISTOL, BS11 0YU Receiving Water: STUP PILL RHYNE Status: SURRENDERED UNDER EPR 2010 Issue date: 02/07/2013 Effective Date: 02-Jul-2013 Revocation Date: 12/06/2014 Effluent Type: TRADE DISCHARGES - PROCESS EFFLUENT - NOT WATER COMPANY Permit Number: EPRZB3934AG Permit Version: 1

### 1.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site:

2

The following records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance	Direction	Application Reference Number	NGR	Application Status	Application Date	Address	Details	Details of Enforcement Action
711	168.0	NW	No Details	353005 181424	Approved	No Details	A.E.M (Avon Ltd), Redstone, Canada & Buchanan Warehouses, Chittening Estate, Avonmouth, BS11 0YB	No Details	Enforcement: Data requested, not received. Date of Enforcement: Data Requested, not received. Comment: Data Requested, not received.
721	168.0	NW	No Details	353005 181424	Approved	No Details	Shell Gas Limited, Bank Road, Chiittening Ind.Estate, Avonmouth, Bristol, BS11 0YB	No Details	Enforcement: Data requested, not received. Date of Enforcement: Data Requested, not received. Comment: Data Requested, not received.

## 1.2 Dangerous or Hazardous Sites

Records of COMAH & NIHHS sites within 500m of the study site:

4

The following COMAH & NIHHS Authorisation records provided by the Health and Safety Executive are represented as polygons or buffered points on the Environmental Permits, Incidents and Registers Map:

ID	Distance	Direction	Company	Address	Operational Status	Tier
51	0.0	On Site	Shell Gas Ltd	Shell Gas Ltd, Chittening Industrial Estate, Bristol, Bs11 0yb	Historical NIHHS Site	-

ID	Distance	Direction	Company	Address	Operational Status	Tier
52	0.0	On Site	A E Murphy Ltd	A E Murphy Ltd, Chittening Industrial Estate, Avonmouth, Bristol, Bs11 0yb	Historical NIHHS Site	-
53	264.0	NW	Avongas Ltd	Avongas Ltd, Bank Road, Avonmouth Docks Estate, Chittening, Avonmouth	Historical NIHHS Site	-
54	457.0	NE	British Gas	British Gas, Avonmouth Storage Installation, Severn Road, Hallen, Bristol	Historical COMAH Site	-

## 1.3 Environment Agency Recorded Pollution Incidents

### 1.3.1 Records of National Incidents Recording System, List 2 within 500m of the study site:

12

The following NIRS List 2 records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance	Direction	NGR	Details
1	92.0	NW	181507 353134	Incident Date: 02-Jul-2001 Incident Identification: 12920 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Dust Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
2A	111.0	W	181147 352945	Incident Date: 08-Sep-2002 Incident Identification: 106216 Pollutant: Organic Chemicals/Products Pollutant Description: Solvents Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
3A	111.0	W	181147 352945	Incident Date: 25-Oct-2001 Incident Identification: 39162 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Smoke Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
4I	146.0	NW	181418 353026	Incident Date: 22-May-2001 Incident Identification: 6353 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Dust Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
5	157.0	NW	181373 352989	Incident Date: 18-Jun-2002 Incident Identification: 85718 Pollutant: Organic Chemicals/Products Pollutant Description: Other Organic Chemical or Product Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
6C	171.0	NE	181608 353393	Incident Date: 02-Feb-2008 Incident Identification: 561280 Pollutant: Oils and Fuel Pollutant Description: Other Oil or Fuel Water Impact: Category 2 (Significant) Land Impact: Category 2 (Significant) Air Impact: Category 4 (No Impact)
7B	219.0	NE	181636 353441	Incident Date: 10-May-2001 Incident Identification: 5806 Pollutant: Other Pollutant Pollutant Description: Other Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
8B	219.0	NE	181636 353441	Incident Date: 10-May-2001 Incident Identification: 5806 Pollutant: Other Pollutant Pollutant Description: Other Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
9	297.0	W	181118 352761	Incident Date: 12-Nov-2002 Incident Identification: 120319 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Fumes Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)

ID	Distance	Direction	NGR	Details	
10	363.0	NE	181790 353460	Incident Date: 07-Feb-2005 Incident Identification: 291946 Pollutant: Oils and Fuel Pollutant Description: Kerosene and Aviation Fuel	Water Impact: Category 2 (Significant) Land Impact: Category 2 (Significant) Air Impact: Category 3 (Minor)
11	368.0	NE	181640 353640	Incident Date: 07-Aug-2003 Incident Identification: 180015 Pollutant: Inorganic Chemicals/Products Pollutant Description: Other Inorganic Chemical or Product	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
12	410.0	E	181426 353733	Incident Date: 15-Aug-2002 Incident Identification: 100351 Pollutant: Oils and Fuel Pollutant Description: Other Oil or Fuel	Water Impact: Category 3 (Minor) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)

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### 1.3.2 Records of National Incidents Recording System, List 1 within 500m of the study site:

0

Database searched and no data found.

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### 1.4 Sites Determined as Contaminated Land under Part 2A EPA 1990

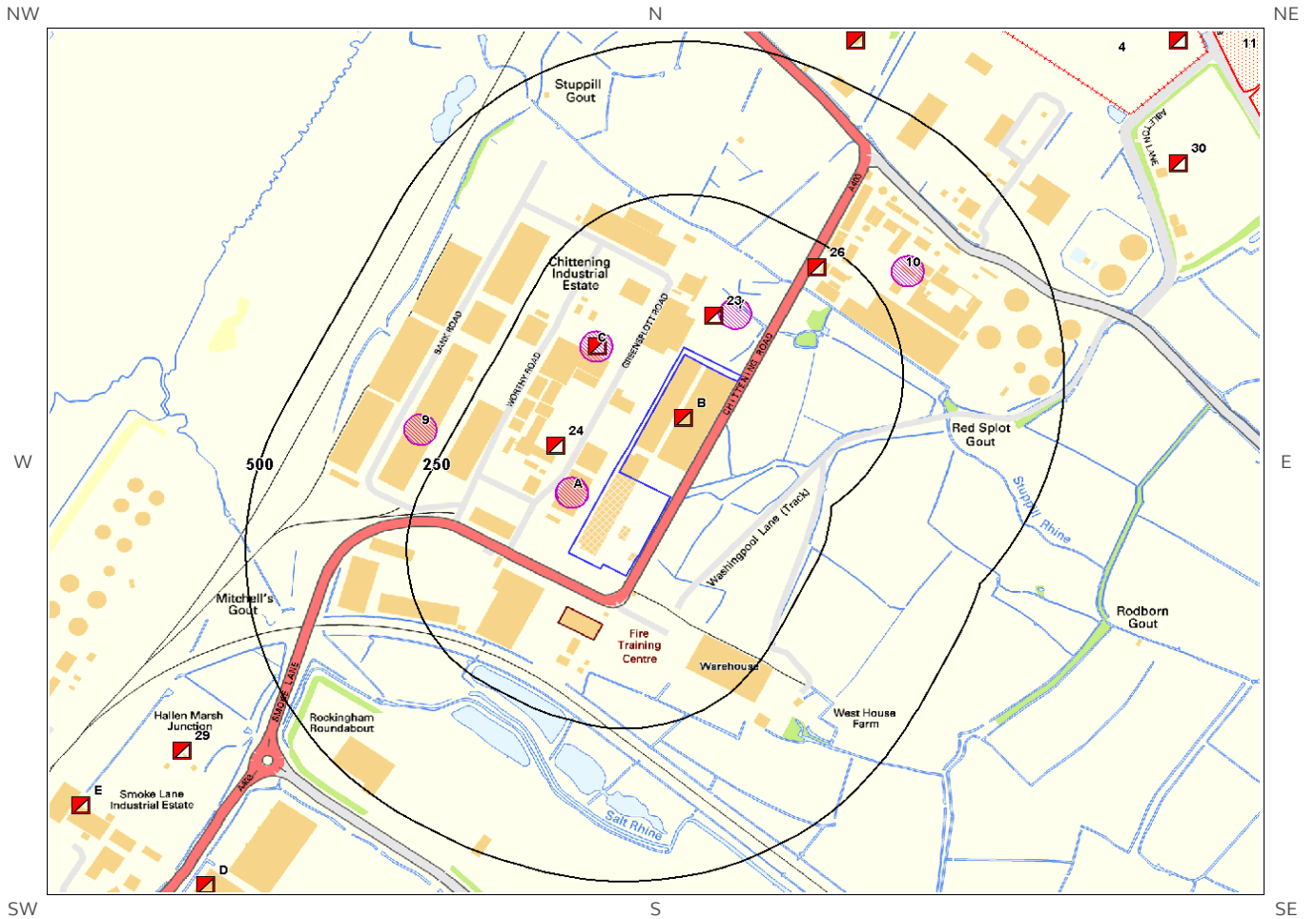
How many records of sites determined as contaminated land under Section 78R of the Environmental Protection Act 1990 are there within 500m of the study site?

0

Database searched and no data found.

---

# 2. Landfill and Other Waste Sites Map



**Landfill and Other Waste Sites Legend**



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- |                        |                           |   |
|------------------------|---------------------------|---|
| Site Outline           | E.A. Active Landfill      | Historic and Planned Waste Sites                    |
| 250 Search Buffers (m) | E.A. Historic Landfill    | E.A. Licensed Waste Site                            |
| 500 Search Buffers (m) | BGS / DoE Survey Landfill | Local Authority/Historical Mapping Landfill Records |



# 2. Landfill and Other Waste Sites

## 2.1 Landfill Sites

### 2.1.1 Records from Environment Agency landfill data within 1000m of the study site:

1

The following Environment Agency landfill records are represented as polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details
4	696.0	NE	354000 182000	Address: Crooks Marsh Farm, Land / Premises At, Crooks Marsh Farm, Hallen, Bristol, Avon, BS10 7SF Landfill Reference: 27256.0 Environmental Permitting Regulations (Waste) Reference: AVO329 Landfill Type: A1 : Co-Disposal Landfill Site  Operator: Bristol City Council Status: Issued IPPC Reference: EPR Reference:

### 2.1.2 Records of Environment Agency historic landfill sites within 1500m of the study site:

10

The following landfill records are represented as either points or polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details
11	906.0	NE	354100 182000	Site Address: Crooks Marsh Farm Sevalco, Hallen, Avonmouth Waste Licence: Yes Site Reference: S/NA/T/5A Waste Type: Inert, Industrial, Commercial , Environmental Permitting Regulations (Waste) Reference: -  Licence Issue: 18-Oct-1977 Licence Surrendered: 31-Dec-1979 Licence Hold Address: Avon House North, St James Barton, Bristol Operator: - First Recorded Input: 31-Oct-1977 Last Recorded Input: 31-Dec-1979
12	908.0	NE	354200 181900	Site Address: Crooks Marsh Farm, Hallen, Avonmouth Waste Licence: Yes Site Reference: S/BL/T/30 Waste Type: Inert, Industrial Environmental Permitting Regulations (Waste) Reference: -  Licence Issue: 16-Jan-1986 Licence Surrendered: Licence Hold Address: Avon House, Barton Operator: - First Recorded Input: 31-Dec-1986 Last Recorded Input:



ID	Distance (m)	Direction	NGR	Details
Not shown	937.0	SW	352600 180300	<p>Site Address: Tenneco Organics Limited, Rockingham Works, Avonmouth, Bristol</p> <p>Waste Licence: Yes</p> <p>Site Reference: L/BL/T/53</p> <p>Waste Type: Inert Liquid sludge, Environmental Permitting Regulations (Waste) Reference: -</p> <p>Licence Issue: 24-Apr-1979</p> <p>Licence Surrendered: 20-Oct-1992</p> <p>Licence Hold Address: Rockingham Works, Avonmouth, Bristol</p> <p>Operator: -</p> <p>First Recorded Input: -</p> <p>Last Recorded Input: -</p>
Not shown	1268.0	SW	352500 179900	<p>Site Address: Gas Area Tip, Kingsweston Lane, Avonmouth, Avon</p> <p>Waste Licence: -</p> <p>Site Reference: -</p> <p>Waste Type: -</p> <p>Environmental Permitting Regulations (Waste) Reference: -</p> <p>Licence Issue: -</p> <p>Licence Surrendered: -</p> <p>Licence Hold Address: -</p> <p>Operator: -</p> <p>First Recorded Input: -</p> <p>Last Recorded Input: -</p>
Not shown	1280.0	S	352700 179700	<p>Site Address: 2 AHF Lagoon, Kings Weston Lane, Avonmouth, Avon</p> <p>Waste Licence: -</p> <p>Site Reference: -</p> <p>Waste Type: Industrial</p> <p>Environmental Permitting Regulations (Waste) Reference: -</p> <p>Licence Issue: -</p> <p>Licence Surrendered: -</p> <p>Licence Hold Address: -</p> <p>Operator: R T Z Estates</p> <p>First Recorded Input: 31-Dec-1956</p> <p>Last Recorded Input: 31-Dec-1964</p>
Not shown	1387.0	S	352800 179500	<p>Site Address: No.3 AHF Lagoon, Avonmouth, Bristol</p> <p>Waste Licence: Yes</p> <p>Site Reference: L/BL/T/77D</p> <p>Waste Type: Inert, Industrial</p> <p>Environmental Permitting Regulations (Waste) Reference: -</p> <p>Licence Issue: 18-Mar-1980</p> <p>Licence Surrendered: 19-Apr-1994</p> <p>Licence Hold Address: St Andrews Road, Avonmouth, Bristol</p> <p>Operator: -</p> <p>First Recorded Input: 18-Mar-1980</p> <p>Last Recorded Input: 19-Apr-1994</p>
Not shown	1388.0	S	352800 179600	<p>Site Address: 3 AHF Lagoon, Kings Weston Lane, Avonmouth, Avon</p> <p>Waste Licence: -</p> <p>Site Reference: -</p> <p>Waste Type: Industrial</p> <p>Environmental Permitting Regulations (Waste) Reference: -</p> <p>Licence Issue: -</p> <p>Licence Surrendered: -</p> <p>Licence Hold Address: -</p> <p>Operator: ISC Chemicals</p> <p>First Recorded Input: 31-Dec-1964</p> <p>Last Recorded Input: -</p>
Not shown	1397.0	S	352800 179500	<p>Site Address: No.4 AHF Lagoon, North Of Kingsweston, Avonmouth, Bristol</p> <p>Waste Licence: Yes</p> <p>Site Reference: L/BL/T/126D</p> <p>Waste Type: Industrial</p> <p>Environmental Permitting Regulations (Waste) Reference: -</p> <p>Licence Issue: 18-Jan-1983</p> <p>Licence Surrendered: 19-Apr-1994</p> <p>Licence Hold Address: -</p> <p>Operator: -</p> <p>First Recorded Input: 18-Jan-1983</p> <p>Last Recorded Input: 19-Apr-1994</p>
Not shown	1449.0	E	354800 181700	<p>Site Address: Crooks Marsh Farm Sevalco, Hallen, Avonmouth</p> <p>Waste Licence: Yes</p> <p>Site Reference: S/NA/T/5</p> <p>Waste Type: Inert, Industrial, Commercial ,</p> <p>Environmental Permitting Regulations (Waste) Reference: -</p> <p>Licence Issue: 18-Oct-1977</p> <p>Licence Surrendered: 31-Dec-1979</p> <p>Licence Hold Address: Avon House North, St James Barton, Bristol</p> <p>Operator: -</p> <p>First Recorded Input: 31-Oct-1977</p> <p>Last Recorded Input: 31-Dec-1979</p>
Not shown	1485.0	SW	352200 179800	<p>Site Address: Beryllium Burial Pits, Kings Weston Lane, Avonmouth, Avon</p> <p>Waste Licence: -</p> <p>Site Reference: -</p> <p>Waste Type: -</p> <p>Environmental Permitting Regulations (Waste) Reference: -</p> <p>Licence Issue: -</p> <p>Licence Surrendered: -</p> <p>Licence Hold Address: -</p> <p>Operator: R T Z Estates</p> <p>First Recorded Input: 31-May-1972</p> <p>Last Recorded Input: 31-Aug-1972</p>

### 2.1.3 Records of BGS/DoE non-operational landfill sites within 1500m of the study site:

3

The following landfill records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details	
Not shown	1376.0	SW	35250 0.0 17990 0.0	Address: Gas Area Tip, Kingsweston Lane, Avonmouth BGS Number: 2867.0	Risk: No risk to aquifer Waste Type: N/A
Not shown	1396.0	S	35270 0.0 17980 0.0	Address: no 2 AHF Lagoon, Kings Weston Lane, Avonmouth,AV BGS Number: 2868.0	Risk: Risk to minor aquifer Waste Type: 12000 tons toxic waste
Not shown	1466.0	S	35280 0.0 17970 0.0	Address: No 3 AAF Lagoon, Kings Weston Lane, Avonmouth,AV BGS Number: 2866.0	Risk: Risk to minor aquifer Waste Type: 1000 tons toxic waste

### 2.1.4 Records of Landfills from Local Authority and Historical Mapping records within 1500m of the study site:

0

Database searched and no data found.

## 2.2 Other Waste Sites

### 2.2.1 Records of waste treatment, transfer or disposal sites within 500m of the study site:

6

The following waste treatment, transfer or disposal sites records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details	
5A	15.0	NW	353061 181260	Type of Site: Waste Transfer/Workshops Site Address: Chittening Estate, Greensplott Road, Avonmouth, BRISTOL, Avon, BS11 Planning Application Reference: 0316F/95N Date: -	Further Details: Construction of a waste transfer station and workshops with 2 storey offices. An application (ref: 0316F/95N) for Detailed Planning permission was submitted to Bristol C.C. on 15th February 1995. Data Source: Historic Planning Application Data Type: Point

ID	Distance (m)	Direction	NGR			Details
6A	16.0	NW	353060 181260	Type of Site: Recycling & Office	Planning Application Reference: 05/03469/F/N Date: -	Further Details: Scheme comprises proposed use of site as recycling depot, grading/screening of materials and construction of office building, landscaping, new entrance. Construction - planting site works. An application (ref: 05/03469/F/N) for detailed planning permission was withdrawn from Bristol C.C. Planning decision obtained Data Source: Historic Planning Application Data Type: Point
7	61.0	NE	353313 181552	Type of Site: Recycling Facility	Planning Application Reference: 08/01749/F Date: -	Further Details: Scheme comprises change of use from vacant industrial land to recycling facility including reprofiling site levels and construction of site portacabins (partly in retrospect), cycle shed and office. An application (ref: 08/01749/F) for detailed planning permission was submitted to Bristol C.C. Data Source: Historic Planning Application Data Type: Point
8C	95.0	NW	353098 181499	Type of Site: Waste Transfer Station (Extension)	Planning Application Reference: 00/03609/F/N Date: -	Further Details: Scheme comprises construction of a single storey, steel framed, steel clad extension of 408 sqm. Construction - profiled steel cladding walls; profiled steel cladding roof; steel frame. An application (ref: 00/03609/F/N) for Detailed Planning permission was submitted to Bristol C.C. on 2nd November 2000. Data Source: Historic Planning Application Data Type: Point
9	271.0	NW	352826 181363	Type of Site: Waste Transfer Station	Planning Application Reference: 10/01733/F Date: 16/01/2012	Further Details: Scheme comprises change of use of an industrial unit to include a clinical waste and health care waste treatment and transfer station. An application (ref: 10/01733/F) for detailed planning permission was granted by Bristol C.C. The start date, contract period and project value are for guideline only. Detailed plans approved. Data Source: Historic Planning Application Data Type: Point
10	284.0	NE	353581 181622	Type of Site: Material Recycling Facility	Planning Application Reference: 09/04470/F Date: 19/04/2012	Further Details: Scheme comprises construction and operation of a Resource Recovery Centre, including a Material Recycling facility, an Energy-from-Waste and Bottom Ash facility, associated Office Visitor Centre, with new access road and weighbridge facilities, associated landscaping and surface water attenuation features. Construction - curtain, steel cladding walls; aluminium framed, double glazed windows; roller shutter, steel, up and over doors; planting, reinforced concrete surfacing, sewer outfall site works. An application (ref: 09/04470/F) for detailed planning permission was granted by the Secretary of State. A public enquiry has now been held and a positive decision has been received from the Secretary of State, allowing this scheme to now proceed. Data Source: Historic Planning Application Data Type: Point

## 2.2.2 Records of Environment Agency licensed waste sites within 1500m of the study site:

47

The following waste treatment, transfer or disposal sites records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details
21B	45.0	SE	353233 181384	<p>Site Address: Units A, B &amp; C Estuary Park, Chittening Road, Avonmouth, Bristol, Avon, BS11 0YB            Type: HCI Waste TS + treatment            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: BOO041            EPR reference: EA/EPR/SP3591EP/A001            Operator: Boomeco Ltd            Waste Management licence No: 102356            Annual Tonnage: 74999.0</p> <p>Issue Date: 12/03/2012            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Units A, B &amp; C Estuary Park            Correspondence Address: -, -</p>
22B	45.0	SE	353233 181384	<p>Site Address: Units A, B &amp; C Estuary Park, Chittening Road, Avonmouth, Bristol, Avon, BS11 0YB            Type: Use of waste to manufacture timber &lt;75,000 tpy            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: BOO043            EPR reference: EA/EPR/FB3733RJ/V003            Operator: Boomeco Limited            Waste Management licence No: 104006            Annual Tonnage: 74999.0</p> <p>Issue Date: 24/05/2012            Effective Date: -            Modified: 24/06/2013            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Modified            Site Name: Units A, B &amp; C Estuary Park            Correspondence Address: -, -</p>
23	67.0	NE	353280 181550	<p>Site Address: Chittening Road Recycling Centre, Chittening Road Ind Est, Avonmouth, Bristol, Avon, BS11 0YU            Type: Metal Recycling Site (mixed MRS's)            Size: &gt;= 75000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: BRI118            EPR reference: EA/EPR/LP3596SW/A001            Operator: Bristol &amp; Avon Remediation Ltd            Waste Management licence No: 100449            Annual Tonnage: 299999.0</p> <p>Issue Date: 30/10/2009            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Chittening Road Recycling Centre            Correspondence Address: -, -</p>
24	99.0	NW	353036 181338	<p>Site Address: Greensplott Road, Chittening Industrial Eastate, Avonmouth, Bristol, BS11 0YB            Type: Vehicle depollution facility            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: PRE113            EPR reference: EA/EPR/BB3508HF/A001            Operator: P R Export Import Limited            Waste Management licence No: 401406            Annual Tonnage: 0.0</p> <p>Issue Date: 24/06/2014            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Pr Exports Imports Limited            Correspondence Address: -, -</p>

ID	Distance (m)	Direction	NGR	Details
25C	119.0	NW	353100 181500	<p>Site Address: Greensplott Road, Greensplott Rd, Chittening Estate, Avonmouth, Bristol, Avon, BS11 0YB            Type: Special Waste Transfer Station            Size: &gt;= 25000 tonnes &lt; 75000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: DUR326            EPR reference: EA/EPR/DP3990FV/S002            Operator: Durston Waste Management Ltd            Waste Management licence No: 27161            Annual Tonnage: 75000.0</p> <p>Issue Date: 05/02/1996            Effective Date: -            Modified: -            Surrendered Date: 24/05/2006            Expiry Date: -            Cancelled Date: -            Status: Surrendered            Site Name: Durston T/s            Correspondence Address: -, -</p>
26	213.0	NE	353440 181630	<p>Site Address: The Old Brickworks, Severn Road, Avonmouth, Bristol, Avon, BS10 0YL            Type: Metal Recycling Site (Vehicle Dismantler)            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: HAL427            EPR reference: EA/EPR/LP3495SZ/A001            Operator: D Hales Ltd            Waste Management licence No: 26213            Annual Tonnage: 4999.0</p> <p>Issue Date: 27/02/2008            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: The Old Brickworks            Correspondence Address: -, -</p>
27	568.0	NE	353500 182000	<p>Site Address: Former Texaco Oil Depot, Severn Road, Avonmouth, Bristol, Avon, BS11 0YL            Type: Special Waste Transfer Station            Size: &gt;= 75000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: STE146            EPR reference: EA/EPR/TP3896EW/A001            Operator: Steve Ball Recycled Aggregates Ltd            Waste Management licence No: 102455            Annual Tonnage: 99999.0</p> <p>Issue Date: 27/09/2011            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Former Texaco Oil Depot            Correspondence Address: -, -</p>
Not shown	666.0	SW	352700 180600	<p>Site Address: Rockingham Works, Smoke Lane, Avonmouth, Bristol, BS11 0YA            Type: Special Waste Transfer Station            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: CHE226            EPR reference: -            Operator: Chemical Recoveries Ltd            Waste Management licence No: 27219            Annual Tonnage: 25000.0</p> <p>Issue Date: 15/08/1991            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Chemical Recoveries Avonmouth            Correspondence Address: Smoke Lane, Smoke Lane, Avonmouth, Bristol, BS11 0YA</p>
29	680.0	SW	352457 180839	<p>Site Address: Land At Rockingham Park, Smoke Lane, Bristol, Avon, BS11 0YW            Type: Deposit of waste to land as a recovery operation            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: TER339            EPR reference: EA/EPR/JB3330AR/A001            Operator: Terramond Ltd            Waste Management licence No: 104455            Annual Tonnage: 84200.0</p> <p>Issue Date: 04/10/2012            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Land At Rockingham Park            Correspondence Address: -, -</p>

ID	Distance (m)	Direction	NGR	Details
30	761.0	NE	354000 181800	<p>Site Address: Ableton Lane, Severn Beach, Chitting, Bristol, Avon, BS10 0YB            Type: Metal Recycling Site (Vehicle Dismantler)            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: HAL425            EPR reference: EA/EPR/RP3493FS/A001            Operator: D Hales Ltd            Waste Management licence No: 26079            Annual Tonnage: 25000.0</p> <p>Issue Date: 09/10/2003            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Ableton Lane            Correspondence Address: -, -</p>
31D	781.0	SW	352493 180620	<p>Site Address: Rockingham Works, Land / Premises At, Smoke Lane, Avonmouth, Bristol, Avon, BS11 0YA            Type: Special Waste Transfer Station            Size: &gt;= 75000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: AUG005            EPR reference: EA/EPR/BP3499FJ/V003            Operator: Augean Treatment Ltd            Waste Management licence No: 27219            Annual Tonnage: 25000.0</p> <p>Issue Date: 15/08/1991            Effective Date: 13/03/2008            Modified: 31/03/2014            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Modified            Site Name: Chemical Recoveries Avonmouth            Correspondence Address: -, -</p>
32D	781.0	SW	352493 180620	<p>Site Address: Rockingham Works, Land / Premises At, Smoke Lane, Avonmouth, Bristol, Avon, BS11 0YA            Type: Special Waste Transfer Station            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: AUG005            EPR reference: EA/EPR/BP3499FJ/T002            Operator: Augean Treatment Ltd            Waste Management licence No: 27219            Annual Tonnage: 25000.0</p> <p>Issue Date: 15/08/1991            Effective Date: 13/03/2008            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Transferred            Site Name: Chemical Recoveries Avonmouth            Correspondence Address: -, -</p>
33E	861.0	SW	352300 180750	<p>Site Address: Eastern Shed, Rear Of Moleson Holdings, Smoke Lane, Avonmouth, Bristol, BS11 0YA            Type: Household, Commercial &amp; Industrial Waste T Stn            Size: &gt;= 25000 tonnes &lt; 75000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: SMI429            EPR reference: -            Operator: Smith's (gloucester) Ltd            Waste Management licence No: 26181            Annual Tonnage: 0.0</p> <p>Issue Date: 23/09/2005            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Eastern Shed Transfer &amp; Recycling Site            Correspondence Address: -, Beaumont House, 172, Southgate Street, Gloucester, Gloucestershire, GL1 2EZ</p>
34E	861.0	SW	352300 180750	<p>Site Address: Eastern Shed, Rear Of Moleson Holdings, Smoke Lane, Avonmouth, Bristol, BS11 0YA            Type: Household, Commercial &amp; Industrial Waste T Stn            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: SMI429            EPR reference: -            Operator: Smith's (gloucester) Ltd            Waste Management licence No: 26181            Annual Tonnage: 0.0</p> <p>Issue Date: 23/09/2005            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Eastern Shed Transfer &amp; Recycling Site            Correspondence Address: -, Beaumont House, 172, Southgate Street, Gloucester, Gloucestershire, GL1 2EZ</p>

ID	Distance (m)	Direction	NGR	Details
35E	861.0	SW	352300 180750	<p>Site Address: East Shed, Rear Of Moleson Holdings, Smoke Lane, Avonmouth, Bristol, Avon, BS11 0YA            Type: Household, Commercial &amp; Industrial Waste T Stn            Size: &gt;= 25000 tonnes &lt; 75000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: SMI429            EPR reference: EA/EPR/SP3290FW/V002            Operator: Smith's ( Gloucester ) Ltd            Waste Management licence No: 26181            Annual Tonnage: 74960.0</p> <p>Issue Date: 23/09/2005            Effective Date: -            Modified: 11/06/2012            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Modified            Site Name: East Shed Transfer &amp; Recycling Site            Correspondence Address: -, -</p>
36E	861.0	SW	352300 180750	<p>Site Address: Eastern Shed, Rear Of Moleson Holdings, Smoke Lane, Avonmouth, Bristol, BS11 0YA            Type: -            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: SMI429            EPR reference: -            Operator: Smith's (gloucester) Ltd            Waste Management licence No: 26181            Annual Tonnage: 0.0</p> <p>Issue Date: 23/09/2005            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Eastern Shed Transfer &amp; Recycling Site            Correspondence Address: -, Beaumont House, 172, Southgate Street, Gloucester, Gloucestershire, GL1 2EZ</p>
37F	871.0	NE	354000 182000	<p>Site Address: Crooks Marsh Farm, Hallen, Crooks Marsh Farm, Hallen, Bristol            Type: Co-Disposal Landfill Site            Size: &gt;= 75000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: AVO329            EPR reference: -            Operator: Bristol City Council            Waste Management licence No: 27256            Annual Tonnage: 0.0</p> <p>Issue Date: 16/01/1986            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Crooks Marsh Farm Landfill Site            Correspondence Address: Brunel House, Brunel House, St Georges Road, Bristol, Avon, BS1 5UY</p>
38F	871.0	NE	354000 182000	<p>Site Address: Crooks Marsh Farm, Land / Premises At, Crooks Marsh Farm, Hallen, Bristol, Avon, BS10 7SF            Type: Co-Disposal Landfill Site            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: AVO329            EPR reference: EA/EPR/UP3999FL/A001            Operator: Bristol City Council            Waste Management licence No: 27256            Annual Tonnage: 52000.0</p> <p>Issue Date: 16/01/1986            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Crooks Marsh Farm Landfill Site            Correspondence Address: -, -</p>
Not shown	1069.0	SW	352665 180162	<p>Site Address: Unit 117a, Burcott Road, Avonmouth, Bristol, Avon, BS11 8AG            Type: WEEE treatment facility            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: EUR053            EPR reference: EA/EPR/FP3098LJ/A001            Operator: E Recycling Ltd            Waste Management licence No: 101256            Annual Tonnage: 74999.0</p> <p>Issue Date: 24/11/2009            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Euro Recycling Ltd            Correspondence Address: -, -</p>



ID	Distance (m)	Direction	NGR	Details
Not shown	1075.0	SW	352100 180670	<p>Site Address: Ironchurch Road, Avonmouth, Bristol, Avon, BS11 9BP            Type: Household, Commercial &amp; Industrial Waste T Stn            Size: &gt;= 75000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: BRI349            EPR reference: EA/EPR/VP3193FP/V002            Operator: Bristol &amp; Avon Waste Management Ltd            Waste Management licence No: 26042            Annual Tonnage: 100000.0</p> <p>Issue Date: 16/07/2004            Effective Date: -            Modified: 20/10/2014            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Modified            Site Name: Bristol &amp; Avon Waste Management Ltd            Correspondence Address: -, -</p>
Not shown	1075.0	SW	352100 180670	<p>Site Address: Bristol &amp; Avon Waste Ltd, Ironchurch Road, Avonmouth, Bristol, BS11 9BP            Type: Household, Commercial &amp; Industrial Waste T Stn            Size: &gt;= 75000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: BRI349            EPR reference: -            Operator: Bristol &amp; Avon Waste Ltd            Waste Management licence No: 26042            Annual Tonnage: 0.0</p> <p>Issue Date: 16/07/2004            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Bristol &amp; Avon Waste Ltd            Correspondence Address: -, Nigel Cant Planning, 16, Long Street, Dursley, Gloucestershire, GL11 4HY</p>
Not shown	1105.0	E	354400 181200	<p>Site Address: Unit N1, Hallen Industrial Estate, Severn Road, Hallen, Bristol, Avon, BS10 7SE            Type: Household, Commercial &amp; Industrial Waste T Stn            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: EUR271            EPR reference: EA/EPR/LP3990FP/S002            Operator: Euro Recycling Ltd            Waste Management licence No: 26188            Annual Tonnage: 0.0</p> <p>Issue Date: 17/01/2006            Effective Date: -            Modified: -            Surrendered Date: 03/02/2010            Expiry Date: -            Cancelled Date: -            Status: Surrendered            Site Name: Euro Recycling W E E E Recycling Facility            Correspondence Address: -, -</p>
Not shown	1105.0	E	354400 181200	<p>Site Address: Unit C, Hallen Ind Est, Severn Road, Hallen, South Glos, BS10 7SE            Type: Household, Commercial &amp; Industrial Waste T Stn            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: ABL001            EPR reference: -            Operator: Able Waste Management Ltd            Waste Management licence No: 26171            Annual Tonnage: 0.0</p> <p>Issue Date: 23/06/2005            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Able Waste Management Recycling &amp; Transfer Facility            Correspondence Address: -, 3, Alma Vale Road, Clifton, Bristol, BS8 2HL</p>
Not shown	1105.0	E	354400 181200	<p>Site Address: Fish &amp; Skips, Severn Road, Hallen, Gloucestershire, BS10 7SE            Type: Household, Commercial &amp; Industrial Waste T Stn            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: FIS001            EPR reference: EA/EPR/NP3593FP/A001            Operator: Fish Paul            Waste Management licence No: 26016            Annual Tonnage: 5000.0</p> <p>Issue Date: 19/06/2000            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Revoked            Site Name: Fish &amp; Skips Transfer Station            Correspondence Address: -, -</p>



ID	Distance (m)	Direction	NGR	Details
Not shown	1105.0	E	354400 181200	<p>Site Address: Unit C, Hallen Ind Est, Severn Road, Hallen, Gloucestershire, BS10 7SE            Type: Household, Commercial &amp; Industrial Waste T Stn            Size: &gt;= 25000 tonnes &lt; 75000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: ABL001            EPR reference: EA/EPR/BP3690FK/A001            Operator: Able Waste Management Ltd            Waste Management licence No: 26171            Annual Tonnage: 17398.0</p> <p>Issue Date: 23/06/2005            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Able Waste Management Recycling &amp; Transfer Facility            Correspondence Address: -, -</p>
Not shown	1105.0	E	354400 181200	<p>Site Address: The Recycling Centre, ( Unit C), Hallen Ind Est, Severn Road, Hallen, Bristol, BS10 7SE            Type: HCI Waste TS + treatment            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: ABL001            EPR reference: EA/EPR/BP3690FK/V003            Operator: Able Waste Management Ltd            Waste Management licence No: 26171            Annual Tonnage: 74999.0</p> <p>Issue Date: 23/06/2005            Effective Date: -            Modified: 25/11/2014            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Modified            Site Name: Able Waste Management Ltd            Correspondence Address: -, -</p>
Not shown	1105.0	E	354400 181200	<p>Site Address: Unit C, Hallen Ind Est, Severn Road, Hallen, South Glos, BS10 7SE            Type: -            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: ABL001            EPR reference: -            Operator: Able Waste Management Ltd            Waste Management licence No: 26171            Annual Tonnage: 0.0</p> <p>Issue Date: 23/06/2005            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Able Waste Management Recycling &amp; Transfer Facility            Correspondence Address: -, 3, Alma Vale Road, Clifton, Bristol, BS8 2HL</p>
Not shown	1105.0	E	354400 181200	<p>Site Address: Fish &amp; Skips, Severn Road, Hallen, BS10 7SE            Type: Household, Commercial &amp; Industrial Waste T Stn            Size: Unknown            Environmental Permitting Regulations (Waste) Licence Number: FIS001            EPR reference: -            Operator: Fish Paul            Waste Management licence No: 26016            Annual Tonnage: 5000.0</p> <p>Issue Date: 19/06/2000            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Revoked            Site Name: Fish &amp; Skips Transfer Station            Correspondence Address: -, Hallen Works, Severn Road, Hallen, BS10 7SE</p>
Not shown	1109.0	SW	352100 180600	<p>Site Address: St Andrews Road, Smoke Lane, Avonmouth, Bristol, Avon, BS11 9BP            Type: Clinical Waste Transfer Station            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: MOT325            EPR reference: EA/EPR/AP3498SK/S002            Operator: S R C L Ltd            Waste Management licence No: 27162            Annual Tonnage: 0.0</p> <p>Issue Date: 08/12/1995            Effective Date: -            Modified: -            Surrendered Date: 30/06/2008            Expiry Date: -            Cancelled Date: -            Status: Surrendered            Site Name: S R C L Ltd            Correspondence Address: -, -</p>
Not shown	1109.0	SW	352100 180600	<p>Site Address: St Andrews Road, Smoke Lane, Avonmouth, Bristol, BS11 9H2            Type: Clinical Waste Transfer Station            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: MOT325            EPR reference: -            Operator: South West Energy Ltd            Waste Management licence No: 27162            Annual Tonnage: 0.0</p> <p>Issue Date: 08/12/1995            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: South West Energy Clinical Waste Incinerator            Correspondence Address: -</p>

ID	Distance (m)	Direction	NGR	Details
Not shown	1128.0	E	354424 181199	<p>Site Address: Unit J1 Hallen Ind Est, Severn Road, Hallen, Bristol, Avon, BS10 7SE</p> <p>Type: ELV Facility</p> <p>Size: &lt; 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: ACS010</p> <p>EPR reference: EA/EPR/GP3699VQ/T001</p> <p>Operator: Fallows Marc</p> <p>Waste Management licence No: 26096</p> <p>Annual Tonnage: 2499.0</p> <p>Issue Date: 14/09/2004</p> <p>Effective Date: 22/06/2010</p> <p>Modified: -</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Transferred</p> <p>Site Name: Unit J1 Hallen Industrial Estate</p> <p>Correspondence Address: -, -</p>
Not shown	1199.0	SW	352500 180100	<p>Site Address: Units C &amp; D, 203, Burcott Road, Avonmouth, Bristol, Avon, BS11 8AP</p> <p>Type: Clinical Waste Transfer Station</p> <p>Size: &lt; 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: ECO023</p> <p>EPR reference: EA/EPR/GP3698EM/V002</p> <p>Operator: Tradebe Healthcare ( South West ) Ltd</p> <p>Waste Management licence No: 100334</p> <p>Annual Tonnage: 24999.0</p> <p>Issue Date: 04/07/2008</p> <p>Effective Date: -</p> <p>Modified: 18/02/2013</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Modified</p> <p>Site Name: Tradebe Healthcare ( South West ) Ltd</p> <p>Correspondence Address: -, -</p>
Not shown	1199.0	SW	352500 180100	<p>Site Address: Units C &amp; D, 203, Burcott Road, Avonmouth, Bristol, Avon, BS11 8AP</p> <p>Type: Clinical Waste Transfer Station</p> <p>Size: &lt; 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: ECO023</p> <p>EPR reference: EA/EPR/GP3698EM/A001</p> <p>Operator: Eco Waste South West Ltd</p> <p>Waste Management licence No: 100334</p> <p>Annual Tonnage: 24999.0</p> <p>Issue Date: 04/07/2008</p> <p>Effective Date: -</p> <p>Modified: -</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Issued</p> <p>Site Name: Ecowaste South West Ltd</p> <p>Correspondence Address: -, -</p>
Not shown	1209.0	SW	352160 180350	<p>Site Address: 309, Dean Road, Severnside T E Avonmouth, Bristol, BS11 8AT</p> <p>Type: Household, Commercial &amp; Industrial Waste T Stn</p> <p>Size: Unknown</p> <p>Environmental Permitting Regulations (Waste) Licence Number: ARL001</p> <p>EPR reference: -</p> <p>Operator: Gale Kevin Derrick</p> <p>Waste Management licence No: 26069</p> <p>Annual Tonnage: 0.0</p> <p>Issue Date: 14/05/2003</p> <p>Effective Date: -</p> <p>Modified: -</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Issued</p> <p>Site Name: Dean Road Transfer Station</p> <p>Correspondence Address: -, 267, Juniper Way, Bradley Stoke, Bristol, BS32 ODP</p>
Not shown	1209.0	SW	352160 180350	<p>Site Address: 309, Dean Road Severnside Trad Est, Avonmouth, Bristol, Avon, BS11 8AT</p> <p>Type: Household, Commercial &amp; Industrial Waste T Stn</p> <p>Size: &lt; 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: ARL001</p> <p>EPR reference: EA/EPR/AP3693FZ/A002</p> <p>Operator: Gale Kevin Derrick</p> <p>Waste Management licence No: 26069</p> <p>Annual Tonnage: 25000.0</p> <p>Issue Date: 14/05/2003</p> <p>Effective Date: -</p> <p>Modified: -</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Issued</p> <p>Site Name: Dean Road Transfer Station</p> <p>Correspondence Address: -, -</p>

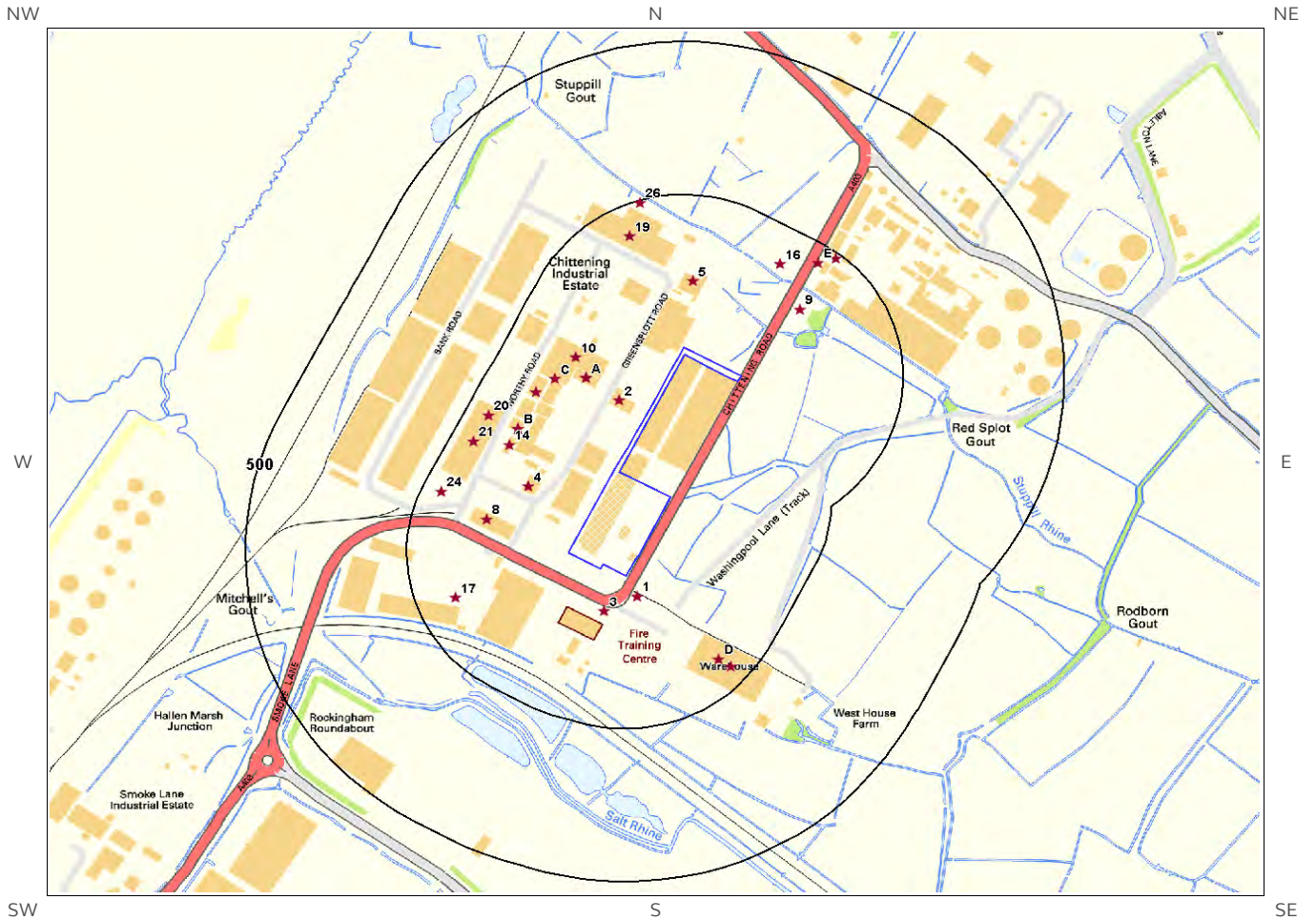
ID	Distance (m)	Direction	NGR	Details
Not shown	1221.0	E	354519 181199	<p>Site Address: Willow Farm, Severn Road, Severnside, South Gloucs, BS10 7SE            Type: Use of waste in construction &lt;100,000 tps            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: CHU080            EPR reference: EA/EPR/BB3631AR/A001            Operator: Churngold Recycling Ltd            Waste Management licence No: 103266            Annual Tonnage: 99999.0</p> <p>Issue Date: 11/11/2011            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Willow Farm            Correspondence Address: -, -</p>
Not shown	1221.0	E	354519 181199	<p>Site Address: Willow Farm, Severn Road, Severnside, South Gloucs, BS10 7SE            Type: Use of waste in construction &lt;100,000 tps            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: CHU089            EPR reference: EA/EPR/JP3738RC/S002            Operator: M J Church ( Plant) Ltd            Waste Management licence No: 103266            Annual Tonnage: 0.0</p> <p>Issue Date: 11/11/2011            Effective Date: 27/07/2012            Modified: -            Surrendered Date: 31/12/2013            Expiry Date: -            Cancelled Date: -            Status: Surrendered            Site Name: Willow Farm            Correspondence Address: -, -</p>
Not shown	1221.0	E	354519 181199	<p>Site Address: Willow Farm, Severn Road, Severnside, South Gloucs, BS10 7SE            Type: Use of waste in construction &lt;100,000 tps            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: CHU089            EPR reference: EA/EPR/JP3738RC/S002            Operator: M J Church ( Plant ) Ltd            Waste Management licence No: 103266            Annual Tonnage: 0.0</p> <p>Issue Date: 11/11/2011            Effective Date: 27/07/2012            Modified: -            Surrendered Date: 31/12/2013            Expiry Date: -            Cancelled Date: -            Status: Surrendered            Site Name: Willow Farm            Correspondence Address: -, -</p>
Not shown	1334.0	S	353300 179800	<p>Site Address: Off Kingsweston Lane, Land/premises At, Kingsweston Lane, Avonmouth, Bristol, Avon, BS11 0YS            Type: Household, Commercial &amp; Industrial Waste T Stn            Size: &gt;= 25000 tonnes &lt; 75000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: AVO283            EPR reference: EA/EPR/JP3790FA/V002            Operator: Bristol City Council            Waste Management licence No: 27190            Annual Tonnage: 75000.0</p> <p>Issue Date: 13/08/1993            Effective Date: -            Modified: 28/03/2007            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Modified            Site Name: Kingsweston Lane Transfer Station            Correspondence Address: -, -</p>
Not shown	1350.0	S	353400 179800	<p>Site Address: Kingsweston Lane Civic Amenity Site, Avonmouth Refuse Transfer Station, Kingswestern Lane, Avonmouth, Bristol, Avon, BS11 0YS            Type: Household Waste Amenity Site            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: AVO273            EPR reference: EA/EPR/QP3790FB/A001            Operator: Bristol City Council            Waste Management licence No: 27200            Annual Tonnage: 24999.0</p> <p>Issue Date: 13/08/1993            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Kingsweston Lane Civic Amenity Site            Correspondence Address: -, -</p>

ID	Distance (m)	Direction	NGR	Details
Not shown	1350.0	E	354623 181083	<p>Site Address: Hallen Yard, Land Off Severn Road, Hallen, Severnside, South Glos, BS10 7SE            Type: Deposit of waste to land as a recovery operation            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: BRI291            EPR reference: EA/EPR/BB3204CV/A002            Operator: Bristol &amp; Avon Transport &amp; Recycling Ltd            Waste Management licence No: 401161            Annual Tonnage: 0.0</p> <p>Issue Date: 16/05/2014            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Bristol &amp; Avon Transport &amp; Recycling Hallen Yard            Correspondence Address: -, -</p>
Not shown	1356.0	SW	352100 180200	<p>Site Address: Bath Reclamation, Ironchurch Road, Avonmouth, Bristol, Avon, BS11 9HP            Type: Metal Recycling Site (mixed MRS's)            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: REC291            EPR reference: -            Operator: Sims Group Uk Ltd            Waste Management licence No: 27184            Annual Tonnage: 0.0</p> <p>Issue Date: 14/09/1993            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Transferred            Site Name: Sims Group Reclamation Scrap Yard            Correspondence Address: -, Ironchurch Road, Avonmouth, Bristol, Avon, BS11 9HP</p>
Not shown	1356.0	SW	352100 180200	<p>Site Address: Bath Reclamation, Land/premises At, Ironchurch Road, Avonmouth, Bristol, Avon, BS11 9HP            Type: Metal Recycling Site (mixed MRS's)            Size: &gt;= 25000 tonnes &lt; 75000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: REC291            EPR reference: EA/EPR/JP3590FN/V003            Operator: Sims Group U K Ltd            Waste Management licence No: 27184            Annual Tonnage: 74999.0</p> <p>Issue Date: 14/09/1993            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Transferred            Site Name: Sims Group Reclamation Scrap Yard            Correspondence Address: -, -</p>
Not shown	1356.0	SW	352100 180200	<p>Site Address: Bath Reclamation, Land/premises At, Ironchurch Road, Avonmouth, Bristol, Avon, BS11 9HP            Type: Metal Recycling Site (mixed MRS's)            Size: &gt;= 25000 tonnes &lt; 75000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: REC291            EPR reference: EA/EPR/JP3590FN/V003            Operator: Sims Group Uk Ltd            Waste Management licence No: 27184            Annual Tonnage: 74999.0</p> <p>Issue Date: 14/09/1993            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Transferred            Site Name: Sims Group Reclamation Scrap Yard            Correspondence Address: -, -</p>
Not shown	1356.0	SW	352100 180200	<p>Site Address: Bath Reclamation, Ironchurch Road, Avonmouth, Bristol, Avon, BS11 9HP            Type: Metal Recycling Site (mixed MRS's)            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: REC291            EPR reference: -            Operator: Simsmetal U K ( Reclamation) Ltd            Waste Management licence No: 27184            Annual Tonnage: 0.0</p> <p>Issue Date: 14/09/1993            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Simsmetal Reclamation Scrap Yard            Correspondence Address: Ironchurch Road, Ironchurch Road, Avonmouth, Bristol, Avon, BS11 9HP</p>

ID	Distance (m)	Direction	NGR	Details
Not shown	1396.0	S	352700 179800	<p>Site Address: Merebank Road, Avonmouth, Bristol, Avon            Type: HCI Waste TS + treatment            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: AVO013            EPR reference: EA/EPR/LP3637GL/A001            Operator: Avonmouth Resource Park Ltd            Waste Management licence No: 101887            Annual Tonnage: 40000.0</p> <p>Issue Date: 09/09/2010            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Avonmouth Resource Park            Correspondence Address: -, -</p>
Not shown	1426.0	SW	351995 180209	<p>Site Address: Bath Reclamation, Sims Group U K Ltd, Ironchurch Road, Avonmouth, Bristol, Avon, BS11 9HP            Type: Metal Recycling Site (mixed MRS's)            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: REC291            EPR reference: EA/EPR/JP3590FN/V003            Operator: Sims Group U K Ltd            Waste Management licence No: 27184            Annual Tonnage: 74999.0</p> <p>Issue Date: 14/09/1993            Effective Date: -            Modified: 04/10/2013            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Modified            Site Name: Sims Group U K Ltd            Correspondence Address: -, -</p>



# 3. Current Land Use Map



Current Land Use Legend



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-  Site Outline
-  Current Industrial Sites
-  Gas Transmission Pipeline
-  Petrol & Fuel Sites
-  Electricity Transmission Cable
-  Search Buffers (m)

# 3. Current Land Uses

## 3.1 Current Industrial Data

Records of potentially contaminative industrial sites within 250m of the study site:

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The following records are represented as points on the Current Land Uses map.

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1	38.0	SE	Electricity Sub Station		BS11	Electrical Features	Infrastructure and Facilities
2	49.0	NW	Mobile Mini	181411	Unit D2, Chittening Industrial Estate, Chittening, Bristol, BS11 0YB	Container and Storage	Transport, Storage and Delivery
3	67.0	SW	Electricity Sub Station		BS11	Electrical Features	Infrastructure and Facilities
4	106.0	NW	Stone Hardy	352992	London House, Chittening Industrial Estate, Chittening, Bristol, BS11 0YB	Industrial Repairs and Servicing	Repair and Servicing
5	109.0	N	Anstey Transport Services Ltd	353247 181606	Chittening Industrial Estate, Chittening, Bristol, BS11 0YB	Distribution and Haulage	Transport, Storage and Delivery
6A	110.0	NW	A S S L	181448	Chittening Industrial Estate, Chittening, Bristol, BS11 0YB	Container and Storage	Transport, Storage and Delivery
7A	110.0	NW	B I P	181448	Chittening Industrial Estate, Chittening, Bristol, BS11 0YB	Workwear	Industrial Products
8	137.0	NW	Ross Gordon		Chittening Industrial Estate, Chittening, Bristol, BS11 0YB	Vehicle Repair, Testing and Servicing	Repair and Servicing
9	141.0	NE	Tank		BS11	Tanks (Generic)	Industrial Features
10	142.0	NW	Dawson Rentals Ltd	353065 181482	Chittening Industrial Estate, Chittening, Bristol, BS11 0YB	Vehicle Hire and Rental	Hire Services
11C	153.0	NW	Electricity Sub Station		BS11	Electrical Features	Infrastructure and Facilities
12B	164.0	NW	Avonmouth Signs	352976 181365	Unit B1, Chittening Industrial Estate, Chittening, Bristol, BS11 0YB	Signs	Industrial Products
13B	164.0	NW	M & M Trailers Ltd	352976 181365	Unit B1, Chittening Industrial Estate, Chittening, Bristol, BS11 0YB	Vehicle Repair, Testing and Servicing	Repair and Servicing
14	164.0	NW	Brandon Hire	181339	Unit 2, Chittening Industrial Estate, Chittening, Bristol, BS11 0YB	Construction and Tool Hire	Hire Services

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
15C	168.0	NW	Bristol Industrial Protection Ltd	353005 181424	Chittening Industrial Estate, Chittening, Bristol, BS11 0YB	General Purpose Machinery	Industrial Products
16	190.0	NE	Pipeline		BS11	Pipelines	Industrial Features
17	190.0	SW	Tanks		BS11	Tanks (Generic)	Industrial Features
18D	199.0	SE	Expert Logistics	353288 180988	The Link Building, Smoke Lane, Bristol, BS11 0YA	Distribution and Haulage	Transport, Storage and Delivery
19	200.0	NW	Bibby Distribution Ltd	353150 181679	Chittening Industrial Estate, Chittening, Bristol, BS11 0YB	Distribution and Haulage	Transport, Storage and Delivery
20	215.0	NW	Turners Soham Ltd		Chittening Industrial Estate, Chittening, Bristol, BS11 0YB	Distribution and Haulage	Transport, Storage and Delivery
21	215.0	NW	Avonmouth Auto Electrical Ltd	352908	Unit B Canada Warehouse, Chittening Industrial Estate, Chittening, Bristol, BS11 0YB	Vehicle Repair, Testing and Servicing	Repair and Servicing
22E	220.0	NE	Ryder	353441 181636	Old Severn Valley Brick Factory, Severn Road, Chittening, Bristol, BS11 0YL	Vehicle Hire and Rental	Hire Services
23D	220.0	SE	Warehouse		BS11	Container and Storage	Transport, Storage and Delivery
24	221.0	NW	Docks Industrial Estate		BS11	Business Parks and Industrial Estates	Industrial Features
25E	241.0	NE	Works		BS11	Unspecified Works Or Factories	Industrial Features
26	247.0	N	Pipeline		BS11	Pipelines	Industrial Features

### 3.2 Petrol and Fuel Sites

Records of petrol or fuel sites within 500m of the study site:

0

Database searched and no data found.



### 3.3 National Grid High Voltage Underground Electricity Transmission Cables

This dataset identifies the high voltage electricity transmission lines running between generating power plants and electricity substations. The dataset does not include the electricity distribution network (smaller, lower voltage cables distributing power from substations to the local user network). This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high voltage underground electricity transmission cables within 500m of the study site: 0

Database searched and no data found.

---

### 3.4 National Grid High Pressure Gas Transmission Pipelines

This dataset identifies high-pressure, large diameter pipelines which carry gas between gas terminals, power stations, compressors and storage facilities. The dataset does not include the Local Transmission System (LTS) which supplies gas directly into homes and businesses. This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high pressure gas transmission pipelines within 500m of the study site: 0

Database searched and no data found.

---

# 4. Geology

## 4.1 Artificial Ground and Made Ground

Database searched and no data found.

The database has been searched on site, including a 50m buffer.

---

## 4.2 Superficial Ground and Drift Geology

The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
TFD	TIDAL FLAT DEPOSITS	CLAY AND SILT [UNLITHIFIED DEPOSITS CODING SCHEME]

---

## 4.3 Bedrock and Solid Geology

The database has been searched on site, including a 50m buffer.

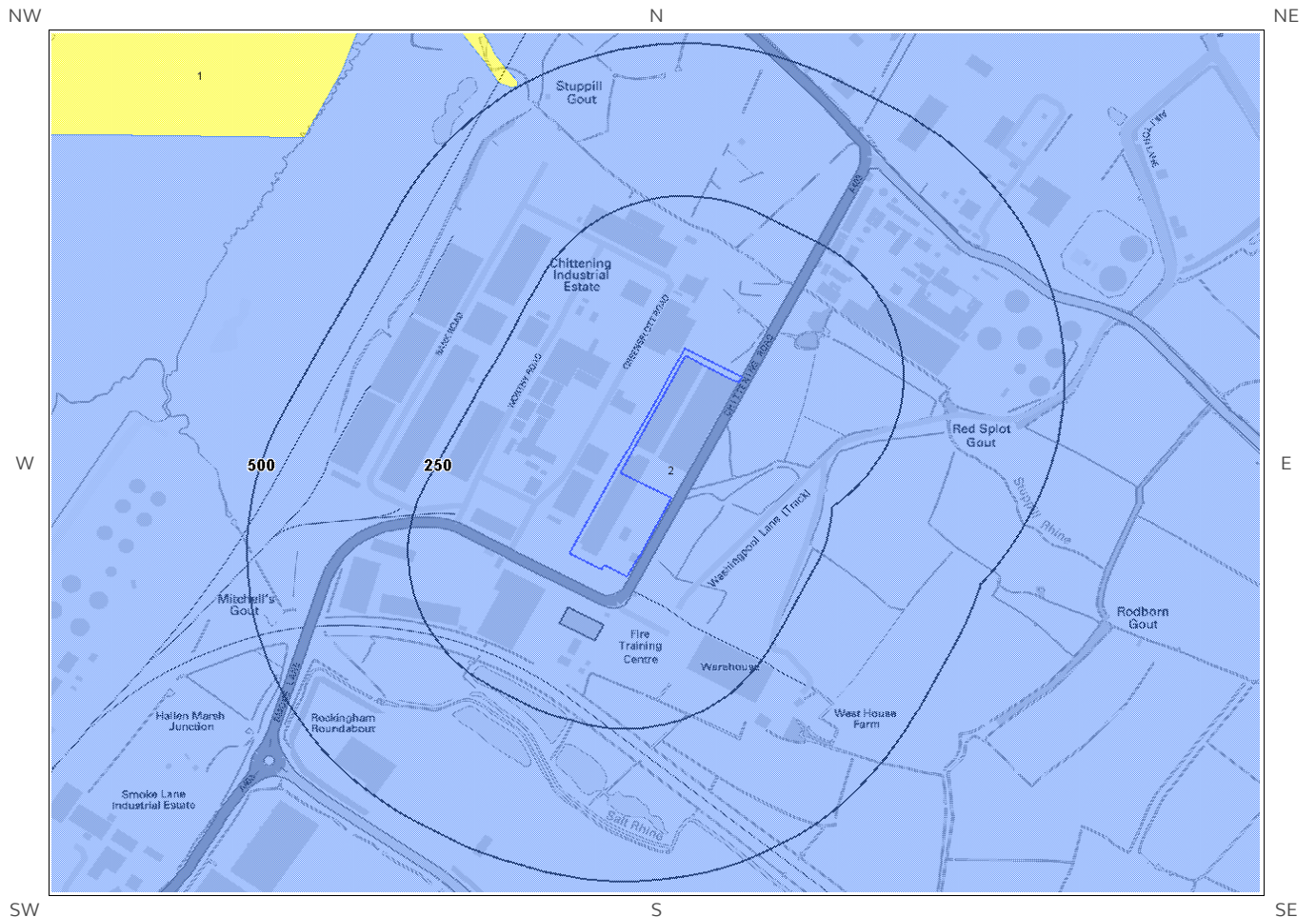
Lex Code	Description	Rock Type
MMG-MDHA	MERCIA MUDSTONE GROUP	MUDSTONE AND HALITE-STONE

(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

---

# 5. Hydrogeology and Hydrology

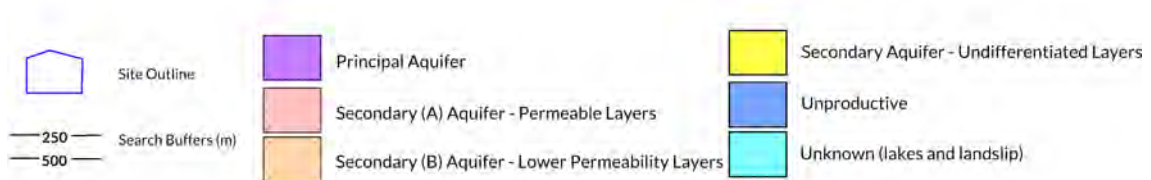
## 5a. Aquifer Within Superficial Geology



Aquifer Within Superficial Geology



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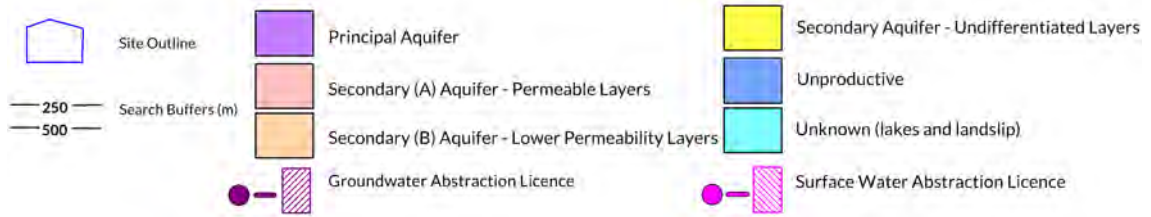
# 5b. Aquifer Within Bedrock Geology and Abstraction Licenses



**Aquifer Within Bedrock Geology and Abstraction Licenses**

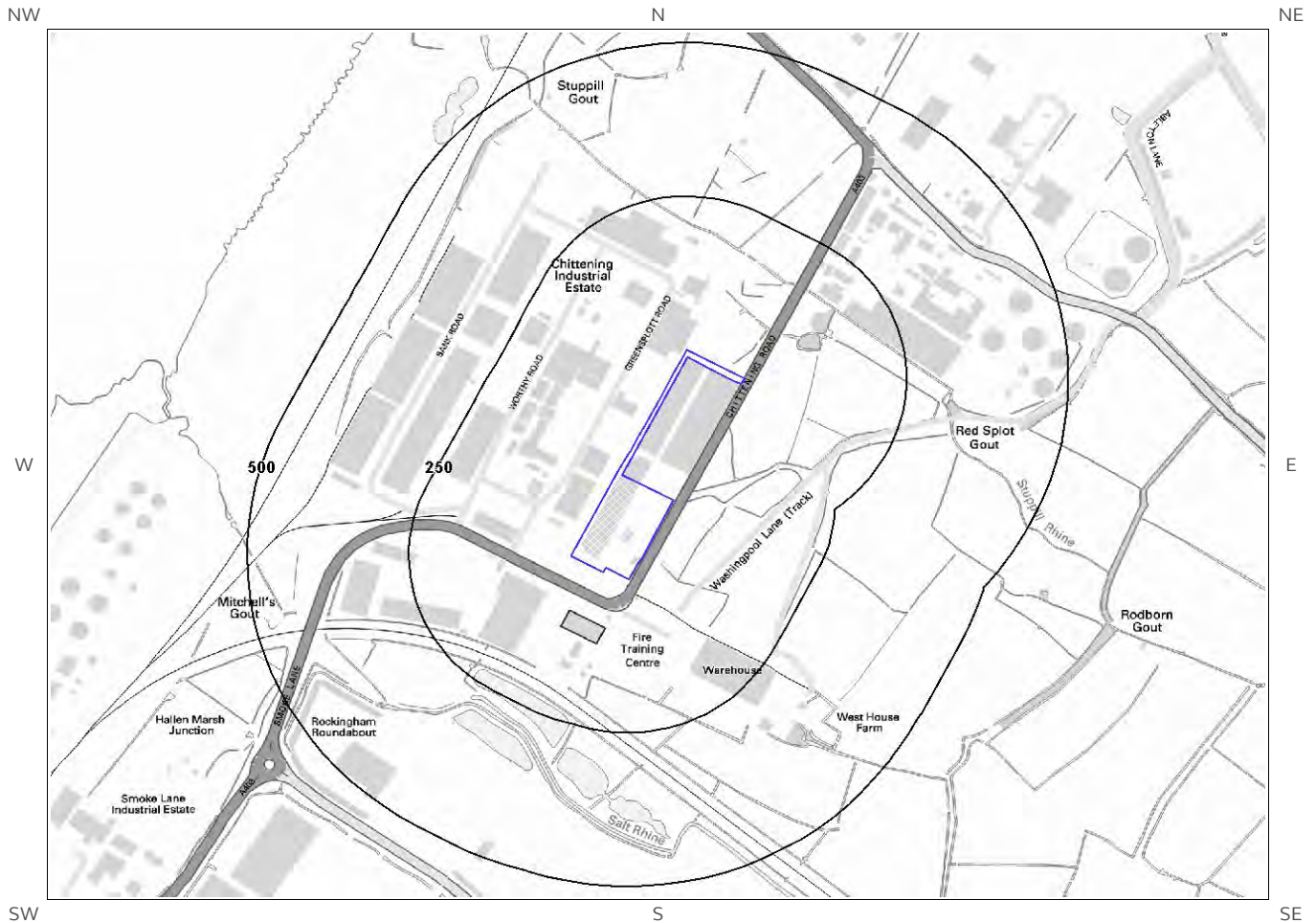


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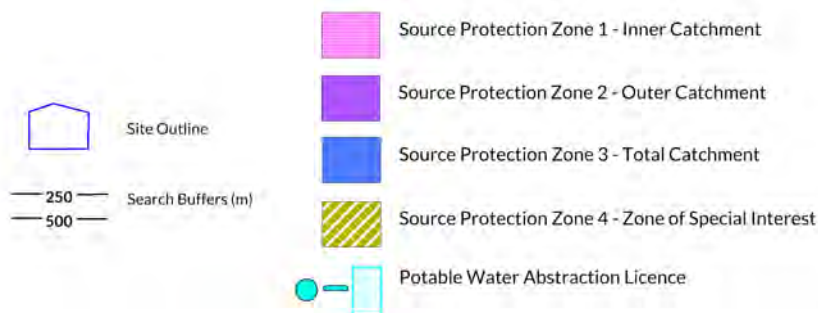
# 5c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licenses



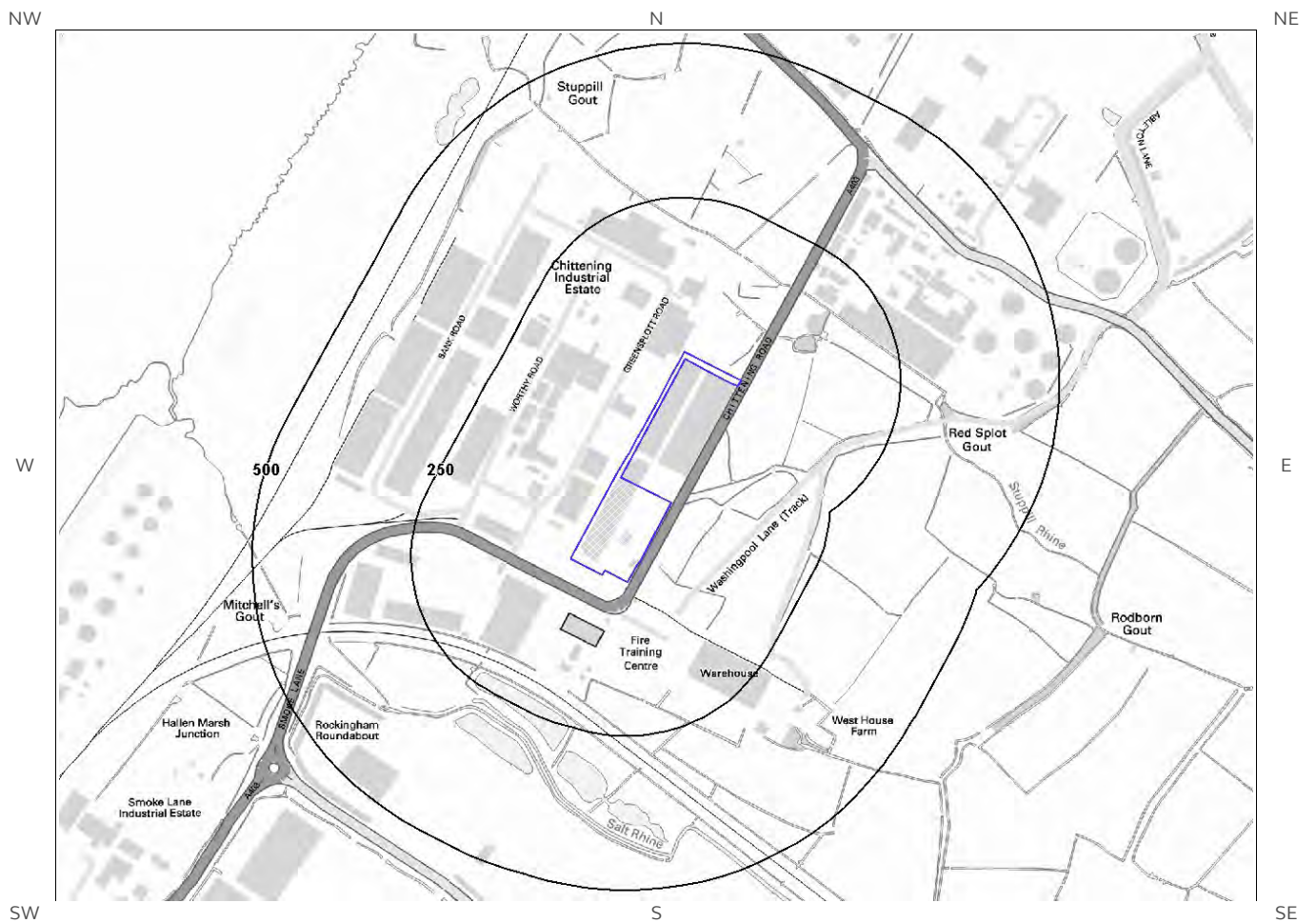
Hydrogeology-Source Protection Zones and Potable Water Abstraction Licenses



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# 5d. Hydrogeology - Source Protection Zones within confined aquifer



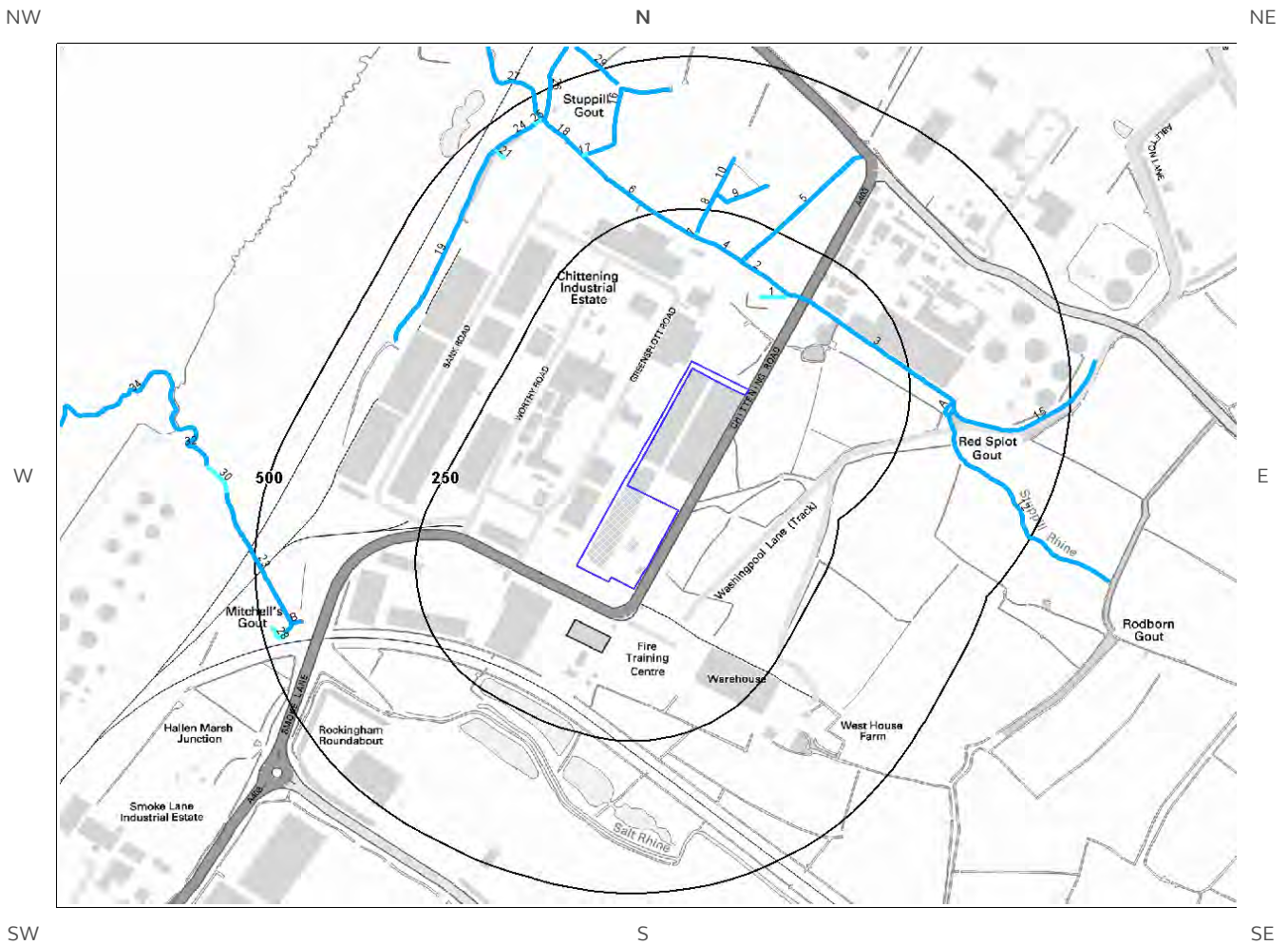
Hydrogeology Source Protection Zones



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# 5e. Hydrology – Detailed River Network and River Quality



Hydrology – Detailed River Network and River Quality

Mapping sourced from Ordnance Survey

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Site Outline  
 Search Buffers (m)  
 250  
 500

- |                                       |                                     |
|---------------------------------------|-------------------------------------|
| Primary River                         | Canal                               |
| Secondary River                       | Canal Tunnel                        |
| Tertiary River                        | Culvert                             |
| Lake/Reservoir                        | Multiple Channel Culvert            |
| Underground River (inferred)          | Underground River (Potential Sewer) |
| General Quality Assessment: Biology   | Underground River (local knowledge) |
| General Quality Assessment: Chemistry |                                     |



# 5. Hydrogeology and Hydrology

## 5.1 Aquifer within Superficial Deposits

Are there records of strata classification within the superficial geology at or in proximity to the property?  
Yes

From 1 April 2010, the Environment Agency's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the Groundsure Enviroinsight User Guide.

The following aquifer records are shown on the Aquifer within Superficial Geology Map (5a):

ID	Distance (m)	Direction	Designation	Description
2	0.0	On Site	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

## 5.2 Aquifer within Bedrock Deposits

Are there records of strata classification within the bedrock geology at or in proximity to the property? Yes

From 1 April 2010, the Environment Agency's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the Groundsure Enviroinsight User Guide.

The following aquifer records are shown on the Aquifer within Bedrock Geology Map (5b):

ID	Distance (m)	Direction	Designation	Description
1	0.0	On Site	Secondary B	Predominantly lower permeability layers which may store/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



### 5.3 Groundwater Abstraction Licences

Are there any Groundwater Abstraction Licences within 2000m of the study site? Yes

The following Abstraction Licences records are represented as points, lines and regions on the Aquifer within Bedrock Geology Map (5b):

ID	Distance (m)	Direction	NGR	Name	Details
Not shown	975.0	S	353150 180150	Rhodia UK Limited	Licence No: 18/54/020/G/132 Details: Non-Evaporative Cooling Direct Source: Ground Water - Fresh Point: Madam Farm (borehole No 9) Data Type: Point Annual Volume (m <sup>3</sup> ): 398236 Max Daily Volume (m <sup>3</sup> ): 1091.06 Original Application No: - Original Start Date: 8/7/1966 Expiry Date: - Issue No: 101 Version Start Date: 1/1/2005 Version End Date:
Not shown	975.0	S	353150 180150	Rhodia UK Limited	Licence No: 18/54/020/G/132 Details: Process Water Direct Source: Ground Water - Fresh Point: Madam Farm (borehole No 9) Data Type: Point Annual Volume (m <sup>3</sup> ): 398236 Max Daily Volume (m <sup>3</sup> ): 1091.06 Original Application No: - Original Start Date: 8/7/1966 Expiry Date: - Issue No: 101 Version Start Date: 1/1/2005 Version End Date:
Not shown	1872.0	S	353300 179260	Rhodia UK Limited	Licence No: 18/54/020/G/130 Details: Non-Evaporative Cooling Direct Source: Ground Water - Fresh Point: Merebank (borehole No 6) Data Type: Point Annual Volume (m <sup>3</sup> ): 716826 Max Daily Volume (m <sup>3</sup> ): 1963.91 Original Application No: - Original Start Date: 8/7/1966 Expiry Date: - Issue No: 101 Version Start Date: 1/1/2005 Version End Date:
Not shown	1872.0	S	353300 179260	Rhodia UK Limited	Licence No: 18/54/020/G/130 Details: Process Water Direct Source: Ground Water - Fresh Point: Merebank (borehole No 6) Data Type: Point Annual Volume (m <sup>3</sup> ): 716826 Max Daily Volume (m <sup>3</sup> ): 1963.91 Original Application No: - Original Start Date: 8/7/1966 Expiry Date: - Issue No: 101 Version Start Date: 1/1/2005 Version End Date:

### 5.4 Surface Water Abstraction Licences

Are there any Surface Water Abstraction Licences within 2000m of the study site? No

Database searched and no data found.

## 5.5 Potable Water Abstraction Licences

Are there any Potable Water Abstraction Licences within 2000m of the study site? No

Database searched and no data found.

---

## 5.6 Source Protection Zones

Are there any Source Protection Zones within 500m of the study site? No

Database searched and no data found.

---

## 5.7 Source Protection Zones within Confined Aquifer

Are there any Source Protection Zones within the Confined Aquifer within 500m of the study site?

No

Historically, Source Protection Zone maps have been focused on regulation of activities which occur at or near the ground surface, such as prevention of point source pollution and bacterial contamination of water supplies. Sources in confined aquifers were often considered to be protected from these surface pressures due to the presence of a low permeability confining layer (e.g. glacial till, clay). The increased interest in subsurface activities such as onshore oil and gas exploration, ground source heating and cooling requires protection zones for confined sources to be marked on SPZ maps where this has not already been done.

Database searched and no data found.

---

## 5.8 Groundwater Vulnerability and Soil Leaching Potential

Is there any Environment Agency information on groundwater vulnerability and soil leaching potential within 500m of the study site? No

Database searched and no data found.

---

## 5.9 River Quality

Is there any Environment Agency information on river quality within 1500m of the study site? No

---

**5.9.1 Biological Quality:**

Database searched and no data found.

---

**5.9.2 Chemical Quality:**

Database searched and no data found.

---

## 5.10 Detailed River Network

Are there any Detailed River Network entries within 500m of the study site?

Yes

The following Detailed River Network records are represented on the Hydrology Map (5e):

ID	Distance (m)	Direction	Details	
1	143.0	NE	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
2	168.0	NE	River Name: Stuppill Rhine Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
3	168.0	NE	River Name: Stuppill Rhine Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
4	181.0	NE	River Name: Stuppill Rhine Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
5	181.0	NE	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
6	204.0	N	River Name: Stuppill Rhine Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
7	204.0	N	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
8	212.0	N	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
9	267.0	N	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
10	278.0	N	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
11 A	307.0	E	River Name: Stuppill Rhine Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
12	312.0	E	River Name: Stuppill Rhine Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
13 A	312.0	E	River Name: Stuppill Rhine Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
14 A	318.0	E	River Name: Stuppill Rhine Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
15	319.0	E	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
16	375.0	N	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
17	377.0	NW	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
18	379.0	NW	River Name: Stuppill Rhine Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
19	418.0	NW	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
20 B	435.0	W	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined

ID	Distance (m)	Direction	Details	
21	442.0	NW	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
22 B	452.0	W	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
23	452.0	W	River Name: Salt Rhine Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
24	459.0	NW	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
25	459.0	NW	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
26	460.0	NW	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
27	460.0	NW	River Name: Stuppill Rhine Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
28	467.0	W	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
29	469.0	N	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined

## 5.11 Surface Water Features

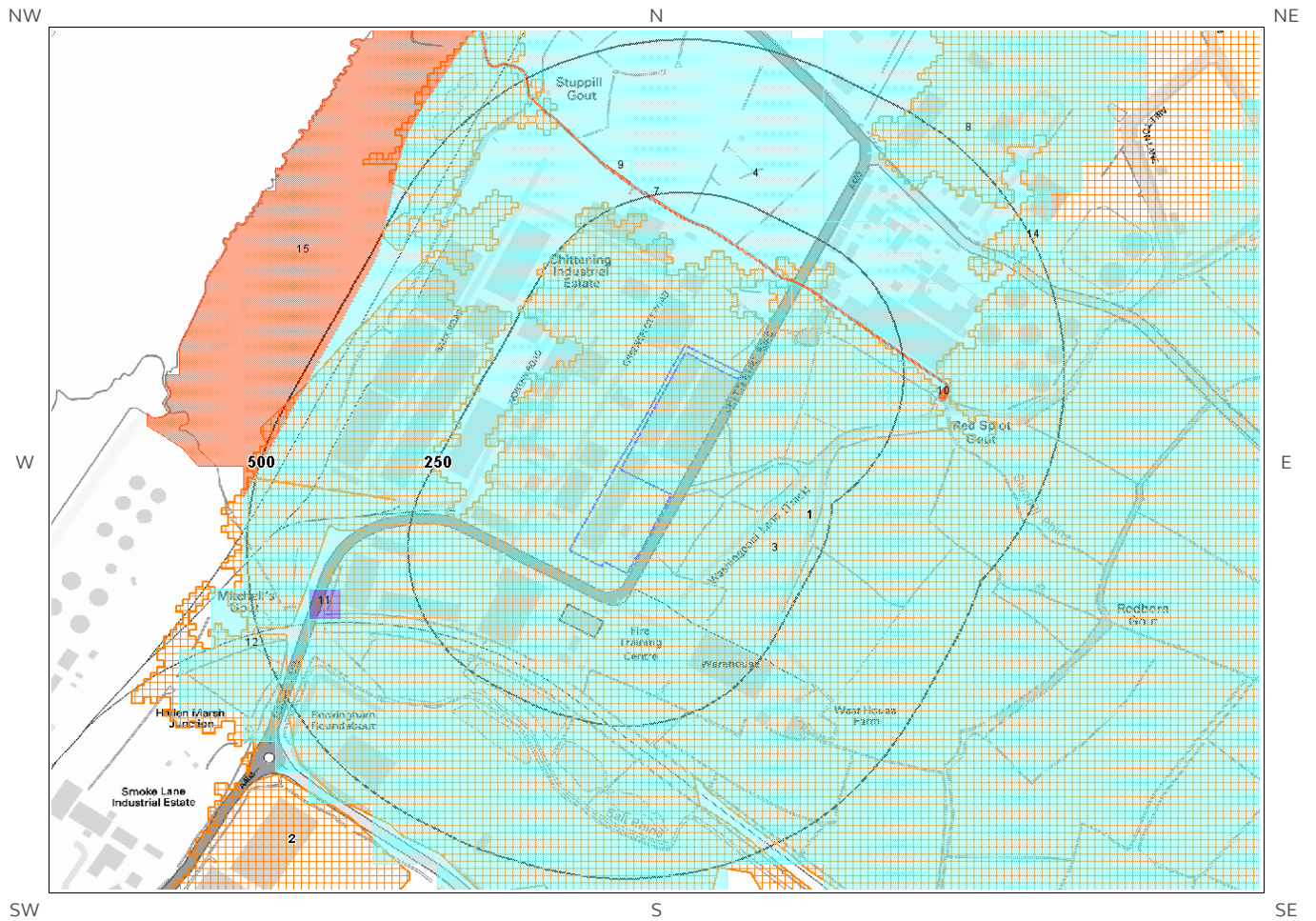
Are there any surface water features within 250m of the study site?

Yes

The following surface water records are not represented on mapping:

Distance (m)	Direction
24.0	E
29.0	SE
34.0	NE
91.0	NE
94.0	E
98.0	E
114.0	SE
138.0	SE
143.0	NE
166.0	S
166.0	NE
167.0	S
179.0	NE
184.0	SW
186.0	S
191.0	SE
210.0	S
215.0	N
218.0	SW
226.0	SW
232.0	SE
248.0	S

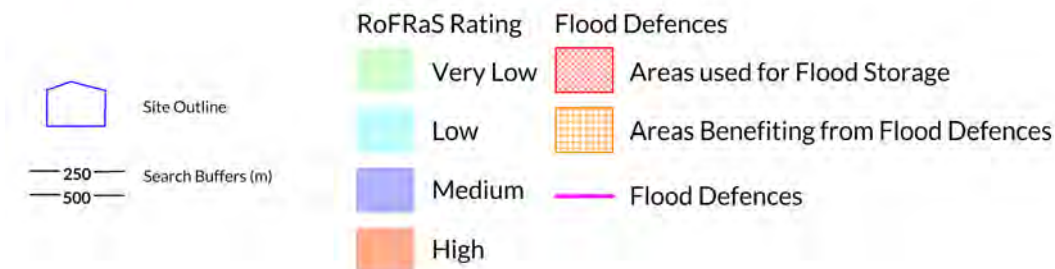
# 6. Environment Agency Risk of Flooding from Rivers and the Sea (RoFRaS) Map



Environment Agency Risk of Flooding From Rivers and the Sea (RoFRaS)



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# 6. Flooding

## 6.1 Risk of Flooding from Rivers and the Sea (RoFRaS)

What is the risk of flooding at the centre of the study site? Low

What is the highest risk of flooding within 25m of the centre of the study site? Low

The Environment Agency RoFRaS database provides an indication of river and coastal flood risk at a national level on a 50m grid as used by many of the insurance companies. RoFRaS data is based on a 50m grid system, with the flood rating at the centre of the grid calculated and given below. The data considers the probability that the flood defences will overtop or breach, and the distance from the river or the sea.

RoFRaS data for the study site indicates the property or an area within 25m has a Low (greater than 1 in 1000 but less than 1 in 100) chance of flooding in any given year.

The following floodplain records within 50m of the study site are represented on the River and Coastal Flood Risk Map above:

ID	Distance (m)	Direction	Rofras Flood Risk
3	0	On Site	Low

## 6.2 Flood Defences

Are there any Flood Defences within 250m of the study site? No

Database searched and no data found.

## 6.3 Areas benefiting from Flood Defences

Are there any areas benefiting from Flood Defences within 250m of the study site? Yes

## 6.4 Areas benefiting from Flood Storage

Are there any areas used for Flood Storage within 250m of the study site? No

## 6.5 Groundwater Flooding Susceptibility Areas

6.5.1 Are there any British Geological Survey groundwater flooding susceptibility areas within 50m of the boundary of the study site?

No

Notes: Groundwater flooding may either be associated with shallow unconsolidated sedimentary aquifers which overlie unproductive aquifers (Superficial Deposits Flooding), or with unconfined aquifers (Clearwater Flooding).

---

6.5.2 What is the highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions?

Not Prone

The area is not considered to be prone to groundwater flooding based on rock type.

---

## 6.6 Groundwater Flooding Confidence Areas

What is the British Geological Survey confidence rating in this result?

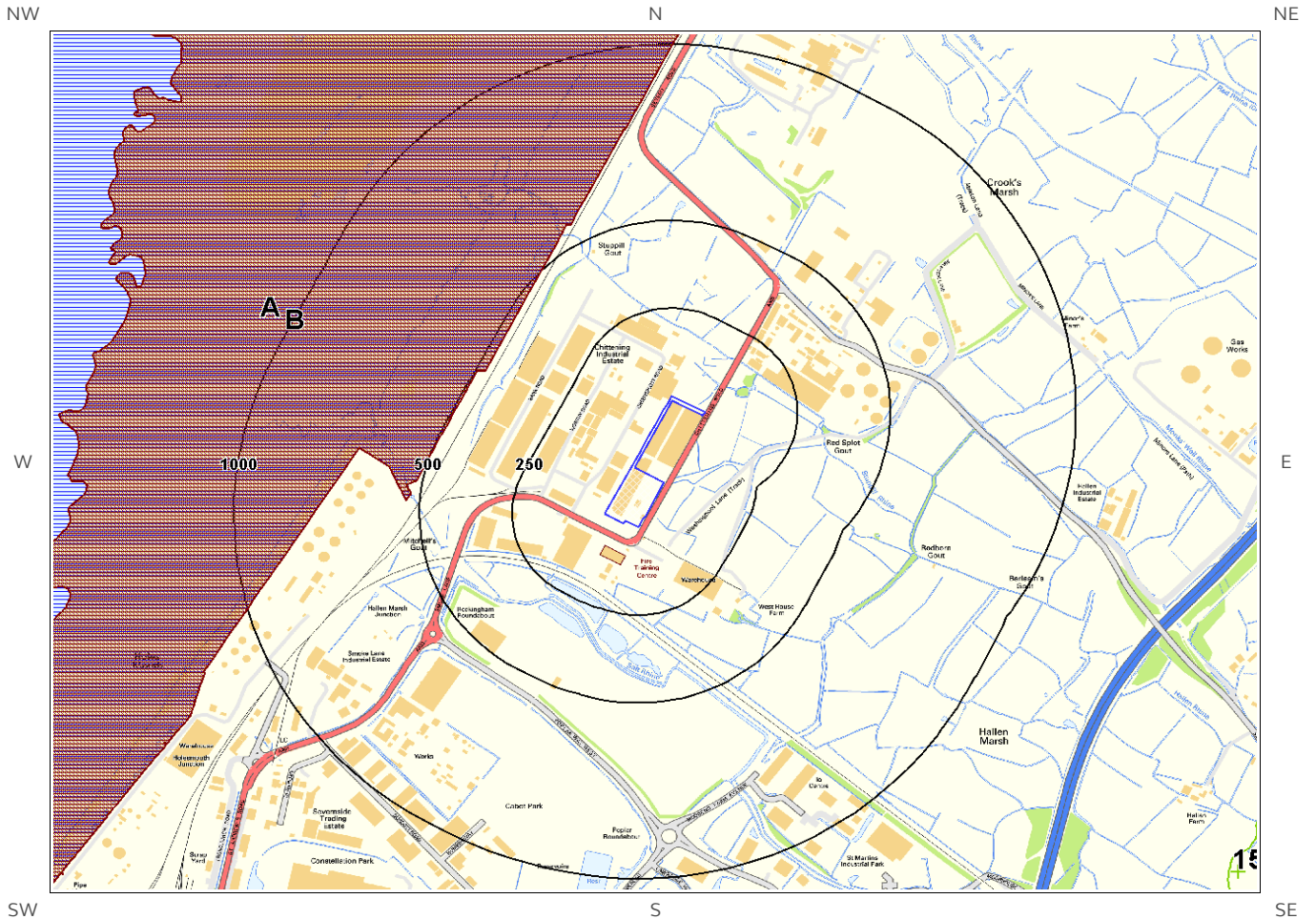
Not Applicable

Notes: Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

The confidence rating is on a threefold scale - Low, Moderate and High. This provides a relative indication of the BGS confidence in the accuracy of the susceptibility result for groundwater flooding. This is based on the amount and precision of the information used in the assessment. In areas with a relatively lower level of confidence the susceptibility result should be treated with more caution. In other areas with higher levels of confidence the susceptibility result can be used with more confidence.

---

# 7. Designated Environmentally Sensitive Sites Map



Designated Environmentally Sensitive Sites Map



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# 7. Designated Environmentally Sensitive Sites

Presence of Designated Environmentally Sensitive Sites within 2000m of the study site? Yes

## 7.1 Records of Sites of Special Scientific Interest (SSSI) within 2000m of the study site:

2

The following Site of Special Scientific Interest (SSSI) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	SSSI Name	Data Source
9B	476.0	NW	Severn Estuary	Natural England
Not shown	1973.0	SW	Severn Estuary	Natural England

## 7.2 Records of National Nature Reserves (NNR) within 2000m of the study site:

0

Database searched and no data found.

## 7.3 Records of Special Areas of Conservation (SAC) within 2000m of the study site:

4

The following Special Area of Conservation (SAC) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	SAC Name	Data Source
1A	476.0	NW	Severn Estuary	Natural England
2A	476.0	NW	Severn Estuary (England)	Natural Resources Wales
Not shown	1973.0	SW	Severn Estuary	Natural England
Not shown	1973.0	SW	Severn Estuary (England)	Natural Resources Wales

**7.4 Records of Special Protection Areas (SPA) within 2000m of the study site:**

4

The following Special Protection Area (SPA) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	SPA Name	Data Source
5B	476.0	NW	Severn Estuary	Natural England
6B	476.0	NW	Severn Estuary (England)	Natural Resources Wales
Not shown	1973.0	SW	Severn Estuary	Natural England
Not shown	1973.0	SW	Severn Estuary (England)	Natural Resources Wales

**7.5 Records of Ramsar sites within 2000m of the study site:**

4

The following Ramsar records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	Ramsar Site Name	Ramsar Site Status	Data Source
11B	476.0	NW	Severn Estuary	Current	Natural England
12B	476.0	NW	Severn Estuary (England)	Current	Natural Resources Wales
Not shown	1973.0	SW	Severn Estuary	Current	Natural England
Not shown	1973.0	SW	Severn Estuary (England)	Current	Natural Resources Wales

**7.6 Records of Ancient Woodland within 2000m of the study site:**

0

Database searched and no data found.

**7.7 Records of Local Nature Reserves (LNR) within 2000m of the study site:**

0

Database searched and no data found.

**7.8 Records of World Heritage Sites within 2000m of the study site:**

0

Database searched and no data found.

---

**7.9 Records of Environmentally Sensitive Areas within 2000m of the study site:**

0

Database searched and no data found.

---

**7.10 Records of Areas of Outstanding Natural Beauty (AONB) within 2000m of the study site:**

0

Database searched and no data found.

---

**7.11 Records of National Parks (NP) within 2000m of the study site:**

0

Database searched and no data found.

---

**7.12 Records of Nitrate Sensitive Areas within 2000m of the study site:**

0

Database searched and no data found.

---

**7.13 Records of Nitrate Vulnerable Zones within 2000m of the study site:**

0

Database searched and no data found.

---

**7.14 Records of Green Belt land within 2000m of the study site:**

2

Green Belt data contains Ordnance Survey data © Crown copyright and database right [2015]

ID	Distance (m)	Direction	Green Belt Name	Local Authority Name
15	1606.0	E	Bristol and Bath Greenbelt	South Gloucestershire

---

Not shown	1960.0	SE	Bristol and Bath Greenbelt	South Gloucestershire
-----------	--------	----	----------------------------	-----------------------

---

# 8. Natural Hazards Findings

## 8.1 Detailed BGS GeoSure Data

BGS GeoSure Data has been searched to 50m. The data is included in tabular format. If you require further information on geology and ground stability, please obtain a Groundsure GeoInsight, available from our website. The following information has been found:

### 8.1.1 Shrink Swell

What is the maximum Shrink-Swell\* hazard rating identified on the study site? Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

---

**Hazard**

---

Ground conditions predominantly medium plasticity. Do not plant trees with high soil moisture demands near to buildings. For new build, consideration should be given to advice published by the National House Building Council (NHBC) and the Building Research Establishment (BRE). There is a possible increase in construction cost to reduce potential shrink-swell problems. For existing property, there is a possible increase in insurance risk, especially during droughts or where vegetation with high moisture demands is present.

---

### 8.1.2 Landslides

What is the maximum Landslide\* hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

---

**Hazard**

---

Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.

---



---

\* This indicates an automatically generated 50m buffer and site.



### 8.1.3 Soluble Rocks

What is the maximum Soluble Rocks\* hazard rating identified on the study site? Negligible

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

---

**Hazard**

---

Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

---

### 8.1.4 Compressible Ground

What is the maximum Compressible Ground\* hazard rating identified on the study site? Moderate

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

---

**Hazard**

---

Significant potential for compressibility problems. Avoid large differential loadings of ground. Do not drain or de-water ground near the property without technical advice. For new build consider possibility of compressible ground in ground investigation, construction and building design. Consider effects of groundwater changes. Extra construction costs are likely. For existing property possible increase in insurance risk from compressibility, especially if water conditions or loading of the ground change significantly.

---

### 8.1.5 Collapsible Rocks

What is the maximum Collapsible Rocks\* hazard rating identified on the study site? Negligible

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

---

**Hazard**

---

No indicators for collapsible deposits identified. No actions required to avoid problems due to collapsible deposits. No special ground investigation required, or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

---

## 8.1.6 Running Sand

What is the maximum Running Sand\* hazard rating identified on the study site?

Moderate

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

---

**Hazard**

---

Significant potential for running sand problems with relatively small changes in ground conditions. Avoid large amounts of water entering the ground (for example through pipe leakage or soak-aways). Do not dig (deep) holes into saturated ground near the property without technical advice. For new build consider the consequences of soil and groundwater conditions during and after construction. For existing property possible increase in insurance risk from running sand, for example, due to water leakage, high rainfall events or flooding.

---



---

\* This indicates an automatically generated 50m buffer and site.

# 9. Mining

## 9.1 Coal Mining

Are there any coal mining areas within 75m of the study site? No

Database searched and no data found.

---

## 9.2 BGS Non Coal Mining Hazards

What is the potential for undermining as a result of underground mineral extraction, excluding coal and minerals extracted as a consequence of coal mining? Unclassified

Database searched and no data found.

---

## 9.3 Brine Affected Areas

Are there any brine affected areas within 75m of the study site? No

Guidance: No Guidance Required.

---

# Contact Details

EmapSite  
Telephone: 0118 9736883  
sales@emapsite.com

## British Geological Survey Enquiries

Kingsley Dunham Centre  
Keyworth, Nottingham NG12 5GG  
Tel: 0115 936 3143.  
Fax: 0115 936 3276.  
Email: [enquiries@bgs.ac.uk](mailto:enquiries@bgs.ac.uk)  
Web: [www.bgs.ac.uk](http://www.bgs.ac.uk)

BGS Geological Hazards Reports and general geological enquiries



## Environment Agency

National Customer Contact Centre, PO Box 544  
Rotherham, S60 1BY  
Tel: 08708 506 506  
Web: [www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)  
Email: [enquiries@environment-agency.gov.uk](mailto:enquiries@environment-agency.gov.uk)



## Public Health England

Public information access office  
Public Health England, Wellington House  
133-155 Waterloo Road, London, SE1 8UG  
[www.gov.uk/phe](http://www.gov.uk/phe)  
Email: [enquiries@phe.gov.uk](mailto:enquiries@phe.gov.uk)  
Main switchboard: 020 7654 8000



Public Health  
England

## The Coal Authority

200 Lichfield Lane  
Mansfield  
Notts NG18 4RG  
Tel: 0345 7626 848  
DX 716176 Mansfield 5  
[www.coal.gov.uk](http://www.coal.gov.uk)



The Coal  
Authority

## Ordnance Survey

Adanac Drive, Southampton  
SO16 0AS  
Tel: 08456 050505



## Local Authority

Authority: Bristol City Council  
Phone: 0117 922 2000  
Web: <http://www.bristol.gov.uk/>  
Address: The Council House, College Green, Bristol, BS1 5TR

## Gemapping PLC

Virginia Villas, High Street, Hartley Witney,  
Hampshire RG27 8NW  
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This report has been prepared in accordance with the Groundsure Ltd standard Terms and Conditions of business for work of this nature.

## Standard Terms and Conditions

### 1 Definitions

In these terms and conditions unless the context otherwise requires:

**“Beneficiary”** means the person or entity for whose benefit the Client has obtained the Services.

**“Client”** means the party or parties entering into a Contract with Groundsure.

**“Commercial”** means any building or property which is not Residential.

**“Confidential Information”** means the contents of this Contract and all information received from the Client as a result of, or in connection with, this Contract other than

(i) information which the Client can prove was rightfully in its possession prior to disclosure by Groundsure and

(ii) any information which is in the public domain (other than by virtue of a breach of this Contract).

**“Support Services”** means Support Services provided by Groundsure including, without limitation, interpreting third party and in-house environmental data, providing environmental support advice, undertaking environmental audits and assessments, Site investigation, Site monitoring and related items.

**“Contract”** means the contract between Groundsure and the Client for the provision of the Services, and which shall incorporate these terms and conditions, the Order, and the relevant User Guide.

**“Third Party Data Provider”** means any third party providing Third Party Content to Groundsure.

**“Data Reports”** means reports comprising factual data with no accompanying interpretation.

**“Fees”** has the meaning set out in clause 5.1.

**“Groundsure”** means Groundsure Limited, a company registered in England and Wales under number 03421028.

**“Groundsure Materials”** means all materials prepared by Groundsure and provided as part of the Services, including but not limited to Third Party Content, Data Reports, Mapping, and Risk Screening Reports.

**“Intellectual Property”** means any patent, copyright, design rights, trade or service mark, moral rights, data protection rights, know-how or trade mark in each case whether registered or not and including applications for the same or any other rights of a similar nature anywhere in the world.

**“Mapping”** means a map, map data or a combination of historical maps of various ages, time periods and scales.

**“Order”** means an electronic, written or other order form submitted by the Client requesting Services from Groundsure in respect of a specified Site.

**“Ordnance Survey”** means the Secretary of State for Business, Innovation and Skills, acting through Ordnance Survey, Adanac Drive, Southampton, SO16 0AS, UK.

**“Order Website”** means the online platform through which Orders may be placed by the Client and accepted by Groundsure.

**“Report”** means a Risk Screening Report or Data Report for Commercial or Residential property.

**“Residential”** means any building or property used as or intended to be used as a single dwelling.

**“Risk Screening Report”** means a risk screening report comprising factual data with an accompanying interpretation by Groundsure.

**“Services”** means any Report, Mapping and/or Support Services which Groundsure has agreed to provide by accepting an Order pursuant to clause 2.6.

**“Site”** means the area of land in respect of which the Client has requested Groundsure to provide the Services.

**“Third Party Content”** means data, database information or other information which is provided to Groundsure by a Third Party Data Provider.

**“User Guide”** means the user guide, as amended from time to time, available upon request from Groundsure and on the website (www.Groundsure.com) and forming part of this Contract.

### 2 Scope of Services, terms and conditions, requests for insurance and quotations

2.1 Groundsure agrees to provide the Services in accordance with the Contract.

2.2 Groundsure shall exercise reasonable skill and care in the provision of the Services.

2.3 Subject to clause 7.3 the Client acknowledges that it has not relied on any statement or representation made by or on behalf of Groundsure which is not set out and expressly agreed in writing in the Contract and all such statements and representations are hereby excluded to the fullest extent permitted by law.

2.4 The Client acknowledges that terms and conditions appearing on a Client’s order form, printed stationery or other communication, or any terms or conditions implied by custom, practice or course of dealing shall be of no effect, and that this Contract shall prevail over all others in relation to the Order.

2.5 If the Client or Beneficiary requests insurance in conjunction with or as a result of the Services, Groundsure shall use reasonable endeavours to recommend such insurance, but makes no warranty that such insurance shall be available from insurers or that it will be offered on reasonable terms. Any insurance purchased by the Client or Beneficiary shall be subject solely to the terms of the policy issued by insurers and Groundsure will have no liability therefor. In addition you acknowledge and agree that Groundsure does not act as an agent or broker for any insurance providers. The Client should take (and ensure that the Beneficiary takes) independent advice to ensure that the insurance policy requested or offered is suitable for its requirements.

2.6 Groundsure’s quotations or proposals are valid for a period of 30 days only unless an alternative period of time is explicitly stipulated by Groundsure. Groundsure reserves the right to withdraw any quotation or proposal at any time before an Order is accepted by Groundsure. Groundsure’s acceptance of an Order shall be binding only when made in writing and signed by Groundsure’s authorised representative or when accepted through the Order Website.

### 3 The Client’s obligations

3.1 The Client shall comply with the terms of this Contract and

(i) procure that the Beneficiary or any third party relying on the Services complies with and acts as if it is bound by the Contract and

(ii) be liable to Groundsure for the acts and omissions of the Beneficiary or any third party relying on the Services as if such acts and omissions were those of the Client.

3.2 The Client shall be solely responsible for ensuring that the Services are appropriate and suitable for its and/or the Beneficiary’s needs.

3.3 The Client shall supply to Groundsure as soon as practicable and without charge all requisite information (and the Client warrants that such information is accurate, complete and appropriate), including without limitation any environmental information relating to the Site and shall give such assistance as Groundsure shall reasonably require in the provision of the Services including, without limitation, access to the Site, facilities and equipment.

3.4 Where the Client’s approval or decision is required to enable Groundsure to carry out work in order to provide the Services, such approval or decision shall be given or procured in reasonable time and so as not to delay or disrupt the performance of the Services.

3.5 Save as expressly permitted by this Contract the Client shall not, and shall procure that the Beneficiary shall not, re-sell, alter, add to, or amend the Groundsure Materials, or use the Groundsure Materials in a manner for which they were not intended. The Client may make the Groundsure Materials available to a third party who is considering acquiring some or all of, or providing funding in relation to, the Site, but such third party cannot rely on the same unless expressly permitted under clause 4.

3.6 The Client is responsible for maintaining the confidentiality of its user name and password if using the Order Website and the Client acknowledges that Groundsure accepts no liability of any kind for any loss or damage suffered by the Client as a consequence of using the Order Website.

### 4 Reliance

4.1 The Client acknowledges that the Services provided by Groundsure consist of the presentation and analysis of Third Party Content and other content and that information obtained from a Third Party Data Provider cannot be guaranteed or warranted by Groundsure to be reliable.

4.2 In respect of Data Reports, Mapping and Risk Screening Reports, the following classes of person and no other are entitled to rely on their contents;

(i) the Beneficiary,

(ii) the Beneficiary’s professional advisers, (iii) any person providing funding to the Beneficiary in relation to the Site (whether directly or as part of a lending syndicate),

(iv) the first purchaser or first tenant of the Site, and

(v) the professional advisers and lenders of the first purchaser or tenant of the Site.

4.3 In respect of Support Services, only the Client, Beneficiary and parties expressly named in a Report and no other parties are entitled to rely on its contents.

4.4 Save as set out in clauses 4.2 and 4.3 and unless otherwise expressly agreed in writing, no other person or entity of any kind is entitled to rely on any Services or Report issued or provided by Groundsure. Any party considering such Reports and Services does so at their own risk.

### 5 Fees and Disbursements

5.1 Groundsure shall charge and the Client shall pay fees at the rate and

frequency specified in the written proposal, Order Website or Order acknowledgement form, plus (in the case of Support Services) all proper disbursements incurred by Groundsure. The Client shall in addition pay all value added tax or other tax payable on such fees and disbursements in relation to the provision of the Services (together "Fees").

5.2 The Client shall pay all outstanding Fees to Groundsure in full without deduction, counterclaim or set off within 30 days of the date of Groundsure's invoice or such other period as may be agreed in writing between Groundsure and the Client ("Payment Date"). Interest on late payments will accrue on a daily basis from the Payment Date until the date of payment (whether before or after judgment) at the rate of 8% per annum.

5.3 The Client shall be deemed to have agreed the amount of any invoice unless an objection is made in writing within 28 days of the date of the invoice. As soon as reasonably practicable after being notified of an objection, without prejudice to clause 5.2 a member of Groundsure's management team will contact the Client and the parties shall then use all reasonable endeavours to resolve the dispute within 15 days.

## 6 Intellectual Property and Confidentiality

### 6.1 Subject to

(i) full payment of all relevant Fees and

(ii) compliance with this Contract, the Client is granted (and is permitted to sub-licence to the Beneficiary) a royalty-free, worldwide, non-assignable and (save to the extent set out in this Contract) non-transferable licence to make use of the Groundsure Materials.

6.2 All Intellectual Property in the Groundsure Materials are and shall remain owned by Groundsure or Groundsure's licensors (including without limitation the Third Party Data Providers) the Client acknowledges, and shall procure acknowledgement by the Beneficiary of, such ownership. Nothing in this Contract purports to transfer or assign any rights to the Client or the Beneficiary in respect of such Intellectual Property.

6.3 Third Party Data Providers may enforce any breach of clauses 6.1 and 6.2 against the Client or Beneficiary.

6.4 The Client shall, and shall procure that any recipients of the Groundsure Materials shall:

(i) not remove, suppress or modify any trade mark, copyright or other proprietary marking belonging to Groundsure or any third party from the Services;

(ii) use the information obtained as part of the Services in respect of the subject Site only, and shall not store or reuse any information obtained as part of the Services provided in respect of adjacent or nearby sites;

(iii) not create any product or report which is derived directly or indirectly from the Services (save that those acting in a professional capacity to the Beneficiary may provide advice based upon the Services);

(iv) not combine the Services with or incorporate such Services into any other information data or service;

(v) not reformat or otherwise change (whether by modification, addition or enhancement), the Services (save that those acting for the Beneficiary in a professional capacity shall not be in breach of this clause 6.4(v) where such reformatting is in the normal course of providing advice based upon the Services);

(vi) where a Report and/or Mapping contains material belonging to Ordnance Survey, acknowledge and agree that such content is protected by Crown Copyright and shall not use such content for any purpose outside of receiving the Services; and

(vii) not copy in whole or in part by any means any map prints or run-on copies containing content belonging to Ordnance Survey (other than that contained within Ordnance Survey's OS Street Map) without first being in possession of a valid Paper Map Copying Licence from Ordnance Survey,

6.5 Notwithstanding clause 6.4, the Client may make reasonable use of the Groundsure Materials in order to advise the Beneficiary in a professional capacity. However, Groundsure shall have no liability in respect of any advice, opinion or report given or provided to Beneficiaries by the Client.

6.6 The Client shall procure that any person to whom the Services are made available shall notify Groundsure of any request or requirement to disclose, publish or disseminate any information contained in the Services in accordance with the Freedom of Information Act 2000, the Environmental Information Regulations 2004 or any associated legislation or regulations in force from time to time.

## 7. Liability: Particular Attention Should Be Paid To This Clause

7.1 This Clause 7 sets out the entire liability of Groundsure, including any liability for the acts or omissions of its employees, agents, consultants, subcontractors and Third Party Content, in respect of:

(i) any breach of contract, including any deliberate breach of the Contract by Groundsure or its employees, agents or

subcontractors;

(ii) any use made of the Reports, Services, Materials or any part of them; and

(iii) any representation, statement or tortious act or omission (including negligence) arising under or in connection with the Contract.

7.2 All warranties, conditions and other terms implied by statute or common law are, to the fullest extent permitted by law, excluded from the Contract.

7.3 Nothing in the Contract limits or excludes the liability of the Supplier for death or personal injury resulting from negligence, or for any damage or liability incurred by the Client or Beneficiary as a result of fraud or fraudulent misrepresentation.

7.4 Groundsure shall not be liable for

(i) loss of profits;

(ii) loss of business;

(iii) depletion of goodwill and/or similar losses;

(iv) loss of anticipated savings;

(v) loss of goods;

(vi) loss of contract;

(vii) loss of use;

(viii) loss or corruption of data or information;

(ix) business interruption;

(x) any kind of special, indirect, consequential or pure economic loss, costs, damages, charges or expenses;

(xi) loss or damage that arise as a result of the use of all or part of the Groundsure Materials in breach of the Contract;

(xii) loss or damage arising as a result of any error, omission or inaccuracy in any part of the Groundsure Materials where such error, omission or inaccuracy is caused by any Third Party Content or any reasonable interpretation of Third Party Content;

(xiii) loss or damage to a computer, software, modem, telephone or other property; and

(xiv) loss or damage caused by a delay or loss of use of Groundsure's internet ordering service.

7.5 Groundsure's total liability in relation to or under the Contract shall be limited to £10 million for any claim or claims.

7.6 Groundsure shall procure that the Beneficiary shall be bound by limitations and exclusions of liability in favour of Groundsure which accord with those detailed in clauses 7.4 and 7.5 (subject to clause 7.3) in respect of all claims which the Beneficiary may bring against Groundsure in relation to the Services or other matters arising pursuant to the Contract.

## 8 Groundsure's right to suspend or terminate

8.1 If Groundsure reasonably believes that the Client or Beneficiary has not provided the information or assistance required to enable the proper provision of the Services, Groundsure shall be entitled to suspend all further performance of the Services until such time as any such deficiency has been made good.

8.2 Groundsure shall be entitled to terminate the Contract immediately on written notice in the event that:

(i) the Client fails to pay any sum due to Groundsure within 30 days of the Payment Date; or

(ii) the Client (being an individual) has a bankruptcy order made against him or (being a company) shall enter into liquidation whether compulsory or voluntary or have an administration order made against it or if a receiver shall be appointed over the whole or any part of its property assets or undertaking or if the Client is struck off the Register of Companies or dissolved; or

(iii) the Client being a company is unable to pay its debts within the meaning of Section 123 of the Insolvency Act 1986 or being an individual appears unable to pay his debts within the meaning of Section 268 of the Insolvency Act 1986 or if the Client shall enter into a composition or arrangement with the Client's creditors or shall suffer distress or execution to be levied on his goods; or

(iv) the Client or the Beneficiary breaches any term of the Contract (including, but not limited to, the obligations in clause 4) which is incapable of remedy or if remediable, is not remedied within five days of notice of the breach.

## 9. Client's Right to Terminate and Suspend

9.1 Subject to clause 10.1, the Client may at any time upon written notice terminate or suspend the provision of all or any of the Services.

9.2 In any event, where the Client is a consumer (and not a business) he/she hereby expressly acknowledges and agrees that:

(i) the supply of Services under this Contract (and therefore the performance of this Contract) commences immediately upon Groundsure's acceptance of the Order; and

(ii) the Reports and/or Mapping provided under this Contract are

(a) supplied to the Client's specification(s) and in any event

(b) by their nature cannot be returned.

## 10 Consequences of Withdrawal, Termination or Suspension

10.1 Upon termination of the Contract:

(i) Groundsure shall take steps to bring to an end the Services in an orderly manner, vacate any Site with all reasonable speed and shall deliver to the Client and/or Beneficiary any property of the Client and/or Beneficiary in Groundsure's possession or control; and

(ii) the Client shall pay to Groundsure all and any Fees payable in respect of the performance of the Services up to the date of termination or suspension. In respect of any Support Services provided, the Client shall also pay Groundsure any additional costs incurred in relation to the termination or suspension of the Contract.

## 11 Anti-Bribery

11.1 The Client warrants that it shall:

(i) comply with all applicable laws, statutes and regulations relating to anti-bribery and anti-corruption including but not limited to the Bribery Act 2010;

(ii) comply with such of Groundsure's anti-bribery and anti-corruption policies as are notified to the Client from time to time; and

(iii) promptly report to Groundsure any request or demand for any undue financial or other advantage of any kind received by or on behalf of the Client in connection with the performance of this Contract.

11.2 Breach of this Clause 11 shall be deemed a material breach of this Contract.

## 12 General

12.1 The Mapping contained in the Services is protected by Crown copyright and must not be used for any purpose other than as part of the Services or as specifically provided in the Contract.

12.2 The Client shall be permitted to make one copy only of each Report or Mapping Order. Thereafter the Client shall be entitled to make unlimited copies of the Report or Mapping Order only in accordance with an Ordnance Survey paper map copy license available through Groundsure.

12.3 Groundsure reserves the right to amend or vary this Contract. No amendment or variation to this Contract shall be valid unless signed by an authorised representative of Groundsure.

12.4 No failure on the part of Groundsure to exercise, and no delay in exercising, any right, power or provision under this Contract shall operate as a waiver thereof.

12.5 Save as expressly provided in this Contract, no person other than the persons set out therein shall have any right under the Contract (Rights of Third Parties) Act 1999 to enforce any terms of the Contract.

12.6 The Secretary of State for Business, Innovation and Skills ("BIS") or BIS' successor body, as the case may be, acting through Ordnance Survey may enforce a breach of clause 6.4(vi) and clause 6.4(vii) of these terms and conditions against the Client in accordance with the provisions of the Contracts (Rights of Third Parties) Act 1999.

12.7 Groundsure shall not be liable to the Client if the provision of the Services is delayed or prevented by one or more of the following circumstances:

(i) the Client or Beneficiary's failure to provide facilities, access or information;

(ii) fire, storm, flood, tempest or epidemic;

(iii) Acts of God or the public enemy;

(iv) riot, civil commotion or war;

(v) strikes, labour disputes or industrial action;

(vi) acts or regulations of any governmental or other agency;

(vii) suspension or delay of services at public registries by Third Party Data Providers;

(viii) changes in law; or

(ix) any other reason beyond Groundsure's reasonable control.

In the event that Groundsure is prevented from performing the Services (or any part thereof) in accordance with this clause 12.6 for a period of not less than 30 days then Groundsure shall be entitled to terminate this Contract immediately on written notice to the Client.

12.8 Any notice provided shall be in writing and shall be deemed to be properly given if delivered by hand or sent by first class post, facsimile or by email to the address, facsimile number or email address of the relevant party as may have been notified by each party to the other for such purpose or in the absence of such notification the last known address.

12.9 Such notice shall be deemed to have been received on the day of delivery if delivered by hand, facsimile or email (save to the extent such day is not a working day where it shall be deemed to have been delivered on the next working day) and on the second working day after the day of posting if sent by first class post.

12.10 The Contract constitutes the entire agreement between the parties and shall supersede all previous arrangements between the parties relating to the subject matter hereof.

12.11 Each of the provisions of the Contract is severable and distinct from the others and if one or more provisions is or should become invalid, illegal or unenforceable, the validity and enforceability of the remaining provisions shall not in any way be tainted or impaired.

12.12 This Contract shall be governed by and construed in accordance with English law and any proceedings arising out of or connected with this Contract shall be subject to the exclusive jurisdiction of the English courts.

12.13 Groundsure is an executive member of the Council of Property Search Organisation (CoPSO) and has signed up to the Search Code administered by the Property Codes Compliance Board (PCCB). All Risk Screening Reports shall be supplied in accordance with the provisions of the Search Code.

12.14 If the Client or Beneficiary has a complaint about the Services, written notice should be given to the Compliance Officer at Groundsure who will respond in a timely manner.

12.15 The Client agrees that it shall, and shall procure that each Beneficiary shall, treat in confidence all Confidential Information and shall not, and shall procure that each Beneficiary shall not (i) disclose any Confidential Information to any third party other than in accordance with the terms of this Contract; and (ii) use Confidential Information for a purpose other than the exercise of its rights and obligations under this Contract. Subject to clause 6.6, nothing shall prevent the Client or any Beneficiary from disclosing Confidential Information to the extent required by law.

© Groundsure Limited June 2013





**26<sup>th</sup> November 2019**  
**Report No 10506/R01 Issue 1**

## **Bristol Resource Recovery Facility and Depot, Avonmouth**

### **Phase 1 Desk Study and Preliminary Risk Assessment Report**

Prepared for

**Veolia ES (UK) Ltd**



## **Bristol Resource Recovery Facility and Depot, Avonmouth**

### **Phase 1 Desk Study and Preliminary Risk Assessment Report**

**26<sup>th</sup> November 2019**

**Carried Out For:**

**Veolia ES (UK) Ltd**  
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Corby  
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**Prepared By:**

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**DOCUMENT INFORMATION AND CONTROL SHEET**

**Document Status and Approval Schedule**

<b>Report No 10506/R01 Issue 1</b>	<b>Title</b>
	<b>Bristol Resource Recovery Facility and Depot, Avonmouth Phase 1 Desk Study and Preliminary Risk Assessment Report</b>

**Issue History**

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<b>1</b>	Final	26/11/2019	<b>Prepared By:</b> Adam Steele BSc (Hons) MSc MEnvSc	<i>A Steele</i>	22/11/2019
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			<b>Authorised By:</b> Jason Tilley BEng (Hons) MSc DIC FGS	<i>J Tilley</i>	26/11/2019

**DISCLAIMER**

This report should be read with the Service Constraints Report Limitations & Planning Requirements set out in Appendix A.



## **Executive Summary**

The client, Veolia ES (UK) Ltd, commissioned TerraConsult Ltd to undertake a Phase 1 desk study for Bristol Resource Recovery Facility and Depot, Avonmouth, which is being considered for development.

### **Development Proposals**

Development proposals are understood that the development proposals comprise the construction of a new depot building and weighbridge office, along with the relocation of the existing weighbridge.

### **Conclusions**

Based on the findings of the Conceptual Side Model (CSM) a plausible pollutant linkage has not been identified. Additional investigation is therefore considered unnecessary.

### **Recommendations**

We would recommend that this report is forwarded to the relevant statutory consultees including the Environment Agency and Local Authority to seek their comments and subsequent approval prior to site works commencing.

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# **Bristol Resource Recovery Facility and Depot, Avonmouth**

## **Phase 1 Desk Study and Preliminary Risk Assessment Report**

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<b>Appendix C</b>	<b>Relevant Site Information from Historical Reports</b>
<b>Appendix D</b>	<b>Site Mapping in Relation to Previous Investigation</b>

## **1. Introduction**

### **1.1 Background Information**

TerraConsult Limited (TerraConsult) was commissioned by Veolia ES (UK) Ltd to undertake a Phase 1 Desk Study and Preliminary Risk Assessment for the site known as Bristol Resource Recovery Facility and Depot, Avonmouth.

### **1.2 Development Proposals**

It is understood that the development proposals comprise the construction of a new depot building and weighbridge office, along with the relocation of the existing weighbridge.

### **1.3 Purpose of Investigation**

The purpose of the report is to provide a preliminary assessment of the site using published information in relation to the proposed development of the site.

This report has been devised to comply 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, March 2012);
- 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)
- DEFRA/Environment Agency (2004) Report CLR11 "Model Procedures for the Management of Land Contamination";
- Environment Agency (2011) Report GPLC1 "Guiding Principles for Land Contamination";
- Environment Agency (2017) "The Environment Agency's Approach to Groundwater Protection" November 2017 Version 1.1

### **1.4 Previous Investigations**

It is understood that the site has been subject to two previous investigations; a Site Investigation Report produced by Balfour Beatty Investments Ltd (report ref. 729873R1, dated August 2015) and a Site Investigation and Foundation Assessment report produced by TerraConsult Ltd (report ref. 3378R01-1, dated 23<sup>rd</sup> February 2018). This Phase 1 Desk Study and Preliminary Risk Assessment Report reviews the information presented in both of these reports to draw upon its own conclusions and recommendations. Relevant information from the reports are presented in **Appendix C** and mapping illustrating this development site in relation to previous report findings are presented in **Appendix D**. The previous reports should be read in conjunction with this report.

---

## 1.5 Limitations

TerraConsult's service constraints and report limitations are presented in Appendix A and a description of environmental risk assessment methodology and terminology is presented in Appendix B.

In preparation of this report, it is assumed that any information provided to TerraConsult by the client in connection with the commission is accurate, complete and not misleading. TerraConsult cannot guarantee the accuracy or validity of this information.



## 2. Site Location and Description

### 2.1 Site Location

A location summary and brief description of the site are presented in **Table 2.1** below.

**Table 2.1 Summary of Description of the Site and its Environs**

<b>Location</b>	The site is located off Estuary Park, Chittening Road, Bristol, approximately 3km north-east of Avonmouth Village.
<b>Grid Reference</b>	ST 531 812
<b>Post Code</b>	BS11 0YB
<b>Site Area</b>	0.35ha (approximately)
<b>Topography</b>	The site is relatively flat.

### 2.2 Site Description

A site walkover was completed as part of the Site Investigation Report produced by Balfour Beatty Investments Ltd (report ref. 729873R1, dated August 2015).

*“The site is located on the south-west portion of Estuary Park and is used as the operational yard for Boomeco Limited. The oblong site is approximately 0.35 hectares in area. It is generally level and is divided in to two halves by an approximately 2m high wooden and barbed wire fence down the centre, trending north-east to south-west, as does the adjacent road.*

*The north-western half is used for storing waste wood, with eight concrete block construction storage bays at the northern end and a wood stockpile at the southern end, which had been removed by the end of the investigation. The area is mostly laid to asphalt but a concrete pad is present at the southern end, underneath where the wood stockpile was. The foundation outline of a past building can be seen within the asphalt. A disused railway line runs parallel with the north-west boundary of site. In the southern corner, at the end of the central fence, the remains of a former boom gate are present. Piles of waste concrete were also found here.*

*The south-eastern half of site is used for lorry-loaded container storage. Soft landscaping/gravel surfacing is present along the south side of the central fence and along the south-east boundary of site. Two concrete pads are located in the southern corner and midway along the central fence line, adjacent to the soft landscaping. The far southern corner of site is sectioned off via a wooden fence and has painted car parking bays. Storage containers are present along the southeast edge of site and on the central concrete pad. Old conveyor belts and associated machinery were littered along the central fence line.*

*The south-east boundary is bounded by an approximately 1.50m high fence with concrete blocks blocking the old entrance in the south-east corner of site. Approximately 2m high metal railings border the south-west and north-west of site. Further Boomeco operational areas can be found to the north-east of site and Chittening Industrial Estate to the north-west. Undeveloped land can be found on the south-west side of Chittening Road and further industrial development to the south-west of site”.*

### 3. Geological Information

A summary of the environmental background information (geology, hydrology, hydrogeology, database information *etc.*) and regulator consultation information has been presented in the following chapters. Unless otherwise stated, the following information has been obtained from the Site Investigation Report produced by Balfour Beatty Investments Ltd (report ref. 729873R1, dated August 2015) and a Site Investigation and Foundation Assessment report produced by TerraConsult Ltd (report ref. 3378R01-1, dated 23rd February 2018) which are included in **Appendix C**.

#### 3.1 Anticipated Ground Conditions and Permeability

The anticipated superficial deposits, underlying solid geology and recorded Made Ground within 250m of the site are detailed in **Table 3.1**.

**Table 3.1 Ground Conditions and Permeability**

Item	Anticipated Ground Conditions	Recorded Permeability
Made/Artificial Ground	Made Ground comprising a surface layer of asphalt overlying sandy, silty gravel of limestone was encountered in boreholes BH6 and TP12 to depths of 0.50mbgl and 0.47mbgl.	-
Superficial Deposits	Superficial deposits comprising Tidal Flat Deposits were encountered underlying the Made Ground to a depth of 6.60mbgl in BH6. TP12 was completed within this stratum at a depth of 2.20mbgl.  Estuarine Alluvium was encountered underlying Tidal Flats Deposits to a depth of 14.70mbgl.	The Tidal Flat Deposits have a low to very low permeability with an intergranular flow type.  -
Solid Geology	The superficial deposits on site are underlain by the Mercia Mudstone Group. BH6 was completed within this strata at a depth of 25.00mbgl.	Low permeability with a fracture flow type.
Faults	None recorded.	-

#### 3.2 Radon Potential

Information regarding radon is presented in **Table 3.2** below.

**Table 3.2 Radon**

Item	Details
Radon Affected Area	The site is not within a radon affected area, as less than 1% of properties are above the action level.
Radon Protected Measure	No radon protective measures are considered necessary for new properties or extensions as described in Building Research Establishment (BRE) publication BR211.

### 3.3 Geological Hazards

Information regarding the risk of geological hazards affecting the site is presented in **Table 3.3** below.

**Table 3.3 Geological Hazards**

Hazard	Distance/Direction	Hazard Rating
Shrink-swell clays	On site	Low
Landslides	On site	Very low
Ground dissolution of soluble rocks	On site	Negligible
Compressible deposits	On site	Moderate to high
Collapsible deposits	On site	Negligible
Running sands	On site	Moderate to high

### 3.4 Previously Encountered Ground Conditions

As part of the previous investigation by Balfour Beatty Investments Ltd (report ref. 729873R1, dated August 2015), six cable percussive boreholes progressed by rotary drilling, and twelve machine excavated trial pits were completed on site between the 15<sup>th</sup> and 25<sup>th</sup> June 2015. **Table 3.4** below presents a summary of the encountered ground conditions.

**Table 3.4 Summary of Encountered Ground Conditions**

Strata	Location	Depth to top of stratum (mbgl)	Thickness (m)
Asphalt	BH1, BH2, BH5, BH6, TP1-TP4, TP11, TP12	0.00	0.05 to 0.11
Made Ground	All locations	0.00 to 0.11	0.30 to 1.82
Tidal Flat Deposits	BH1-BH6, TP1-TP7, TP9, TP11, TP12	0.30 to 1.90	4.60 to 6.10
Estuarine Alluvium	BH1-BH6	5.30 to 6.60	7.00 to 10.30
Mercia Mudstone Group	BH1-BH6	13.00 to 16.40	Proved to base of all boreholes 8.80 to 12.10

#### Made Ground

Made Ground was encountered in all boreholes from ground level to depths between 0.30mbgl to 1.90mbgl. At the locations of BH1, BH2, BH5, BH6, TP1-TP4, TP11 and TP12, the Made Ground initially comprised a surface covering of asphalt between 55mm and 110mm thick. This was underlain by pinkish grey hardcore of limestone to 0.22m to 0.60m depth which also formed the surface at several other locations.

Underlying the surfacing, gravelly clay or clayey gravel, with gravel of limestone and also brick, concrete, slate, wood and charcoal were encountered. The Made Ground extended between 0.3mbgl to 1.90mbgl, but there was no systematic variation in thickness across the site.

#### Tidal Flat Deposits

Tidal Flat Deposits were encountered underlying Made Ground in all boreholes. This stratum comprised firm to very stiff, silty or slightly sandy clays that were generally orange brown in colour. This represents a stiffer alluvial 'crust' of the Tidal Flat Deposits that overlies

increasingly softer clay. The 'crust' was generally encountered to a depth of 2.50m, but varied across the site from 1.40m to 2.90m depth.

The underlying soft or very soft silty, and sometimes slightly sandy, grey clays of the Tidal Flat Deposits have a varying but generally low organic content. A peat layer was encountered across the site in all boreholes at depths between 4.40mbgl to 5.30mbgl depth, and possibly two layers in BH2.

#### Estuarine Alluvium

This stratum was encountered underlying the Tidal Flat Deposits in boreholes BH1 to BH6 and initially comprised very loose to medium dense silty sands. Peat was noted towards the base of the silty sands in BH2 and BH4. In most boreholes, there was approximately a 1-2m thick layer of sandy clay below the silty sands. In BH5, this contains some gravel just below the sands. Peat was found just above the Mercia Mudstone in BH5, which comprises the basal peat and is widespread across the Avonmouth area.

#### Mercia Mudstone Group

The Tidal Flat Deposits were typically underlain by very stiff to hard reddish brown silty clays passing into extremely weak reddish brown coloured mudstone or siltstone of the Mercia Mudstone Group.

Within the red mudstones, two distinctive thin green-coloured sandstone and siltstone beds were proved in boreholes BH1 to BH6, at approximately the same depths across the site.

#### Groundwater

Groundwater was encountered at depths between 1.10mbgl to 2.20mbgl.

#### Summary of Analysis and Monitoring Results

Analysis of selected soil samples indicated loose chrysotile asbestos fibres in samples from TP3 at 0.35mbgl and TP7 at 0.10mbgl. Cement bound chrysotile asbestos was observed in a sample from BH1 at 0.20mbgl.

Quantification of these positive screens indicated that the loose fibres and cement bound asbestos made up between 0.001% and 0.013% of the respective samples by mass.

The Balfour Beatty report mentions elevated concentrations of lead and zinc in TP1 and TPH in TP9. However, on review of the laboratory data comparing these results against their respective criteria for commercial end use, we believe this text to be an error within the report.

#### Gas Screening Value and Classification

The Gas Screening Value (GSV) for the site based on the recorded maximum concentrations of methane and carbon dioxide is provided in **Table 3.5** below.

**Table 3.5 Gas Screening Values for Methane and Carbon Dioxide**

Peak Flow Rate (l/hr)	Worst Case CO <sub>2</sub> (%)	CO <sub>2</sub> GSV	Worst Case CH <sub>4</sub> (%)	CH <sub>4</sub> GSV
0.1	6.7	0.0067 l/hr CO <sub>2</sub>	16.7	0.0167 l/hr CH <sub>4</sub>

Characteristic Situation 1 is considered applicable to the site based on the gas screening value of 0.0167 l/hr. However because methane has been encountered above 1%, an

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increase to Characterisation Situation 2 should be considered. This is also in line with CL:AIRE publication RB17 which considers that Characterisation Situation 2 is appropriate for organic alluvial soils with or without peat.

## 4. Hydrogeology and Hydrology Information

### 4.1 Aquifers

Information regarding aquifers beneath the site is presented in **Table 4.1** below.

**Table 4.1 Aquifers**

Item	Distance/Direction	Designation
Superficial Deposits	On site	Unproductive.
Solid Geology	On site	Secondary B Aquifer.

### 4.2 Abstraction Licences

Information regarding abstraction licences within 250m of the site is presented in **Table 4.2** below.

**Table 4.2 Abstraction Licences**

Item	Distance/Direction	Details
Groundwater Abstraction	-	None recorded.
Surface Water Abstraction	-	None recorded.
Potable Water Abstraction	-	None recorded.

### 4.3 Source Protection Zones and Groundwater Vulnerability

Information regarding source protection zones (SPZs) and groundwater vulnerability within 250m of the site are presented in **Table 4.3** below.

**Table 4.3 SPZs and Groundwater Vulnerability**

Item	Distance/Direction	Classification / Soil Vulnerability Category
SPZs	-	None recorded.
SPZs within Confined Aquifers	-	None recorded.
Groundwater Vulnerability and Leaching Potential	-	None recorded.

#### 4.5 Detailed River Network and Surface Water Features

Information regarding river networks and surface water features within 250m of the site are presented in **Table 4.4** below.

**Table 4.4 Detailed River Network and Surface Water Features**

Item	Distance/Direction	Details
Ordnance Survey MasterMap Water Network	143-212m north-east and north	Drain; secondary and tertiary river (3 records).
	168-204m north-east and north	Stuppill Rhine; secondary river (4 records).
	204m north	Unknown; tertiary river.
Surface Water Features (not represented on mapping).	24-248m east, south-east, north-east, south, south-west and north	22 records; no further details given.

#### 4.6 Flooding

Information regarding flooding within 250m of the site is presented in **Table 4.5** below.

**Table 4.5 Flooding**

Item	Details
Environment Agency Zone 2 and Zone 3 Floodplains	The site is located within an Environment Agency Zone 2 and Zone 3 floodplain.*
Risk of Flooding from Rivers and the Sea (RoFRaS) Flood Rating	The highest risk of flooding on site is recorded as low.
Flood Defences	There are no recorded flood defences within 250m of the site.
Areas benefitting from Flood Defences	There are no areas benefitting from flood defences within 250m of the site.
Areas benefitting from Flood Storage	There are no areas used for flood storage within 250m of the site.
Groundwater Flooding Susceptibility Areas and Flooding Confidence Areas	There are no groundwater flooding susceptible areas within 50m of the site.

\*Information obtained from Environment Agency Flood Map For Planning website (<https://flood-map-for-planning.service.gov.uk/confirm-location?easting=352999&northing=181439&placeOrPostcode=bs11%200yb>) accessed on 21st November 2019 at 10:34am

## 5. Historical Information

### 5.1 Historical Industrial Sites and Landfills

Information regarding historical industrial sites and landfills within 250m of the site is provided in **Table 5.1**.

**Table 5.1 Historical Potentially Contaminative Uses**

Item	Distance/Direction	Use
Environment Agency Landfills	-	None recorded.
Environment Agency Historical Landfills	-	None recorded.
BGS/DoE Non-operational Landfill Sites	-	None recorded.
Landfills from Local Authority and Historical Mapping Records	-	None recorded.
Waste treatment, transfer or disposal sites	15m north-west	Waste transfer/ workshops.
	16m north-west	Recycling and office.
	61m north-east	Recycling facility.
	95m north-west	Waste transfer station (extension).
Environment Agency Licensed Waste Sites	45m south-east	Units A, B and C Estuary Park (2 records). Type: HCI waste transfer station and treatment, and use of waste to manufacture timber.
	67m north-east	Chittening Road Recycling Centre. Type: metal recycling site (mixed MRS's).
	119m north-west	Greensplott Road (2 records). Type: vehicle depollution facility and special waste transfer station.
	213m north-east	The Old Brickworks. Type: metal recycling site (vehicle dismantler).

### 5.2 Site History

The site history is summarised below in **Table 5.2** and determined from the GroundSure historical mapping.

**Table 5.2 Site History**

Map Date	Map Scale	On Site	Off Site
1880-1887	1:2,500 1:10,560	Site is part of several fields with bordering drainage ditches. Farm buildings and well present in south. Washingpool Lane intersects the south of the site.	Surrounding area is larkely undeveloped with only farm buildings and associated ponds present. Numerous drainage ditches. Closest rhine is Step Hill Rhine approximately 150m north-west, draining north-west.
1901-1903	1:2,500 1:10,560	Additional building in south of site, now named Green Splot Farm.	No significant change has occurred since the previous mapping editions.



Map Date	Map Scale	On Site	Off Site
1912-1921	1:10,560	Rail link along north-west edge of site.	Second World War munitions factory with rail link is adjacent to the north-western boundary. Avonmouth and Filton railway cutting is approximately 250m south-west.
1935-1955	1:10,560	No significant change has occurred since the previous mapping editions.	Re-use of buildings within plot adjacent the north-west of the site for warehousing and industrial workshops.
1964	1:10,560	Site is part of Chittering Trading Estate. Green Splot Farm is no longer present. A large building is present in the south. Railway tracks on north-western boundary.	Works are present 250m north-east and a depot 250m north.
1971-1973	1:1,250 1:10,000	Building on site is labelled as a warehouse.	A tank is 110m north-east and numerous works are present 200m north.
1992-2014	1:1,250 1:10,000	Drains no longer present. Additional small buildings in south.	A fuel storage depot that was 250m north is no longer present. Ponds are 250m south and the railway has been dismantled.

### 5.3 Railways and Tunnels

Information regarding railways and tunnels on or within 250m of the site are presented in **Table 5.3** below.

**Table 5.3 Railways and Tunnels**

Feature	Distance/Direction	Use / Detail
Tunnels	-	None recorded.
Historical Railway and Tunnel Features	On site	Railway sidings (8 records).
	2-51m north	Railway sidings (3 records).
	129-238m south-east, north and north-west	Railway sidings (12 records).
Historical Railways	-	None recorded.
Active Railways	25-231m south, west and south-west	Multi track and rail (7 records).
Railway Projects	-	None recorded.

## 6. Environmental Information

### 6.1 Environmental Permits, Incidents, Registers and Sensitive Sites

Information regarding environmental permits, incidents, registers and designated sensitive sites are provided in **Table 6.1** below.

**Table 6.1 Environmental Permits, Incidents, Registers and Sensitive Sites**

Item	Distance/Direction	Detail
Industrial Sites Holding Licences and/or Authorisations	Historic IPC Authorisations	213m north-east Operator: Sevalco Ltd (12 records). Process: carbonisation and associated processes. Status: superseded by variation or revoked – now Ippc.
	Part A(1) and IPPC Authorised Activities	217m north-east Operator: Sevalco Ltd (2 records). Process: combustion; any fuel => 20MW but <50MW (unless 1.1 A(1) B). Status: surrender effective and superceded.
	Red List Discharge Consents	- None recorded.
	List 1 Dangerous Substances Inventory Sites	- None recorded.
	List 2 Dangerous Substances Inventory Sites	167m north-east Sevalco Ltd. Status: active. Authorised substances: chromium, copper, lead, pH and zinc. Receiving water: Severn Estuary (upper).
	Part A(2) and Part B Activities and Enforcements	147m north-east Ross Gordon Engineering Ltd. Process: 6.4b vehicle refinishing. Current permit, part B.
	Category 3 or 4 Radioactive Substances Authorisations	- None recorded.
	Licensed Discharge Consents	166m north-east Address: Recycling Depot, BS11 0YL. Trade discharges – site drainage into Stuphill Rhyne. Status: new consent (WRA 91, S88 and schedule 10 as amended by environmental act 1995). 183m north Address: Durston Plant Contractors Ltd, BS11 0YE. Trade dishcarges – process effluent – water company (wtw). Status: revoked (WRA 91, S88 and schedule 10 as amended by environment act 1995).

Item		Distance/Direction	Detail
		194m south	Address: Somerset Fire Training Centre. Sewage and trade combined – unspecified. Status: new consent (WRA 91, S88 and schedule 10 as amended by environmental act 1995).
	Hazardous Substance Consents and Enforcements	168m north-west	A.E.M; approved.
		168m north-east	Shell Gas Limited; approved.
Dangerous or Hazardous Sites		On site	Shell Gas Ltd; historical NIHHS Site.
		On site	A E Murphy Ltd; historical NIHHS Site.
Environment Agency Recorded Pollution Incidents	National Incidents Recording System, List 2	92m north-west	02/07/2001; dust producing category 3 (minor) air impact.
		111m west	08/09/2001; solvents producing category 3 (minor) air impact.
		111m west	25/10/2001; smoke producing category 3 (minor) air impact.
		146m north-west	22/05/2001; dust producing category 3 (minor) air impact.
		157m north-west	18/06/2002; other organic chemical or product producing category 3 (minor) air impact.
		171m north-east	02/02/2008; other oil or fuel producing category 2 (significant) water and land impact.
	219m north-east	10/05/2001; other pollutant producing no impact (2 records).	
	National Incidents Recording System, List 1	-	None recorded.
Recorded Part 2A Sites		-	None recorded.
Potentially Contaminative Industrial Sites		38-153m south-east, south-west and north-west	Electricity substation (3 records).
		49m north-west	Mobile Mini; container and storage.
		106m north-west	Stone Hardy; industrial repairs and servicing.
		109m north	Anstey Transport Services Ltd; distribution and haulage.
		110m north-west	ASSL; container and storage.
		110m north-west	BIP; workwear.
		137m north-west	Ross Gordon; vehicle repair, testing and servicing.
141-190m north-east and north-west	Tank and tanks; tanks (generic) (2 records).		

Item	Distance/Direction	Detail
	142m north-west	Dawson Rentals Ltd; vehicle hire and rental.
	164m north-west	Avonmouth Signs; signs.
	164m north-west	M&M Trailers Ltd; vehicle repair, testing and servicing.
	164m north-west	Brandon Hire; construction and tool hire.
	168m north-west	Bristol Industrial Protection Ltd; general purpose machinery.
	190-247mm north-east and north	Pipeline; pipelines (2 records).
	199m south-east	Expert logistics; distribution and haulage.
	200m north-west	Bibby Distribution Ltd; distribution and haulage.
	215m north-west	Turners Soham Ltd; distribution and haulage.
	215m north-west	Avonmouth Auto Electrical Ltd; vehicle repair, testing and servicing.
	220m north-east	Ryder; vehicle hire and rental.
	220m south-east	Warehouse; container and storage.
	221m north-west	Docks Industrial Estate; business parks and industrial estates.
241m north-east	Works; unspecified works or factories.	
Petrol and Fuel Sites	-	None recorded.
Underground Electricity Transmission Cables	-	None recorded.
High Pressure Gas Transmission Pipelines	-	None recorded.
Designated Environmentally Sensitive Sites	-	None recorded.

## 7. Ground Workings, Mining, Extractions and Cavaties

Information regarding historical and current ground workings, mining activities, extractions and cavities on or within 250m of the site are presented in **Table 7.1** below.

**Table 7.1 Ground Workings, Mining, Extractions and Cavaties**

Feature	Distance/Direction	Use/Detail
Historical Surface Ground Working Features	189-228m north-east and south-east	Pond and unspecified ground workings (3 records).
Historical Underground Ground Working Features	-	None recorded.
Current Ground Workings	-	None recorded.
Historical Mining	-	None recorded.
Coal Mining	-	None recorded.
Records Held by Johnson Poole and Bloomer	-	The study site is not located within 1000m of an area when Johnson Poole and Bloomer hold information.
Non-coal Mining	-	None recorded.
Non-coal Mining Cavaties	-	None recorded.
Natural Cavaties	-	None recorded.
Brine Extraction	-	None recorded.
Gypsum Extraction	-	None recorded.
Tin Mining	-	None recorded.
Clay Mining	-	None recorded.

## 8. Hazard Assessment and Preliminary Conceptual Site Model

### 8.1 Hazards Identified with the Proposed Development

The hazard identification is based on the assumption that the site is to be developed to a commercial end-use, comprising a new depot building and weighbridge office, along with the relocation of the existing weighbridge. It is assumed that drinking water will be supplied by underground pipes.

#### 8.1.1 Potential Sources of Contamination

Potentially contaminative land uses identified from the Phase 1 desk study are summarised in **Table 8.1**.

**Table 8.1** Potential Contaminative Sources

Item	Detail
Summary of Land Use and Potential Contaminative Sources	<u>Historical Site Use</u> Green Splot Farm, warehouse, railway sidings and historical NIHHS sites.
	<u>Current Site Use</u> Operational yard for Boomeco Limited and asbestos identified within localised Made Ground.
	<u>Historical Land Use / Features Within Vicinity</u> Waste transfer/ workshops, recycling and office, recycling facility, waste transfer station (extension), Environment Agency Licenced Waste Sites, railway sidings, Historic IPC Authorisations, Part A(1) and IPPC Authorised Activities, Licensed Discharge Consents, Environment Agency Recorded Pollution Incidents, pond and unspecified ground workings.
	<u>Current Land Use Within Vicinity</u> List 2 Dangerous Substances Inventory Sites; Part A(2) and Part B Activities and Enforcements; Licensed Discharge Consents; Hazardous Substance Consents and Enforcements; electricity substations; container and storage; industrial repairs and servicing; distribution and haulage; workwear; vehicle repair, testing and servicing; tanks (generic); vehicle hire and rental; signs; construction and tool hire; general purpose machinery; pipelines; business parks and industrial estates; unspecified works or factories; and active railways.

#### 8.1.2 Identification of Pathways

The principal potential pathways for contaminant migration are presented in **Table 8.2**.

**Table 8.2** Pathways

Source	Pathway
Soil / dust / fibres.	Dermal contact, ingestion and inhalation.
Liquid (including surface water / groundwater).	Dermal contact, ingestion, leaching, infiltration and migration.
Harmful ground gases / vapour.	Inhalation, accumulation within confined spaces with subsequent asphyxiation or explosion.

### 8.1.3 Potential Receptors of Contamination

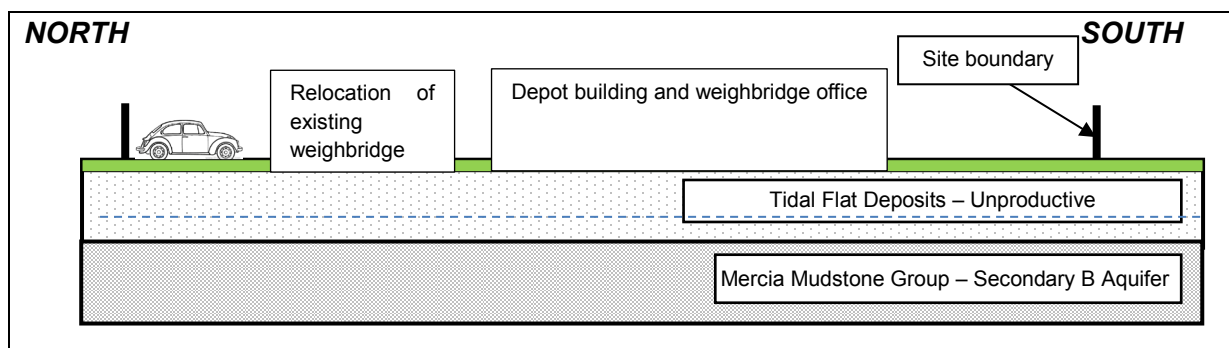
Receptors identified through the desk study are described in **Table 8.3**.

**Table 8.3** Receptors

Receptor	Detail
Site workers	Site workers are anticipated to include those involved with the construction works at the site, particularly ground workers.
End Users	Workers and visitors to the completed development.
Controlled Waters	The site is underlain by superficial deposits designated Unproductive, overlying solid geology designated a Secondary B Aquifer. The nearest water feature is located 24m east.
Buildings	Any buildings to be constructed.
Buried services	Potable water pipes are anticipated as part of proposals.

### 8.2 Conceptual Site Model

In accordance with BS 10175, a general schematic section has been developed for the site based on the previously presented data and contaminant linkage assessment. This is shown in **Figure 1**.



**Figure 1** Preliminary Conceptual Site Model based on the proposed development (not to scale).

The model for the site shows the anticipated geology, former site usage and vulnerable receptors. The information presented above represents the preliminary conceptual ground model that may need to be revised based on data obtained during any future investigation, either desk-based or intrusive. The conceptual site model and proposed end use described above should be considered very broadly representative of a residential land use, as a worst case scenario, as defined in SR3 “Updated Technical Model to the CLEA Model” (SC050021/SR3, 2011) for the purpose of this report.

### 8.3 Preliminary Contamination Hazard Assessment

The preliminary hazard assessment is based on current available guidance published by a number of sources and is summarised in **Appendix B**. A preliminary conceptual site model for this site has been established using the Site Investigation Report produced by Balfour Beatty Investments Ltd (report ref. 729873R1, dated August 2015) and a Site Investigation and Foundation Assessment report produced by TerraConsult Ltd (report ref. 3378R01-1, dated 23rd February 2018), providing a basis for the preliminary hazard assessment. The contaminant linkages have been individually assessed and a summary of the potential geo-

environmental risks associated with the site and in the context of the proposed residential development is provided in **Table 8.4**.

**Table 8.4** Summary of Preliminary Qualitative Risk Assessment

Issue	Risk Rating	Justification Comments
<b>Contamination Potential</b>		
Potential for significant on-site contamination	Low	<p>Loose chrysotile asbestos fibres were encountered within samples of Made Ground at TP3 and TP7, and cement bound chrysotile asbestos was encountered within Made Ground at BH1.</p> <p>Quantification of these positive screens indicated that the loose fibres and cement bound asbestos made up between 0.001% and 0.013% of the respective samples by mass.</p> <p>When comparing these localised areas of contamination in relation to the proposed new developments (<b>Appendix D</b>), all three locations are outside the construction area. Therefore, as development is envisaged to occur within these hotspot areas the risk is considered low.</p>
Potential for contaminants to migrate via soil/air/groundwater pathways to site	Low	The shallow soils are cohesive with low permeability and the underlying superficial deposits are designated as Unproductive.
Potential for contaminants to migrate via soil/air/groundwater pathways off-site	Low	The shallow soils are cohesive with low permeability and the underlying superficial deposits are designated as Unproductive.
<b>Geo-environmental Risk</b>		
Risk of harm to human health based on anticipated conditions	Low	Potential sources of contamination have not been identified within the proposed construction zones.
Risk to site workers	Low	Potential sources of contamination have not been identified within the proposed construction zones.
Risk of pollution to controlled water	Low	Underlying ground conditions are designated as Unproductive overlying a Secondary B Aquifer.
Hazards to flora and fauna	Low	Limited landscaping is expected on site.
Hazards to building structures and services – excluding ground gas	Low	Contamination has not been identified within the construction zones.
<b>Liabilities</b>		
Likelihood of designation as Contaminated Land under Part 2A of EPA 1990	Low	Potential for contamination has not been identified but if discovered would likely be addressed under the planning regime.
Liability issues for owner	Low	Potential liability issues have not been identified.
<b>Development Implications</b>		



Issue	Risk Rating	Justification Comments
Possible requirement for remediation of soil	Low	Contamination has not been identified within the proposed construction zones.
Possible requirement for remediation of groundwater	Low	Contamination has not been identified within the proposed construction zones. Underlying ground conditions are designated as Unproductive overlying a Secondary B Aquifer.
Possible requirement for gas protection	Low	<p>Encountered ground gas levels from the previous site investigation indicated maximum carbon dioxide concentrations of 6.7% and maximum methane concentrations of 16.7%, with a recorded maximum flow of 0.1l/hr. Using this data, a Characteristic Situation 1 is considered applicable to the site.</p> <p>As methane has been encountered above 1%, an increase to Characterisation Situation 2 should be considered. This is also in line with CL:AIRE publication RB17 which considers that Characterisation Situation 2 is appropriate for organic alluvial soils with or without peat.</p> <p>However, due to the lack of ground gas flow and if building designs were to be elevated ground level, a low risk is considered appropriate.</p>
Special requirements for water supply pipes	Low	Specialist pipework is unlikely to be required.
Potential limitations on foundation design	Low	Concrete selection may be affected by potential for chemical attack. Results from previous site investigation indicate piling may be appropriate depending on proposed structure due to the compressibility of the underlying strata.
Risk of encountering materials classed as hazardous waste	Low	Loose chrysotile asbestos fibres were encountered within samples of Made Ground at TP3 and TP7, and cement bound chrysotile asbestos was encountered within Made Ground at BH1. A Waste Acceptance Criteria assessment has been undertaken and the material has been classed as non-hazardous.

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## **9. Conclusions**

### **9.1 Environmental Risk Assessment**

A preliminary risk assessment has been made based on the contaminant - pathway - receptor model, as defined in Part IIA of the Environmental Protection Act 1990 and in accordance with *BS10175: 2011 +A2:2017 "Investigation of Potentially Contaminated Sites - Code of Practice"*. A preliminary conceptual site model has been produced to set out the characteristic ground conditions and elements of the surrounding environment and has assisted with identifying potential sources of contamination, potential receptors of the contamination and potential pathways between them.

From the site history, walkover survey and information obtained during the desk study, potential sources of contamination have not been identified within the proposed construction areas.

### **9.2 Recommendations**

We would recommend that this report is forwarded to the relevant statutory consultees including the Environment Agency and Local Authority to seek their comments and subsequent approval.

### **9.3 Health & 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 the information used as an input to 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.

In accordance with the Construction Design and Management (CDM) Regulations 2015, TerraConsult 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, TerraConsult has discharged and completed all contractual and legal requirements for these positions and has no further involvement with the project. It is the developer's duty, as required by the CDM Regulations, to appoint others to fill these roles for the further development of the site.

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## **Appendices**

Appendix A	Service Constraints, Report Limitations and Planning Requirements
Appendix B	Environmental Risk Assessment Methodology and Terminology
Appendix C	Relevant Site Information from Historical Reports
Appendix D	Site Mapping in Relation to Previous Investigation

## **Appendix A**

### **Service Constraints, Report Limitations and Planning Requirements**

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## **Service Constraints, Report Limitations and Planning Requirements**

This report (the "Services") was compiled and carried out by TerraConsult (South) Limited (TCSL) for the client named on the front of the report (the "client") in accordance with the terms of a contract between TCSL and the "client". The Services were performed by TCSL with the 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 TCSL taking into account the limits of the scope of works required by the client, the time scale involved and the resources, including financial and manpower resources, agreed between TCSL and the client.

Other than that expressly contained in the above paragraph, TCSL 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 TCSL. If a third party relies on this report, it does so wholly at its own and sole risk and TCSL disclaims any liability to such parties.

It is TCSL'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 TCSL'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 TerraConsult (South) 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 TCSL. In the absence of such written advice of TCSL, reliance on the report in the future shall be at the client's own and sole risk. Should TCSL be requested to review the report in the future, TCSL shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between TCSL 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 TCSL. TCSL has not performed any observations, investigations, studies or testing not specifically set out or mentioned within this report. TCSL 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, TCSL did not seek to evaluate the presence on or off the site of asbestos, electromagnetic fields, lead paint, radon gas or other radioactive or hazardous materials.

The Services are based upon TCSL's observations of existing physical conditions at the site gained from existing documents, together with TCSL'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 TerraConsult (South) Limited has 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, TCSL 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. TCSL 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 TCSL and

including the doing of any independent investigation of the information provided to TCSL save as otherwise provided in the terms of the contract between the client and TCSL.

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 TCSL] 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 'geoenvironmental' 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 geoenvironmental sections are written in broad agreement with BS 10175:2011+A1 2013. For the geotechnical aspects of the report, the general requirements of Eurocode 7 (BS EN 1997-2:2007) providing a desk study assessment. This report shall not be considered as being a Ground Investigation Report (GIR).

### **Planning Requirements**

The National Planning Policy Framework (NPPF, 2012) has twelve core land-use planning principles, two of which directly relate to the potential for pollution and contaminated land:

- Requirement to *"contribute to conserving and enhancing the natural environment and reducing pollution"* and setting out of a preference for developments to be on land of *"lesser environmental value"*; and
- *"encourage the effective use of land by re-using land that has been previously developed (brownfield land), providing that it is not of high environmental value."*

In accordance with the core principles of NPPF, Paragraph 109 clarifies that enhancing the natural environment includes:

- *"preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability; and*
- *remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate."*

Paragraph 121 of NPPF states that planning policies and decisions for developments should also ensure that:

- *"the site is suitable for its new use taking account of ground conditions and land instability, including from natural hazards or former activities such as mining, pollution arising from previous uses and any proposals for mitigation including land remediation or impacts on the natural environment arising from that remediation;*
- *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*
- *adequate site investigation information, prepared by a competent person, is presented."*



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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 experienced 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 recently 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 and Contaminated Land Statutory Guidance was published by Defra in (Defra, 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 March 2012 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 levels 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 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 CLR 11 Model Procedures for the Management of Land Contamination (Environment Agency, 2004), and BS10175:2011+A2 20173. 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+A1

2013. The result of the Ground Investigation reduces uncertainty in the geotechnical and geoenvironmental 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 Phase I Investigation (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 pollution linkage is not of significance then no further assessment or action is required due to this linkage. For each significant and possible 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**

The criteria used for risk assessment are broadly based on those presented in DETR’s “A Guide to Risk Assessment and Risk Management for Environmental Protection” (2000). The Severity of the risk is classified according to the criteria in Table B.1 below:

<b>Table B.1 Severity/Consequence of Risk</b>	
<b>Severe</b>	Acute risks to human health. Catastrophic damage to buildings/property (e.g. by explosion).

	Direct pollution of sensitive water receptors or serious pollution of other controlled water (watercourses or groundwater) bodies.
<b>Medium</b>	Harm to human health from long-term exposure. Slight pollution of sensitive controlled waters (surface waters or aquifers) or pollution of other water bodies. Significant effects on sensitive ecosystems or species.
<b>Mild</b>	No significant harm to human health in either short or long term. No pollution of sensitive controlled waters, no more than slight pollution of non-sensitive waters. Significant damage to buildings or structures. Requirement for protective equipment during site works to mitigate health effects.
<b>Negligible</b>	Damage to non-sensitive ecosystems or species. Minor damage to buildings or structures. No harm or pollution of water.

The probability of the risk occurring is classified according to criteria given in Table B.2 below:

<b>Table B.2: Probability of Risk Occurring</b>	
<b>High likelihood</b>	Contaminant linkage may be present, and risk is almost certain to occur in the long term, or there is evidence of harm to the receptor.
<b>Medium/Reasonably Foreseeable</b>	Contaminant linkage may be present, and it is probable that the risk will occur over the long term.
<b>Low/Unlikely</b>	Contaminant linkage may be present and there is a possibility of the risk occurring, although there is no certainty that it will do so.
<b>Negligible/ Not credible</b>	Contaminant linkage may be present but the circumstances under which harm would occur are improbable.

An overall evaluation of the level of risk is gained from a comparison of the severity and probability, as shown in Table B.3 below:

<b>Table B.3: Comparison of Severity and Probability</b>					
		<b>Severity</b>			
		<b>Severe</b>	<b>Medium</b>	<b>Mild</b>	<b>Negligible</b>
<b>Probability</b>	<b>High likelihood</b>	Very High Risk	High Risk	Medium/Low Risk	Low Risk
	<b>Medium/Reasonably Foreseeable</b>	High Risk	Medium Risk	Low Risk	Near Zero
	<b>Low/Unlikely</b>	High/Medium Risk	Medium/Low Risk	Low Risk	Near Zero
	<b>Negligible/ Not credible</b>	Medium/Low Risk	Low Risk	Low Risk	Near Zero

The various risk rankings provide guidance for recommended actions, whether this is:

- AR - Action Required, Remediation or mitigation or site investigation works required
- SIR - Site Investigation Required, further assessment is required.
- NAR - No Action Required.

A description of the evaluated risk is as follows:

<b>Table B.4 – Description of the Classified Risks and Likely Action Required</b>	
<b>Evaluated Risk</b>	<b>Recommended Actions</b>
<b>Very High Risk</b>	AR: 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.
<b>High Risk</b>	AR: 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 long term.
<b>Moderate Risk</b>	SIR: It is possible that harm could arise to a designated receptor from an identified hazard. However, it is 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.
<b>Low Risk</b>	NAR: It is possible that harm could arise to a designated receptor from an identified hazard, but there is a low likelihood of this hazard occurring and if realised, harm would at worst normally be mild.
<b>Near Zero</b>	NAR: There is a negligible possibility that harm could arise to a receptor. In the event of such harm being realised, it is not likely to be severe.

### **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 aquifer 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.

## 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 publication CLR11 (2004) "Model Procedures for the Management of Land Contamination." 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
CIRIA	Construction Industry Research Association		(atmospheric pressure)
CLEA	Contaminated Land Exposure Assessment	l/hr	Litres per hour
CSM	Conceptual Site Model	ha	Hectare (10,000 m <sup>2</sup> )
DNAPL	Dense Non-Aqueous Phase Liquid (chlorinated solvents, PCB)	µg/l	Micrograms per Litre (parts per billion)
DWS	Drinking Water Standard	ppb	Parts Per Billion
EA	Environment Agency	mg/kg	Milligrams per kilogram (parts per million)
EQS	Environmental Quality Standard		
GAC	General Assessment Criteria	ppm	Parts Per Million
GL	Ground Level	mg/m <sup>3</sup>	Milligram per metre cubed
GSV	Gas Screening Value	Mg/m <sup>3</sup>	Megagram per metre cubed
HCV	Health Criteria Value	µg/m <sup>3</sup>	Microgram per metre cubed
LNAPL	Light Non-Aqueous Phase Liquid (petrol, diesel)	m bgl	Metres Below Ground Level
ND	Not Detected	m bcl	Metre Below Cover Level
LMRL	Lower Method Reporting Limit	mOD	Metres Above Ordnance Datum (sea level)
NR	Not Recorded		
OD	Ordnance Datum	kN/m <sup>2</sup>	Kilo Newtons per metre squared
PAH	Poly Aromatic Hydrocarbon	kPa	Kilo Pascal – same as kN/m <sup>2</sup>
PCB	Poly-Chlorinated Biphenyl	µm	Micro metre
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**

### **Relevant Site Information from Historical Reports**

# Groundsure Envirosight

Address: Estuary Park, Chittening Industrial Estate,  
Date: 4 Jun 2015  
Reference: EMS-307406\_414939  
Client: EmapSite

NW

N

NE

W

E



SW

S

SE

Aerial Photograph Capture date: 01-Jun-2009  
Grid Reference: 353148,181243  
Site Size: 1.75ha

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# Overview of Findings

For further details on each dataset, please refer to each individual section in the main report as listed. Where the database has been searched a numerical result will be recorded. Where the database has not been searched '-' will be recorded.

Section 1: Environmental Permits, Incidents and Registers	On-site	0-50m	51-250	251-500
1.1 Industrial Sites Holding Environmental Permits and/or Authorisations				
1.1.1 Records of historic IPC Authorisations	0	0	12	0
1.1.2 Records of Part A(1) and IPPC Authorised Activities	0	0	2	0
1.1.3 Records of Water Industry Referrals (potentially harmful discharges to the public sewer)	0	0	0	0
1.1.4 Records of Red List Discharge Consents (potentially harmful discharges to controlled waters)	0	0	0	1
1.1.5 Records of List 1 Dangerous Substances Inventory sites	0	0	0	0
1.1.6 Records of List 2 Dangerous Substances Inventory sites	0	0	1	1
1.1.7 Records of Part A(2) and Part B Activities and Enforcements	0	0	1	0
1.1.8 Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	0	0
1.1.9 Records of Licensed Discharge Consents	0	0	3	17
1.1.10 Records of Planning Hazardous Substance Consents and Enforcements	0	0	2	0
1.2 Records of COMAH and NIHHS sites	2	0	0	2
1.3 Environment Agency Recorded Pollution Incidents				
1.3.1 National Incidents Recording System, List 2	0	0	8	4
1.3.2 National Incidents Recording System, List 1	0	0	0	0
1.4 Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0

Section 2: Landfill and Other Waste Sites	On-site	0-50m	51-250	251-500	501-1000	1000-5000
2.1 Landfill Sites						
2.1.1 Environment Agency Registered Landfill Sites	0	0	0	0	1	Not searched
2.1.2 Environment Agency Historic Landfill Sites	0	0	0	0	3	7
2.1.3 BGS/DoE Landfill Site Survey	0	0	0	0	0	3

Section 2: Landfill and Other Waste Sites	On-site	0-50m	51-250	251-500	501-1000	1000-5000
2.1.4 Landfills from Local Authority and Historical Mapping Records	0	0	0	0	0	0
2.2 Landfill and Other Waste Sites Findings						
2.2.1 Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites	0	2	2	2	Not searched	Not searched
2.2.2 Environment Agency Licensed Waste Sites	0	2	4	0	12	29

Section 3: Current Land Use	On-site	0-50m	51-250	251-500
3.1 Current Industrial Sites Data	0	2	24	Not searched
3.2 Records of Petrol and Fuel Sites	0	0	0	0
3.3 National Grid Underground Electricity Cables	0	0	0	0
3.4 National Grid Gas Transmission Pipelines	0	0	0	0

Section 4: Geology	
4.1 Are there any records of Artificial Ground and Made Ground present beneath the study site?	No
4.2 Are there any records of Superficial Ground and Drift Geology present beneath the study site?	Yes
4.3 For records of Bedrock and Solid Geology beneath the study site see the detailed findings section.	

Section 5: Hydrogeology and Hydrology	0-500m					
5.1 Are there any records of Strata Classification in the Superficial Geology within 500m of the study site?	Yes					
5.2 Are there any records of Strata Classification in the Bedrock Geology within 500m of the study site?	Yes					
	On-site	0-50m	51-250	251-500	501-1000	1000-2000
5.3 Groundwater Abstraction Licences (within 2000m of the study site)	0	0	0	0	2	2
5.4 Surface Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
5.5 Potable Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
5.6 Source Protection Zones (within 500m of the study site)	0	0	0	0	Not searched	Not searched
5.7 Source Protection Zones within Confined Aquifer	0	0	0	0	Not searched	Not searched
5.8 Groundwater Vulnerability and Soil Leaching Potential (within 500m of the study site)	0	0	0	0	Not searched	Not searched
	On-site	0-50m	51-250	251-500	501-1000	1000-1500

## Section 5: Hydrogeology and Hydrology

0-500m

5.9 Is there any Environment Agency information on river quality within 1500m of the study site?	No	No	No	No	No	No
5.10 Detailed River Network entries within 500m of the site	0	0	8	21	Not searched	Not searched
5.11 Surface water features within 250m of the study site	No	Yes	Yes	Not searched	Not searched	Not searched

## Section 6: Flooding

6.1 What is the highest risk of flooding within 25m of the centre of the study site?	Low
6.2 Are there any Flood Defences within 250m of the study site?	No
6.3 Are there any areas benefiting from Flood Defences within 250m of the study site?	Yes
6.4 Are there any areas used for Flood Storage within 250m of the study site?	No
6.5 What is the maximum BGS Groundwater Flooding susceptibility within 50m of the study site?	Not Prone
6.6 What is the BGS confidence rating for the Groundwater Flooding susceptibility areas?	Not Applicable

## Section 7: Designated Environmentally Sensitive Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
7.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	0	1	0	1
7.2 Records of National Nature Reserves (NNR)	0	0	0	0	0	0
7.3 Records of Special Areas of Conservation (SAC)	0	0	0	2	0	2
7.4 Records of Special Protection Areas (SPA)	0	0	0	2	0	2
7.5 Records of Ramsar sites	0	0	0	2	0	2
7.6 Records of Ancient Woodlands	0	0	0	0	0	0
7.7 Records of Local Nature Reserves (LNR)	0	0	0	0	0	0
7.8 Records of World Heritage Sites	0	0	0	0	0	0
7.9 Records of Environmentally Sensitive Areas	0	0	0	0	0	0
7.10 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	0	0



Section 7: Designated Environmentally Sensitive Sites	On-site	0-50m	51-250	251-500	501-1000	1000-2000
7.11 Records of National Parks	0	0	0	0	0	0
7.12 Records of Nitrate Sensitive Areas	0	0	0	0	0	0
7.13 Records of Nitrate Vulnerable Zones	0	0	0	0	0	0
7.14 Records of Green Belt Data	0	0	0	0	0	2

## Section 8: Natural Hazards

8.1 What is the maximum risk of natural ground subsidence?	Moderate
8.1.1 What is the maximum Shrink-Swell hazard rating identified on the study site?	Low
8.1.2 What is the maximum Landslides hazard rating identified on the study site?	Very Low
8.1.3 What is the maximum Soluble Rocks hazard rating identified on the study site?	Negligible
8.1.4 What is the maximum Compressible Ground hazard rating identified on the study site?	Moderate
8.1.5 What is the maximum Collapsible Rocks hazard rating identified on the study site?	Negligible
8.1.6 What is the maximum Running Sand hazard rating identified on the study site?	Moderate

## Section 9: Mining

9.1 Are there any coal mining areas within 75m of the study site?	No
9.2 What is the potential for undermining as a result of underground mineral extraction, excluding coal and minerals extracted as a consequence of coal mining?	Unclassified
9.3 Are there any brine affected areas within 75m of the study site?	No

# Using this report

The following report is designed by Environmental Consultants for Environmental Professionals bringing together the most up-to-date market leading environmental data. This report is provided under and subject to the Terms & Conditions agreed between Groundsure and the Client. The document contains the following sections:

## 1. Environmental Permits, Incidents and Registers

Provides information on Regulated Industrial Activities and Pollution Incidents as recorded by Regulatory Authorities, and sites determined as Contaminated Land. This search is conducted using radii up to 500m.

## 2. Landfills and Other Waste Sites

Provides information on landfills and other waste sites that may pose a risk to the study site. This search is conducted using radii up to 1500m.

## 3. Current Land Uses

Provides information on current land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. These searches are conducted using radii of up to 500m. This includes information on potentially contaminative industrial sites, petrol stations and fuel sites as well as high pressure gas pipelines and underground electricity transmission lines.

## 4. Geology

Provides information on artificial and superficial deposits and bedrock beneath the study site.

## 5. Hydrogeology and Hydrology

Provides information on productive strata within the bedrock and superficial geological layers, abstraction licenses, Source Protection Zones (SPZs) and river quality. These searches are conducted using radii of up to 2000m.

## 6. Flooding

Provides information on surface water flooding, flood defences, flood storage areas and groundwater flood areas. This search is conducted using radii of up to 250m.

## 7. Designated Environmentally Sensitive Sites

Provides information on the Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, Local Nature Reserves (LNR), Areas of Outstanding Natural Beauty (AONB), National Parks (NP), Environmentally Sensitive Areas, Nitrate Sensitive Areas, Nitrate Vulnerable Zones and World Heritage Sites and Scheduled Ancient Woodland. These searches are conducted using radii of up to 2000m.

## 8. Natural Hazards

Provides information on a range of natural hazards that may pose a risk to the study site. These factors include natural ground subsidence.

## 9. Mining

Provides information on areas of coal, “non-coal” mining and brine affected areas.

## 10. Contacts

This section of the report provides contact points for statutory bodies and data providers that may be able to provide further information on issues raised within this report. Alternatively, Groundsure provide a free Technical Helpline (08444 159000) for further information and guidance.

### Note: Maps

Only certain features are placed on the maps within the report. All features represented on maps found within this search are given an identification number. This number identifies the feature on the mapping and correlates it to the additional information provided below. This identification number precedes all other information and takes the following format -Id: 1, Id: 2, etc. Where numerous features on the same map are in such close proximity that the numbers would obscure each other a letter identifier is used instead to represent the features. (e.g. Three features which overlap may be given the identifier “A” on the map and would be identified separately as features 1A, 3A, 10A on the data tables provided).

Where a feature is reported in the data tables to a distance greater than the map area, it is noted in the data table as “Not Shown”.



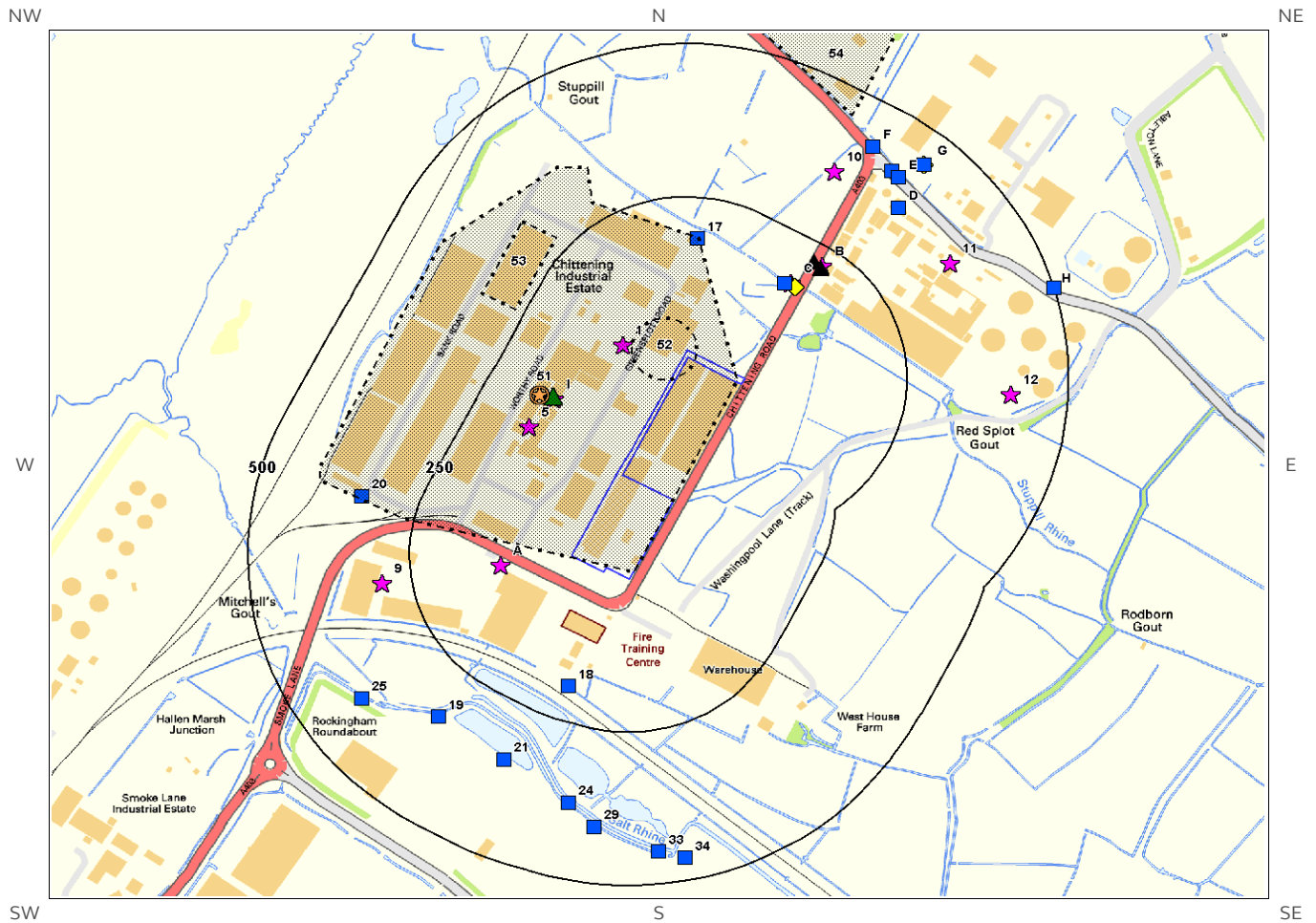
**Groundsure**

LOCATION INTELLIGENCE

**emapsite™**

All distances given in this report are in Metres (m). Directions are given as compass headings such as N: North, E: East, NE: North East from the nearest point of the study site boundary.

# 1. Environmental Permits, Incidents and Registers Map



Environmental Permits, Incidents and Registers Legend

Mapping sourced from **Ordnance Survey**

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- |  |                    |  |                               |  |  |
|--|--------------------|--|-------------------------------|--|--|
|  | Site Outline       |  | Recorded Pollution Incident   |  | Radioactive Consents (Lower Risk)                            |
|  | Search Buffers (m) |  | Dangerous Substances (List 1) |  | Part A(1) Authorised Processes & Historic IPC Authorisations |
|  | 250                |  | Dangerous Substances (List 2) |  | Part A(2) and Part B Authorisations                          |
|  | 500                |  | Water Industry Referrals      |  | Sites Determined as Contaminated Land                        |
|  |                    |  | Licensed Discharge Consents   |  | COMAH / NIHHS Sites  |
|  |                    |  | Red List Discharge Consents   |  | Hazardous Substance Consents & Enforcements                  |

# 1. Environmental Permits, Incidents and Registers

## 1.1 Industrial Sites Holding Licences and/or Authorisations

Searches of information provided by the Environment Agency and Local Authorities reveal the following information:

### 1.1.1 Records of historic IPC Authorisations within 500m of the study site:

12

The following IPC Authorisations are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance	Direction	NGR	Details	
59B	213.0	NE	353440 181630	Operator: Sevalco Ltd Address: Severn Road, Chittening, Bristol, Avon, BS11 0YL Process: Carbonisation And Associated Processes	Permit Number: BD6824 Original Permit Number: IPCMINVAR Date Approved: 24-11-1998 Effective Date: 30-11-1998 Status: Superseded By Variation
60B	213.0	NE	353440 181630	Operator: Sevalco Ltd Address: Severn Road, Chittening, Bristol, Avon, BS11 0YL Process: Carbonisation And Associated Processes	Permit Number: AV3222 Original Permit Number: IPCMINVAR Date Approved: 29-4-1996 Effective Date: 1-6-1996 Status: Superseded By Variation
61B	213.0	NE	353440 181630	Operator: Sevalco Ltd Address: Severn Road, Chittening, Bristol, Avon, BS11 0YL Process: Carbonisation And Associated Processes	Permit Number: BG9854 Original Permit Number: IPCMAJVAR Date Approved: 18-5-2000 Effective Date: 1-6-2000 Status: Superseded By Variation
62B	213.0	NE	353440 181630	Operator: Sevalco Ltd Address: Severn Road, Chittening, Bristol, Avon, BS11 0YL Process: Carbonisation And Associated Processes	Permit Number: AW5034 Original Permit Number: IPCMAJVAR Date Approved: 4-9-1997 Effective Date: 1-10-1997 Status: Superseded By Variation
63B	213.0	NE	353440 181630	Operator: Sevalco Ltd Address: Severn Road, Chittening, Bristol, Avon, BS11 0YL Process: Carbonisation And Associated Processes	Permit Number: AF7916 Original Permit Number: IPCAIRAPP Date Approved: 19-3-1993 Effective Date: 19-3-1993 Status: Superseded By Variation
64B	213.0	NE	353440 181630	Operator: Sevalco Ltd Address: Severn Road, Chittening, Bristol, Avon, BS11 0YL Process: Carbonisation And Associated Processes	Permit Number: BJ0064 Original Permit Number: IPCMINVAR Date Approved: 18-7-2000 Effective Date: 1-8-2000 Status: Superseded By Variation
65B	213.0	NE	353440 181630	Operator: Sevalco Ltd Address: Severn Road, Chittening, Bristol, Avon, BS11 0YL Process: Carbonisation And Associated Processes	Permit Number: BU6662 Original Permit Number: IPCMINVAR Date Approved: 14-4-2003 Effective Date: 21-4-2003 Status: Superseded By Variation
66B	213.0	NE	353440 181630	Operator: Sevalco Ltd Address: Severn Road, Chittening, Bristol, Avon, BS11 0YL Process: Carbonisation And Associated Processes	Permit Number: BV5246 Original Permit Number: IPCMINVAR Date Approved: 4-9-2003 Effective Date: 8-9-2003 Status: Superseded By Variation

ID	Distance	Direction	NGR	Details	
67B	213.0	NE	353440 181630	Operator: Sevalco Ltd Address: Severn Road, Chittening, Bristol, Avon, BS11 0YL Process: Carbonisation And Associated Processes	Permit Number: BW9158 Original Permit Number: IPCMINVAR Date Approved: 16-11-2003 Effective Date: 17-11-2003 Status: Superseded By Variation
68B	213.0	NE	353440 181630	Operator: Sevalco Ltd Address: Severn Road, Chittening, Bristol, Avon, BS11 0YL Process: Carbonisation And Associated Processes	Permit Number: BX8980 Original Permit Number: IPCMINVAR Date Approved: 12-5-2004 Effective Date: 13-5-2004 Status: Superseded By Variation
69B	213.0	NE	353440 181630	Operator: Sevalco Ltd Address: Severn Road, Chittening, Bristol, Avon, BS11 0YL Process: Carbonisation And Associated Processes	Permit Number: BZ2125 Original Permit Number: IPCMINVAR Date Approved: 27-6-2005 Effective Date: 1-7-2005 Status: Superseded By Variation
70B	213.0	NE	353440 181630	Operator: Sevalco Ltd Address: Severn Road, Chittening, Bristol, Avon, BS11 0YL Process: Carbonisation And Associated Processes	Permit Number: CA4714 Original Permit Number: IPCMINVAR Date Approved: 19-5-2006 Effective Date: 24-5-2006 Status: Revoked - Now Ippc

### 1.1.2 Records of Part A(1) and IPPC Authorised Activities within 500m of the study site:

2

The following Part A(1) and IPPC Authorised Activities are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance	Direction	NGR	Details	
57B	217.0	NE	353430 181640	Operator: Sevalco Limited Installation Name: Sevalco Limited Process: COMBUSTION; ANY FUEL =>20MW BUT <50MW (UNLESS 1.1 A(1) B)	Permit Number: MP3035HZ Original Permit Number: YP3538LY EPR Reference: - Issue Date: - Effective Date: 30/11/2011 Last date noted as effective: 2015-01- 01 Status: Surrender Effective
58B	217.0	NE	353430 181640	Operator: Sevalco Limited Installation Name: Sevalco Limited Process: COMBUSTION; ANY FUEL =>20MW BUT <50MW (UNLESS 1.1 A(1) B)	Permit Number: YP3538LY Original Permit Number: YP3538LY EPR Reference: - Issue Date: 1/8/2007 Effective Date: 1/8/2007 Last date noted as effective: 2015-01- 01 Status: Superceded

### 1.1.3 Records of Water Industry Referrals (potentially harmful discharges to the public sewer) within 500m of the study site:

0

Database searched and no data found.

1.1.4 Records of Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of the study site:

1

The following Red List Discharge Consent records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance	Direction	NGR	Details
15H	499.0	E	353800 181600	Address: VIRIDOR WASTE MANAGEMENT LIMITED, SEVERN ROAD RESOURCE RECOVER CENTRE, SEVERN RAOD, CHITTENING, AVONMOUTH, BRISTOL, BS11 0YU Permit Number: EPRZB3934AG Permit Version: 1 Status: NEW ISSUED UNDER EPR 2010 Discharge Type: Industrial waste site Effluent Type: TRADE DISCHARGES - PROCESS EFFLUENT - NOT WATER COMPANY Catchment: Approval Date: 02-Jul-2013

1.1.5 Records of List 1 Dangerous Substances Inventory Sites within 500m of the study site:

0

Database searched and no data found.

1.1.6 Records of List 2 Dangerous Substance Inventory Sites within 500m of the study site:

2

The following List 2 Dangerous Substance Inventory Site records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance	Direction	NGR	Details
13C	167.0	NE	353400 181600	Name: Sevalco Ltd Status: Active Receiving Water: Severn Estuary (upper) Authorised Substances: Chromium, Copper, Lead, pH, Zinc
14G	445.0	NE	353600 181800	Name: Tarmac Bricks And Tiles Status: Not Active Receiving Water: Severn Estuary (upper) Authorised Substances: pH

1.1.7 Records of Part A(2) and Part B Activities and Enforcements within 500m of the study site:

1

The following Part A(2) and Part B Activities are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance	Direction	NGR	Details
50I	147.0	NW	353026 181420	Address: Ross Gordon Engineering Ltd, Worthy Road, Chittening Industrial Estate, BS11 9HL Process: 6.4b Vehicle refinishing Status: Current Permit Permit Type: Part B Enforcement: Data requested, not received. Date of Enforcement: Data requested, not received. Comment: Data requested, not received.

1.1.8 Records of Category 3 or 4 Radioactive Substances Authorisations:

0

Database searched and no data found.

1.1.9 Records of Licensed Discharge Consents within 500m of the study site:

20

The following Licensed Discharge Consents records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance	Direction	NGR	Details
16 C	166.0	NE	353384 181607	Address: RECYCLING DEPOT, CHITTENING IND EST, SEVERN ROAD, CHITTENING, AVONMOUTH, BRISTOL, BS11 0YL Effluent Type: TRADE DISCHARGES - SITE DRAINAGE Permit Number: 103664 Permit Version: 1 Receiving Water: STUPHILL RHYNE Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 19/04/2007 Effective Date: 01-Jun-2007 Revocation Date: -
17	183.0	N	353250 181680	Address: DURSTON PLANT CONTRACTORS LTD, GREENSPLOTT ROAD, CHITTENING INDUSTRIAL ESTATE, AVONMOUTH, BRISTOL, BS11 0YE Effluent Type: TRADE DISCHARGES - PROCESS EFFLUENT - WATER COMPANY (WTW) Permit Number: 013177 Permit Version: 1 Receiving Water: UN-NAMED WATERCOURSE Status: REVOKED (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 09/05/1996 Effective Date: 01-May-1996 Revocation Date: 01/03/2007
18	194.0	S	353050 180950	Address: SOMERSET, AVON & GLOUCESTER JOINT, FIRE TRAINING CENTRE, SMOKE LANE, AVONMOUTH, BRISTOL Effluent Type: SEWAGE & TRADE COMBINED - UNSPECIFIED Permit Number: 101872 Permit Version: 1 Receiving Water: AVONMOUTH RHINE SYSTEM Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 11/07/2002 Effective Date: 10-Jun-2002 Revocation Date: -



ID	Distance	Direction	NGR	Details	
19	333.0	SW	352850 180900	Address: SEVEN GATES, LAWRENCE WESTON ROAD, AVONMOUTH, BRISTOL, -, BS11 0YW Effluent Type: MISCELLANEOUS DISCHARGES - SURFACE WATER Permit Number: 100491 Permit Version: 1	Receiving Water: SALT RHYNE Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 17/02/1998 Effective Date: 17-Feb-1998 Revocation Date: -
20	339.0	W	352730 181260	Address: P B A INDUSTRIAL ESTATE, SMOKE LANE, BRISTOL Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 011196 Permit Version: 1	Receiving Water: RIVER BRISTOL AVON Status: SURRENDERED UNDER EPR 2010 Issue date: - Effective Date: 12-Sep-1989 Revocation Date: 31/07/2014
21	343.0	SW	352950 180830	Address: SEVEN GATES, LAWRENCE WESTON ROAD, AVONMOUTH, BRISTOL, -, BS11 0YW Effluent Type: MISCELLANEOUS DISCHARGES - SURFACE WATER Permit Number: 100492 Permit Version: 1	Receiving Water: SALT RHYNE Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 17/02/1998 Effective Date: 17-Feb-1998 Revocation Date: -
22 D	365.0	NE	353560 181730	Address: SEVERN VALLEY BRICKWORKS, CHITTENING ROAD, AVONMOUTH, BRISTOL, ., BS11 0YB Effluent Type: TRADE DISCHARGES - SITE DRAINAGE (CONTAM SURFACE WATER, NOT WASTE SIT Permit Number: 102159 Permit Version: 1	Receiving Water: STUP PILL RHINE Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 26/02/2004 Effective Date: 22-Apr-2003 Revocation Date: 29/12/2003
23 D	365.0	NE	353560 181730	Address: SEVERN VALLEY BRICKWORKS, CHITTENING ROAD, AVONMOUTH, BRISTOL, ., BS11 0YB Effluent Type: TRADE DISCHARGES - SITE DRAINAGE (CONTAM SURFACE WATER, NOT WASTE SIT Permit Number: 102159 Permit Version: 2	Receiving Water: STUP PILL RHINE Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 30/12/2003 Effective Date: 30-Dec-2003 Revocation Date: -
24	377.0	S	353050 180760	Address: SEVEN GATES, LAWRENCE WESTON ROAD, AVONMOUTH, BRISTOL, -, BS11 0YW Effluent Type: MISCELLANEOUS DISCHARGES - SURFACE WATER Permit Number: 100493 Permit Version: 1	Receiving Water: SALT RHYNE Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 17/02/1998 Effective Date: 17-Feb-1998 Revocation Date: -
25	400.0	SW	352730 180930	Address: SEVEN GATES, LAWRENCE WESTON ROAD, AVONMOUTH, BRISTOL, -, BS11 0YW Effluent Type: MISCELLANEOUS DISCHARGES - SURFACE WATER Permit Number: 100490 Permit Version: 1	Receiving Water: UNNAMED WATERCOURSE Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 17/02/1998 Effective Date: 17-Feb-1998 Revocation Date: -
26 E	405.0	NE	353560 181780	Address: SEVERN VALLEY BRICKWORKS, CHITTENING ROAD, AVONMOUTH, BRISTOL, ., BS11 0YB Effluent Type: TRADE DISCHARGES - UNSPECIFIED Permit Number: 102159 Permit Version: 2	Receiving Water: STUP PILL RHINE Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 30/12/2003 Effective Date: 30-Dec-2003 Revocation Date: -

ID	Distance	Direction	NGR	Details	
27 E	407.0	NE	353550 181790	Address: SEVERN VALLEY BRICKWORKS, CHITTENING ROAD, AVONMOUTH, BRISTOL, ., BS11 0YB Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: 102159 Permit Version: 2	Receiving Water: STUP PILL RHINE Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 30/12/2003 Effective Date: 30-Dec-2003 Revocation Date: -
28 E	407.0	NE	353550 181790	Address: SEVERN VALLEY BRICKWORKS, CHITTENING ROAD, AVONMOUTH, BRISTOL, ., BS11 0YB Effluent Type: SEWAGE DISCHARGES - FINAL/TREATED EFFLUENT - NOT WATER COMPANY Permit Number: 102159 Permit Version: 1	Receiving Water: STUP PILL RHINE Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 26/02/2004 Effective Date: 22-Apr-2003 Revocation Date: 29/12/2003
29	409.0	S	353090 180720	Address: SEVEN GATES, LAWRENCE WESTON ROAD, AVONMOUTH, BRISTOL, -, BS11 0YW Effluent Type: MISCELLANEOUS DISCHARGES - SURFACE WATER Permit Number: 100494 Permit Version: 1	Receiving Water: SALT RHYNE Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 17/02/1998 Effective Date: 17-Feb-1998 Revocation Date: -
30 F	427.0	NE	353520 181830	Address: SEVERN VALLEY BRICKWORKS, CHITTENING ROAD, AVONMOUTH, BRISTOL, ., BS11 0YB Effluent Type: TRADE DISCHARGES - SITE DRAINAGE (CONTAM SURFACE WATER, NOT WASTE SIT Permit Number: 102159 Permit Version: 2	Receiving Water: STUP PILL RHINE Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 30/12/2003 Effective Date: 30-Dec-2003 Revocation Date: -
31 F	427.0	NE	353520 181830	Address: SEVERN VALLEY BRICKWORKS, CHITTENING ROAD, AVONMOUTH, BRISTOL, ., BS11 0YB Effluent Type: TRADE DISCHARGES - SITE DRAINAGE (CONTAM SURFACE WATER, NOT WASTE SIT Permit Number: 102159 Permit Version: 1	Receiving Water: STUP PILL RHINE Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 26/02/2004 Effective Date: 22-Apr-2003 Revocation Date: 29/12/2003
32 G	445.0	NE	353600 181800	Address: SEVERN VALLEY BRICKWORKS, CHITTENING ROAD, AVONMOUTH, BRISTOL, ., BS11 0YB Effluent Type: TRADE DISCHARGES - PROCESS EFFLUENT - WATER COMPANY (WTW) Permit Number: 021239 Permit Version: 1	Receiving Water: - Status: REVOKED - APPEAL PERIOD( WATER ACT 1989 SCHED 12, 6 & 8) Issue date: - Effective Date: 11-Feb-1983 Revocation Date: 01/03/1994
33	447.0	S	353190 180680	Address: SEVEN GATES, LAWRENCE WESTON ROAD, AVONMOUTH, BRISTOL, -, BS11 0YW Effluent Type: MISCELLANEOUS DISCHARGES - SURFACE WATER Permit Number: 100495 Permit Version: 1	Receiving Water: SALT RHYNE Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 17/02/1998 Effective Date: 17-Feb-1998 Revocation Date: -
34	463.0	S	353230 180670	Address: SEVEN GATES, LAWRENCE WESTON ROAD, AVONMOUTH, BRISTOL, -, BS11 0YW Effluent Type: MISCELLANEOUS DISCHARGES - SURFACE WATER Permit Number: 100496 Permit Version: 1	Receiving Water: SALT RHYNE Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 17/02/1998 Effective Date: 17-Feb-1998 Revocation Date: -

ID	Distance	Direction	NGR	Details
35 H	499.0	E	353800 181600	Address: SEVERN ROAD RESOURCE RECOVER CENTRE, SEVERN RAOD, CHITTENING, AVONMOUTH, BRISTOL, BS11 0YU Receiving Water: STUP PILL RHYNE Status: SURRENDERED UNDER EPR 2010 Issue date: 02/07/2013 Effective Date: 02-Jul-2013 Revocation Date: 12/06/2014 Effluent Type: TRADE DISCHARGES - PROCESS EFFLUENT - NOT WATER COMPANY Permit Number: EPRZB3934AG Permit Version: 1

### 1.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site:

2

The following records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance	Direction	Application Reference Number	NGR	Application Status	Application Date	Address	Details	Details of Enforcement Action
711	168.0	NW	No Details	353005 181424	Approved	No Details	A.E.M (Avon Ltd), Redstone, Canada & Buchanan Warehouses, Chittening Estate, Avonmouth, BS11 0YB	No Details	Enforcement: Data requested, not received. Date of Enforcement: Data Requested, not received. Comment: Data Requested, not received.
721	168.0	NW	No Details	353005 181424	Approved	No Details	Shell Gas Limited, Bank Road, Chiittening Ind.Estate, Avonmouth, Bristol, BS11 0YB	No Details	Enforcement: Data requested, not received. Date of Enforcement: Data Requested, not received. Comment: Data Requested, not received.

## 1.2 Dangerous or Hazardous Sites

Records of COMAH & NIHHS sites within 500m of the study site:

4

The following COMAH & NIHHS Authorisation records provided by the Health and Safety Executive are represented as polygons or buffered points on the Environmental Permits, Incidents and Registers Map:

ID	Distance	Direction	Company	Address	Operational Status	Tier
51	0.0	On Site	Shell Gas Ltd	Shell Gas Ltd, Chittening Industrial Estate, Bristol, Bs11 0yb	Historical NIHHS Site	-

ID	Distance	Direction	Company	Address	Operational Status	Tier
52	0.0	On Site	A E Murphy Ltd	A E Murphy Ltd, Chittening Industrial Estate, Avonmouth, Bristol, Bs11 0yb	Historical NIHHS Site	-
53	264.0	NW	Avongas Ltd	Avongas Ltd, Bank Road, Avonmouth Docks Estate, Chittening, Avonmouth	Historical NIHHS Site	-
54	457.0	NE	British Gas	British Gas, Avonmouth Storage Installation, Severn Road, Hallen, Bristol	Historical COMAH Site	-

## 1.3 Environment Agency Recorded Pollution Incidents

### 1.3.1 Records of National Incidents Recording System, List 2 within 500m of the study site:

12

The following NIRS List 2 records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance	Direction	NGR	Details
1	92.0	NW	181507 353134	Incident Date: 02-Jul-2001 Incident Identification: 12920 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Dust Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
2A	111.0	W	181147 352945	Incident Date: 08-Sep-2002 Incident Identification: 106216 Pollutant: Organic Chemicals/Products Pollutant Description: Solvents Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
3A	111.0	W	181147 352945	Incident Date: 25-Oct-2001 Incident Identification: 39162 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Smoke Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
4I	146.0	NW	181418 353026	Incident Date: 22-May-2001 Incident Identification: 6353 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Dust Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
5	157.0	NW	181373 352989	Incident Date: 18-Jun-2002 Incident Identification: 85718 Pollutant: Organic Chemicals/Products Pollutant Description: Other Organic Chemical or Product Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
6C	171.0	NE	181608 353393	Incident Date: 02-Feb-2008 Incident Identification: 561280 Pollutant: Oils and Fuel Pollutant Description: Other Oil or Fuel Water Impact: Category 2 (Significant) Land Impact: Category 2 (Significant) Air Impact: Category 4 (No Impact)
7B	219.0	NE	181636 353441	Incident Date: 10-May-2001 Incident Identification: 5806 Pollutant: Other Pollutant Pollutant Description: Other Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
8B	219.0	NE	181636 353441	Incident Date: 10-May-2001 Incident Identification: 5806 Pollutant: Other Pollutant Pollutant Description: Other Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
9	297.0	W	181118 352761	Incident Date: 12-Nov-2002 Incident Identification: 120319 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Fumes Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)

ID	Distance	Direction	NGR	Details	
10	363.0	NE	181790 353460	Incident Date: 07-Feb-2005 Incident Identification: 291946 Pollutant: Oils and Fuel Pollutant Description: Kerosene and Aviation Fuel	Water Impact: Category 2 (Significant) Land Impact: Category 2 (Significant) Air Impact: Category 3 (Minor)
11	368.0	NE	181640 353640	Incident Date: 07-Aug-2003 Incident Identification: 180015 Pollutant: Inorganic Chemicals/Products Pollutant Description: Other Inorganic Chemical or Product	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
12	410.0	E	181426 353733	Incident Date: 15-Aug-2002 Incident Identification: 100351 Pollutant: Oils and Fuel Pollutant Description: Other Oil or Fuel	Water Impact: Category 3 (Minor) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)

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### 1.3.2 Records of National Incidents Recording System, List 1 within 500m of the study site:

0

Database searched and no data found.

---

### 1.4 Sites Determined as Contaminated Land under Part 2A EPA 1990

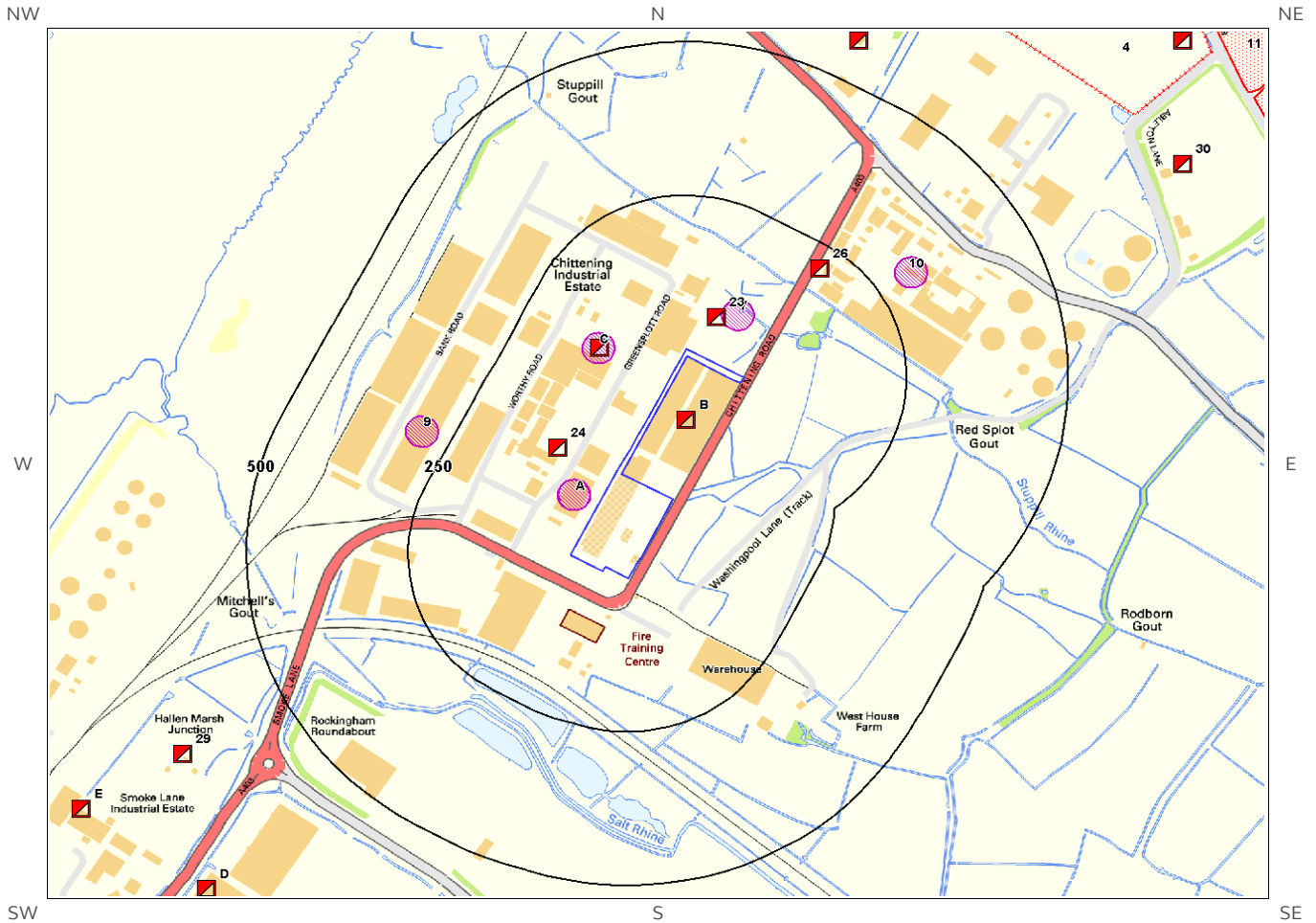
How many records of sites determined as contaminated land under Section 78R of the Environmental Protection Act 1990 are there within 500m of the study site?

0

Database searched and no data found.

---

# 2. Landfill and Other Waste Sites Map



**Landfill and Other Waste Sites Legend**



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- |                        |                           |   |
|------------------------|---------------------------|---|
| Site Outline           | E.A. Active Landfill      | Historic and Planned Waste Sites                    |
| 250 Search Buffers (m) | E.A. Historic Landfill    | E.A. Licensed Waste Site                            |
| 500 Search Buffers (m) | BGS / DoE Survey Landfill | Local Authority/Historical Mapping Landfill Records |

# 2. Landfill and Other Waste Sites

## 2.1 Landfill Sites

### 2.1.1 Records from Environment Agency landfill data within 1000m of the study site:

1

The following Environment Agency landfill records are represented as polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details
4	696.0	NE	354000 182000	Address: Crooks Marsh Farm, Land / Premises At, Crooks Marsh Farm, Hallen, Bristol, Avon, BS10 7SF Landfill Reference: 27256.0 Environmental Permitting Regulations (Waste) Reference: AVO329 Landfill Type: A1 : Co-Disposal Landfill Site  Operator: Bristol City Council Status: Issued IPPC Reference: EPR Reference:

### 2.1.2 Records of Environment Agency historic landfill sites within 1500m of the study site:

10

The following landfill records are represented as either points or polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details
11	906.0	NE	354100 182000	Site Address: Crooks Marsh Farm Sevalco, Hallen, Avonmouth Waste Licence: Yes Site Reference: S/NA/T/5A Waste Type: Inert, Industrial, Commercial , Environmental Permitting Regulations (Waste) Reference: -  Licence Issue: 18-Oct-1977 Licence Surrendered: 31-Dec-1979 Licence Hold Address: Avon House North, St James Barton, Bristol Operator: - First Recorded Input: 31-Oct-1977 Last Recorded Input: 31-Dec-1979
12	908.0	NE	354200 181900	Site Address: Crooks Marsh Farm, Hallen, Avonmouth Waste Licence: Yes Site Reference: S/BL/T/30 Waste Type: Inert, Industrial Environmental Permitting Regulations (Waste) Reference: -  Licence Issue: 16-Jan-1986 Licence Surrendered: Licence Hold Address: Avon House, Barton Operator: - First Recorded Input: 31-Dec-1986 Last Recorded Input:



ID	Distance (m)	Direction	NGR	Details
Not shown	937.0	SW	352600 180300	<p>Site Address: Tenneco Organics Limited, Rockingham Works, Avonmouth, Bristol</p> <p>Waste Licence: Yes</p> <p>Site Reference: L/BL/T/53</p> <p>Waste Type: Inert Liquid sludge, Environmental Permitting Regulations (Waste) Reference: -</p> <p>Licence Issue: 24-Apr-1979</p> <p>Licence Surrendered: 20-Oct-1992</p> <p>Licence Hold Address: Rockingham Works, Avonmouth, Bristol</p> <p>Operator: -</p> <p>First Recorded Input: -</p> <p>Last Recorded Input: -</p>
Not shown	1268.0	SW	352500 179900	<p>Site Address: Gas Area Tip, Kingsweston Lane, Avonmouth, Avon</p> <p>Waste Licence: -</p> <p>Site Reference: -</p> <p>Waste Type: -</p> <p>Environmental Permitting Regulations (Waste) Reference: -</p> <p>Licence Issue: -</p> <p>Licence Surrendered: -</p> <p>Licence Hold Address: -</p> <p>Operator: -</p> <p>First Recorded Input: -</p> <p>Last Recorded Input: -</p>
Not shown	1280.0	S	352700 179700	<p>Site Address: 2 AHF Lagoon, Kings Weston Lane, Avonmouth, Avon</p> <p>Waste Licence: -</p> <p>Site Reference: -</p> <p>Waste Type: Industrial</p> <p>Environmental Permitting Regulations (Waste) Reference: -</p> <p>Licence Issue: -</p> <p>Licence Surrendered: -</p> <p>Licence Hold Address: -</p> <p>Operator: R T Z Estates</p> <p>First Recorded Input: 31-Dec-1956</p> <p>Last Recorded Input: 31-Dec-1964</p>
Not shown	1387.0	S	352800 179500	<p>Site Address: No.3 AHF Lagoon, Avonmouth, Bristol</p> <p>Waste Licence: Yes</p> <p>Site Reference: L/BL/T/77D</p> <p>Waste Type: Inert, Industrial</p> <p>Environmental Permitting Regulations (Waste) Reference: -</p> <p>Licence Issue: 18-Mar-1980</p> <p>Licence Surrendered: 19-Apr-1994</p> <p>Licence Hold Address: St Andrews Road, Avonmouth, Bristol</p> <p>Operator: -</p> <p>First Recorded Input: 18-Mar-1980</p> <p>Last Recorded Input: 19-Apr-1994</p>
Not shown	1388.0	S	352800 179600	<p>Site Address: 3 AHF Lagoon, Kings Weston Lane, Avonmouth, Avon</p> <p>Waste Licence: -</p> <p>Site Reference: -</p> <p>Waste Type: Industrial</p> <p>Environmental Permitting Regulations (Waste) Reference: -</p> <p>Licence Issue: -</p> <p>Licence Surrendered: -</p> <p>Licence Hold Address: -</p> <p>Operator: ISC Chemicals</p> <p>First Recorded Input: 31-Dec-1964</p> <p>Last Recorded Input: -</p>
Not shown	1397.0	S	352800 179500	<p>Site Address: No.4 AHF Lagoon, North Of Kingsweston, Avonmouth, Bristol</p> <p>Waste Licence: Yes</p> <p>Site Reference: L/BL/T/126D</p> <p>Waste Type: Industrial</p> <p>Environmental Permitting Regulations (Waste) Reference: -</p> <p>Licence Issue: 18-Jan-1983</p> <p>Licence Surrendered: 19-Apr-1994</p> <p>Licence Hold Address: -</p> <p>Operator: -</p> <p>First Recorded Input: 18-Jan-1983</p> <p>Last Recorded Input: 19-Apr-1994</p>
Not shown	1449.0	E	354800 181700	<p>Site Address: Crooks Marsh Farm Sevalco, Hallen, Avonmouth</p> <p>Waste Licence: Yes</p> <p>Site Reference: S/NA/T/5</p> <p>Waste Type: Inert, Industrial, Commercial ,</p> <p>Environmental Permitting Regulations (Waste) Reference: -</p> <p>Licence Issue: 18-Oct-1977</p> <p>Licence Surrendered: 31-Dec-1979</p> <p>Licence Hold Address: Avon House North, St James Barton, Bristol</p> <p>Operator: -</p> <p>First Recorded Input: 31-Oct-1977</p> <p>Last Recorded Input: 31-Dec-1979</p>
Not shown	1485.0	SW	352200 179800	<p>Site Address: Beryllium Burial Pits, Kings Weston Lane, Avonmouth, Avon</p> <p>Waste Licence: -</p> <p>Site Reference: -</p> <p>Waste Type: -</p> <p>Environmental Permitting Regulations (Waste) Reference: -</p> <p>Licence Issue: -</p> <p>Licence Surrendered: -</p> <p>Licence Hold Address: -</p> <p>Operator: R T Z Estates</p> <p>First Recorded Input: 31-May-1972</p> <p>Last Recorded Input: 31-Aug-1972</p>



### 2.1.3 Records of BGS/DoE non-operational landfill sites within 1500m of the study site:

3

The following landfill records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details	
Not shown	1376.0	SW	35250 0.0 17990 0.0	Address: Gas Area Tip, Kingsweston Lane, Avonmouth BGS Number: 2867.0	Risk: No risk to aquifer Waste Type: N/A
Not shown	1396.0	S	35270 0.0 17980 0.0	Address: no 2 AHF Lagoon, Kings Weston Lane, Avonmouth,AV BGS Number: 2868.0	Risk: Risk to minor aquifer Waste Type: 12000 tons toxic waste
Not shown	1466.0	S	35280 0.0 17970 0.0	Address: No 3 AAF Lagoon, Kings Weston Lane, Avonmouth,AV BGS Number: 2866.0	Risk: Risk to minor aquifer Waste Type: 1000 tons toxic waste

### 2.1.4 Records of Landfills from Local Authority and Historical Mapping records within 1500m of the study site:

0

Database searched and no data found.

## 2.2 Other Waste Sites

### 2.2.1 Records of waste treatment, transfer or disposal sites within 500m of the study site:

6

The following waste treatment, transfer or disposal sites records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details	
5A	15.0	NW	353061 181260	Type of Site: Waste Transfer/Workshops Site Address: Chittening Estate, Greensplott Road, Avonmouth, BRISTOL, Avon, BS11 Planning Application Reference: 0316F/95N Date: -	Further Details: Construction of a waste transfer station and workshops with 2 storey offices. An application (ref: 0316F/95N) for Detailed Planning permission was submitted to Bristol C.C. on 15th February 1995. Data Source: Historic Planning Application Data Type: Point

ID	Distance (m)	Direction	NGR		Details
6A	16.0	NW	353060 181260	Type of Site: Recycling & Office Site Address: Chittening Industrial Estate, Chittening Road, Avonmouth, BRISTOL, Avon, BS11 0YB	Planning Application Reference: 05/03469/F/N Date: -  Further Details: Scheme comprises proposed use of site as recycling depot, grading/screening of materials and construction of office building, landscaping, new entrance. Construction - planting site works. An application (ref: 05/03469/F/N) for detailed planning permission was withdrawn from Bristol C.C. Planning decision obtained Data Source: Historic Planning Application Data Type: Point
7	61.0	NE	353313 181552	Type of Site: Recycling Facility Site Address: Chittening Road, BRISTOL, Avon, BS11	Planning Application Reference: 08/01749/F Date: -  Further Details: Scheme comprises change of use from vacant industrial land to recycling facility including reprofiling site levels and construction of site portacabins (partly in retrospect), cycle shed and office. An application (ref: 08/01749/F) for detailed planning permission was submitted to Bristol C.C. Data Source: Historic Planning Application Data Type: Point
8C	95.0	NW	353098 181499	Type of Site: Waste Transfer Station (Extension) Site Address: Durston Waste Management, Chittening Estate, Avonmouth, BRISTOL, Avon, BS11 0YB	Planning Application Reference: 00/03609/F/N Date: -  Further Details: Scheme comprises construction of a single storey, steel framed, steel clad extension of 408 sqm. Construction - profiled steel cladding walls; profiled steel cladding roof; steel frame. An application (ref: 00/03609/F/N) for Detailed Planning permission was submitted to Bristol C.C. on 2nd November 2000. Data Source: Historic Planning Application Data Type: Point
9	271.0	NW	352826 181363	Type of Site: Waste Transfer Station Site Address: CCT Building,4, Chittening Industrial Estate, Greensplott Road,Chittening, BRISTOL, Avon, BS11 0YB	Planning Application Reference: 10/01733/F Date: 16/01/2012  Further Details: Scheme comprises change of use of an industrial unit to include a clinical waste and health care waste treatment and transfer station. An application (ref: 10/01733/F) for detailed planning permission was granted by Bristol C.C. The start date, contract period and project value are for guideline only. Detailed plans approved. Data Source: Historic Planning Application Data Type: Point
10	284.0	NE	353581 181622	Type of Site: Material Recycling Facility Site Address: Former Sevalco Site (North, Severn Road, Avonmouth, BRISTOL, Avon, BS11 0YU	Planning Application Reference: 09/04470/F Date: 19/04/2012  Further Details: Scheme comprises construction and operation of a Resource Recovery Centre, including a Material Recycling facility, an Energy-from-Waste and Bottom Ash facility, associated Office Visitor Centre, with new access road and weighbridge facilities, associated landscaping and surface water attenuation features. Construction - curtain, steel cladding walls; aluminium framed, double glazed windows; roller shutter, steel, up and over doors; planting, reinforced concrete surfacing, sewer outfall site works. An application (ref: 09/04470/F) for detailed planning permission was granted by the Secretary of State. A public enquiry has now been held and a positive decision has been received from the Secretary of State, allowing this scheme to now proceed. Data Source: Historic Planning Application Data Type: Point

## 2.2.2 Records of Environment Agency licensed waste sites within 1500m of the study site:

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The following waste treatment, transfer or disposal sites records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details
21B	45.0	SE	353233 181384	<p>Site Address: Units A, B &amp; C Estuary Park, Chittening Road, Avonmouth, Bristol, Avon, BS11 0YB            Type: HCI Waste TS + treatment            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: BOO041            EPR reference: EA/EPR/SP3591EP/A001            Operator: Boomeco Ltd            Waste Management licence No: 102356            Annual Tonnage: 74999.0</p> <p>Issue Date: 12/03/2012            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Units A, B &amp; C Estuary Park            Correspondence Address: -, -</p>
22B	45.0	SE	353233 181384	<p>Site Address: Units A, B &amp; C Estuary Park, Chittening Road, Avonmouth, Bristol, Avon, BS11 0YB            Type: Use of waste to manufacture timber &lt;75,000 tpy            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: BOO043            EPR reference: EA/EPR/FB3733RJ/V003            Operator: Boomeco Limited            Waste Management licence No: 104006            Annual Tonnage: 74999.0</p> <p>Issue Date: 24/05/2012            Effective Date: -            Modified: 24/06/2013            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Modified            Site Name: Units A, B &amp; C Estuary Park            Correspondence Address: -, -</p>
23	67.0	NE	353280 181550	<p>Site Address: Chittening Road Recycling Centre, Chittening Road Ind Est, Avonmouth, Bristol, Avon, BS11 0YU            Type: Metal Recycling Site (mixed MRS's)            Size: &gt;= 75000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: BRI118            EPR reference: EA/EPR/LP3596SW/A001            Operator: Bristol &amp; Avon Remediation Ltd            Waste Management licence No: 100449            Annual Tonnage: 299999.0</p> <p>Issue Date: 30/10/2009            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Chittening Road Recycling Centre            Correspondence Address: -, -</p>
24	99.0	NW	353036 181338	<p>Site Address: Greensplott Road, Chittening Industrial Eastate, Avonmouth, Bristol, BS11 0YB            Type: Vehicle depollution facility            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: PRE113            EPR reference: EA/EPR/BB3508HF/A001            Operator: P R Export Import Limited            Waste Management licence No: 401406            Annual Tonnage: 0.0</p> <p>Issue Date: 24/06/2014            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Pr Exports Imports Limited            Correspondence Address: -, -</p>

ID	Distance (m)	Direction	NGR	Details
25C	119.0	NW	353100 181500	<p>Site Address: Greensplott Road, Greensplott Rd, Chittening Estate, Avonmouth, Bristol, Avon, BS11 0YB            Type: Special Waste Transfer Station            Size: &gt;= 25000 tonnes &lt; 75000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: DUR326            EPR reference: EA/EPR/DP3990FV/S002            Operator: Durston Waste Management Ltd            Waste Management licence No: 27161            Annual Tonnage: 75000.0</p> <p>Issue Date: 05/02/1996            Effective Date: -            Modified: -            Surrendered Date: 24/05/2006            Expiry Date: -            Cancelled Date: -            Status: Surrendered            Site Name: Durston T/s            Correspondence Address: -, -</p>
26	213.0	NE	353440 181630	<p>Site Address: The Old Brickworks, Severn Road, Avonmouth, Bristol, Avon, BS10 0YL            Type: Metal Recycling Site (Vehicle Dismantler)            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: HAL427            EPR reference: EA/EPR/LP3495SZ/A001            Operator: D Hales Ltd            Waste Management licence No: 26213            Annual Tonnage: 4999.0</p> <p>Issue Date: 27/02/2008            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: The Old Brickworks            Correspondence Address: -, -</p>
27	568.0	NE	353500 182000	<p>Site Address: Former Texaco Oil Depot, Severn Road, Avonmouth, Bristol, Avon, BS11 0YL            Type: Special Waste Transfer Station            Size: &gt;= 75000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: STE146            EPR reference: EA/EPR/TP3896EW/A001            Operator: Steve Ball Recycled Aggregates Ltd            Waste Management licence No: 102455            Annual Tonnage: 99999.0</p> <p>Issue Date: 27/09/2011            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Former Texaco Oil Depot            Correspondence Address: -, -</p>
Not shown	666.0	SW	352700 180600	<p>Site Address: Rockingham Works, Smoke Lane, Avonmouth, Bristol, BS11 0YA            Type: Special Waste Transfer Station            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: CHE226            EPR reference: -            Operator: Chemical Recoveries Ltd            Waste Management licence No: 27219            Annual Tonnage: 25000.0</p> <p>Issue Date: 15/08/1991            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Chemical Recoveries Avonmouth            Correspondence Address: Smoke Lane, Smoke Lane, Avonmouth, Bristol, BS11 0YA</p>
29	680.0	SW	352457 180839	<p>Site Address: Land At Rockingham Park, Smoke Lane, Bristol, Avon, BS11 0YW            Type: Deposit of waste to land as a recovery operation            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: TER339            EPR reference: EA/EPR/JB3330AR/A001            Operator: Terramond Ltd            Waste Management licence No: 104455            Annual Tonnage: 84200.0</p> <p>Issue Date: 04/10/2012            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Land At Rockingham Park            Correspondence Address: -, -</p>

ID	Distance (m)	Direction	NGR	Details
30	761.0	NE	354000 181800	<p>Site Address: Ableton Lane, Severn Beach, Chitting, Bristol, Avon, BS10 0YB            Type: Metal Recycling Site (Vehicle Dismantler)            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: HAL425            EPR reference: EA/EPR/RP3493FS/A001            Operator: D Hales Ltd            Waste Management licence No: 26079            Annual Tonnage: 25000.0</p> <p>Issue Date: 09/10/2003            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Ableton Lane            Correspondence Address: -, -</p>
31D	781.0	SW	352493 180620	<p>Site Address: Rockingham Works, Land / Premises At, Smoke Lane, Avonmouth, Bristol, Avon, BS11 0YA            Type: Special Waste Transfer Station            Size: &gt;= 75000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: AUG005            EPR reference: EA/EPR/BP3499FJ/V003            Operator: Augean Treatment Ltd            Waste Management licence No: 27219            Annual Tonnage: 25000.0</p> <p>Issue Date: 15/08/1991            Effective Date: 13/03/2008            Modified: 31/03/2014            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Modified            Site Name: Chemical Recoveries Avonmouth            Correspondence Address: -, -</p>
32D	781.0	SW	352493 180620	<p>Site Address: Rockingham Works, Land / Premises At, Smoke Lane, Avonmouth, Bristol, Avon, BS11 0YA            Type: Special Waste Transfer Station            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: AUG005            EPR reference: EA/EPR/BP3499FJ/T002            Operator: Augean Treatment Ltd            Waste Management licence No: 27219            Annual Tonnage: 25000.0</p> <p>Issue Date: 15/08/1991            Effective Date: 13/03/2008            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Transferred            Site Name: Chemical Recoveries Avonmouth            Correspondence Address: -, -</p>
33E	861.0	SW	352300 180750	<p>Site Address: Eastern Shed, Rear Of Moleson Holdings, Smoke Lane, Avonmouth, Bristol, BS11 0YA            Type: Household, Commercial &amp; Industrial Waste T Stn            Size: &gt;= 25000 tonnes &lt; 75000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: SMI429            EPR reference: -            Operator: Smith's (gloucester) Ltd            Waste Management licence No: 26181            Annual Tonnage: 0.0</p> <p>Issue Date: 23/09/2005            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Eastern Shed Transfer &amp; Recycling Site            Correspondence Address: -, Beaumont House, 172, Southgate Street, Gloucester, Gloucestershire, GL1 2EZ</p>
34E	861.0	SW	352300 180750	<p>Site Address: Eastern Shed, Rear Of Moleson Holdings, Smoke Lane, Avonmouth, Bristol, BS11 0YA            Type: Household, Commercial &amp; Industrial Waste T Stn            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: SMI429            EPR reference: -            Operator: Smith's (gloucester) Ltd            Waste Management licence No: 26181            Annual Tonnage: 0.0</p> <p>Issue Date: 23/09/2005            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Eastern Shed Transfer &amp; Recycling Site            Correspondence Address: -, Beaumont House, 172, Southgate Street, Gloucester, Gloucestershire, GL1 2EZ</p>

ID	Distance (m)	Direction	NGR	Details
35E	861.0	SW	352300 180750	<p>Site Address: East Shed, Rear Of Moleson Holdings, Smoke Lane, Avonmouth, Bristol, Avon, BS11 0YA            Type: Household, Commercial &amp; Industrial Waste T Stn            Size: &gt;= 25000 tonnes &lt; 75000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: SMI429            EPR reference: EA/EPR/SP3290FW/V002            Operator: Smith's ( Gloucester ) Ltd            Waste Management licence No: 26181            Annual Tonnage: 74960.0</p> <p>Issue Date: 23/09/2005            Effective Date: -            Modified: 11/06/2012            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Modified            Site Name: East Shed Transfer &amp; Recycling Site            Correspondence Address: -, -</p>
36E	861.0	SW	352300 180750	<p>Site Address: Eastern Shed, Rear Of Moleson Holdings, Smoke Lane, Avonmouth, Bristol, BS11 0YA            Type: -            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: SMI429            EPR reference: -            Operator: Smith's (gloucester) Ltd            Waste Management licence No: 26181            Annual Tonnage: 0.0</p> <p>Issue Date: 23/09/2005            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Eastern Shed Transfer &amp; Recycling Site            Correspondence Address: -, Beaumont House, 172, Southgate Street, Gloucester, Gloucestershire, GL1 2EZ</p>
37F	871.0	NE	354000 182000	<p>Site Address: Crooks Marsh Farm, Hallen, Crooks Marsh Farm, Hallen, Bristol            Type: Co-Disposal Landfill Site            Size: &gt;= 75000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: AVO329            EPR reference: -            Operator: Bristol City Council            Waste Management licence No: 27256            Annual Tonnage: 0.0</p> <p>Issue Date: 16/01/1986            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Crooks Marsh Farm Landfill Site            Correspondence Address: Brunel House, Brunel House, St Georges Road, Bristol, Avon, BS1 5UY</p>
38F	871.0	NE	354000 182000	<p>Site Address: Crooks Marsh Farm, Land / Premises At, Crooks Marsh Farm, Hallen, Bristol, Avon, BS10 7SF            Type: Co-Disposal Landfill Site            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: AVO329            EPR reference: EA/EPR/UP3999FL/A001            Operator: Bristol City Council            Waste Management licence No: 27256            Annual Tonnage: 52000.0</p> <p>Issue Date: 16/01/1986            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Crooks Marsh Farm Landfill Site            Correspondence Address: -, -</p>
Not shown	1069.0	SW	352665 180162	<p>Site Address: Unit 117a, Burcott Road, Avonmouth, Bristol, Avon, BS11 8AG            Type: WEEE treatment facility            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: EUR053            EPR reference: EA/EPR/FP3098LJ/A001            Operator: E Recycling Ltd            Waste Management licence No: 101256            Annual Tonnage: 74999.0</p> <p>Issue Date: 24/11/2009            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Euro Recycling Ltd            Correspondence Address: -, -</p>

ID	Distance (m)	Direction	NGR	Details
Not shown	1075.0	SW	352100 180670	<p>Site Address: Ironchurch Road, Avonmouth, Bristol, Avon, BS11 9BP            Type: Household, Commercial &amp; Industrial Waste T Stn            Size: &gt;= 75000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: BRI349            EPR reference: EA/EPR/VP3193FP/V002            Operator: Bristol &amp; Avon Waste Management Ltd            Waste Management licence No: 26042            Annual Tonnage: 100000.0</p> <p>Issue Date: 16/07/2004            Effective Date: -            Modified: 20/10/2014            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Modified            Site Name: Bristol &amp; Avon Waste Management Ltd            Correspondence Address: -, -</p>
Not shown	1075.0	SW	352100 180670	<p>Site Address: Bristol &amp; Avon Waste Ltd, Ironchurch Road, Avonmouth, Bristol, BS11 9BP            Type: Household, Commercial &amp; Industrial Waste T Stn            Size: &gt;= 75000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: BRI349            EPR reference: -            Operator: Bristol &amp; Avon Waste Ltd            Waste Management licence No: 26042            Annual Tonnage: 0.0</p> <p>Issue Date: 16/07/2004            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Bristol &amp; Avon Waste Ltd            Correspondence Address: -, Nigel Cant Planning, 16, Long Street, Dursley, Gloucestershire, GL11 4HY</p>
Not shown	1105.0	E	354400 181200	<p>Site Address: Unit N1, Hallen Industrial Estate, Severn Road, Hallen, Bristol, Avon, BS10 7SE            Type: Household, Commercial &amp; Industrial Waste T Stn            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: EUR271            EPR reference: EA/EPR/LP3990FP/S002            Operator: Euro Recycling Ltd            Waste Management licence No: 26188            Annual Tonnage: 0.0</p> <p>Issue Date: 17/01/2006            Effective Date: -            Modified: -            Surrendered Date: 03/02/2010            Expiry Date: -            Cancelled Date: -            Status: Surrendered            Site Name: Euro Recycling W E E E Recycling Facility            Correspondence Address: -, -</p>
Not shown	1105.0	E	354400 181200	<p>Site Address: Unit C, Hallen Ind Est, Severn Road, Hallen, South Glos, BS10 7SE            Type: Household, Commercial &amp; Industrial Waste T Stn            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: ABL001            EPR reference: -            Operator: Able Waste Management Ltd            Waste Management licence No: 26171            Annual Tonnage: 0.0</p> <p>Issue Date: 23/06/2005            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Able Waste Management Recycling &amp; Transfer Facility            Correspondence Address: -, 3, Alma Vale Road, Clifton, Bristol, BS8 2HL</p>
Not shown	1105.0	E	354400 181200	<p>Site Address: Fish &amp; Skips, Severn Road, Hallen, Gloucestershire, BS10 7SE            Type: Household, Commercial &amp; Industrial Waste T Stn            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: FIS001            EPR reference: EA/EPR/NP3593FP/A001            Operator: Fish Paul            Waste Management licence No: 26016            Annual Tonnage: 5000.0</p> <p>Issue Date: 19/06/2000            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Revoked            Site Name: Fish &amp; Skips Transfer Station            Correspondence Address: -, -</p>



ID	Distance (m)	Direction	NGR	Details
Not shown	1105.0	E	354400 181200	<p>Site Address: Unit C, Hallen Ind Est, Severn Road, Hallen, Gloucestershire, BS10 7SE            Type: Household, Commercial &amp; Industrial Waste T Stn            Size: &gt;= 25000 tonnes &lt; 75000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: ABL001            EPR reference: EA/EPR/BP3690FK/A001            Operator: Able Waste Management Ltd            Waste Management licence No: 26171            Annual Tonnage: 17398.0</p> <p>Issue Date: 23/06/2005            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Able Waste Management Recycling &amp; Transfer Facility            Correspondence Address: -, -</p>
Not shown	1105.0	E	354400 181200	<p>Site Address: The Recycling Centre, ( Unit C), Hallen Ind Est, Severn Road, Hallen, Bristol, BS10 7SE            Type: HCI Waste TS + treatment            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: ABL001            EPR reference: EA/EPR/BP3690FK/V003            Operator: Able Waste Management Ltd            Waste Management licence No: 26171            Annual Tonnage: 74999.0</p> <p>Issue Date: 23/06/2005            Effective Date: -            Modified: 25/11/2014            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Modified            Site Name: Able Waste Management Ltd            Correspondence Address: -, -</p>
Not shown	1105.0	E	354400 181200	<p>Site Address: Unit C, Hallen Ind Est, Severn Road, Hallen, South Glos, BS10 7SE            Type: -            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: ABL001            EPR reference: -            Operator: Able Waste Management Ltd            Waste Management licence No: 26171            Annual Tonnage: 0.0</p> <p>Issue Date: 23/06/2005            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Able Waste Management Recycling &amp; Transfer Facility            Correspondence Address: -, 3, Alma Vale Road, Clifton, Bristol, BS8 2HL</p>
Not shown	1105.0	E	354400 181200	<p>Site Address: Fish &amp; Skips, Severn Road, Hallen, BS10 7SE            Type: Household, Commercial &amp; Industrial Waste T Stn            Size: Unknown            Environmental Permitting Regulations (Waste) Licence Number: FIS001            EPR reference: -            Operator: Fish Paul            Waste Management licence No: 26016            Annual Tonnage: 5000.0</p> <p>Issue Date: 19/06/2000            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Revoked            Site Name: Fish &amp; Skips Transfer Station            Correspondence Address: -, Hallen Works, Severn Road, Hallen, BS10 7SE</p>
Not shown	1109.0	SW	352100 180600	<p>Site Address: St Andrews Road, Smoke Lane, Avonmouth, Bristol, Avon, BS11 9BP            Type: Clinical Waste Transfer Station            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: MOT325            EPR reference: EA/EPR/AP3498SK/S002            Operator: S R C L Ltd            Waste Management licence No: 27162            Annual Tonnage: 0.0</p> <p>Issue Date: 08/12/1995            Effective Date: -            Modified: -            Surrendered Date: 30/06/2008            Expiry Date: -            Cancelled Date: -            Status: Surrendered            Site Name: S R C L Ltd            Correspondence Address: -, -</p>
Not shown	1109.0	SW	352100 180600	<p>Site Address: St Andrews Road, Smoke Lane, Avonmouth, Bristol, BS11 9H2            Type: Clinical Waste Transfer Station            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: MOT325            EPR reference: -            Operator: South West Energy Ltd            Waste Management licence No: 27162            Annual Tonnage: 0.0</p> <p>Issue Date: 08/12/1995            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: South West Energy Clinical Waste Incinerator            Correspondence Address: -</p>



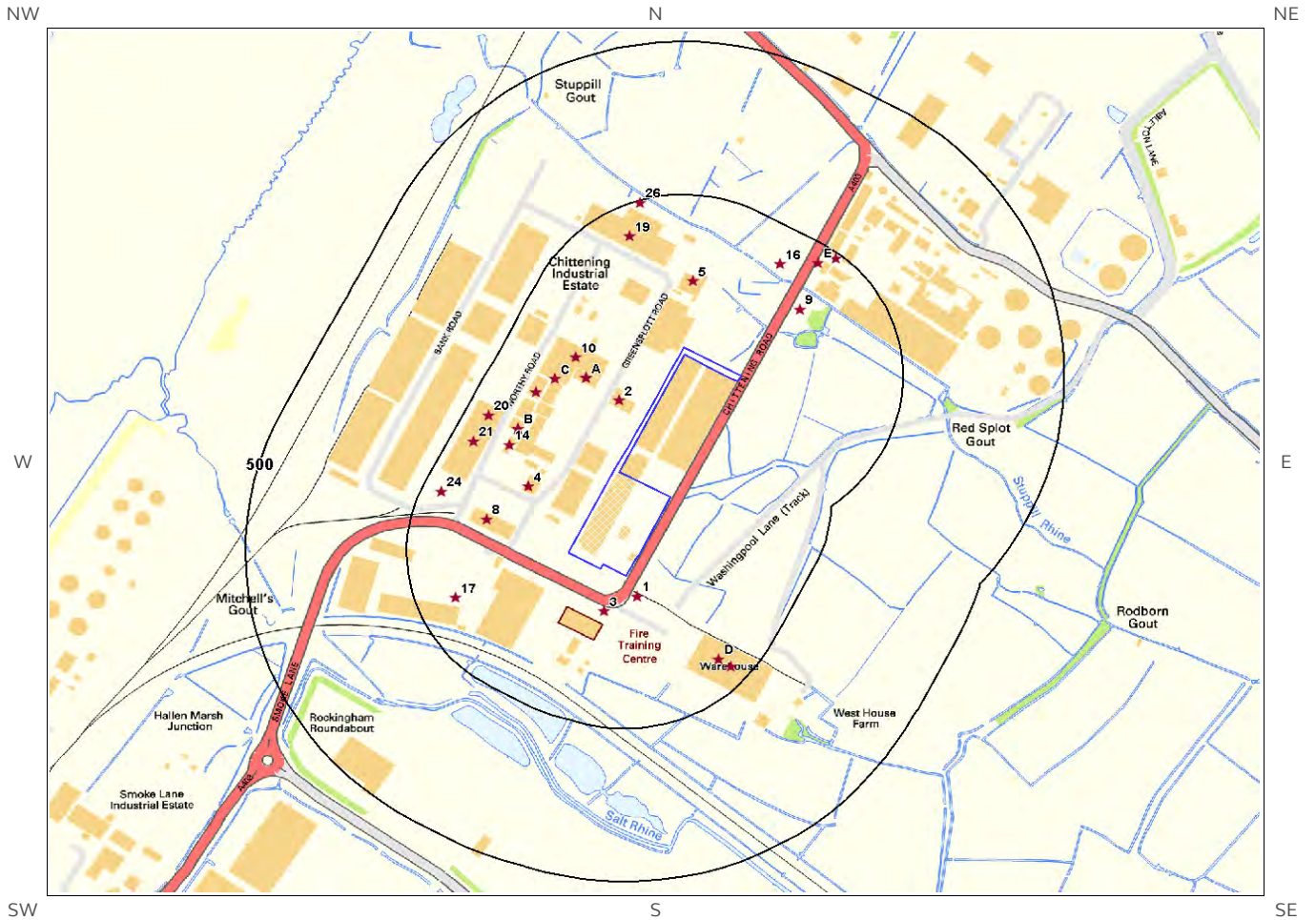
ID	Distance (m)	Direction	NGR	Details
Not shown	1128.0	E	354424 181199	<p>Site Address: Unit J1 Hallen Ind Est, Severn Road, Hallen, Bristol, Avon, BS10 7SE</p> <p>Type: ELV Facility</p> <p>Size: &lt; 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: ACS010</p> <p>EPR reference: EA/EPR/GP3699VQ/T001</p> <p>Operator: Fallows Marc</p> <p>Waste Management licence No: 26096</p> <p>Annual Tonnage: 2499.0</p> <p>Issue Date: 14/09/2004</p> <p>Effective Date: 22/06/2010</p> <p>Modified: -</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Transferred</p> <p>Site Name: Unit J1 Hallen Industrial Estate</p> <p>Correspondence Address: -, -</p>
Not shown	1199.0	SW	352500 180100	<p>Site Address: Units C &amp; D, 203, Burcott Road, Avonmouth, Bristol, Avon, BS11 8AP</p> <p>Type: Clinical Waste Transfer Station</p> <p>Size: &lt; 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: ECO023</p> <p>EPR reference: EA/EPR/GP3698EM/V002</p> <p>Operator: Tradebe Healthcare ( South West ) Ltd</p> <p>Waste Management licence No: 100334</p> <p>Annual Tonnage: 24999.0</p> <p>Issue Date: 04/07/2008</p> <p>Effective Date: -</p> <p>Modified: 18/02/2013</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Modified</p> <p>Site Name: Tradebe Healthcare ( South West ) Ltd</p> <p>Correspondence Address: -, -</p>
Not shown	1199.0	SW	352500 180100	<p>Site Address: Units C &amp; D, 203, Burcott Road, Avonmouth, Bristol, Avon, BS11 8AP</p> <p>Type: Clinical Waste Transfer Station</p> <p>Size: &lt; 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: ECO023</p> <p>EPR reference: EA/EPR/GP3698EM/A001</p> <p>Operator: Eco Waste South West Ltd</p> <p>Waste Management licence No: 100334</p> <p>Annual Tonnage: 24999.0</p> <p>Issue Date: 04/07/2008</p> <p>Effective Date: -</p> <p>Modified: -</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Issued</p> <p>Site Name: Ecowaste South West Ltd</p> <p>Correspondence Address: -, -</p>
Not shown	1209.0	SW	352160 180350	<p>Site Address: 309, Dean Road, Severnside T E Avonmouth, Bristol, BS11 8AT</p> <p>Type: Household, Commercial &amp; Industrial Waste T Stn</p> <p>Size: Unknown</p> <p>Environmental Permitting Regulations (Waste) Licence Number: ARL001</p> <p>EPR reference: -</p> <p>Operator: Gale Kevin Derrick</p> <p>Waste Management licence No: 26069</p> <p>Annual Tonnage: 0.0</p> <p>Issue Date: 14/05/2003</p> <p>Effective Date: -</p> <p>Modified: -</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Issued</p> <p>Site Name: Dean Road Transfer Station</p> <p>Correspondence Address: -, 267, Juniper Way, Bradley Stoke, Bristol, BS32 ODP</p>
Not shown	1209.0	SW	352160 180350	<p>Site Address: 309, Dean Road Severnside Trad Est, Avonmouth, Bristol, Avon, BS11 8AT</p> <p>Type: Household, Commercial &amp; Industrial Waste T Stn</p> <p>Size: &lt; 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: ARL001</p> <p>EPR reference: EA/EPR/AP3693FZ/A002</p> <p>Operator: Gale Kevin Derrick</p> <p>Waste Management licence No: 26069</p> <p>Annual Tonnage: 25000.0</p> <p>Issue Date: 14/05/2003</p> <p>Effective Date: -</p> <p>Modified: -</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Issued</p> <p>Site Name: Dean Road Transfer Station</p> <p>Correspondence Address: -, -</p>

ID	Distance (m)	Direction	NGR	Details
Not shown	1221.0	E	354519 181199	<p>Site Address: Willow Farm, Severn Road, Severnside, South Gloucs, BS10 7SE            Type: Use of waste in construction &lt;100,000 tps            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: CHU080            EPR reference: EA/EPR/BB3631AR/A001            Operator: Churngold Recycling Ltd            Waste Management licence No: 103266            Annual Tonnage: 99999.0</p> <p>Issue Date: 11/11/2011            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Willow Farm            Correspondence Address: -, -</p>
Not shown	1221.0	E	354519 181199	<p>Site Address: Willow Farm, Severn Road, Severnside, South Gloucs, BS10 7SE            Type: Use of waste in construction &lt;100,000 tps            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: CHU089            EPR reference: EA/EPR/JP3738RC/S002            Operator: M J Church ( Plant) Ltd            Waste Management licence No: 103266            Annual Tonnage: 0.0</p> <p>Issue Date: 11/11/2011            Effective Date: 27/07/2012            Modified: -            Surrendered Date: 31/12/2013            Expiry Date: -            Cancelled Date: -            Status: Surrendered            Site Name: Willow Farm            Correspondence Address: -, -</p>
Not shown	1221.0	E	354519 181199	<p>Site Address: Willow Farm, Severn Road, Severnside, South Gloucs, BS10 7SE            Type: Use of waste in construction &lt;100,000 tps            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: CHU089            EPR reference: EA/EPR/JP3738RC/S002            Operator: M J Church ( Plant ) Ltd            Waste Management licence No: 103266            Annual Tonnage: 0.0</p> <p>Issue Date: 11/11/2011            Effective Date: 27/07/2012            Modified: -            Surrendered Date: 31/12/2013            Expiry Date: -            Cancelled Date: -            Status: Surrendered            Site Name: Willow Farm            Correspondence Address: -, -</p>
Not shown	1334.0	S	353300 179800	<p>Site Address: Off Kingsweston Lane, Land/premises At, Kingsweston Lane, Avonmouth, Bristol, Avon, BS11 0YS            Type: Household, Commercial &amp; Industrial Waste T Stn            Size: &gt;= 25000 tonnes &lt; 75000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: AVO283            EPR reference: EA/EPR/JP3790FA/V002            Operator: Bristol City Council            Waste Management licence No: 27190            Annual Tonnage: 75000.0</p> <p>Issue Date: 13/08/1993            Effective Date: -            Modified: 28/03/2007            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Modified            Site Name: Kingsweston Lane Transfer Station            Correspondence Address: -, -</p>
Not shown	1350.0	S	353400 179800	<p>Site Address: Kingsweston Lane Civic Amenity Site, Avonmouth Refuse Transfer Station, Kingswestern Lane, Avonmouth, Bristol, Avon, BS11 0YS            Type: Household Waste Amenity Site            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: AVO273            EPR reference: EA/EPR/QP3790FB/A001            Operator: Bristol City Council            Waste Management licence No: 27200            Annual Tonnage: 24999.0</p> <p>Issue Date: 13/08/1993            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Kingsweston Lane Civic Amenity Site            Correspondence Address: -, -</p>

ID	Distance (m)	Direction	NGR	Details
Not shown	1350.0	E	354623 181083	<p>Site Address: Hallen Yard, Land Off Severn Road, Hallen, Severnside, South Glos, BS10 7SE</p> <p>Type: Deposit of waste to land as a recovery operation</p> <p>Size: &lt; 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: BRI291</p> <p>EPR reference: EA/EPR/BB3204CV/A002</p> <p>Operator: Bristol &amp; Avon Transport &amp; Recycling Ltd</p> <p>Waste Management licence No: 401161</p> <p>Annual Tonnage: 0.0</p> <p>Issue Date: 16/05/2014</p> <p>Effective Date: -</p> <p>Modified: -</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Issued</p> <p>Site Name: Bristol &amp; Avon Transport &amp; Recycling Hallen Yard</p> <p>Correspondence Address: -, -</p>
Not shown	1356.0	SW	352100 180200	<p>Site Address: Bath Reclamation, Ironchurch Road, Avonmouth, Bristol, Avon, BS11 9HP</p> <p>Type: Metal Recycling Site (mixed MRS's)</p> <p>Size: &lt; 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: REC291</p> <p>EPR reference: -</p> <p>Operator: Sims Group UK Ltd</p> <p>Waste Management licence No: 27184</p> <p>Annual Tonnage: 0.0</p> <p>Issue Date: 14/09/1993</p> <p>Effective Date: -</p> <p>Modified: -</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Transferred</p> <p>Site Name: Sims Group Reclamation Scrap Yard</p> <p>Correspondence Address: -, Ironchurch Road, Avonmouth, Bristol, Avon, BS11 9HP</p>
Not shown	1356.0	SW	352100 180200	<p>Site Address: Bath Reclamation, Land/premises At, Ironchurch Road, Avonmouth, Bristol, Avon, BS11 9HP</p> <p>Type: Metal Recycling Site (mixed MRS's)</p> <p>Size: &gt;= 25000 tonnes &lt; 75000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: REC291</p> <p>EPR reference: EA/EPR/JP3590FN/V003</p> <p>Operator: Sims Group U K Ltd</p> <p>Waste Management licence No: 27184</p> <p>Annual Tonnage: 74999.0</p> <p>Issue Date: 14/09/1993</p> <p>Effective Date: -</p> <p>Modified: -</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Transferred</p> <p>Site Name: Sims Group Reclamation Scrap Yard</p> <p>Correspondence Address: -, -</p>
Not shown	1356.0	SW	352100 180200	<p>Site Address: Bath Reclamation, Land/premises At, Ironchurch Road, Avonmouth, Bristol, Avon, BS11 9HP</p> <p>Type: Metal Recycling Site (mixed MRS's)</p> <p>Size: &gt;= 25000 tonnes &lt; 75000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: REC291</p> <p>EPR reference: EA/EPR/JP3590FN/V003</p> <p>Operator: Sims Group UK Ltd</p> <p>Waste Management licence No: 27184</p> <p>Annual Tonnage: 74999.0</p> <p>Issue Date: 14/09/1993</p> <p>Effective Date: -</p> <p>Modified: -</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Transferred</p> <p>Site Name: Sims Group Reclamation Scrap Yard</p> <p>Correspondence Address: -, -</p>
Not shown	1356.0	SW	352100 180200	<p>Site Address: Bath Reclamation, Ironchurch Road, Avonmouth, Bristol, Avon, BS11 9HP</p> <p>Type: Metal Recycling Site (mixed MRS's)</p> <p>Size: &lt; 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: REC291</p> <p>EPR reference: -</p> <p>Operator: Simsmetal U K ( Reclamation) Ltd</p> <p>Waste Management licence No: 27184</p> <p>Annual Tonnage: 0.0</p> <p>Issue Date: 14/09/1993</p> <p>Effective Date: -</p> <p>Modified: -</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Issued</p> <p>Site Name: Simsmetal Reclamation Scrap Yard</p> <p>Correspondence Address: Ironchurch Road, Ironchurch Road, Avonmouth, Bristol, Avon, BS11 9HP</p>

ID	Distance (m)	Direction	NGR	Details
Not shown	1396.0	S	352700 179800	<p>Site Address: Merebank Road, Avonmouth, Bristol, Avon            Type: HCI Waste TS + treatment            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: AVO013            EPR reference: EA/EPR/LP3637GL/A001            Operator: Avonmouth Resource Park Ltd            Waste Management licence No: 101887            Annual Tonnage: 40000.0</p> <p>Issue Date: 09/09/2010            Effective Date: -            Modified: -            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Issued            Site Name: Avonmouth Resource Park            Correspondence Address: -, -</p>
Not shown	1426.0	SW	351995 180209	<p>Site Address: Bath Reclamation, Sims Group U K Ltd, Ironchurch Road, Avonmouth, Bristol, Avon, BS11 9HP            Type: Metal Recycling Site (mixed MRS's)            Size: &lt; 25000 tonnes            Environmental Permitting Regulations (Waste) Licence Number: REC291            EPR reference: EA/EPR/JP3590FN/V003            Operator: Sims Group U K Ltd            Waste Management licence No: 27184            Annual Tonnage: 74999.0</p> <p>Issue Date: 14/09/1993            Effective Date: -            Modified: 04/10/2013            Surrendered Date: -            Expiry Date: -            Cancelled Date: -            Status: Modified            Site Name: Sims Group U K Ltd            Correspondence Address: -, -</p>

# 3. Current Land Use Map



Current Land Use Legend



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-  Site Outline
-  Current Industrial Sites
-  Gas Transmission Pipeline
-  Petrol & Fuel Sites
-  Electricity Transmission Cable
-  Search Buffers (m)

# 3. Current Land Uses

## 3.1 Current Industrial Data

Records of potentially contaminative industrial sites within 250m of the study site:

26

The following records are represented as points on the Current Land Uses map.

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1	38.0	SE	Electricity Sub Station		BS11	Electrical Features	Infrastructure and Facilities
2	49.0	NW	Mobile Mini	181411	Unit D2, Chittening Industrial Estate, Chittening, Bristol, BS11 0YB	Container and Storage	Transport, Storage and Delivery
3	67.0	SW	Electricity Sub Station		BS11	Electrical Features	Infrastructure and Facilities
4	106.0	NW	Stone Hardy	352992	London House, Chittening Industrial Estate, Chittening, Bristol, BS11 0YB	Industrial Repairs and Servicing	Repair and Servicing
5	109.0	N	Anstey Transport Services Ltd	353247 181606	Chittening Industrial Estate, Chittening, Bristol, BS11 0YB	Distribution and Haulage	Transport, Storage and Delivery
6A	110.0	NW	A S S L	181448	Chittening Industrial Estate, Chittening, Bristol, BS11 0YB	Container and Storage	Transport, Storage and Delivery
7A	110.0	NW	B I P	181448	Chittening Industrial Estate, Chittening, Bristol, BS11 0YB	Workwear	Industrial Products
8	137.0	NW	Ross Gordon		Chittening Industrial Estate, Chittening, Bristol, BS11 0YB	Vehicle Repair, Testing and Servicing	Repair and Servicing
9	141.0	NE	Tank		BS11	Tanks (Generic)	Industrial Features
10	142.0	NW	Dawson Rentals Ltd	353065 181482	Chittening Industrial Estate, Chittening, Bristol, BS11 0YB	Vehicle Hire and Rental	Hire Services
11C	153.0	NW	Electricity Sub Station		BS11	Electrical Features	Infrastructure and Facilities
12B	164.0	NW	Avonmouth Signs	352976 181365	Unit B1, Chittening Industrial Estate, Chittening, Bristol, BS11 0YB	Signs	Industrial Products
13B	164.0	NW	M & M Trailers Ltd	352976 181365	Unit B1, Chittening Industrial Estate, Chittening, Bristol, BS11 0YB	Vehicle Repair, Testing and Servicing	Repair and Servicing
14	164.0	NW	Brandon Hire	181339	Unit 2, Chittening Industrial Estate, Chittening, Bristol, BS11 0YB	Construction and Tool Hire	Hire Services



ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
15C	168.0	NW	Bristol Industrial Protection Ltd	353005 181424	Chittening Industrial Estate, Chittening, Bristol, BS11 0YB	General Purpose Machinery	Industrial Products
16	190.0	NE	Pipeline		BS11	Pipelines	Industrial Features
17	190.0	SW	Tanks		BS11	Tanks (Generic)	Industrial Features
18D	199.0	SE	Expert Logistics	353288 180988	The Link Building, Smoke Lane, Bristol, BS11 0YA	Distribution and Haulage	Transport, Storage and Delivery
19	200.0	NW	Bibby Distribution Ltd	353150 181679	Chittening Industrial Estate, Chittening, Bristol, BS11 0YB	Distribution and Haulage	Transport, Storage and Delivery
20	215.0	NW	Turners Soham Ltd		Chittening Industrial Estate, Chittening, Bristol, BS11 0YB	Distribution and Haulage	Transport, Storage and Delivery
21	215.0	NW	Avonmouth Auto Electrical Ltd	352908	Unit B Canada Warehouse, Chittening Industrial Estate, Chittening, Bristol, BS11 0YB	Vehicle Repair, Testing and Servicing	Repair and Servicing
22E	220.0	NE	Ryder	353441 181636	Old Severn Valley Brick Factory, Severn Road, Chittening, Bristol, BS11 0YL	Vehicle Hire and Rental	Hire Services
23D	220.0	SE	Warehouse		BS11	Container and Storage	Transport, Storage and Delivery
24	221.0	NW	Docks Industrial Estate		BS11	Business Parks and Industrial Estates	Industrial Features
25E	241.0	NE	Works		BS11	Unspecified Works Or Factories	Industrial Features
26	247.0	N	Pipeline		BS11	Pipelines	Industrial Features

### 3.2 Petrol and Fuel Sites

Records of petrol or fuel sites within 500m of the study site:

0

Database searched and no data found.

### 3.3 National Grid High Voltage Underground Electricity Transmission Cables

This dataset identifies the high voltage electricity transmission lines running between generating power plants and electricity substations. The dataset does not include the electricity distribution network (smaller, lower voltage cables distributing power from substations to the local user network). This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high voltage underground electricity transmission cables within 500m of the study site: 0

Database searched and no data found.

---

### 3.4 National Grid High Pressure Gas Transmission Pipelines

This dataset identifies high-pressure, large diameter pipelines which carry gas between gas terminals, power stations, compressors and storage facilities. The dataset does not include the Local Transmission System (LTS) which supplies gas directly into homes and businesses. This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high pressure gas transmission pipelines within 500m of the study site: 0

Database searched and no data found.

---



# 4. Geology

## 4.1 Artificial Ground and Made Ground

Database searched and no data found.

The database has been searched on site, including a 50m buffer.

---

## 4.2 Superficial Ground and Drift Geology

The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
TFD	TIDAL FLAT DEPOSITS	CLAY AND SILT [UNLITHIFIED DEPOSITS CODING SCHEME]

---

## 4.3 Bedrock and Solid Geology

The database has been searched on site, including a 50m buffer.

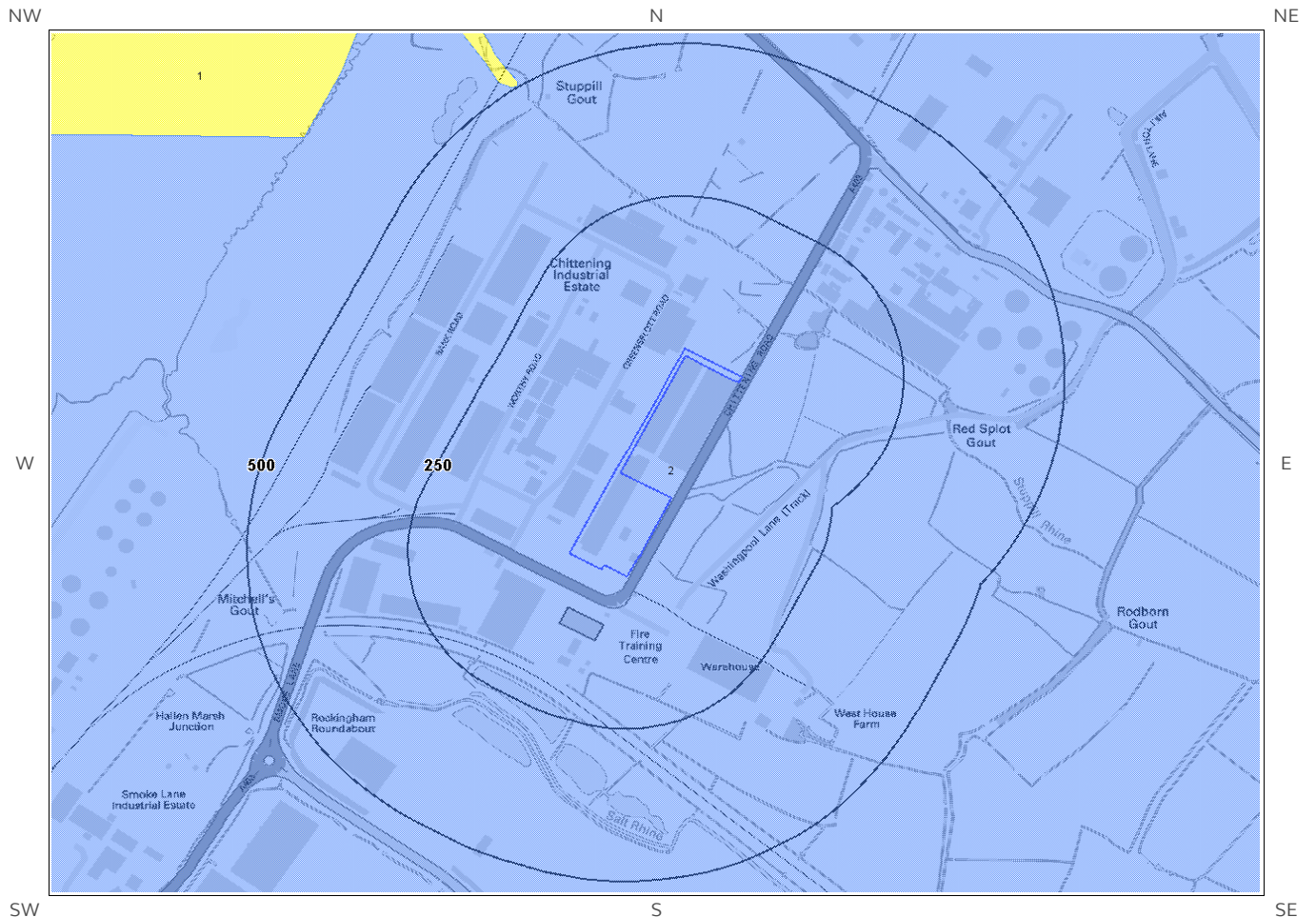
Lex Code	Description	Rock Type
MMG-MDHA	MERCIA MUDSTONE GROUP	MUDSTONE AND HALITE-STONE

(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

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# 5. Hydrogeology and Hydrology

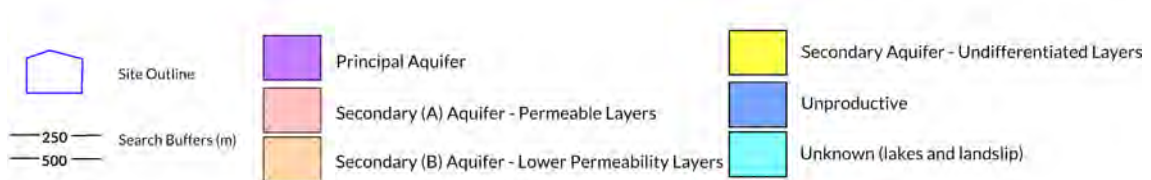
## 5a. Aquifer Within Superficial Geology



Aquifer Within Superficial Geology



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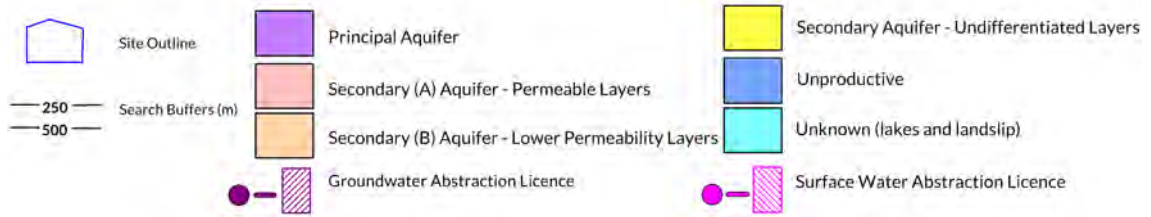
# 5b. Aquifer Within Bedrock Geology and Abstraction Licenses



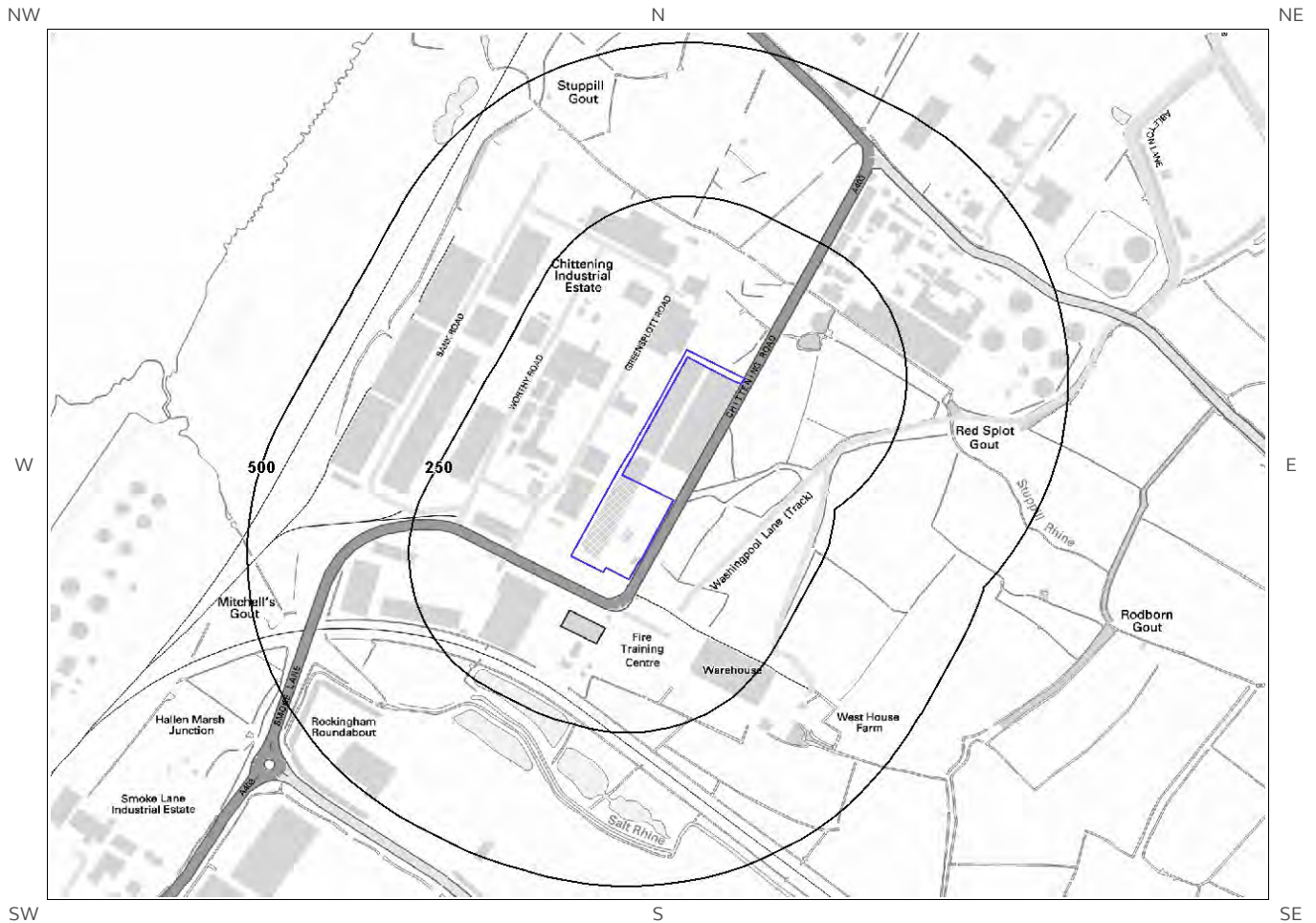
**Aquifer Within Bedrock Geology and Abstraction Licenses**



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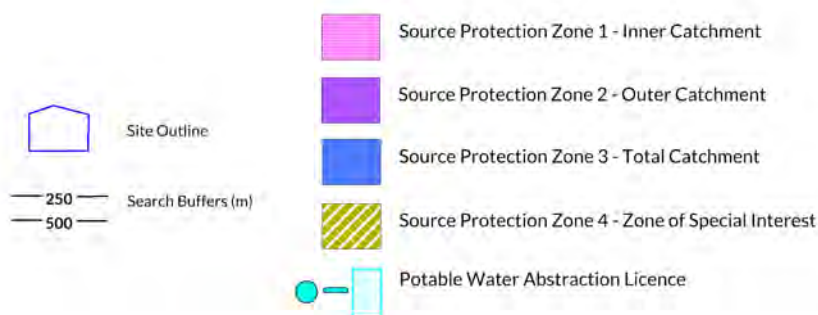
# 5c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licenses



Hydrogeology-Source Protection Zones and Potable Water Abstraction Licenses

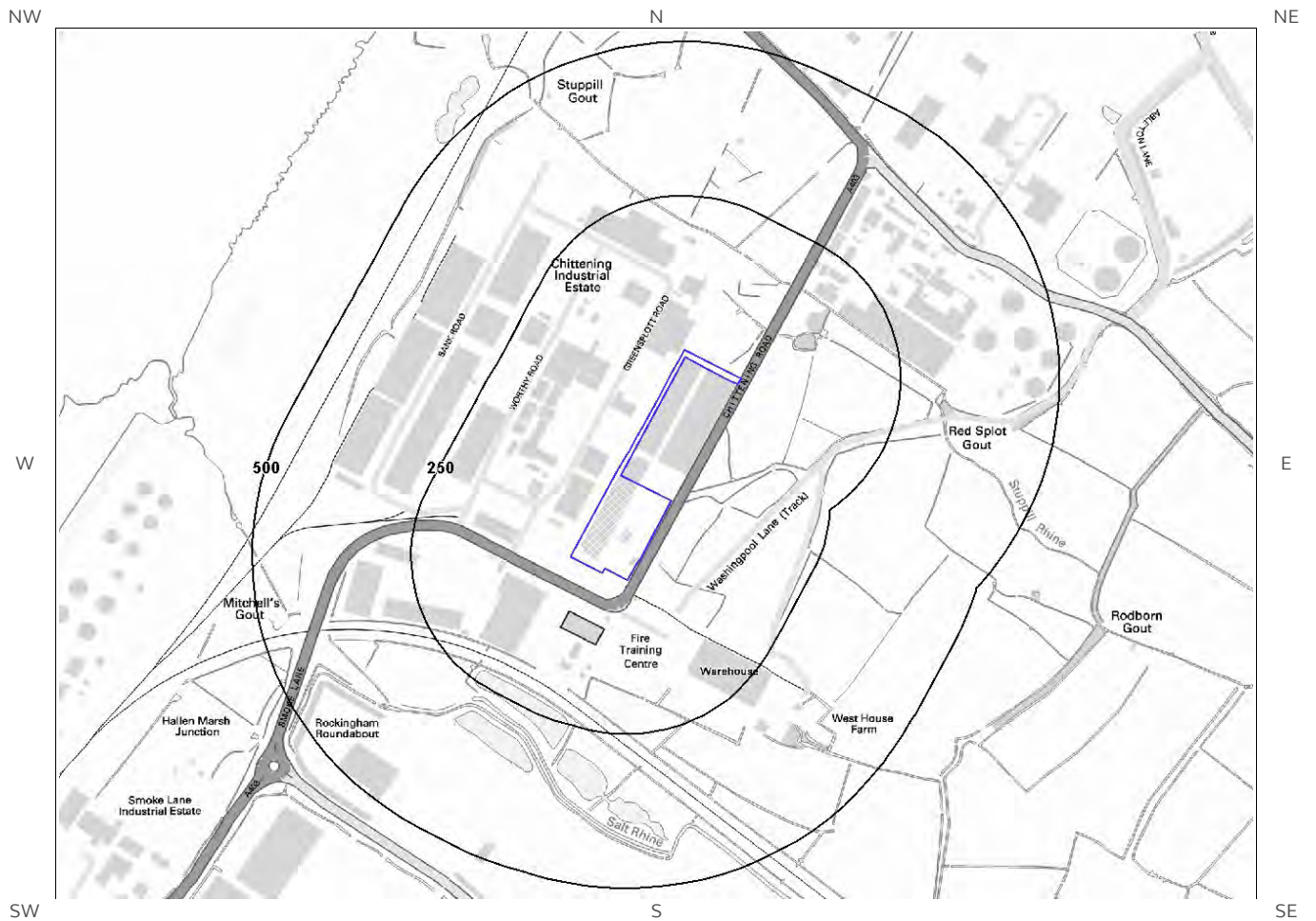


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# 5d. Hydrogeology - Source Protection Zones within confined aquifer



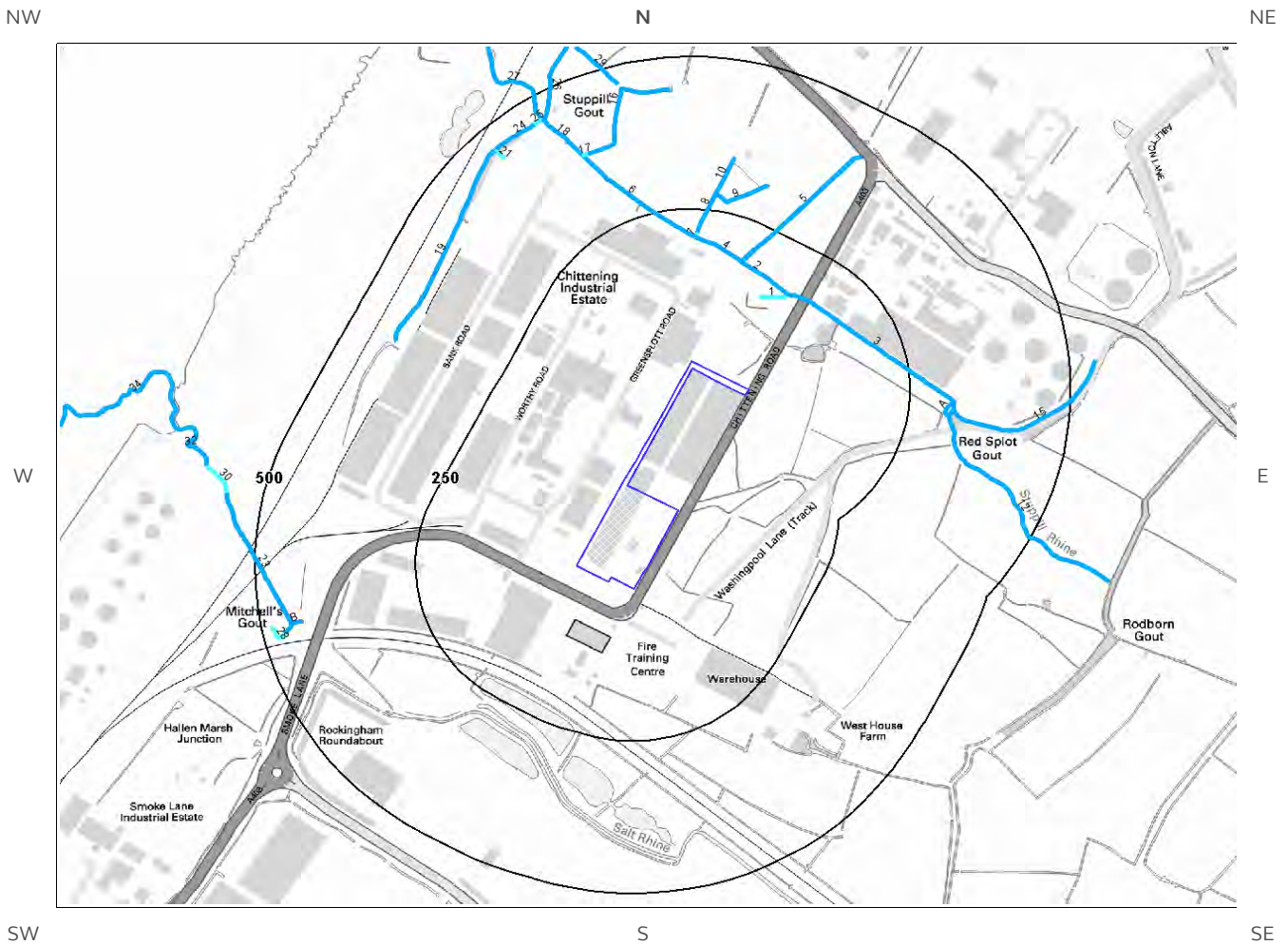
Hydrogeology Source Protection Zones



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# 5e. Hydrology – Detailed River Network and River Quality



Hydrology – Detailed River Network and River Quality

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Site Outline  
 250 Search Buffers (m)  
 500

- |                                       |                                     |
|---------------------------------------|-------------------------------------|
| Primary River                         | Canal                               |
| Secondary River                       | Canal Tunnel                        |
| Tertiary River                        | Culvert                             |
| Lake/Reservoir                        | Multiple Channel Culvert            |
| Underground River (inferred)          | Underground River (Potential Sewer) |
| General Quality Assessment: Biology   | Underground River (local knowledge) |
| General Quality Assessment: Chemistry |                                     |

# 5. Hydrogeology and Hydrology

## 5.1 Aquifer within Superficial Deposits

Are there records of strata classification within the superficial geology at or in proximity to the property?  
Yes

From 1 April 2010, the Environment Agency's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the Groundsure Enviroinsight User Guide.

The following aquifer records are shown on the Aquifer within Superficial Geology Map (5a):

ID	Distance (m)	Direction	Designation	Description
2	0.0	On Site	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

## 5.2 Aquifer within Bedrock Deposits

Are there records of strata classification within the bedrock geology at or in proximity to the property? Yes

From 1 April 2010, the Environment Agency's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the Groundsure Enviroinsight User Guide.

The following aquifer records are shown on the Aquifer within Bedrock Geology Map (5b):

ID	Distance (m)	Direction	Designation	Description
1	0.0	On Site	Secondary B	Predominantly lower permeability layers which may store/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

### 5.3 Groundwater Abstraction Licences

Are there any Groundwater Abstraction Licences within 2000m of the study site? Yes

The following Abstraction Licences records are represented as points, lines and regions on the Aquifer within Bedrock Geology Map (5b):

ID	Distance (m)	Direction	NGR	Name	Details
Not shown	975.0	S	353150 180150	Rhodia UK Limited	Licence No: 18/54/020/G/132 Details: Non-Evaporative Cooling Direct Source: Ground Water - Fresh Point: Madam Farm (borehole No 9) Data Type: Point Annual Volume (m <sup>3</sup> ): 398236 Max Daily Volume (m <sup>3</sup> ): 1091.06 Original Application No: - Original Start Date: 8/7/1966 Expiry Date: - Issue No: 101 Version Start Date: 1/1/2005 Version End Date:
Not shown	975.0	S	353150 180150	Rhodia UK Limited	Licence No: 18/54/020/G/132 Details: Process Water Direct Source: Ground Water - Fresh Point: Madam Farm (borehole No 9) Data Type: Point Annual Volume (m <sup>3</sup> ): 398236 Max Daily Volume (m <sup>3</sup> ): 1091.06 Original Application No: - Original Start Date: 8/7/1966 Expiry Date: - Issue No: 101 Version Start Date: 1/1/2005 Version End Date:
Not shown	1872.0	S	353300 179260	Rhodia UK Limited	Licence No: 18/54/020/G/130 Details: Non-Evaporative Cooling Direct Source: Ground Water - Fresh Point: Merebank (borehole No 6) Data Type: Point Annual Volume (m <sup>3</sup> ): 716826 Max Daily Volume (m <sup>3</sup> ): 1963.91 Original Application No: - Original Start Date: 8/7/1966 Expiry Date: - Issue No: 101 Version Start Date: 1/1/2005 Version End Date:
Not shown	1872.0	S	353300 179260	Rhodia UK Limited	Licence No: 18/54/020/G/130 Details: Process Water Direct Source: Ground Water - Fresh Point: Merebank (borehole No 6) Data Type: Point Annual Volume (m <sup>3</sup> ): 716826 Max Daily Volume (m <sup>3</sup> ): 1963.91 Original Application No: - Original Start Date: 8/7/1966 Expiry Date: - Issue No: 101 Version Start Date: 1/1/2005 Version End Date:

### 5.4 Surface Water Abstraction Licences

Are there any Surface Water Abstraction Licences within 2000m of the study site? No

Database searched and no data found.



## 5.5 Potable Water Abstraction Licences

Are there any Potable Water Abstraction Licences within 2000m of the study site? No

Database searched and no data found.

---

## 5.6 Source Protection Zones

Are there any Source Protection Zones within 500m of the study site? No

Database searched and no data found.

---

## 5.7 Source Protection Zones within Confined Aquifer

Are there any Source Protection Zones within the Confined Aquifer within 500m of the study site?

No

Historically, Source Protection Zone maps have been focused on regulation of activities which occur at or near the ground surface, such as prevention of point source pollution and bacterial contamination of water supplies. Sources in confined aquifers were often considered to be protected from these surface pressures due to the presence of a low permeability confining layer (e.g. glacial till, clay). The increased interest in subsurface activities such as onshore oil and gas exploration, ground source heating and cooling requires protection zones for confined sources to be marked on SPZ maps where this has not already been done.

Database searched and no data found.

---

## 5.8 Groundwater Vulnerability and Soil Leaching Potential

Is there any Environment Agency information on groundwater vulnerability and soil leaching potential within 500m of the study site? No

Database searched and no data found.

---

## 5.9 River Quality

Is there any Environment Agency information on river quality within 1500m of the study site? No

---

**5.9.1 Biological Quality:**

Database searched and no data found.

---

**5.9.2 Chemical Quality:**

Database searched and no data found.

---

## 5.10 Detailed River Network

Are there any Detailed River Network entries within 500m of the study site?

Yes

The following Detailed River Network records are represented on the Hydrology Map (5e):

ID	Distance (m)	Direction	Details
1	143.0	NE	River Name: Drain Welsh River Name: - Alternative Name: - River Type: Tertiary River Main River Status: Currently Undefined
2	168.0	NE	River Name: Stuppill Rhine Welsh River Name: - Alternative Name: - River Type: Secondary River Main River Status: Currently Undefined
3	168.0	NE	River Name: Stuppill Rhine Welsh River Name: - Alternative Name: - River Type: Secondary River Main River Status: Currently Undefined
4	181.0	NE	River Name: Stuppill Rhine Welsh River Name: - Alternative Name: - River Type: Secondary River Main River Status: Currently Undefined
5	181.0	NE	River Name: Drain Welsh River Name: - Alternative Name: - River Type: Secondary River Main River Status: Currently Undefined
6	204.0	N	River Name: Stuppill Rhine Welsh River Name: - Alternative Name: - River Type: Secondary River Main River Status: Currently Undefined
7	204.0	N	River Name: - Welsh River Name: - Alternative Name: - River Type: Tertiary River Main River Status: Currently Undefined
8	212.0	N	River Name: Drain Welsh River Name: - Alternative Name: - River Type: Secondary River Main River Status: Currently Undefined
9	267.0	N	River Name: Drain Welsh River Name: - Alternative Name: - River Type: Secondary River Main River Status: Currently Undefined
10	278.0	N	River Name: Drain Welsh River Name: - Alternative Name: - River Type: Secondary River Main River Status: Currently Undefined
11 A	307.0	E	River Name: Stuppill Rhine Welsh River Name: - Alternative Name: - River Type: Secondary River Main River Status: Currently Undefined
12	312.0	E	River Name: Stuppill Rhine Welsh River Name: - Alternative Name: - River Type: Secondary River Main River Status: Currently Undefined
13 A	312.0	E	River Name: Stuppill Rhine Welsh River Name: - Alternative Name: - River Type: Secondary River Main River Status: Currently Undefined
14 A	318.0	E	River Name: Stuppill Rhine Welsh River Name: - Alternative Name: - River Type: Secondary River Main River Status: Currently Undefined
15	319.0	E	River Name: - Welsh River Name: - Alternative Name: - River Type: Secondary River Main River Status: Currently Undefined
16	375.0	N	River Name: Drain Welsh River Name: - Alternative Name: - River Type: Secondary River Main River Status: Currently Undefined
17	377.0	NW	River Name: - Welsh River Name: - Alternative Name: - River Type: Tertiary River Main River Status: Currently Undefined
18	379.0	NW	River Name: Stuppill Rhine Welsh River Name: - Alternative Name: - River Type: Secondary River Main River Status: Currently Undefined
19	418.0	NW	River Name: Drain Welsh River Name: - Alternative Name: - River Type: Secondary River Main River Status: Currently Undefined
20 B	435.0	W	River Name: - Welsh River Name: - Alternative Name: - River Type: Secondary River Main River Status: Currently Undefined

ID	Distance (m)	Direction	Details	
21	442.0	NW	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
22 B	452.0	W	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
23	452.0	W	River Name: Salt Rhine Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
24	459.0	NW	River Name: - Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
25	459.0	NW	River Name: - Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
26	460.0	NW	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
27	460.0	NW	River Name: Stuppill Rhine Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined
28	467.0	W	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Tertiary River Main River Status: Currently Undefined
29	469.0	N	River Name: Drain Welsh River Name: - Alternative Name: -	River Type: Secondary River Main River Status: Currently Undefined

## 5.11 Surface Water Features

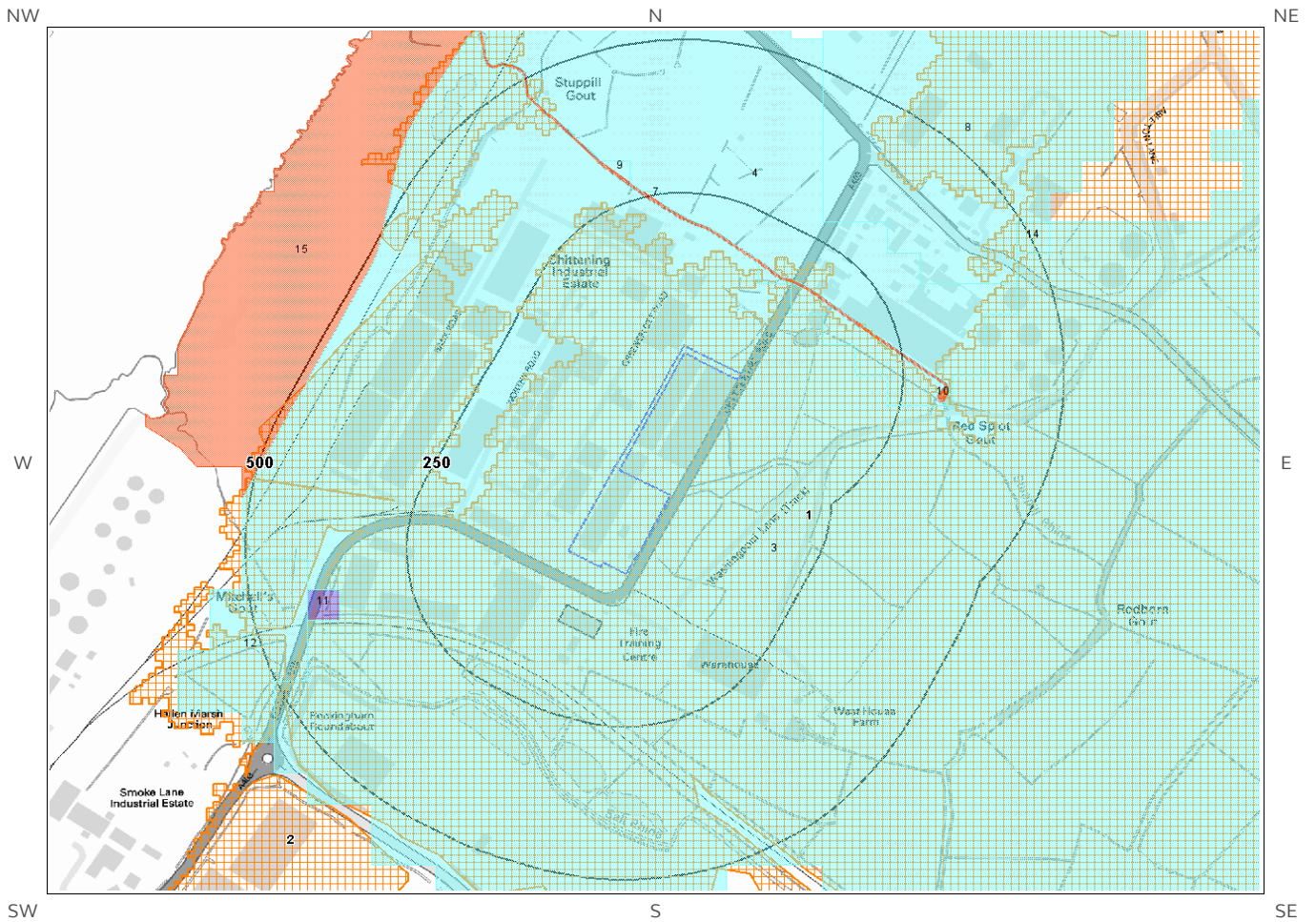
Are there any surface water features within 250m of the study site?

Yes

The following surface water records are not represented on mapping:

Distance (m)	Direction
24.0	E
29.0	SE
34.0	NE
91.0	NE
94.0	E
98.0	E
114.0	SE
138.0	SE
143.0	NE
166.0	S
166.0	NE
167.0	S
179.0	NE
184.0	SW
186.0	S
191.0	SE
210.0	S
215.0	N
218.0	SW
226.0	SW
232.0	SE
248.0	S

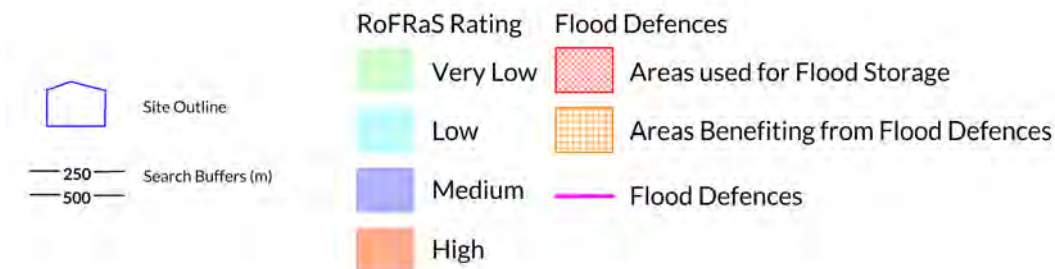
# 6. Environment Agency Risk of Flooding from Rivers and the Sea (RoFRaS) Map



Environment Agency Risk of Flooding From Rivers and the Sea (RoFRaS)



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# 6. Flooding

## 6.1 Risk of Flooding from Rivers and the Sea (RoFRaS)

What is the risk of flooding at the centre of the study site? Low

What is the highest risk of flooding within 25m of the centre of the study site? Low

The Environment Agency RoFRaS database provides an indication of river and coastal flood risk at a national level on a 50m grid as used by many of the insurance companies. RoFRaS data is based on a 50m grid system, with the flood rating at the centre of the grid calculated and given below. The data considers the probability that the flood defences will overtop or breach, and the distance from the river or the sea.

RoFRaS data for the study site indicates the property or an area within 25m has a Low (greater than 1 in 1000 but less than 1 in 100) chance of flooding in any given year.

The following floodplain records within 50m of the study site are represented on the River and Coastal Flood Risk Map above:

ID	Distance (m)	Direction	Rofras Flood Risk
3	0	On Site	Low

## 6.2 Flood Defences

Are there any Flood Defences within 250m of the study site? No

Database searched and no data found.

## 6.3 Areas benefiting from Flood Defences

Are there any areas benefiting from Flood Defences within 250m of the study site? Yes

## 6.4 Areas benefiting from Flood Storage

Are there any areas used for Flood Storage within 250m of the study site? No



## 6.5 Groundwater Flooding Susceptibility Areas

6.5.1 Are there any British Geological Survey groundwater flooding susceptibility areas within 50m of the boundary of the study site?

No

Notes: Groundwater flooding may either be associated with shallow unconsolidated sedimentary aquifers which overlie unproductive aquifers (Superficial Deposits Flooding), or with unconfined aquifers (Clearwater Flooding).

---

6.5.2 What is the highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions?

Not Prone

The area is not considered to be prone to groundwater flooding based on rock type.

---

## 6.6 Groundwater Flooding Confidence Areas

What is the British Geological Survey confidence rating in this result?

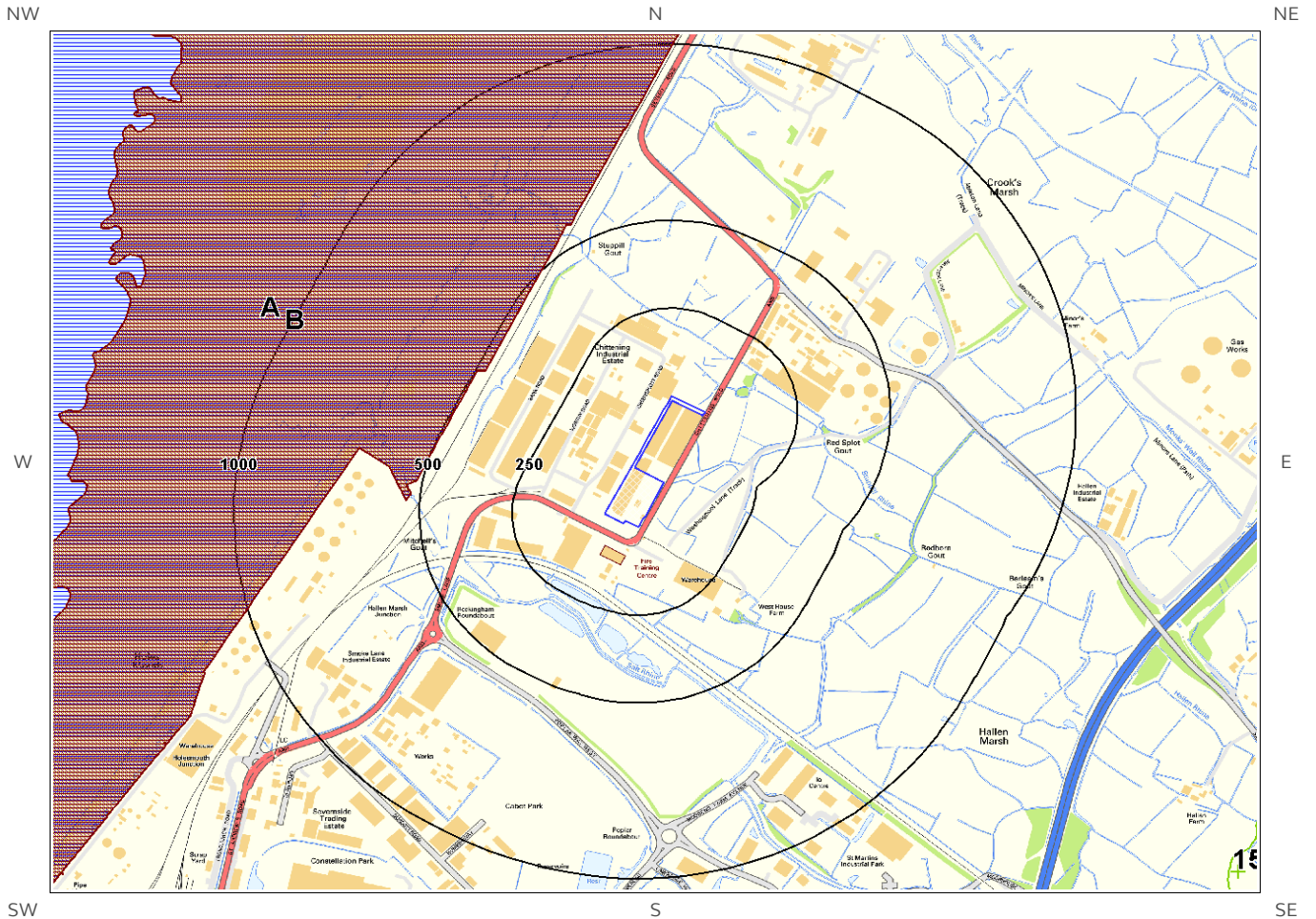
Not Applicable

Notes: Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

The confidence rating is on a threefold scale - Low, Moderate and High. This provides a relative indication of the BGS confidence in the accuracy of the susceptibility result for groundwater flooding. This is based on the amount and precision of the information used in the assessment. In areas with a relatively lower level of confidence the susceptibility result should be treated with more caution. In other areas with higher levels of confidence the susceptibility result can be used with more confidence.

---

# 7. Designated Environmentally Sensitive Sites Map



Designated Environmentally Sensitive Sites Map



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# 7. Designated Environmentally Sensitive Sites

Presence of Designated Environmentally Sensitive Sites within 2000m of the study site? Yes

## 7.1 Records of Sites of Special Scientific Interest (SSSI) within 2000m of the study site:

2

The following Site of Special Scientific Interest (SSSI) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	SSSI Name	Data Source
9B	476.0	NW	Severn Estuary	Natural England
Not shown	1973.0	SW	Severn Estuary	Natural England

## 7.2 Records of National Nature Reserves (NNR) within 2000m of the study site:

0

Database searched and no data found.

## 7.3 Records of Special Areas of Conservation (SAC) within 2000m of the study site:

4

The following Special Area of Conservation (SAC) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	SAC Name	Data Source
1A	476.0	NW	Severn Estuary	Natural England
2A	476.0	NW	Severn Estuary (England)	Natural Resources Wales
Not shown	1973.0	SW	Severn Estuary	Natural England
Not shown	1973.0	SW	Severn Estuary (England)	Natural Resources Wales

**7.4 Records of Special Protection Areas (SPA) within 2000m of the study site:**

4

The following Special Protection Area (SPA) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	SPA Name	Data Source
5B	476.0	NW	Severn Estuary	Natural England
6B	476.0	NW	Severn Estuary (England)	Natural Resources Wales
Not shown	1973.0	SW	Severn Estuary	Natural England
Not shown	1973.0	SW	Severn Estuary (England)	Natural Resources Wales

**7.5 Records of Ramsar sites within 2000m of the study site:**

4

The following Ramsar records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	Ramsar Site Name	Ramsar Site Status	Data Source
11B	476.0	NW	Severn Estuary	Current	Natural England
12B	476.0	NW	Severn Estuary (England)	Current	Natural Resources Wales
Not shown	1973.0	SW	Severn Estuary	Current	Natural England
Not shown	1973.0	SW	Severn Estuary (England)	Current	Natural Resources Wales

**7.6 Records of Ancient Woodland within 2000m of the study site:**

0

Database searched and no data found.

**7.7 Records of Local Nature Reserves (LNR) within 2000m of the study site:**

0

Database searched and no data found.

**7.8 Records of World Heritage Sites within 2000m of the study site:**

0

Database searched and no data found.

---

**7.9 Records of Environmentally Sensitive Areas within 2000m of the study site:**

0

Database searched and no data found.

---

**7.10 Records of Areas of Outstanding Natural Beauty (AONB) within 2000m of the study site:**

0

Database searched and no data found.

---

**7.11 Records of National Parks (NP) within 2000m of the study site:**

0

Database searched and no data found.

---

**7.12 Records of Nitrate Sensitive Areas within 2000m of the study site:**

0

Database searched and no data found.

---

**7.13 Records of Nitrate Vulnerable Zones within 2000m of the study site:**

0

Database searched and no data found.

---

**7.14 Records of Green Belt land within 2000m of the study site:**

2

Green Belt data contains Ordnance Survey data © Crown copyright and database right [2015]

ID	Distance (m)	Direction	Green Belt Name	Local Authority Name
15	1606.0	E	Bristol and Bath Greenbelt	South Gloucestershire

---

Not shown	1960.0	SE	Bristol and Bath Greenbelt	South Gloucestershire
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# 8. Natural Hazards Findings

## 8.1 Detailed BGS GeoSure Data

BGS GeoSure Data has been searched to 50m. The data is included in tabular format. If you require further information on geology and ground stability, please obtain a Groundsure GeoInsight, available from our website. The following information has been found:

### 8.1.1 Shrink Swell

What is the maximum Shrink-Swell\* hazard rating identified on the study site? Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

---

**Hazard**

---

Ground conditions predominantly medium plasticity. Do not plant trees with high soil moisture demands near to buildings. For new build, consideration should be given to advice published by the National House Building Council (NHBC) and the Building Research Establishment (BRE). There is a possible increase in construction cost to reduce potential shrink-swell problems. For existing property, there is a possible increase in insurance risk, especially during droughts or where vegetation with high moisture demands is present.

---

### 8.1.2 Landslides

What is the maximum Landslide\* hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

---

**Hazard**

---

Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.

---



---

\* This indicates an automatically generated 50m buffer and site.

### 8.1.3 Soluble Rocks

What is the maximum Soluble Rocks\* hazard rating identified on the study site? Negligible

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

---

**Hazard**

---

Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

---

### 8.1.4 Compressible Ground

What is the maximum Compressible Ground\* hazard rating identified on the study site? Moderate

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

---

**Hazard**

---

Significant potential for compressibility problems. Avoid large differential loadings of ground. Do not drain or de-water ground near the property without technical advice. For new build consider possibility of compressible ground in ground investigation, construction and building design. Consider effects of groundwater changes. Extra construction costs are likely. For existing property possible increase in insurance risk from compressibility, especially if water conditions or loading of the ground change significantly.

---

### 8.1.5 Collapsible Rocks

What is the maximum Collapsible Rocks\* hazard rating identified on the study site? Negligible

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

---

**Hazard**

---

No indicators for collapsible deposits identified. No actions required to avoid problems due to collapsible deposits. No special ground investigation required, or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

---



## 8.1.6 Running Sand

What is the maximum Running Sand\* hazard rating identified on the study site?

Moderate

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

---

**Hazard**

---

Significant potential for running sand problems with relatively small changes in ground conditions. Avoid large amounts of water entering the ground (for example through pipe leakage or soak-aways). Do not dig (deep) holes into saturated ground near the property without technical advice. For new build consider the consequences of soil and groundwater conditions during and after construction. For existing property possible increase in insurance risk from running sand, for example, due to water leakage, high rainfall events or flooding.

---



---

\* This indicates an automatically generated 50m buffer and site.

# 9. Mining

## 9.1 Coal Mining

Are there any coal mining areas within 75m of the study site? No

Database searched and no data found.

---

## 9.2 BGS Non Coal Mining Hazards

What is the potential for undermining as a result of underground mineral extraction, excluding coal and minerals extracted as a consequence of coal mining? Unclassified

Database searched and no data found.

---

## 9.3 Brine Affected Areas

Are there any brine affected areas within 75m of the study site? No

Guidance: No Guidance Required.

---

# Contact Details

EmapSite  
Telephone: 0118 9736883  
sales@emapsite.com

## British Geological Survey Enquiries

Kingsley Dunham Centre  
Keyworth, Nottingham NG12 5GG  
Tel: 0115 936 3143.  
Fax: 0115 936 3276.  
Email: [enquiries@bgs.ac.uk](mailto:enquiries@bgs.ac.uk)  
Web: [www.bgs.ac.uk](http://www.bgs.ac.uk)

BGS Geological Hazards Reports and general geological enquiries



## Environment Agency

National Customer Contact Centre, PO Box 544  
Rotherham, S60 1BY  
Tel: 08708 506 506  
Web: [www.environment-agency.gov.uk](http://www.environment-agency.gov.uk)  
Email: [enquiries@environment-agency.gov.uk](mailto:enquiries@environment-agency.gov.uk)



## Public Health England

Public information access office  
Public Health England, Wellington House  
133-155 Waterloo Road, London, SE1 8UG  
[www.gov.uk/phe](http://www.gov.uk/phe)  
Email: [enquiries@phe.gov.uk](mailto:enquiries@phe.gov.uk)  
Main switchboard: 020 7654 8000



Public Health  
England

## The Coal Authority

200 Lichfield Lane  
Mansfield  
Notts NG18 4RG  
Tel: 0345 7626 848  
DX 716176 Mansfield 5  
[www.coal.gov.uk](http://www.coal.gov.uk)



The Coal  
Authority

## Ordnance Survey

Adanac Drive, Southampton  
SO16 0AS  
Tel: 08456 050505



## Local Authority

Authority: Bristol City Council  
Phone: 0117 922 2000  
Web: <http://www.bristol.gov.uk/>  
Address: The Council House, College Green, Bristol, BS1 5TR

## Gemapping PLC

Virginia Villas, High Street, Hartley Witney,  
Hampshire RG27 8NW  
Tel: 01252 845444



Acknowledgements: Site of Special Scientific Interest, National Nature Reserve, Ramsar Site, Special Protection Area, Special Area of Conservation data is provided by, and used with the permission of, Natural England who retain the Copyright and Intellectual Property Rights for the data.

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This report has been prepared in accordance with the Groundsure Ltd standard Terms and Conditions of business for work of this nature.

## Standard Terms and Conditions

### 1 Definitions

In these terms and conditions unless the context otherwise requires:

**“Beneficiary”** means the person or entity for whose benefit the Client has obtained the Services.

**“Client”** means the party or parties entering into a Contract with Groundsure.

**“Commercial”** means any building or property which is not Residential.

**“Confidential Information”** means the contents of this Contract and all information received from the Client as a result of, or in connection with, this Contract other than

(i) information which the Client can prove was rightfully in its possession prior to disclosure by Groundsure and

(ii) any information which is in the public domain (other than by virtue of a breach of this Contract).

**“Support Services”** means Support Services provided by Groundsure including, without limitation, interpreting third party and in-house environmental data, providing environmental support advice, undertaking environmental audits and assessments, Site investigation, Site monitoring and related items.

**“Contract”** means the contract between Groundsure and the Client for the provision of the Services, and which shall incorporate these terms and conditions, the Order, and the relevant User Guide.

**“Third Party Data Provider”** means any third party providing Third Party Content to Groundsure.

**“Data Reports”** means reports comprising factual data with no accompanying interpretation.

**“Fees”** has the meaning set out in clause 5.1.

**“Groundsure”** means Groundsure Limited, a company registered in England and Wales under number 03421028.

**“Groundsure Materials”** means all materials prepared by Groundsure and provided as part of the Services, including but not limited to Third Party Content, Data Reports, Mapping, and Risk Screening Reports.

**“Intellectual Property”** means any patent, copyright, design rights, trade or service mark, moral rights, data protection rights, know-how or trade mark in each case whether registered or not and including applications for the same or any other rights of a similar nature anywhere in the world.

**“Mapping”** means a map, map data or a combination of historical maps of various ages, time periods and scales.

**“Order”** means an electronic, written or other order form submitted by the Client requesting Services from Groundsure in respect of a specified Site.

**“Ordnance Survey”** means the Secretary of State for Business, Innovation and Skills, acting through Ordnance Survey, Adanac Drive, Southampton, SO16 0AS, UK.

**“Order Website”** means the online platform through which Orders may be placed by the Client and accepted by Groundsure.

**“Report”** means a Risk Screening Report or Data Report for Commercial or Residential property.

**“Residential”** means any building or property used as or intended to be used as a single dwelling.

**“Risk Screening Report”** means a risk screening report comprising factual data with an accompanying interpretation by Groundsure.

**“Services”** means any Report, Mapping and/or Support Services which Groundsure has agreed to provide by accepting an Order pursuant to clause 2.6.

**“Site”** means the area of land in respect of which the Client has requested Groundsure to provide the Services.

**“Third Party Content”** means data, database information or other information which is provided to Groundsure by a Third Party Data Provider.

**“User Guide”** means the user guide, as amended from time to time, available upon request from Groundsure and on the website ([www.Groundsure.com](http://www.Groundsure.com)) and forming part of this Contract.

### 2 Scope of Services, terms and conditions, requests for insurance and quotations

2.1 Groundsure agrees to provide the Services in accordance with the Contract.

2.2 Groundsure shall exercise reasonable skill and care in the provision of the Services.

2.3 Subject to clause 7.3 the Client acknowledges that it has not relied on any statement or representation made by or on behalf of Groundsure which is not set out and expressly agreed in writing in the Contract and all such statements and representations are hereby excluded to the fullest extent permitted by law.

2.4 The Client acknowledges that terms and conditions appearing on a Client’s order form, printed stationery or other communication, or any terms or conditions implied by custom, practice or course of dealing shall be of no effect, and that this Contract shall prevail over all others in relation to the Order.

2.5 If the Client or Beneficiary requests insurance in conjunction with or as a result of the Services, Groundsure shall use reasonable endeavours to recommend such insurance, but makes no warranty that such insurance shall be available from insurers or that it will be offered on reasonable terms. Any insurance purchased by the Client or Beneficiary shall be subject solely to the terms of the policy issued by insurers and Groundsure will have no liability therefor. In addition you acknowledge and agree that Groundsure does not act as an agent or broker for any insurance providers. The Client should take (and ensure that the Beneficiary takes) independent advice to ensure that the insurance policy requested or offered is suitable for its requirements.

2.6 Groundsure’s quotations or proposals are valid for a period of 30 days only unless an alternative period of time is explicitly stipulated by Groundsure. Groundsure reserves the right to withdraw any quotation or proposal at any time before an Order is accepted by Groundsure. Groundsure’s acceptance of an Order shall be binding only when made in writing and signed by Groundsure’s authorised representative or when accepted through the Order Website.

### 3 The Client’s obligations

3.1 The Client shall comply with the terms of this Contract and

(i) procure that the Beneficiary or any third party relying on the Services complies with and acts as if it is bound by the Contract and

(ii) be liable to Groundsure for the acts and omissions of the Beneficiary or any third party relying on the Services as if such acts and omissions were those of the Client.

3.2 The Client shall be solely responsible for ensuring that the Services are appropriate and suitable for its and/or the Beneficiary’s needs.

3.3 The Client shall supply to Groundsure as soon as practicable and without charge all requisite information (and the Client warrants that such information is accurate, complete and appropriate), including without limitation any environmental information relating to the Site and shall give such assistance as Groundsure shall reasonably require in the provision of the Services including, without limitation, access to the Site, facilities and equipment.

3.4 Where the Client’s approval or decision is required to enable Groundsure to carry out work in order to provide the Services, such approval or decision shall be given or procured in reasonable time and so as not to delay or disrupt the performance of the Services.

3.5 Save as expressly permitted by this Contract the Client shall not, and shall procure that the Beneficiary shall not, re-sell, alter, add to, or amend the Groundsure Materials, or use the Groundsure Materials in a manner for which they were not intended. The Client may make the Groundsure Materials available to a third party who is considering acquiring some or all of, or providing funding in relation to, the Site, but such third party cannot rely on the same unless expressly permitted under clause 4.

3.6 The Client is responsible for maintaining the confidentiality of its user name and password if using the Order Website and the Client acknowledges that Groundsure accepts no liability of any kind for any loss or damage suffered by the Client as a consequence of using the Order Website.

### 4 Reliance

4.1 The Client acknowledges that the Services provided by Groundsure consist of the presentation and analysis of Third Party Content and other content and that information obtained from a Third Party Data Provider cannot be guaranteed or warranted by Groundsure to be reliable.

4.2 In respect of Data Reports, Mapping and Risk Screening Reports, the following classes of person and no other are entitled to rely on their contents;

(i) the Beneficiary,

(ii) the Beneficiary’s professional advisers, (iii) any person providing funding to the Beneficiary in relation to the Site (whether directly or as part of a lending syndicate),

(iv) the first purchaser or first tenant of the Site, and

(v) the professional advisers and lenders of the first purchaser or tenant of the Site.

4.3 In respect of Support Services, only the Client, Beneficiary and parties expressly named in a Report and no other parties are entitled to rely on its contents.

4.4 Save as set out in clauses 4.2 and 4.3 and unless otherwise expressly agreed in writing, no other person or entity of any kind is entitled to rely on any Services or Report issued or provided by Groundsure. Any party considering such Reports and Services does so at their own risk.

### 5 Fees and Disbursements

5.1 Groundsure shall charge and the Client shall pay fees at the rate and

frequency specified in the written proposal, Order Website or Order acknowledgement form, plus (in the case of Support Services) all proper disbursements incurred by Groundsure. The Client shall in addition pay all value added tax or other tax payable on such fees and disbursements in relation to the provision of the Services (together "Fees").

5.2 The Client shall pay all outstanding Fees to Groundsure in full without deduction, counterclaim or set off within 30 days of the date of Groundsure's invoice or such other period as may be agreed in writing between Groundsure and the Client ("Payment Date"). Interest on late payments will accrue on a daily basis from the Payment Date until the date of payment (whether before or after judgment) at the rate of 8% per annum.

5.3 The Client shall be deemed to have agreed the amount of any invoice unless an objection is made in writing within 28 days of the date of the invoice. As soon as reasonably practicable after being notified of an objection, without prejudice to clause 5.2 a member of Groundsure's management team will contact the Client and the parties shall then use all reasonable endeavours to resolve the dispute within 15 days.

## 6 Intellectual Property and Confidentiality

### 6.1 Subject to

(i) full payment of all relevant Fees and

(ii) compliance with this Contract, the Client is granted (and is permitted to sub-licence to the Beneficiary) a royalty-free, worldwide, non-assignable and (save to the extent set out in this Contract) non-transferable licence to make use of the Groundsure Materials.

6.2 All Intellectual Property in the Groundsure Materials are and shall remain owned by Groundsure or Groundsure's licensors (including without limitation the Third Party Data Providers) the Client acknowledges, and shall procure acknowledgement by the Beneficiary of, such ownership. Nothing in this Contract purports to transfer or assign any rights to the Client or the Beneficiary in respect of such Intellectual Property.

6.3 Third Party Data Providers may enforce any breach of clauses 6.1 and 6.2 against the Client or Beneficiary.

6.4 The Client shall, and shall procure that any recipients of the Groundsure Materials shall:

(i) not remove, suppress or modify any trade mark, copyright or other proprietary marking belonging to Groundsure or any third party from the Services;

(ii) use the information obtained as part of the Services in respect of the subject Site only, and shall not store or reuse any information obtained as part of the Services provided in respect of adjacent or nearby sites;

(iii) not create any product or report which is derived directly or indirectly from the Services (save that those acting in a professional capacity to the Beneficiary may provide advice based upon the Services);

(iv) not combine the Services with or incorporate such Services into any other information data or service;

(v) not reformat or otherwise change (whether by modification, addition or enhancement), the Services (save that those acting for the Beneficiary in a professional capacity shall not be in breach of this clause 6.4(v) where such reformatting is in the normal course of providing advice based upon the Services);

(vi) where a Report and/or Mapping contains material belonging to Ordnance Survey, acknowledge and agree that such content is protected by Crown Copyright and shall not use such content for any purpose outside of receiving the Services; and

(vii) not copy in whole or in part by any means any map prints or run-on copies containing content belonging to Ordnance Survey (other than that contained within Ordnance Survey's OS Street Map) without first being in possession of a valid Paper Map Copying Licence from Ordnance Survey,

6.5 Notwithstanding clause 6.4, the Client may make reasonable use of the Groundsure Materials in order to advise the Beneficiary in a professional capacity. However, Groundsure shall have no liability in respect of any advice, opinion or report given or provided to Beneficiaries by the Client.

6.6 The Client shall procure that any person to whom the Services are made available shall notify Groundsure of any request or requirement to disclose, publish or disseminate any information contained in the Services in accordance with the Freedom of Information Act 2000, the Environmental Information Regulations 2004 or any associated legislation or regulations in force from time to time.

## 7. Liability: Particular Attention Should Be Paid To This Clause

7.1 This Clause 7 sets out the entire liability of Groundsure, including any liability for the acts or omissions of its employees, agents, consultants, subcontractors and Third Party Content, in respect of:

(i) any breach of contract, including any deliberate breach of the Contract by Groundsure or its employees, agents or

subcontractors;

(ii) any use made of the Reports, Services, Materials or any part of them; and

(iii) any representation, statement or tortious act or omission (including negligence) arising under or in connection with the Contract.

7.2 All warranties, conditions and other terms implied by statute or common law are, to the fullest extent permitted by law, excluded from the Contract.

7.3 Nothing in the Contract limits or excludes the liability of the Supplier for death or personal injury resulting from negligence, or for any damage or liability incurred by the Client or Beneficiary as a result of fraud or fraudulent misrepresentation.

7.4 Groundsure shall not be liable for

(i) loss of profits;

(ii) loss of business;

(iii) depletion of goodwill and/or similar losses;

(iv) loss of anticipated savings;

(v) loss of goods;

(vi) loss of contract;

(vii) loss of use;

(viii) loss or corruption of data or information;

(ix) business interruption;

(x) any kind of special, indirect, consequential or pure economic loss, costs, damages, charges or expenses;

(xi) loss or damage that arise as a result of the use of all or part of the Groundsure Materials in breach of the Contract;

(xii) loss or damage arising as a result of any error, omission or inaccuracy in any part of the Groundsure Materials where such error, omission or inaccuracy is caused by any Third Party Content or any reasonable interpretation of Third Party Content;

(xiii) loss or damage to a computer, software, modem, telephone or other property; and

(xiv) loss or damage caused by a delay or loss of use of Groundsure's internet ordering service.

7.5 Groundsure's total liability in relation to or under the Contract shall be limited to £10 million for any claim or claims.

7.6 Groundsure shall procure that the Beneficiary shall be bound by limitations and exclusions of liability in favour of Groundsure which accord with those detailed in clauses 7.4 and 7.5 (subject to clause 7.3) in respect of all claims which the Beneficiary may bring against Groundsure in relation to the Services or other matters arising pursuant to the Contract.

## 8 Groundsure's right to suspend or terminate

8.1 If Groundsure reasonably believes that the Client or Beneficiary has not provided the information or assistance required to enable the proper provision of the Services, Groundsure shall be entitled to suspend all further performance of the Services until such time as any such deficiency has been made good.

8.2 Groundsure shall be entitled to terminate the Contract immediately on written notice in the event that:

(i) the Client fails to pay any sum due to Groundsure within 30 days of the Payment Date; or

(ii) the Client (being an individual) has a bankruptcy order made against him or (being a company) shall enter into liquidation whether compulsory or voluntary or have an administration order made against it or if a receiver shall be appointed over the whole or any part of its property assets or undertaking or if the Client is struck off the Register of Companies or dissolved; or

(iii) the Client being a company is unable to pay its debts within the meaning of Section 123 of the Insolvency Act 1986 or being an individual appears unable to pay his debts within the meaning of Section 268 of the Insolvency Act 1986 or if the Client shall enter into a composition or arrangement with the Client's creditors or shall suffer distress or execution to be levied on his goods; or

(iv) the Client or the Beneficiary breaches any term of the Contract (including, but not limited to, the obligations in clause 4) which is incapable of remedy or if remediable, is not remedied within five days of notice of the breach.

## 9. Client's Right to Terminate and Suspend

9.1 Subject to clause 10.1, the Client may at any time upon written notice terminate or suspend the provision of all or any of the Services.

9.2 In any event, where the Client is a consumer (and not a business) he/she hereby expressly acknowledges and agrees that:

(i) the supply of Services under this Contract (and therefore the performance of this Contract) commences immediately upon Groundsure's acceptance of the Order; and

(ii) the Reports and/or Mapping provided under this Contract are

(a) supplied to the Client's specification(s) and in any event

(b) by their nature cannot be returned.

## 10 Consequences of Withdrawal, Termination or Suspension

10.1 Upon termination of the Contract:

(i) Groundsure shall take steps to bring to an end the Services in an orderly manner, vacate any Site with all reasonable speed and shall deliver to the Client and/or Beneficiary any property of the Client and/or Beneficiary in Groundsure's possession or control; and

(ii) the Client shall pay to Groundsure all and any Fees payable in respect of the performance of the Services up to the date of termination or suspension. In respect of any Support Services provided, the Client shall also pay Groundsure any additional costs incurred in relation to the termination or suspension of the Contract.

## 11 Anti-Bribery

11.1 The Client warrants that it shall:

(i) comply with all applicable laws, statutes and regulations relating to anti-bribery and anti-corruption including but not limited to the Bribery Act 2010;

(ii) comply with such of Groundsure's anti-bribery and anti-corruption policies as are notified to the Client from time to time; and

(iii) promptly report to Groundsure any request or demand for any undue financial or other advantage of any kind received by or on behalf of the Client in connection with the performance of this Contract.

11.2 Breach of this Clause 11 shall be deemed a material breach of this Contract.

## 12 General

12.1 The Mapping contained in the Services is protected by Crown copyright and must not be used for any purpose other than as part of the Services or as specifically provided in the Contract.

12.2 The Client shall be permitted to make one copy only of each Report or Mapping Order. Thereafter the Client shall be entitled to make unlimited copies of the Report or Mapping Order only in accordance with an Ordnance Survey paper map copy license available through Groundsure.

12.3 Groundsure reserves the right to amend or vary this Contract. No amendment or variation to this Contract shall be valid unless signed by an authorised representative of Groundsure.

12.4 No failure on the part of Groundsure to exercise, and no delay in exercising, any right, power or provision under this Contract shall operate as a waiver thereof.

12.5 Save as expressly provided in this Contract, no person other than the persons set out therein shall have any right under the Contract (Rights of Third Parties) Act 1999 to enforce any terms of the Contract.

12.6 The Secretary of State for Business, Innovation and Skills ("BIS") or BIS' successor body, as the case may be, acting through Ordnance Survey may enforce a breach of clause 6.4(vi) and clause 6.4(vii) of these terms and conditions against the Client in accordance with the provisions of the Contracts (Rights of Third Parties) Act 1999.

12.7 Groundsure shall not be liable to the Client if the provision of the Services is delayed or prevented by one or more of the following circumstances:

(i) the Client or Beneficiary's failure to provide facilities, access or information;

(ii) fire, storm, flood, tempest or epidemic;

(iii) Acts of God or the public enemy;

(iv) riot, civil commotion or war;

(v) strikes, labour disputes or industrial action;

(vi) acts or regulations of any governmental or other agency;

(vii) suspension or delay of services at public registries by Third Party Data Providers;

(viii) changes in law; or

(ix) any other reason beyond Groundsure's reasonable control.

In the event that Groundsure is prevented from performing the Services (or any part thereof) in accordance with this clause 12.6 for a period of not less than 30 days then Groundsure shall be entitled to terminate this Contract immediately on written notice to the Client.

12.8 Any notice provided shall be in writing and shall be deemed to be properly given if delivered by hand or sent by first class post, facsimile or by email to the address, facsimile number or email address of the relevant party as may have been notified by each party to the other for such purpose or in the absence of such notification the last known address.

12.9 Such notice shall be deemed to have been received on the day of delivery if delivered by hand, facsimile or email (save to the extent such day is not a working day where it shall be deemed to have been delivered on the next working day) and on the second working day after the day of posting if sent by first class post.

12.10 The Contract constitutes the entire agreement between the parties and shall supersede all previous arrangements between the parties relating to the subject matter hereof.

12.11 Each of the provisions of the Contract is severable and distinct from the others and if one or more provisions is or should become invalid, illegal or unenforceable, the validity and enforceability of the remaining provisions shall not in any way be tainted or impaired.

12.12 This Contract shall be governed by and construed in accordance with English law and any proceedings arising out of or connected with this Contract shall be subject to the exclusive jurisdiction of the English courts.

12.13 Groundsure is an executive member of the Council of Property Search Organisation (CoPSO) and has signed up to the Search Code administered by the Property Codes Compliance Board (PCCB). All Risk Screening Reports shall be supplied in accordance with the provisions of the Search Code.

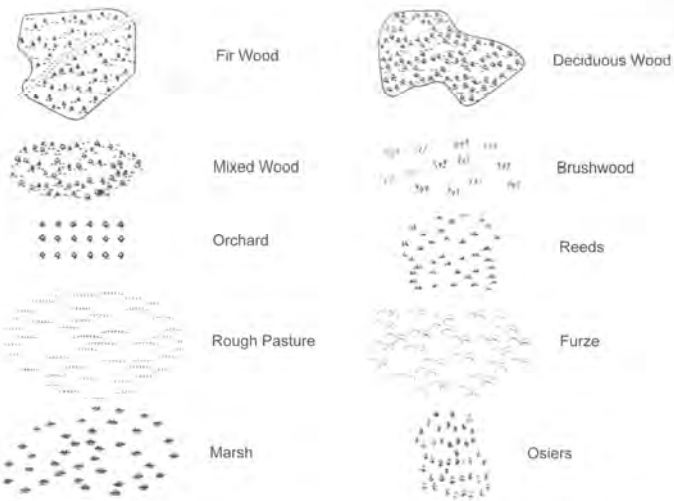
12.14 If the Client or Beneficiary has a complaint about the Services, written notice should be given to the Compliance Officer at Groundsure who will respond in a timely manner.

12.15 The Client agrees that it shall, and shall procure that each Beneficiary shall, treat in confidence all Confidential Information and shall not, and shall procure that each Beneficiary shall not (i) disclose any Confidential Information to any third party other than in accordance with the terms of this Contract; and (ii) use Confidential Information for a purpose other than the exercise of its rights and obligations under this Contract. Subject to clause 6.6, nothing shall prevent the Client or any Beneficiary from disclosing Confidential Information to the extent required by law.

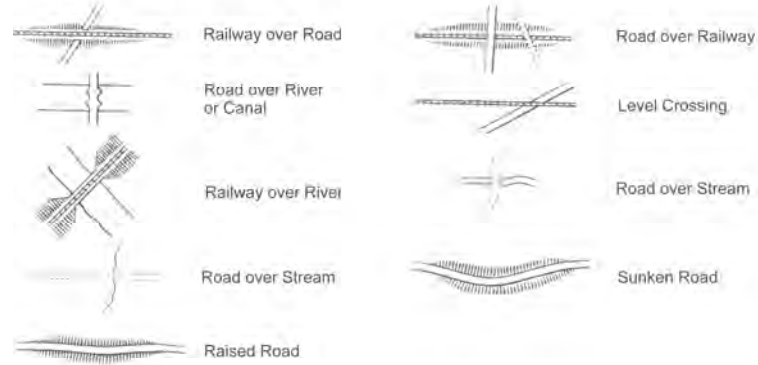
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# County Series 1:10,560 scale

## VEGETATION



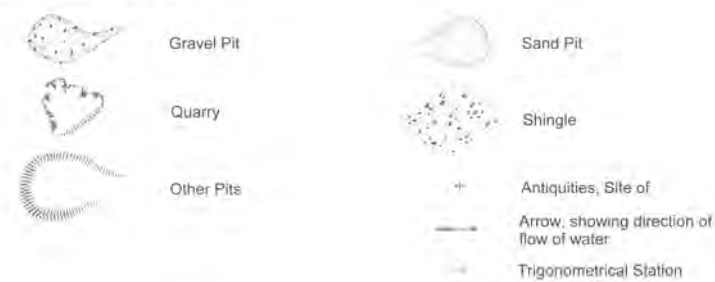
## ROADS



## RAILWAYS



## GENERAL FEATURES



## BOUNDARIES



# National Grid 1:10,000 scale

## HEIGHTS (METRES)

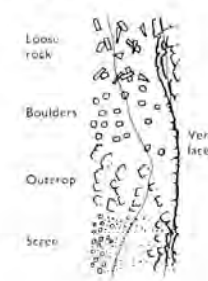
Values are given in metres above mean sea level at Newlyn.

Surface heights determined by ground survey or air survey.

Bench marks and their values are shown on large scale maps, and bench mark lists containing fuller and possibly later levelling information are obtainable from the Director General, Ordnance Survey.

Contours are at 5 metres vertical interval.

## ROCK FEATURES



## CONVERSION SCALE

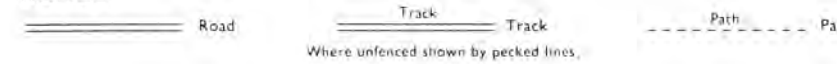
Metres - Feet



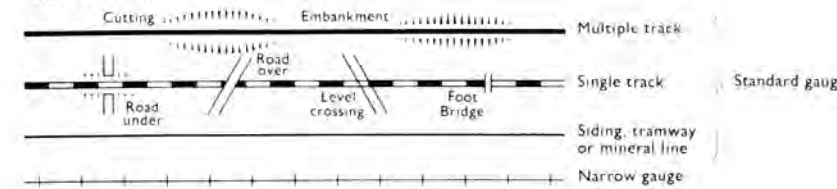
## ABBREVIATIONS

BP,BS	Boundary Post or Stone	PO	Post Office
Ch	Church	PC	Public Convenience
CH	Club House	PH	Public House
F Sta	Fire Station	S	Stone
FB	Foot Bridge	Spr	Spring
Fn	Fountain	TCB	Telephone Call Box
GP	Guide Post	TCP	Telephone Call Post
MP,MS	Mile Post or Stone	TH	Town Hall
P	Pole or Post	W	Well
Poi Sta	Police Station	Y	Youth hostel

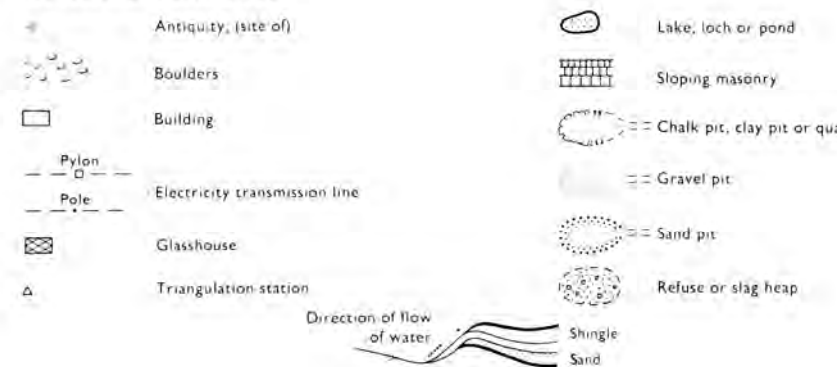
## ROADS



## RAILWAYS



## GENERAL FEATURES



## VEGETATION



In some areas bracken ( ) and rough grassland ( ) are shown separately.



# Historical Map Pack Legend

## County Series & National Grid

## 1:10,560 scale

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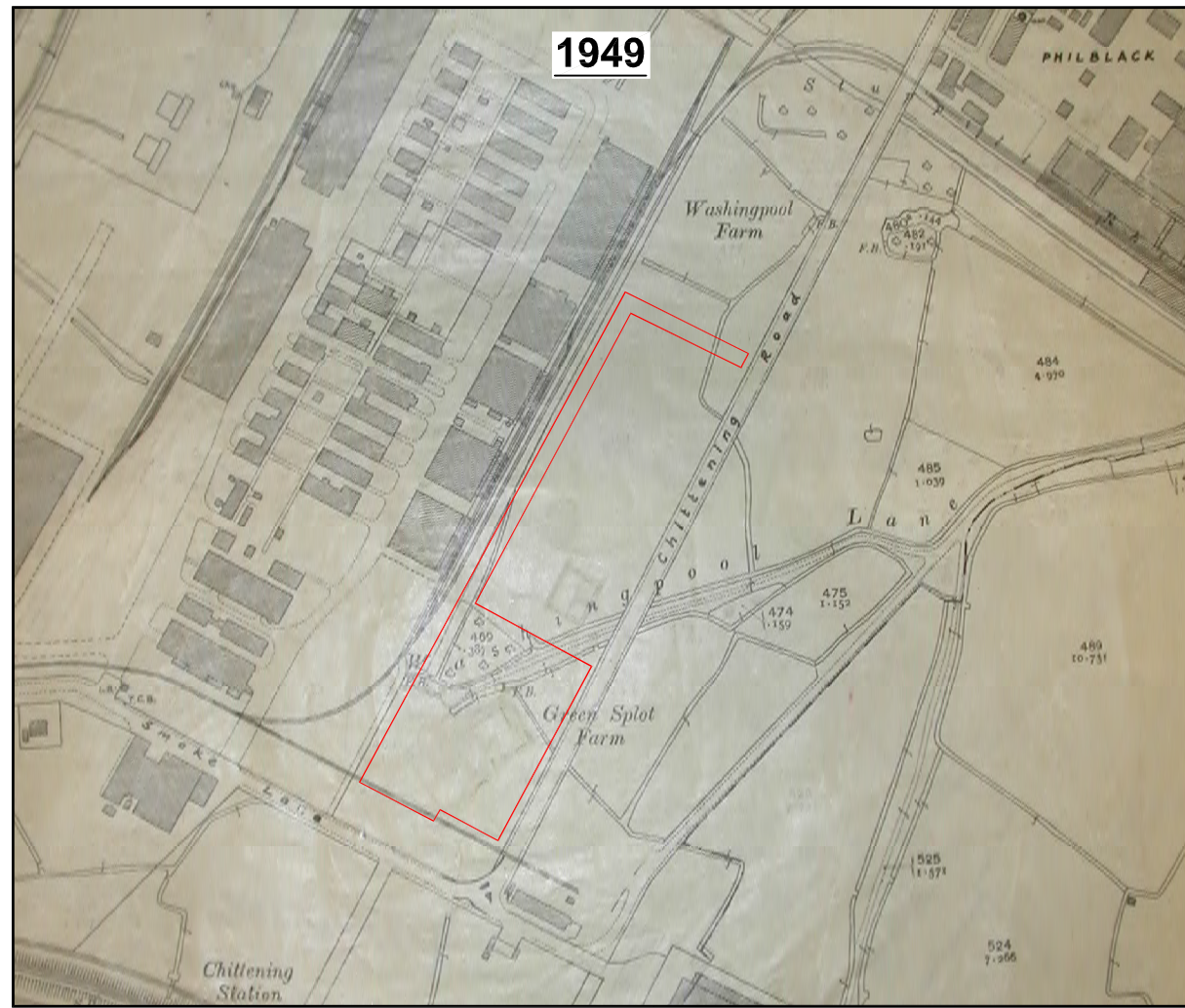
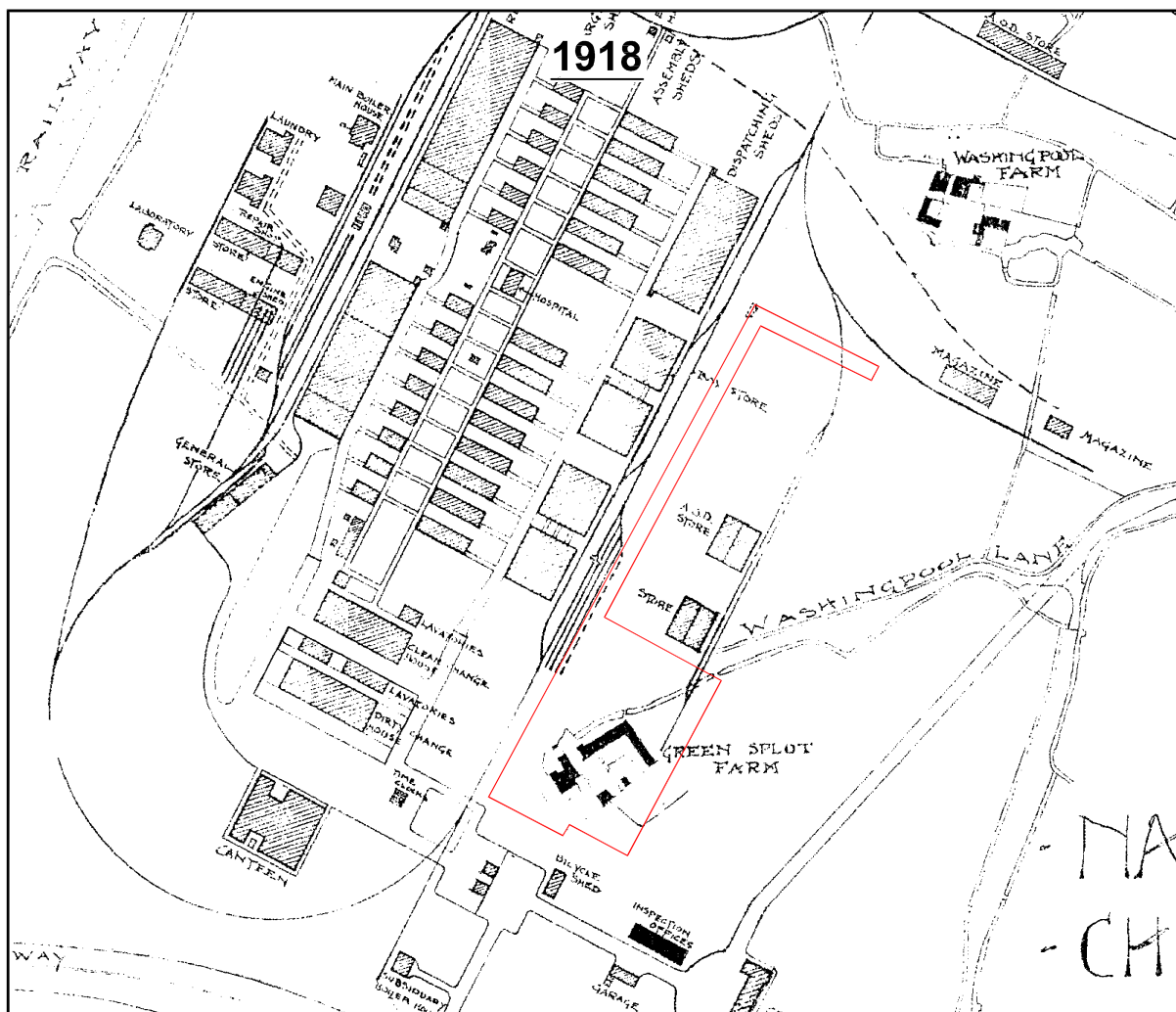
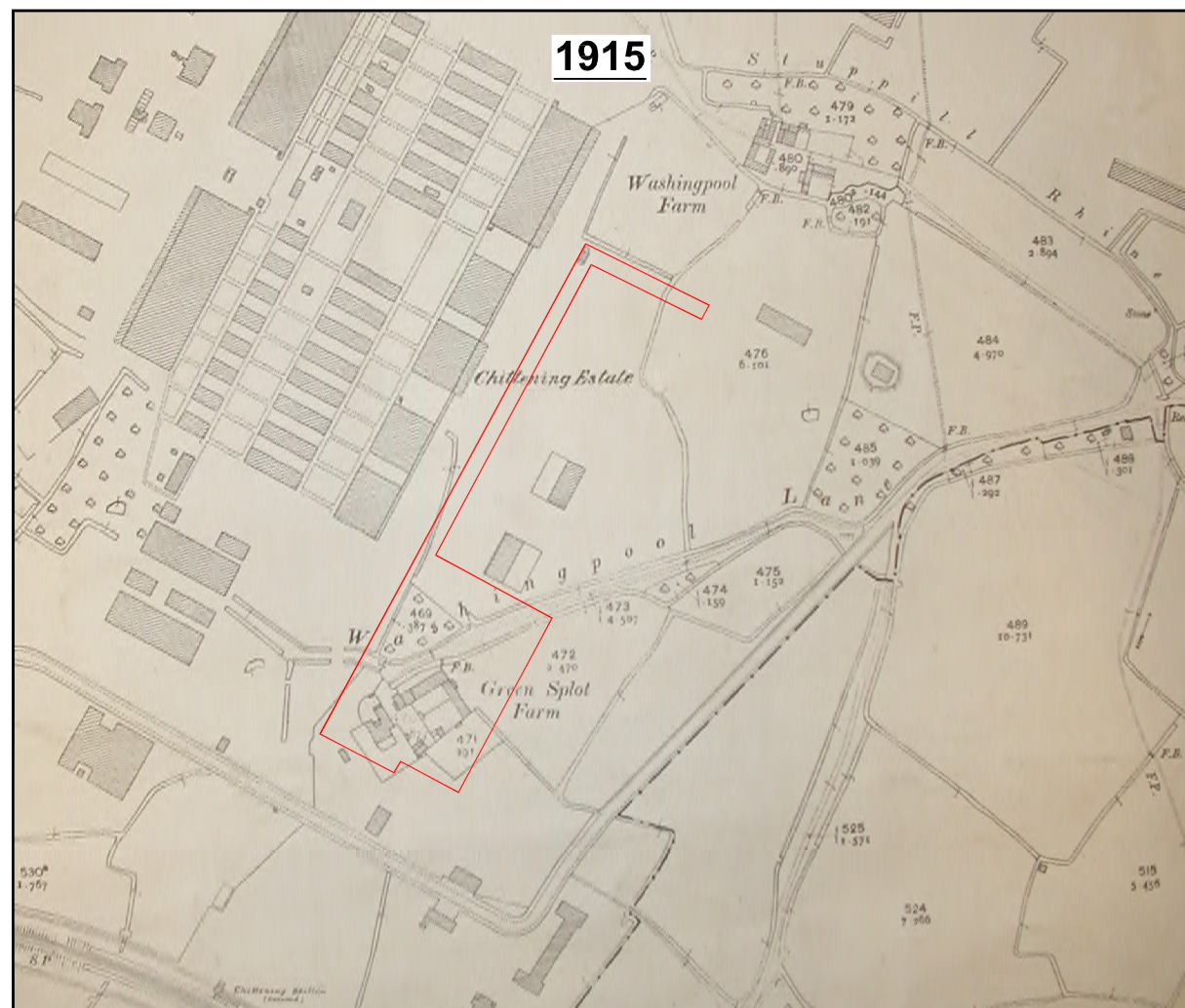
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Technical Helpline

Tel 08444159000

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**LEGEND**

— Site Boundary



00	14.07.2015	-	MW	SS	-
REV	DATE	DESCRIPTION	BY	CHD	APR
DIMENSION		SCALE	ORIGIN SIZE		
m		NTS	A3		



**STRUCTURAL SOILS**

The Old School  
Stillhouse Lane  
Bedminster  
Bristol BS3 4EB

Tel: 0117 947 1000  
Fax: 0117 947 1004  
ask@soils.co.uk  
www.soils.co.uk

CLIENT		Balfour Beatty Investments Limited	
PROJECT		Estuary Park, Avonmouth	
TITLE		HISTORIC SITE LOCATION PLANS	
JOB NO	FIGURE		
729873	3		
DRAWING STATUS	REV		
-	00		
SCALE BAR			



# County Series 1:2,500 scale

# National Grid 1:2,500 / 1:1,250 scale



# Historical Map Pack Legend

**GENERAL FEATURES**

Wood	Marsh	Reeds
Fir	Mixed Wood	Brush Wood
Orchard	Bush	Rough Pasture
Ford	Stepping Stones	Ferry
Lock	Waterfall	Quarry
Shingle	Gravel Pit	

Trigonometrical Station  
 507 Δ Altitude at Trigonometrical Station  
 B.M. 325-9 ◊ Bench Mark  
 342 + Surface Level  
 Permanent Traverse Station  
 Antiquities (site of)  
 Arrow denotes flow of water

**ROADS**

Road over single stream, Road crossing railway, Road over River or Canal

**RAILWAYS**

Railway crossing River or Canal, Railway crossing Road, Level Crossing, Embankment, Cutting

**ABBREVIATIONS**

Trigonometrical Station	Sluice
Altitude at Trigonometrical Station	Trough
Bench Mark	Spring
Surface Level	Well
Permanent Traverse Station	Mooring Ring
Antiquities (site of)	Mooring Post
Arrow denotes flow of water	Boundary Stone
	Boundary Post

**GENERAL FEATURES**

Non-casual Trees	Sluice	Electricity (site of)
Cholla Tree	Cliff	Culvert
Sprayed Trees	Cave Entrance	Direction of water flow
Orchard Trees	Rock	Electricity Pylon
Copse, Giller	Boulders	Electricity Transmission Line
Scrub	Sloping Masonry	Triangulation Station
Bracken	Roofed Building	Traverse Station (permanent)
Heath	Glasshouse	Bench Mark
Rough Grassland	Archway	Surface Level
Heath, listings	Change of boundary marking	Revision Point (instrumentally fixed)
Reeds	see AREAS notes	Revision Point & Bench Mark coincident

Top, Slopes, Quarry, Refuse Heap, Sloping Masonry  
 Flat Rock, Sand, Sand Pit, Culvert, Archway  
 Shingle, Boulders, Gravel Pit, Cliff Face, Glazed Roof Building

**BOUNDARIES**

**England & Wales**

- County Boundary (geographical)
- County & Civil Parish Boundary coterminous
- Admin County or County Borough Boundary
- London Borough Boundary
- County District Boundaries based on civil parish

**England, Wales & Scotland**

- Civil Parish Boundary
- Baro (or Burgh) Const. & Ward Bdy. Parly & Ward Boundaries based on civil parish
- Co Const Bdy
- Baro (or Burgh) Const & Ward Bdy. Parly & Ward Boundaries not based on civil parish

**Scotland**

- County Boundary (geographical)
- Co Cnl Bdy. County Council Boundary
- Co of City Bdy. County of the City Boundary
- Co of City Bdy.
- Burgh Bdy. Burgh Boundary
- Burgh Bdy.
- Dist Bdy. District Council Boundary
- Dist Bdy.

\* Not with parish † Coincident with parish

**ABBREVIATIONS**

B.H. Beer House	F.Sta. Fire Station	M.P.U. Mail Pick-up	S.L. Signal Light
B.M. Bench Mark	G.P. Guide Post	M.S. Mile Stone	Sr. Sluice
B.P. Boundary Post	G.V.C. Gas Valve Compound	N.T. National Trust	S.P. Signal Post
B.S. Boundary Stone	H. Hydrant or Hydraulic	N.T.S. National Trust for Scotland	Spr. Spring
C. Crane	ha. Heccaras	N.Y.L. Normal Tidal Lines	S.Sta. Signal Station
C.H. Club House	L.B. Letter Box	P.C. Pillar, Pole or Post	T.C.B. Telephone Call Box
Chy. Chimney	L.B.Sta. Lighthouse	P.C. Public Convenience	T.C.P. Telephone Call Post
Co. Captain	L.C. Level Crossing	P.C.B. Police Call Box	Tk. Tank or Truck
D.F. Drinking Fountain	L.G. Loading Gauge	P.H. Public House	Tr. Trough
Dk. Dock	L.Ha. Lighthouse	P.O. Post Office	Tr. Traverse Station
E.P. Electricity Pillar or Post	L.Twr. Lighting Tower	P. Pump	W. Wall
E.T.L. Electricity Transmission Line	M. Meas	P.T.P. Police Telephone Pillar	W.B. Weighbridge
F.A. Fire Alarm	M.H.W. Mean High Water	Rsr. Reservoir	Wd.P. Wind Pump
F.A.P. Fire Alarm Pillar	M.H.W.S. Mean High Water Springs	R.H. Road House	Wks. Works
F.B. Filter Bed, Foot Bridge	M.L.W. Mean Low Water	R.P. Revision Point	W.P. Water Point
F.B.M. Fundamental Bench Mark	M.L.W.S. Mean Low Water Springs	S. Stone	W.T. Water Tap
F.S. Flagstaff	M.P. Mile or Mooring Post	S.B. Signal Box	

# County Series 1:1,250 scale ~ County Series & National Grid 1:2,500 scale

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**Site Details:**

Estuary Park, Chittening Industrial Estate

**Client Ref:** EMS\_307406\_414937  
**Report Ref:** EMS-307406\_414937  
**Grid Ref:** 353148, 181311

**Map Name:** County Series

**Map date:** 1881

**Scale:** 1:2,500

**Printed at:** 1:2,500



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 Revised 1881  
 Edition N/A  
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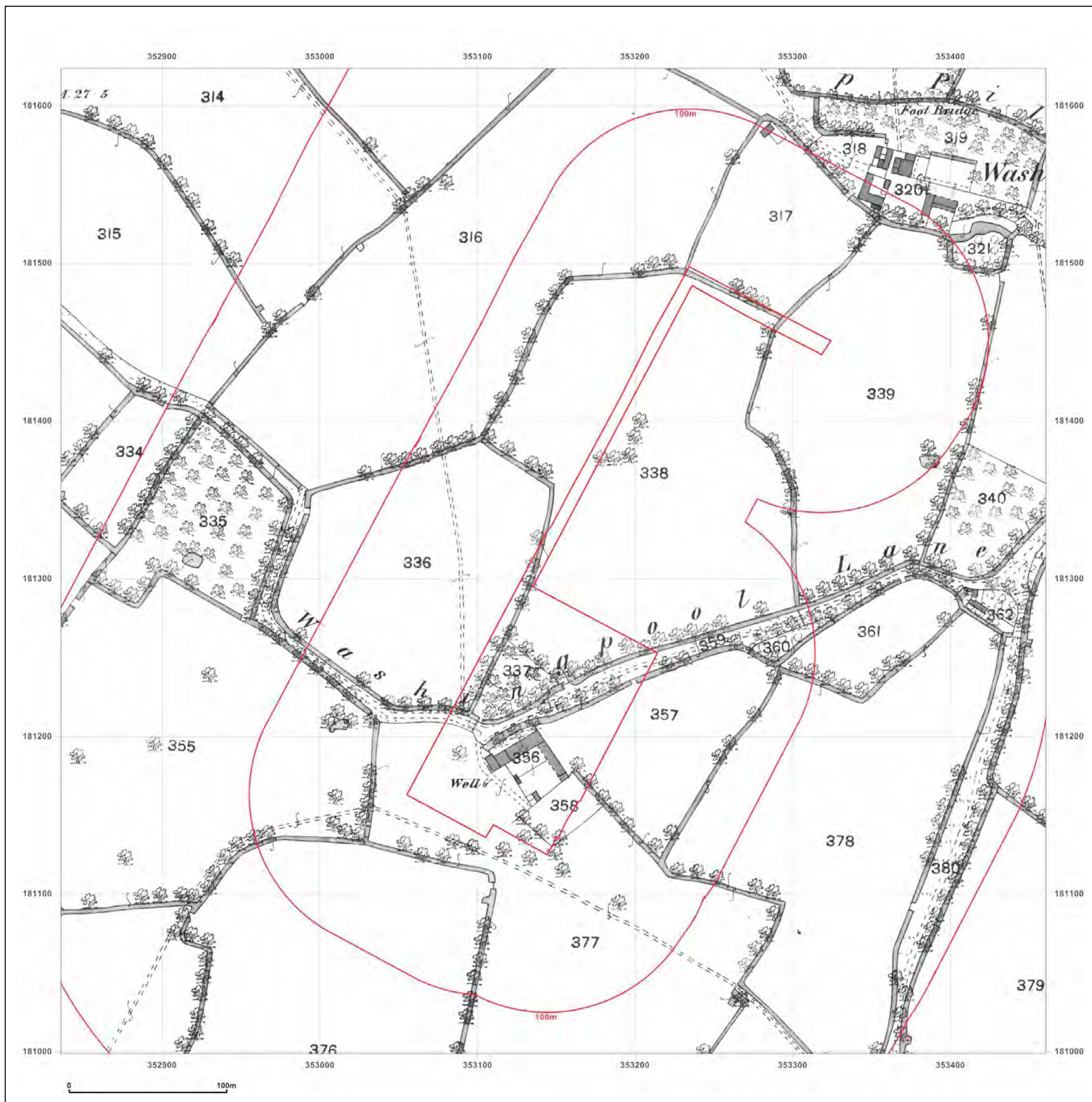


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Industrial Estate

**Client Ref:** EMS\_307406\_414937  
**Report Ref:** EMS-307406\_414937  
**Grid Ref:** 353148, 181311

**Map Name:** County Series

**Map date:** 1903

**Scale:** 1:2,500

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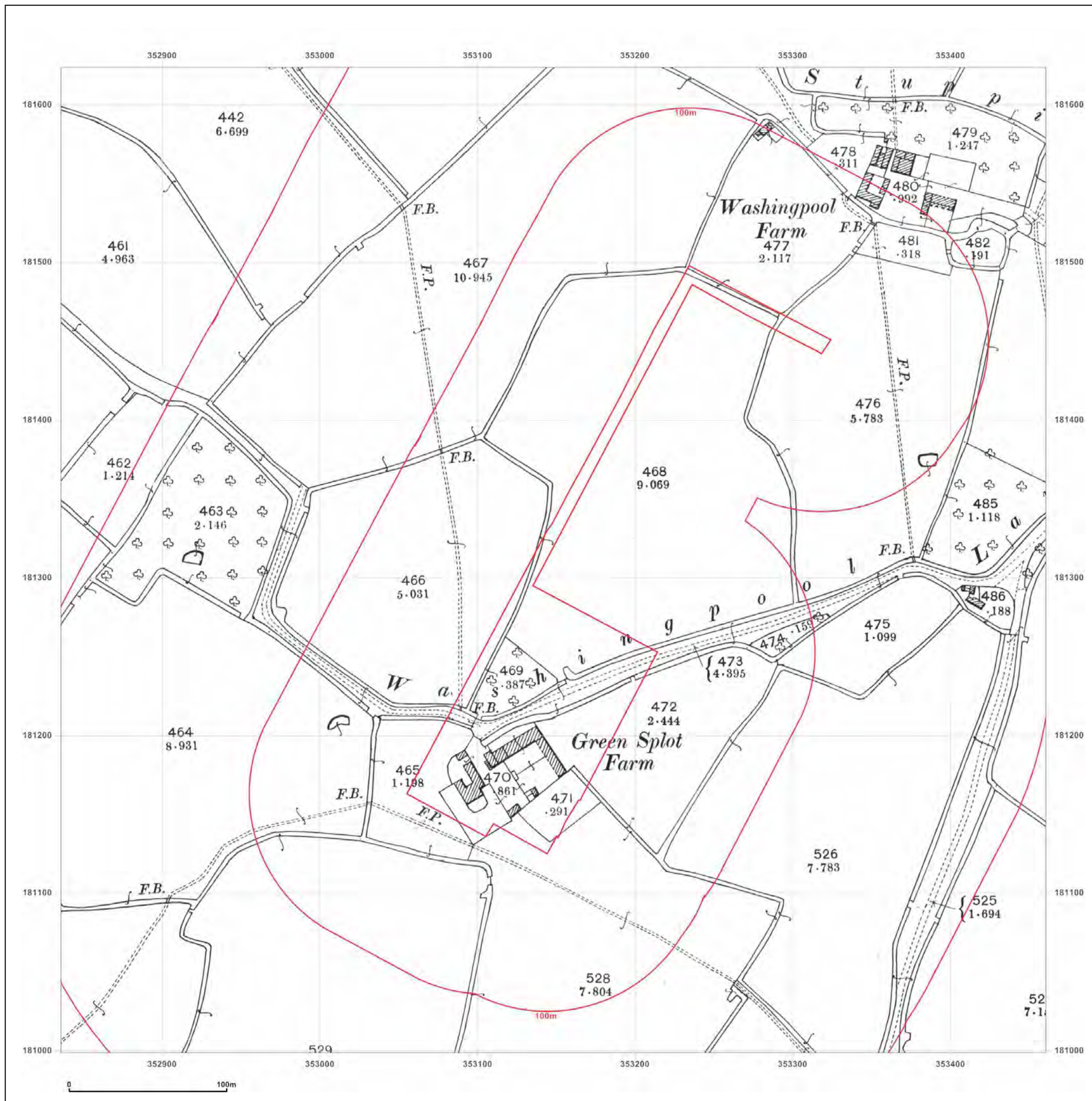


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Client Ref: EMS\_307406\_414937  
Report Ref: EMS-307406\_414937  
Grid Ref: 353148, 181311

Map Name: County Series

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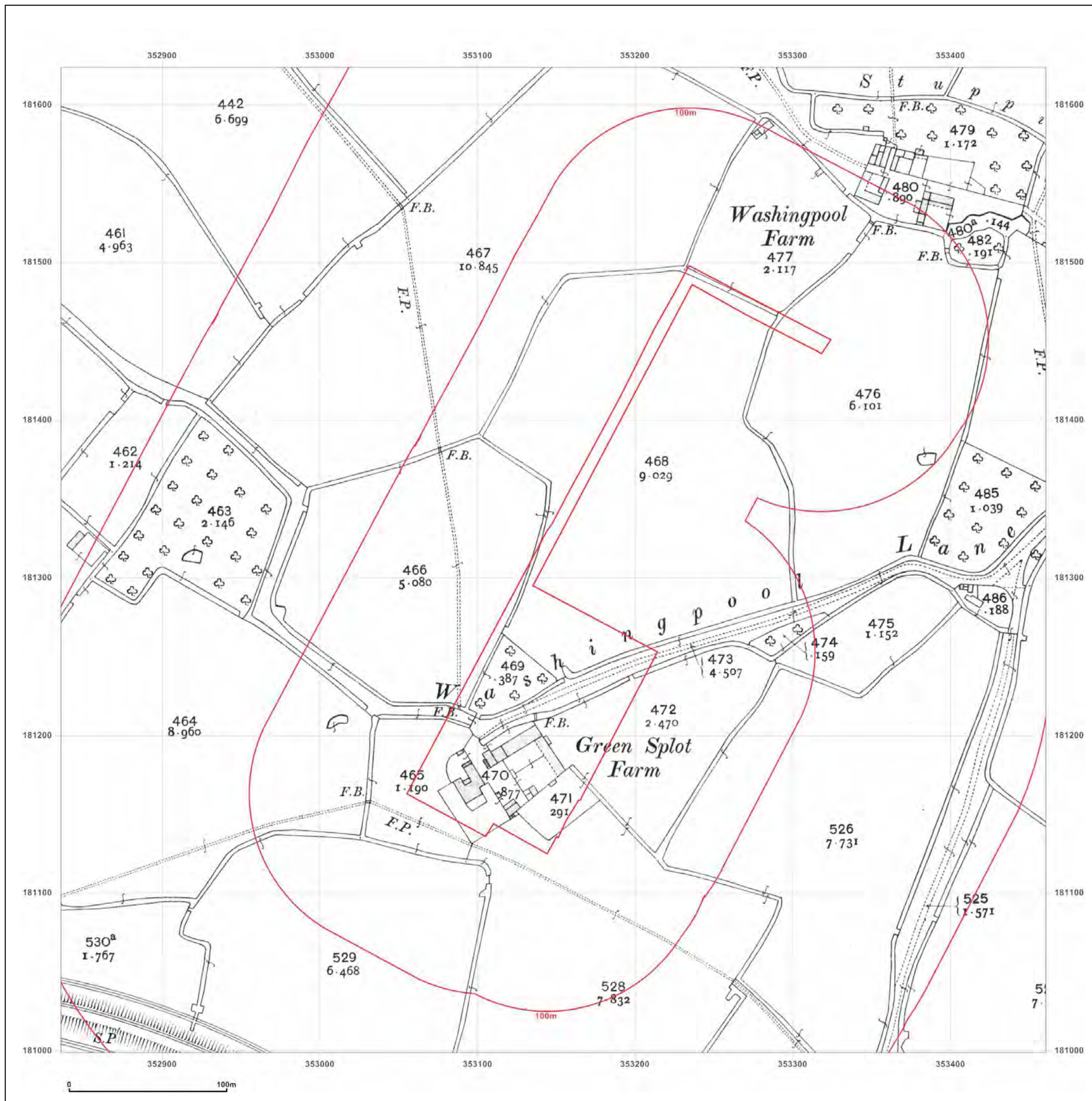


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**Client Ref:** EMS\_307406\_414937  
**Report Ref:** EMS-307406\_414937  
**Grid Ref:** 353148, 181311

**Map Name:** National Grid

**Map date:** 1969-1970

**Scale:** 1:1,250

**Printed at:** 1:2,000



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 Edition N/A  
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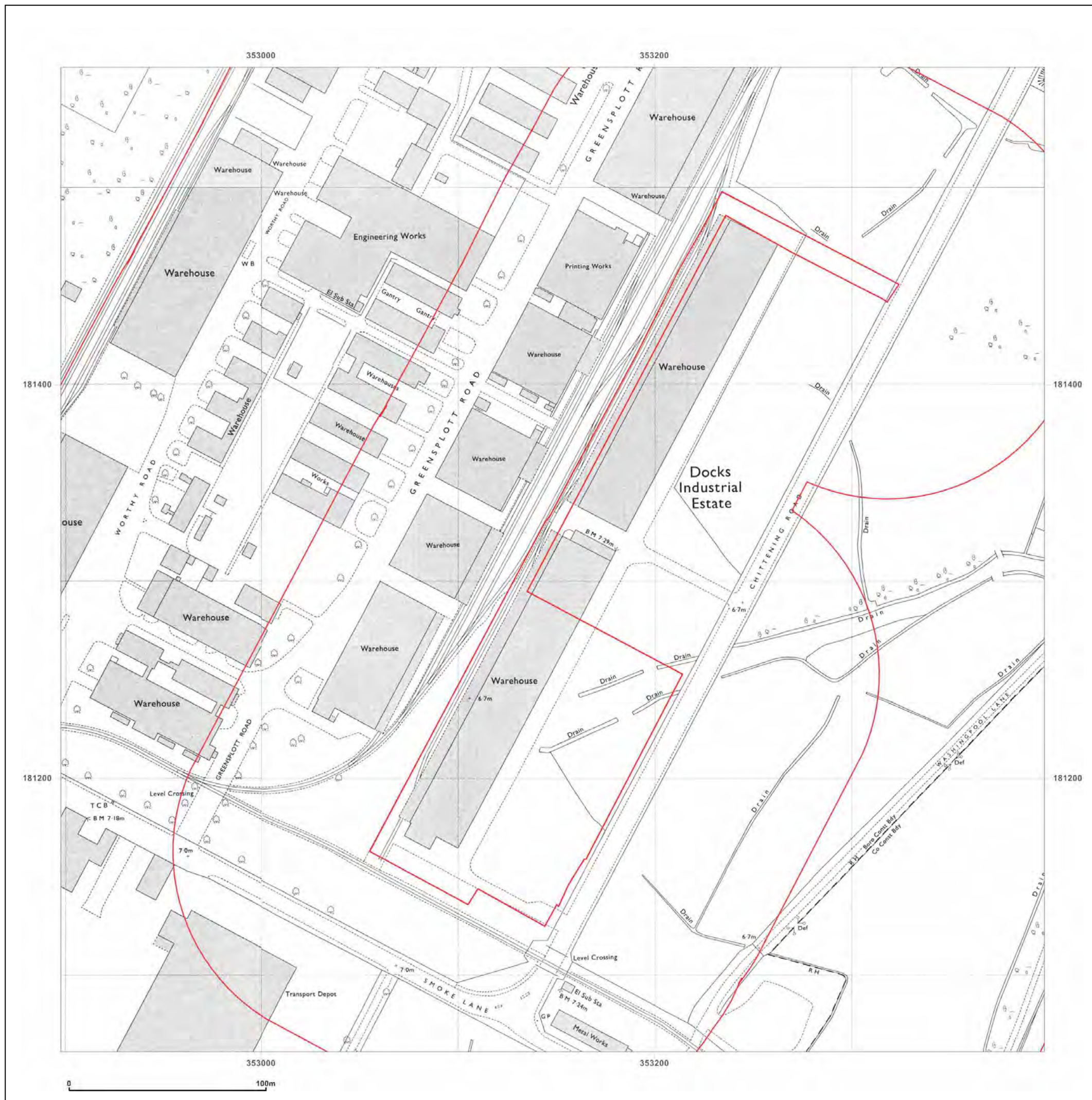


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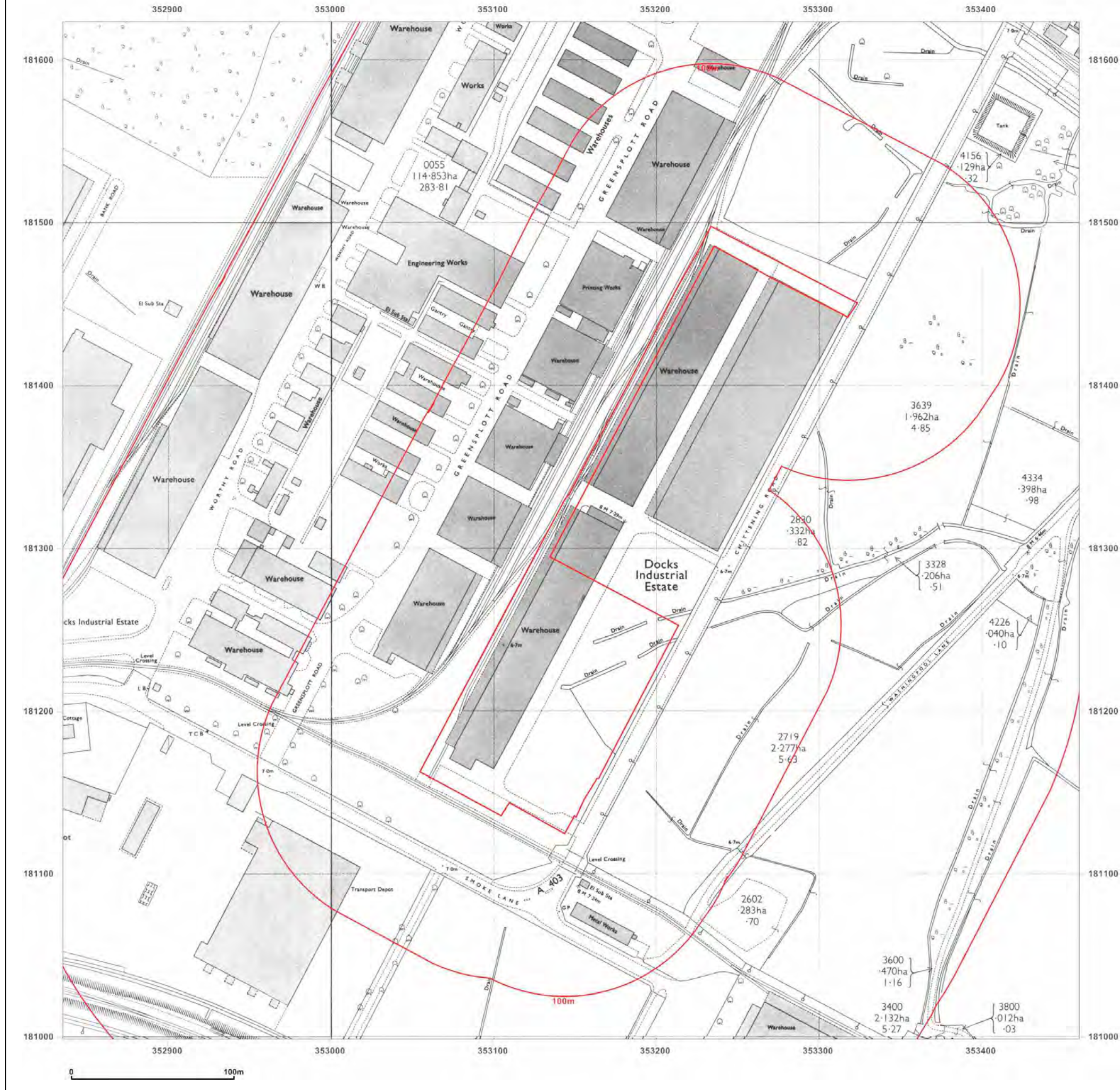
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**Grid Ref:** 353148, 181311

**Map Name:** National Grid

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**Map Name:** National Grid

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**Scale:** 1:1,250

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Edition N/A  
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**Report Ref:** EMS-307406\_414937  
**Grid Ref:** 353148, 181311

**Map Name:** County Series

**Map date:** 1880

**Scale:** 1:10,560

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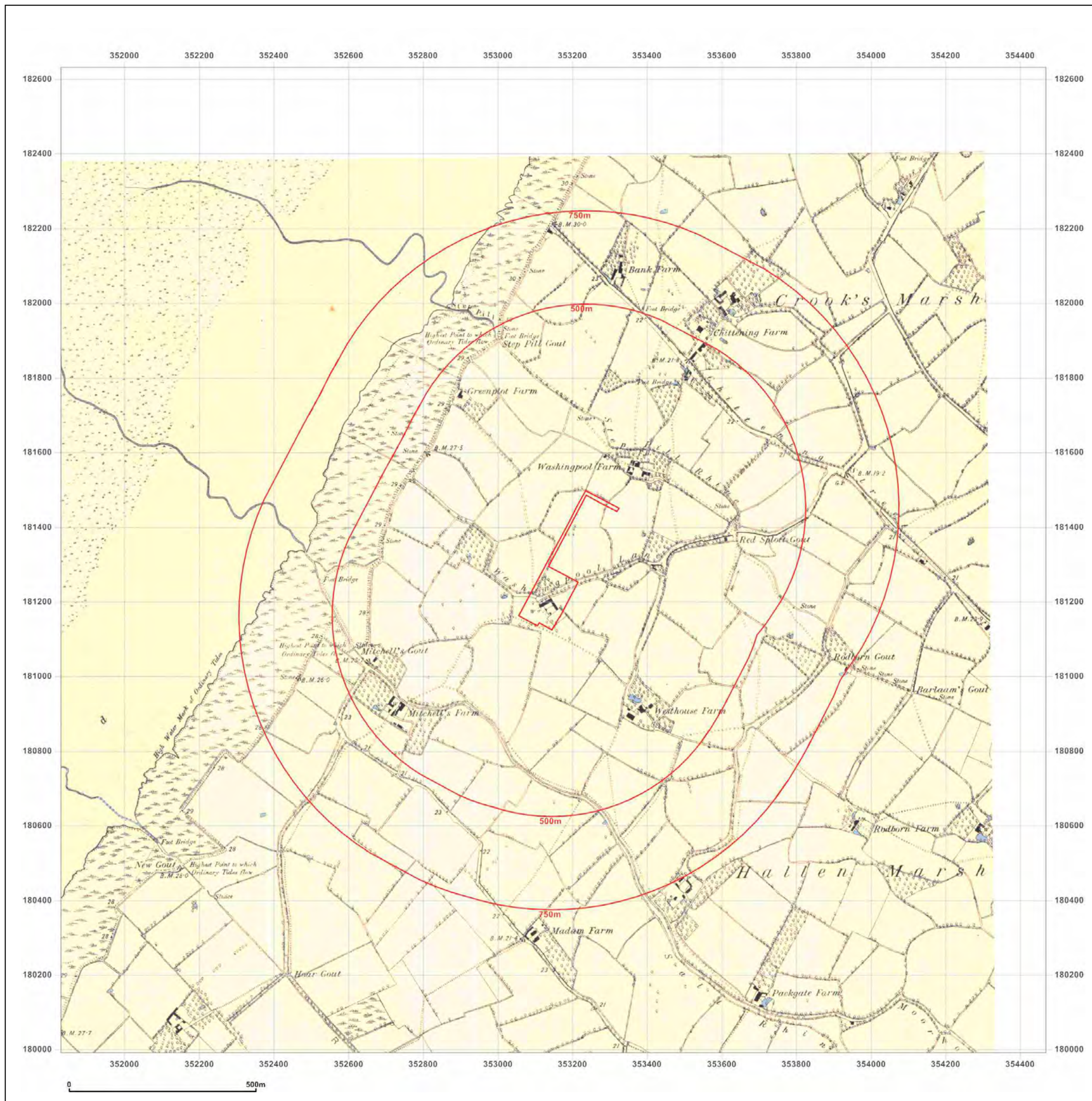


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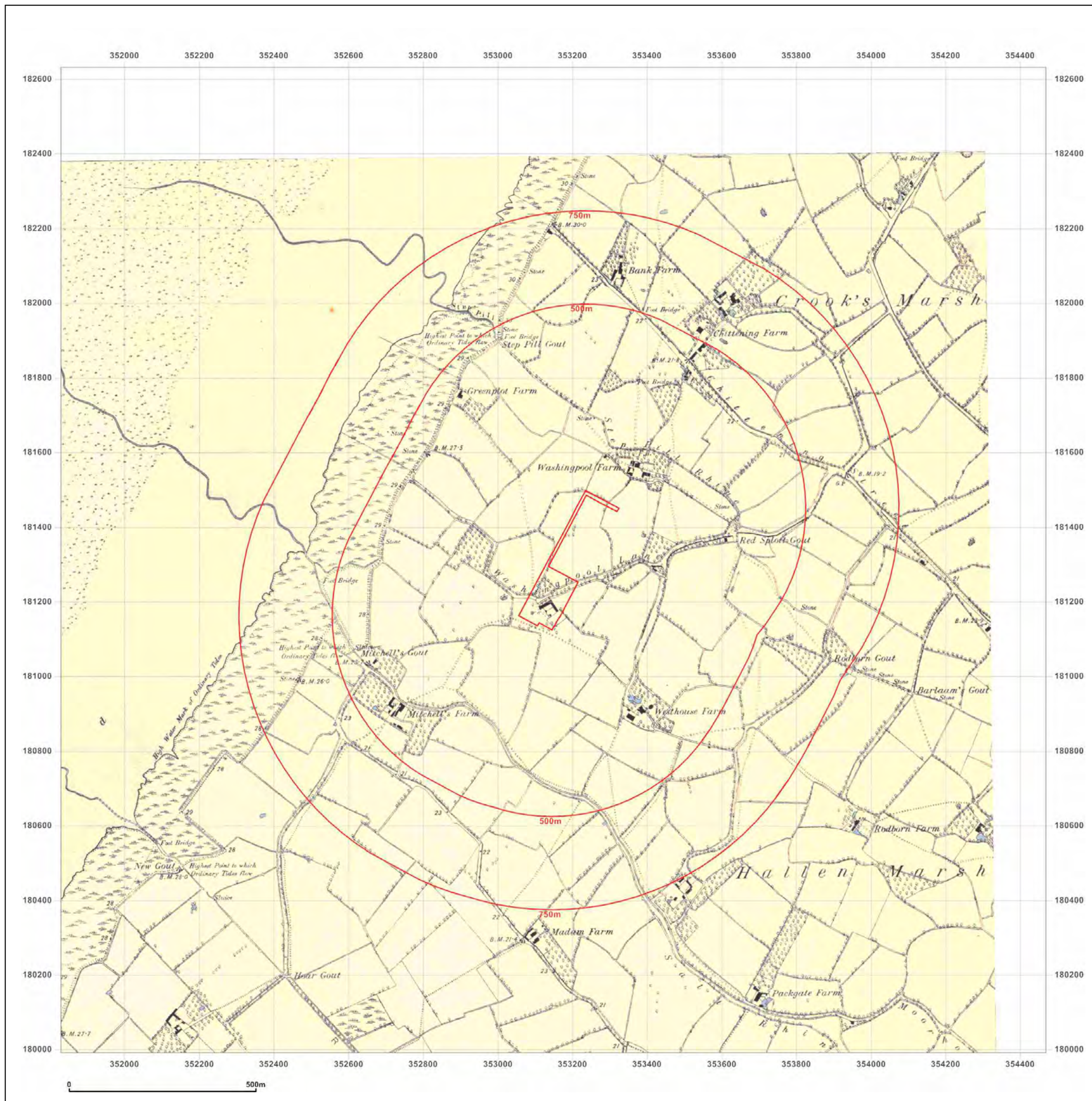


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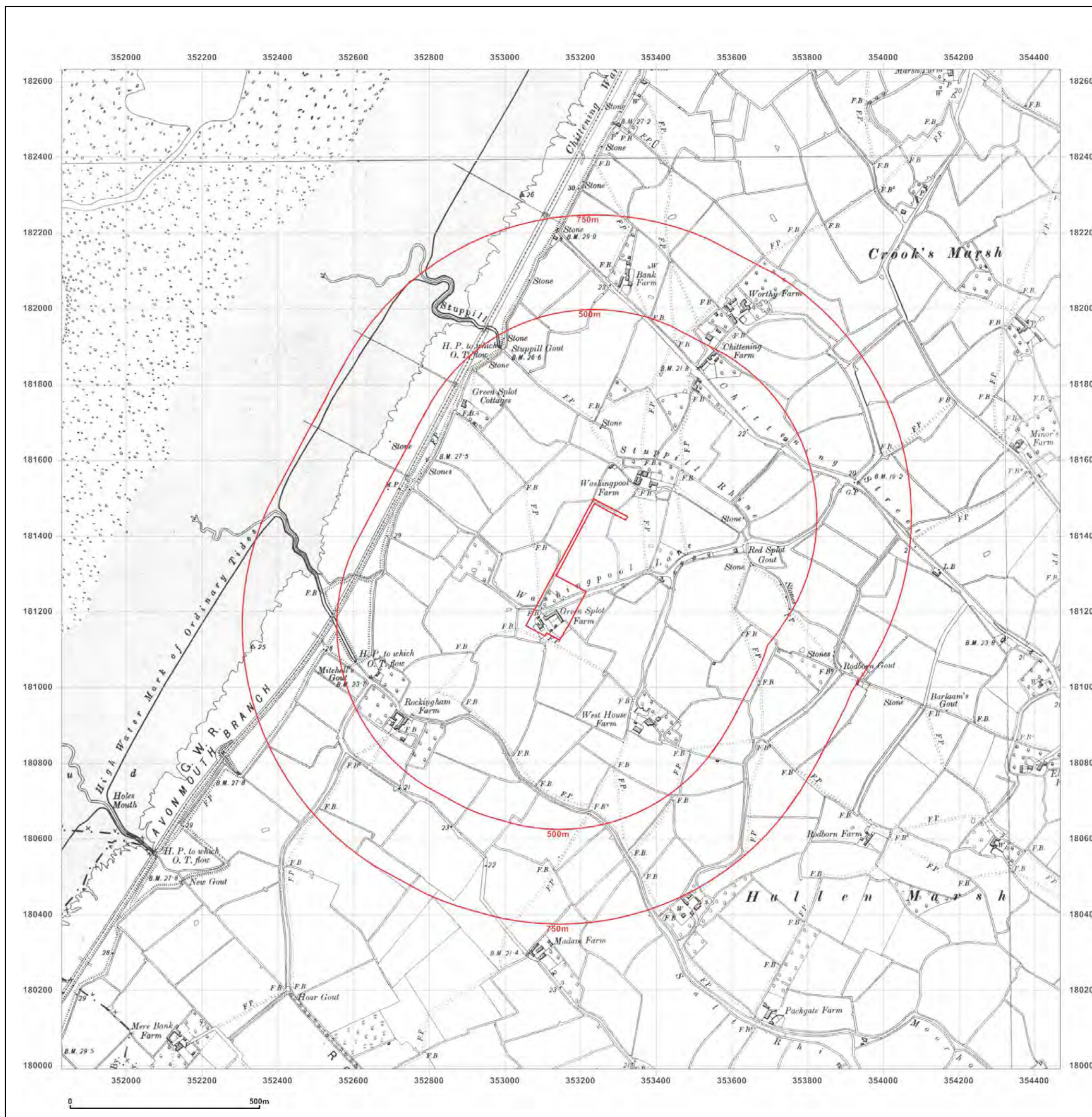


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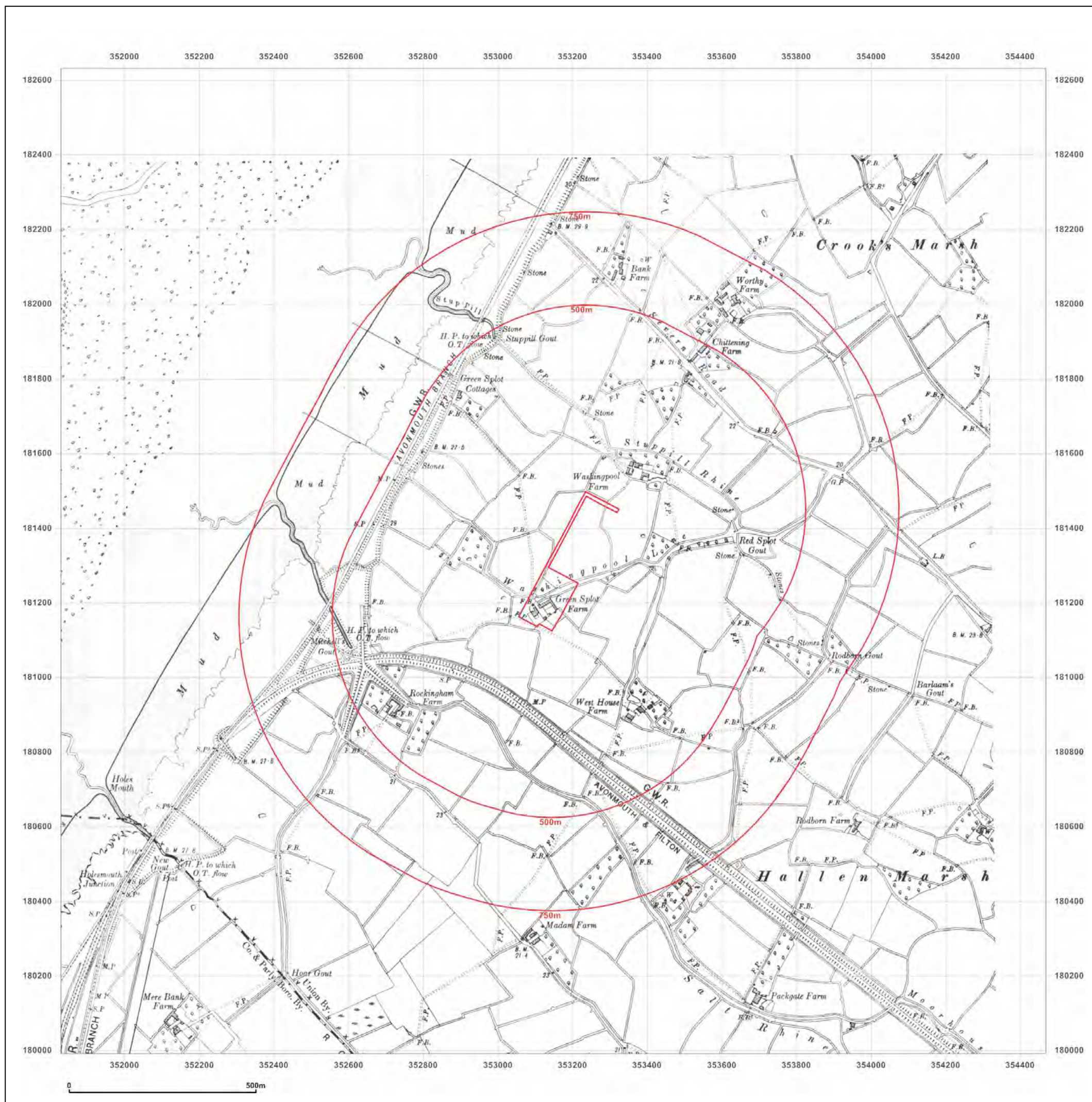


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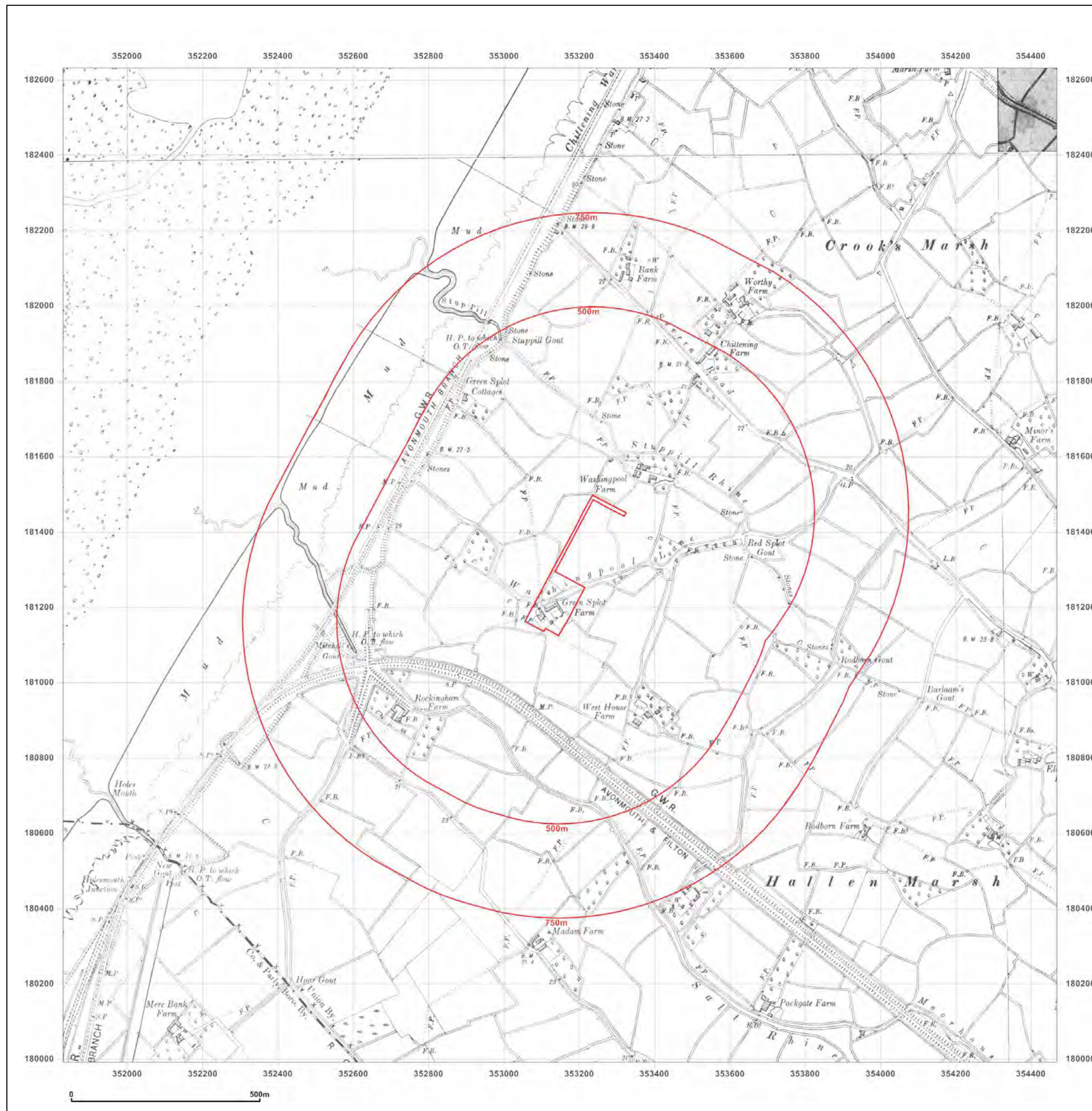


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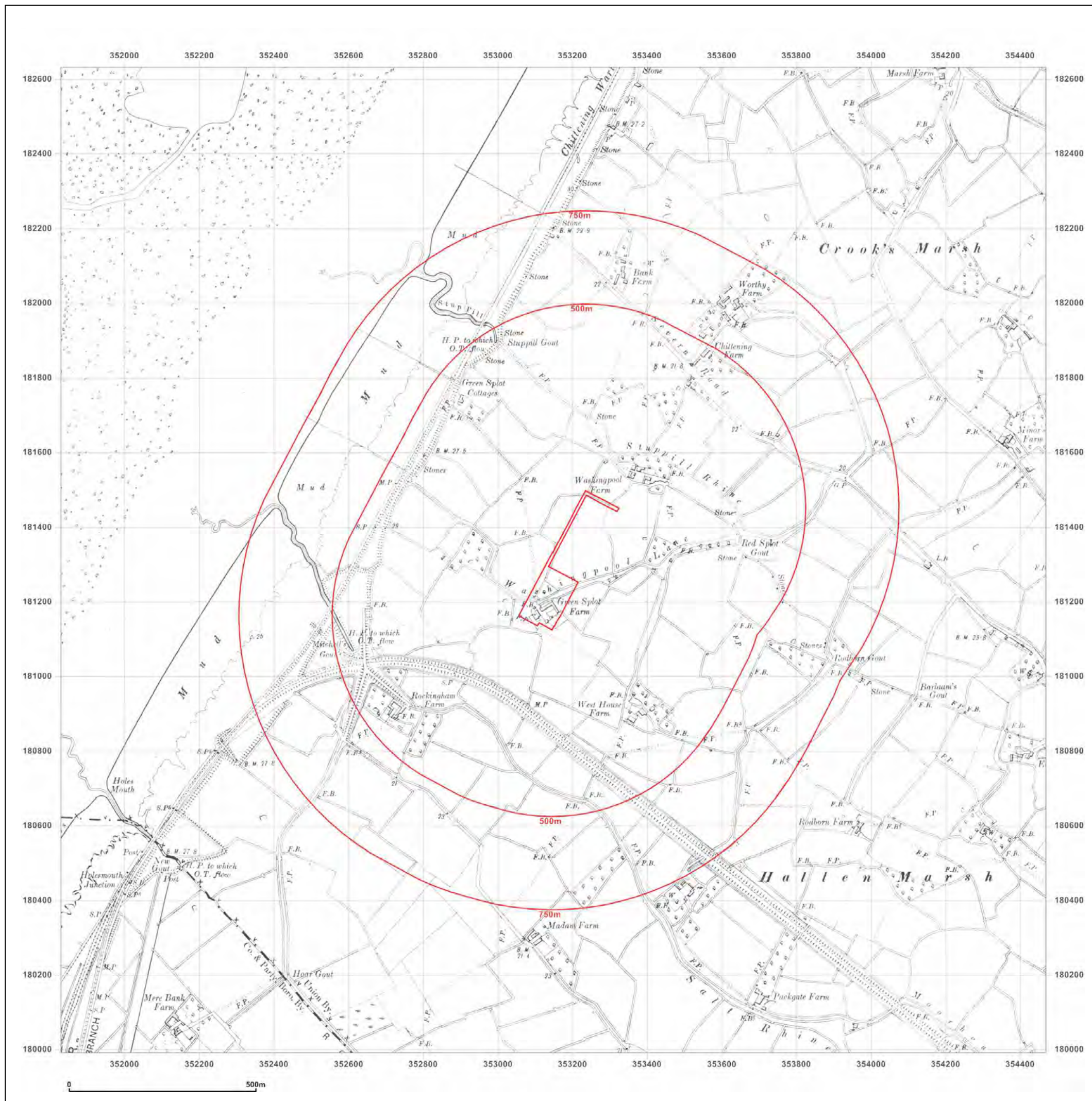


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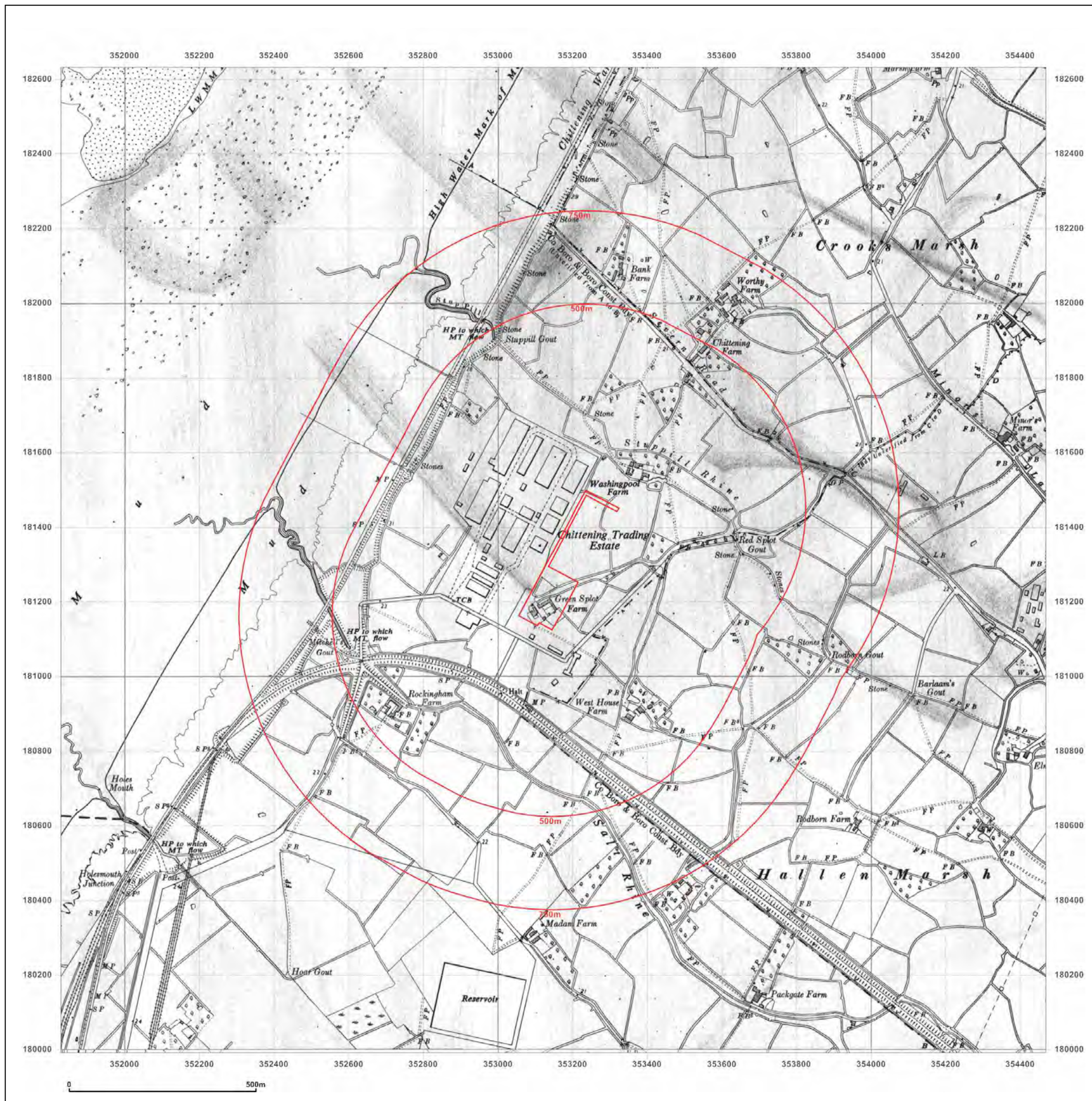


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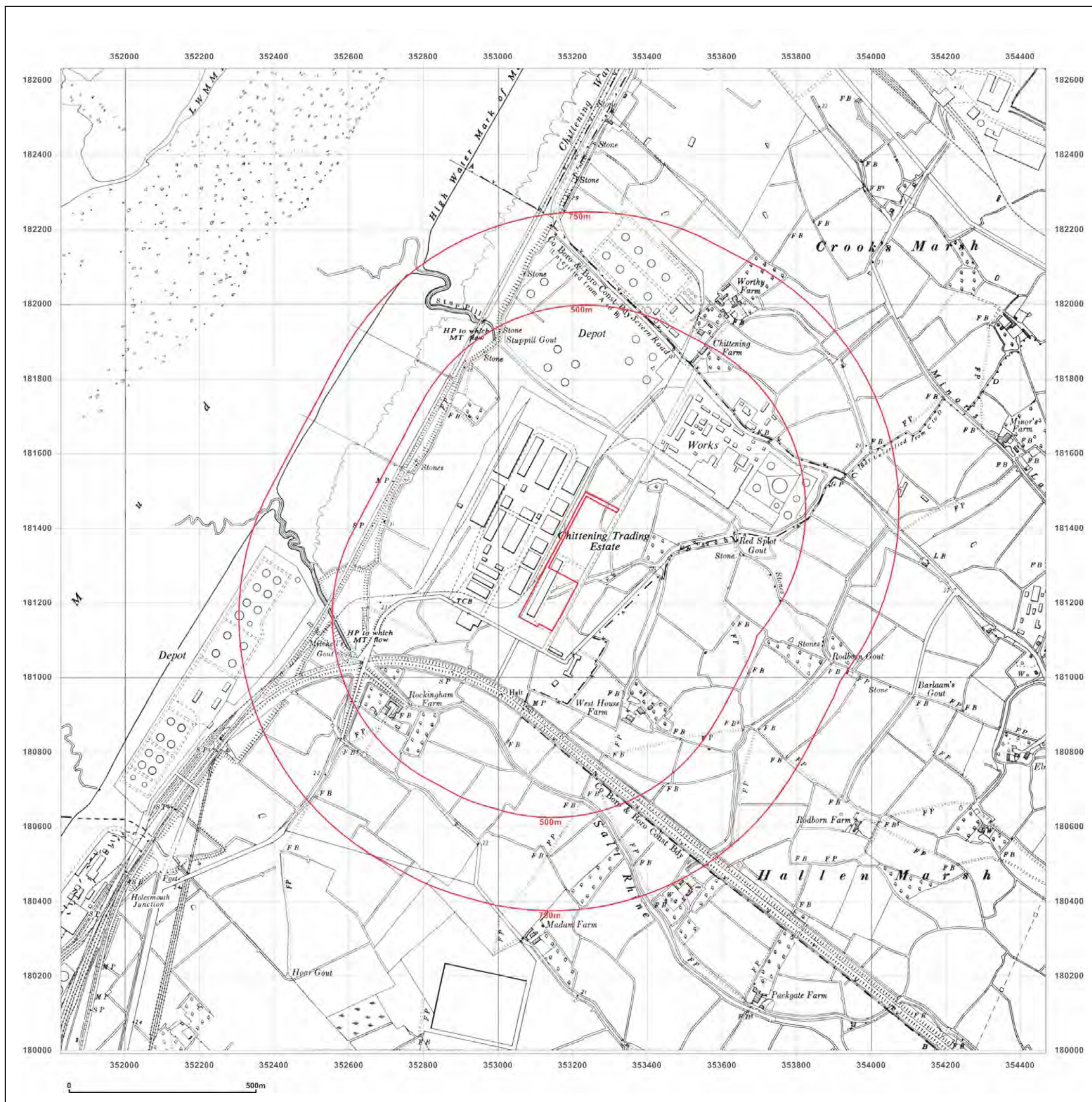


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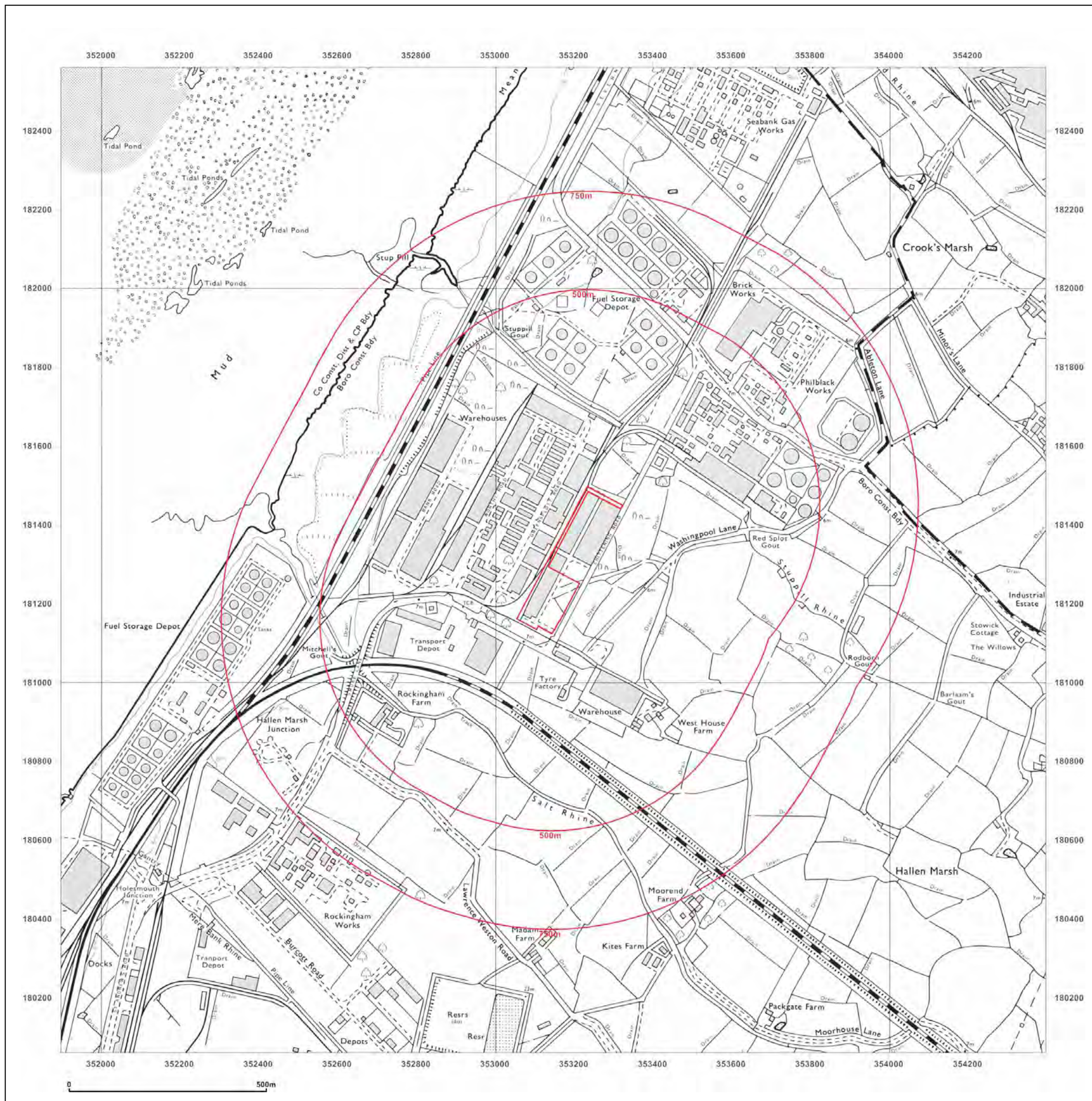


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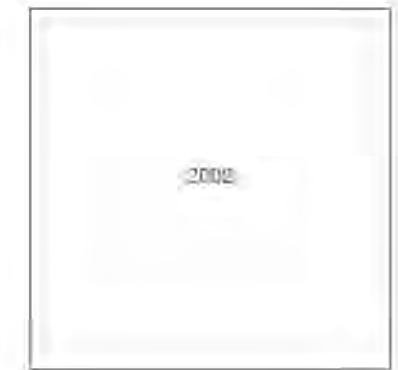
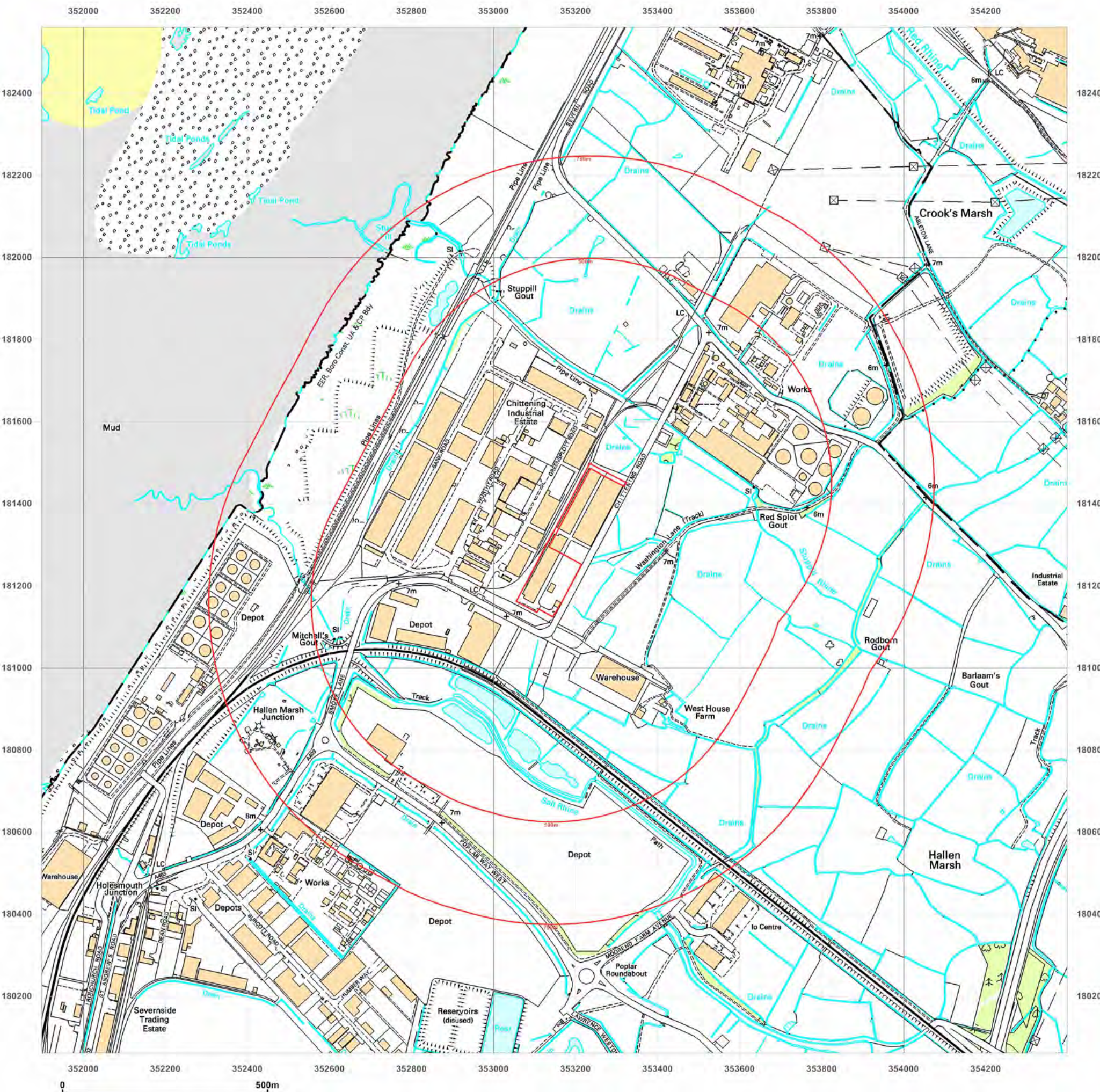
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## Site Details:

Estuary Park, Chittening Industrial Estate

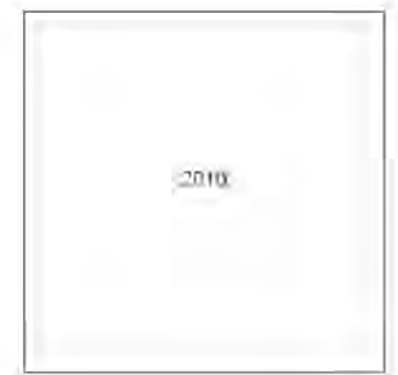
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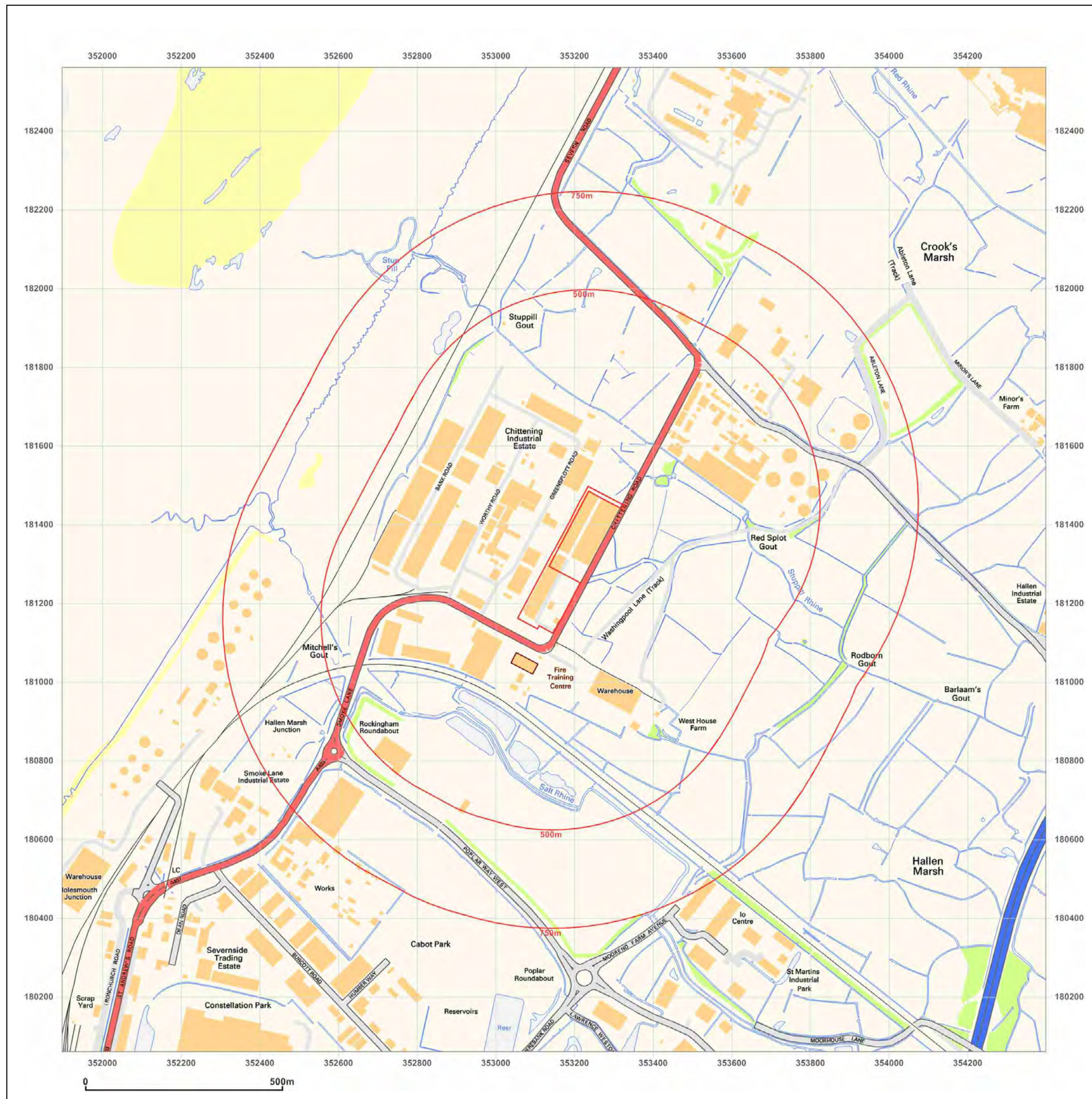


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 Grid Ref: 353148, 181311

Map Name: National Grid

Map date: 2014

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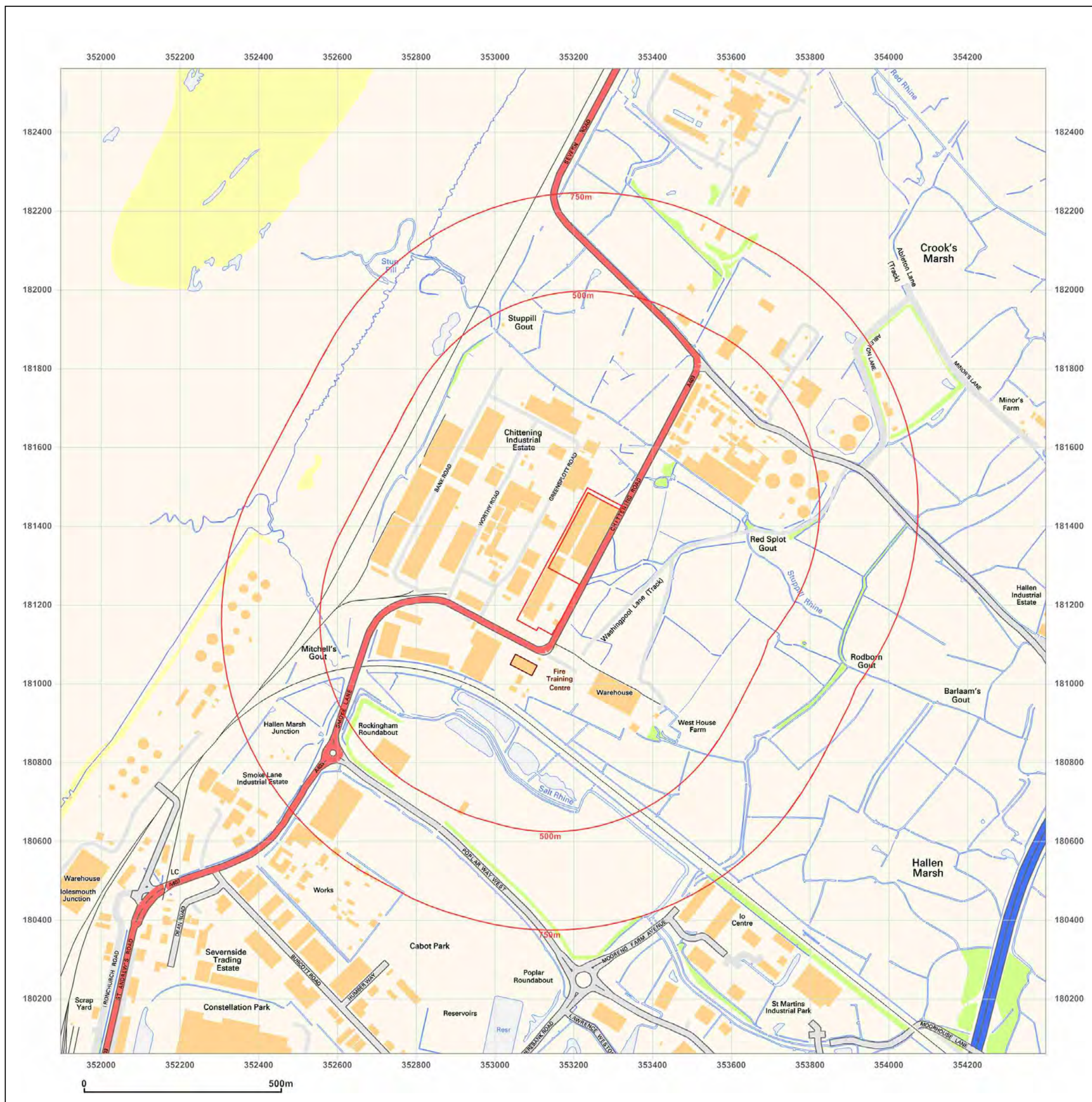


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## **Appendix D**

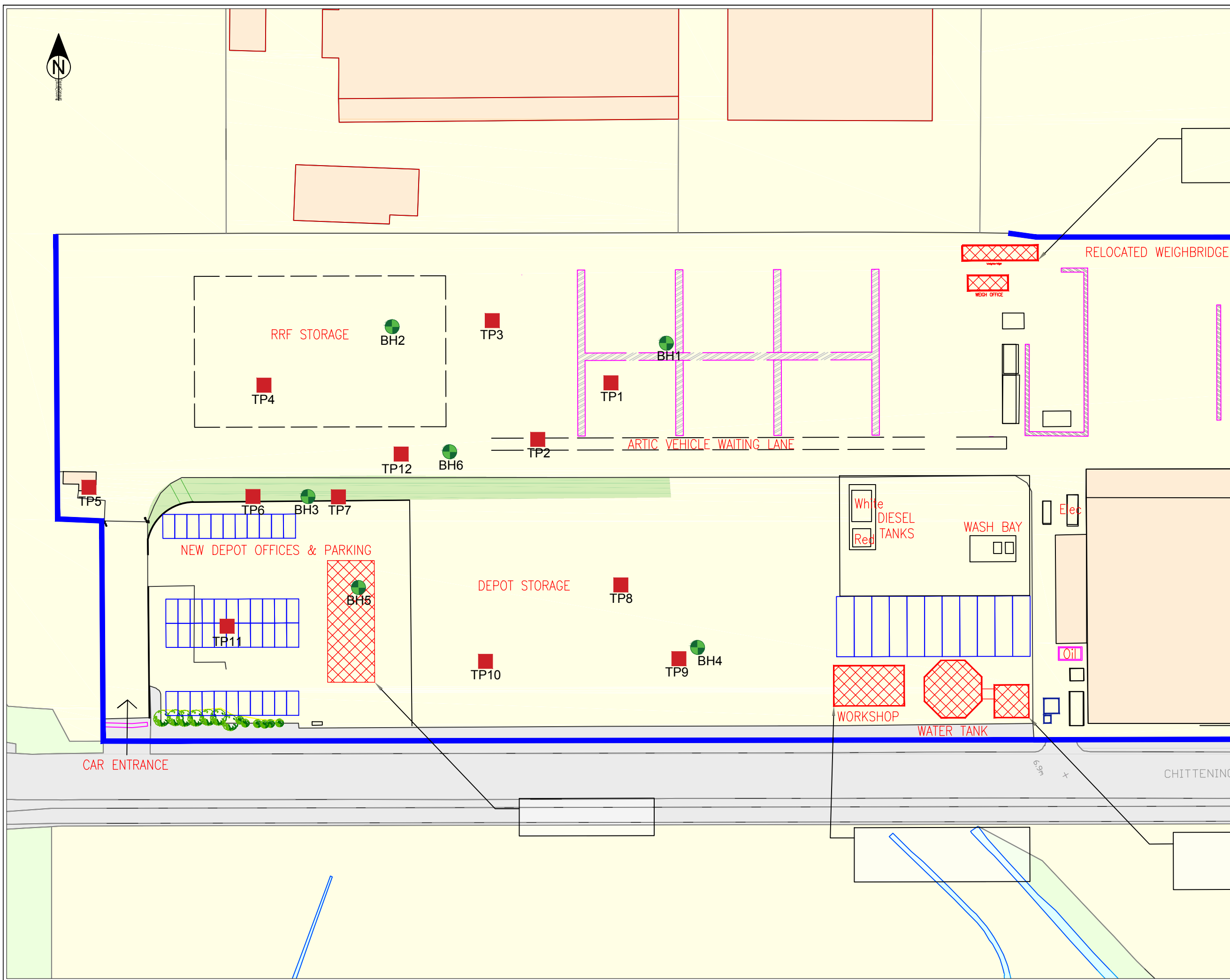
### **Site Mapping in Relation to Previous Investigation**





**Key:**  
 Borehole Location\*  
 Trial Pit Location\*

**Notes:**  
 \*Conducted by Structural Soils for Balfour Beatty Investments Limited



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9 The Courtyard, Phoenix Square,  
Wyncolls Road, Colchester, CO4 9PE

Client  
**Veolia ES (UK) Ltd**

Site  
**Bristol Resource Recovery Facility**

Title  
**Site Location Plan**

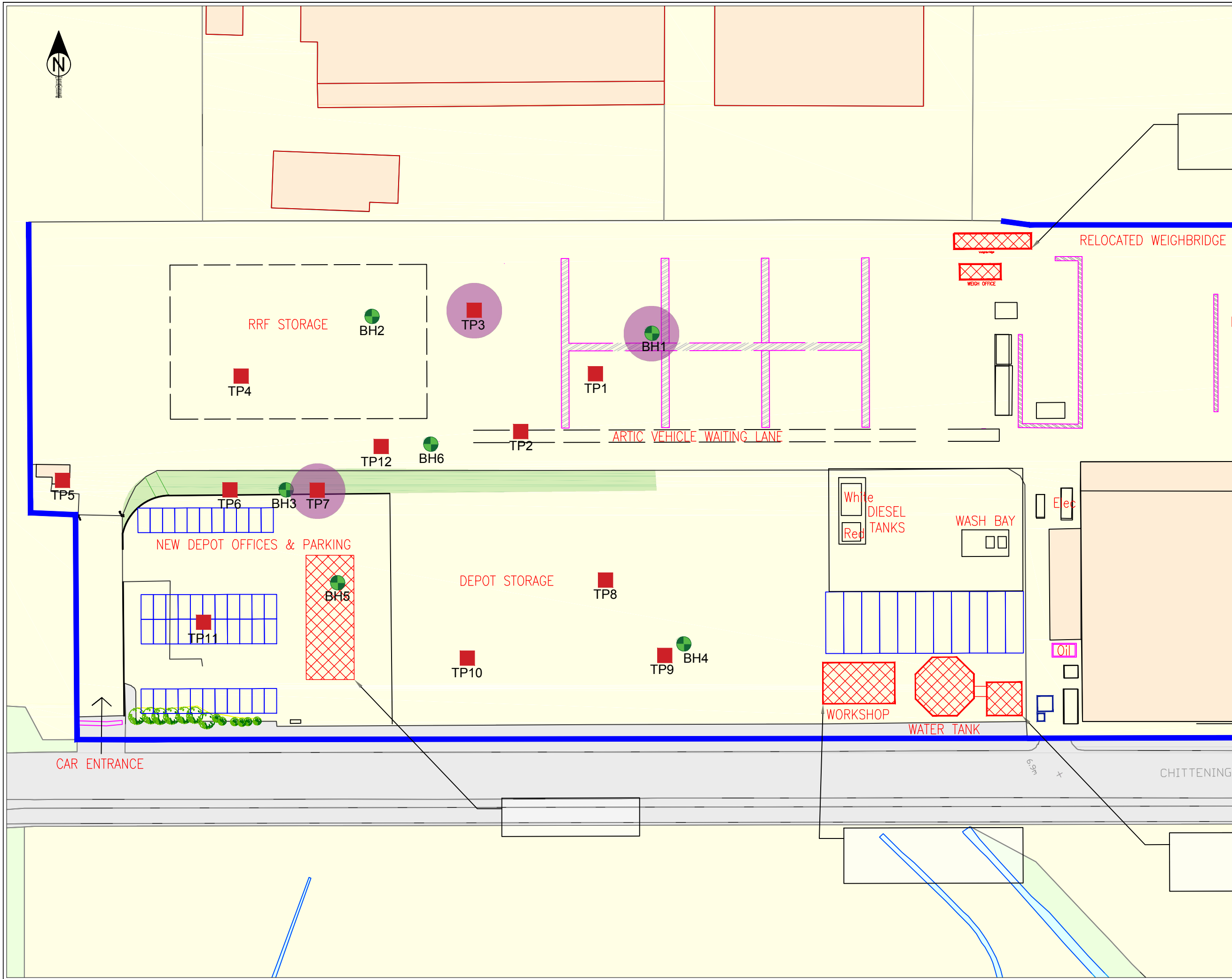
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Rev	Date	Description
File	Site Location Plan.dwg	
Date	21/11/19	Engineer TM
Drawn	DF	Checked AS



**Key:**

- Borehole Location\*
- Trial Pit Location\*
- Asbestos Hot Spot

**Notes:**  
\*Conducted by Structural Soils for Balfour Beatty Investments Limited



9 The Courtyard, Phoenix Square,  
Wyncolls Road, Colchester, CO4 9PE

Client  
**Veolia ES (UK) Ltd**

Site  
**Bristol Resource Recovery Facility**

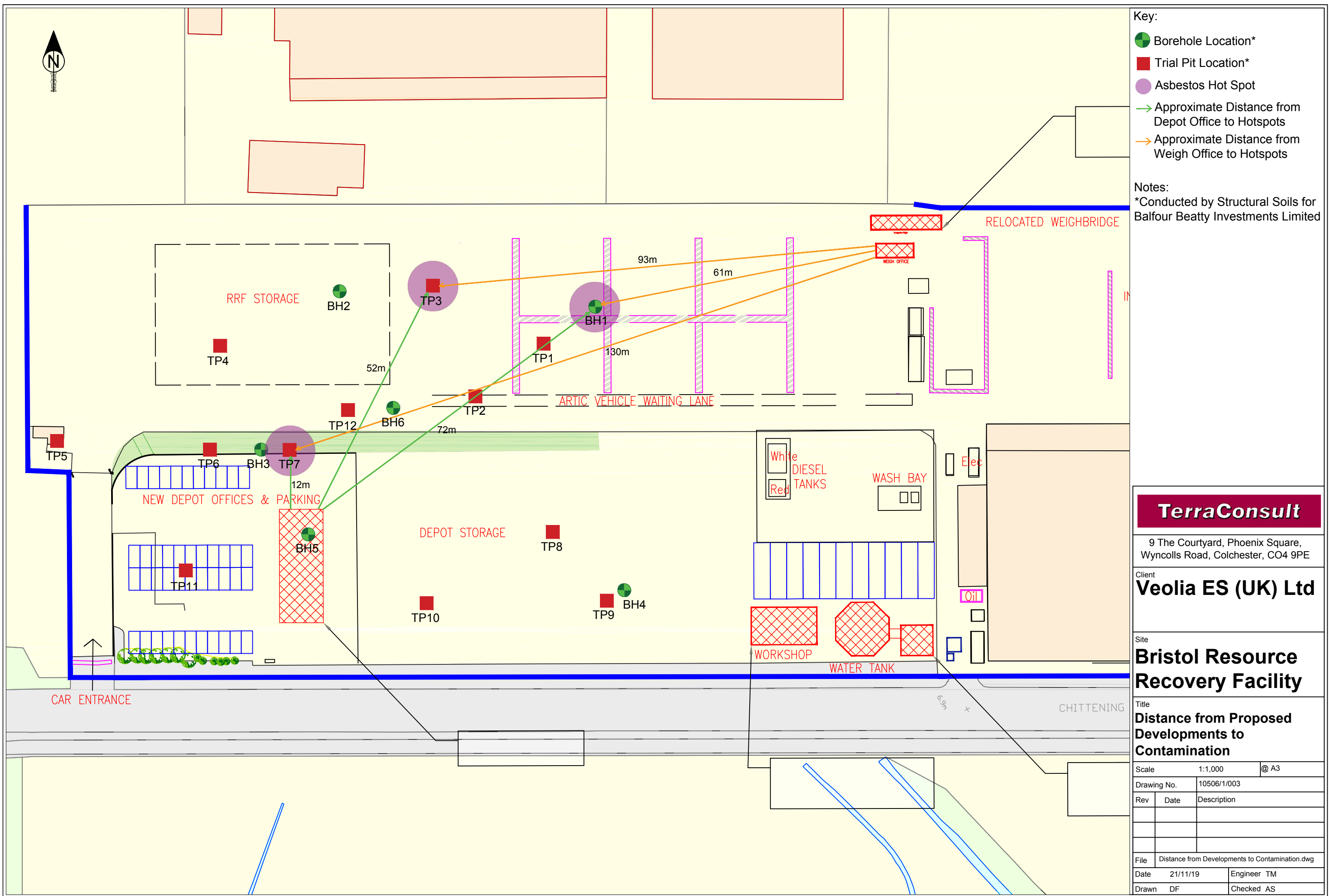
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Rev	Date	Description
File	Identified Site Contamination.dwg	
Date	21/11/19	Engineer TM
Drawn	DF	Checked AS



- Key:**
- Borehole Location\*
  - Trial Pit Location\*
  - Asbestos Hot Spot
  - Approximate Distance from Depot Office to Hotspots
  - Approximate Distance from Weigh Office to Hotspots

**Notes:**  
 \*Conducted by Structural Soils for Balfour Beatty Investments Limited



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Site  
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Title  
**Distance from Proposed Developments to Contamination**

Scale	1:1,000	@ A3
Drawing No.	10506/1/003	
Rev	Date	Description
File	Distance from Developments to Contamination.dwg	
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## Avonmouth Waste Management Centre

### Phase 1 Geo-Environmental Desk Study Report

**Veolia ES (UK) Ltd**

**Report No. 14-K6027-GEO-R000**

21 September 2021

Revision 000

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## Document Control

Document: Phase 1 Geo-Environmental Desk Study Report

Project: Avonmouth Waste Management Centre

Client: Veolia ES (UK) Ltd

Report Number: 14-K6027-GEO-R000

Document Checking:

Revision	Revision/ Review Date	Details of Issue	Authorised		
			Prepared By	Checked By	Approved By
000	21 September 2021	Issued for ITT	Adam Steele	Jason Tilley	Jason Tilley

**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.**



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## 1 Introduction

### 1.1 Background Information

Byrne Looby was commissioned by Veolia ES (UK) Ltd to undertake a Phase 1 Desk Study and Preliminary Risk Assessment for the site known as Avonmouth Hazardous Waste Transfer Station.

### 1.2 Development Proposals

It is understood that the development proposals are for the construction of hazardous waste transfer station which will comprise waste storage bays on concrete hardstanding.

### 1.3 Purpose of Investigation

The purpose of the report is to provide a preliminary assessment of the site using published information and a site walkover survey in relation to the proposed development of the site.

This report has been devised to comply 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, March 2012);
- BS5930:2015+A1:2020: “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)
- Land Contamination Risk Management (Environment Agency 2020);
- Environment Agency (2011) Report GPLC1 “Guiding Principles for Land Contamination”;
- Environment Agency (2017) “The Environment Agency’s Approach to Groundwater Protection” November 2017 Version 1.1

### 1.4 Previous Investigations

Although this specific site has not been subjected to any previous investigations, land immediately adjacent to it has. A Phase 1 Desk Study and Preliminary Risk Assessment for the adjacent should

be read in conjunction with this report (Bristol Resource Recovery Facility and Depot, Avonmouth, report ref. 10506/R01 Issue 1 dated November 2019).

## 1.5 Limitations

Byrne Looby's service constraints and report limitations are presented in **Appendix A** and a description of environmental risk assessment methodology and terminology is presented in **Appendix B**.

In preparation of this report, it is assumed that any information provided to Byrne Looby by the client in connection with the commission is accurate, complete and not misleading. Byrne Looby cannot guarantee the accuracy or validity of this information.

## 2 Site Location and Description

### 2.1 Site Location

A location summary and brief description of the site are presented in **Table 2.1** below.

**Table 2.1** Summary of Description of the Site and its Environs

<b>Location</b>	The site is located off the A403 approximately 2.1km north-east of St Andrews Road railway station, Avonmouth.
<b>Grid Reference</b>	353079 181164
<b>Post Code</b>	BS11 0YB
<b>Site Area</b>	0.13ha (approximately)
<b>Topography</b>	The site is relatively flat with an elevation between 5-6mAOD.

### 2.2 Site Description

A site walkover was completed on 13<sup>th</sup> September 2021, findings are provided below and selected photographs are presented in **Appendix C**.

The site was approached from the main entrance road of the wider Veolia site which connects the A403 Chittening Road to the east. The site was bounded by commercial warehouses and associated infrastructure to the north-west, including Firewood Bristol logs, open commercial space to the south and the wider Veolia site in all other directions. The site boundaries were demarcated by metal security fence on the north-western boundary and south-western boundaries, with the other boundaries being open.

The site comprised an open space with multiple empty waste storage containers in the south-western half. Concrete slabs covered much of the ground with a small section of gravel subbase in the south-eastern corner. A redundant concrete crusher was present in the centre of the waste bins, with two piles of subbase or similar aggregate also present. Finally, towards the south-eastern corner was a linear pile of old tyres.

### 3 Geological Information

A summary of the environmental background information (geology, hydrology, hydrogeology, database information etc.) and regulator consultation information has been presented in the following chapters. Unless otherwise stated, the following information has been obtained from the GroundSure report which is included in **Appendix D**.

#### 3.1 Anticipated Ground Conditions and Permeability

The anticipated superficial deposits, underlying solid geology and recorded Made Ground within 250m of the site are detailed in **Table 3.1**.

Table 3.1 Ground Conditions and Permeability

Item	Anticipated Ground Conditions	Recorded Permeability
Made/Artificial Ground	No Made Ground is recorded within the Groundsure report.  Made Ground comprising a surface layer of concrete slab was encountered during the site walkover, and a surface covering of asphalt was noted within the previous Phase 1 report. A Made Ground comprising a sandy, silty gravel of limestone was encountered in previously drilled boreholes BH6 and TP12 to depths of 0.50mbgl and 0.47mbgl, which is likely to be present on this site as well.	-
Superficial Deposits	The site is underlain by Tidal Flat Deposits comprising clay and silt.  Estuarine Alluvium was also encountered in previously drilled boreholes to 14.70mbgl which is anticipated to also be present on this site.	Tidal Flat Deposits have a low to very low permeability with an intergranular flow type.
Solid Geology	Superficial deposits are underlain by the Mercia Mudstone Group comprising mudstone and halite-stone. This is confirmed in the previous report to depths of 25.00mbgl.	Low permeability with a fracture flow type.
Faults	None recorded.	-



### 3.2 Radon Potential

Information regarding radon is presented in **Table 3.2** below.

Table 3.2 Radon

Item	Details
Radon Affected Area	The site is not within a radon affected area, as less than 1% of properties are above the action level.
Radon Protected Measure	No radon protective measures are considered necessary for new properties or extensions as described in Building Research Establishment (BRE) publication BR211.

### 3.3 Geological Hazards

Information regarding the risk of geological hazards affecting the site is presented in **Table 3.3** below.

Table 3.3 Geological Hazards

Hazard	Distance/Direction	Hazard Rating
Shrink-swell clays	On site	Low
Landslides	On site	Very low
Ground dissolution of soluble rocks	On site	Negligible
Compressible deposits	On site	Moderate
Collapsible deposits	On site	Negligible
Running sands	On site	Moderate

### 3.4 Previously Encountered Ground Conditions

Information regarding previously encountered ground conditions by Balfour Beatty Investments Ltd (report ref. 729873R1, dated August 2015) which is discussed in the previous Phase 1 report (Bristol Resource Recovery Facility and Depot, Avonmouth, report ref. 10506/R01 Issue 1 dated November 2019) are presented in **Table 3.4** below.

**Table 3.4** Previously Encountered Ground Conditions

Strata	Location	Depth to top of stratum (mbgl)	Thickness (m)
Asphalt	BH1, BH2, BH5, BH6, TP1-TP4, TP11, TP12	0.00	0.05 to 0.11
Made Ground	All locations	0.00 to 0.11	0.30 to 1.82
Tidal Flat Deposits	BH1-BH6, TP1-TP7, TP9, TP11, TP12	0.30 to 1.90	4.60 to 6.10
Estuarine Alluvium	BH1-BH6	5.30 to 6.60	7.00 to 10.30

<b>Strata</b>	<b>Location</b>	<b>Depth to top of stratum (mbgl)</b>	<b>Thickness (m)</b>
Mercia Mudstone Group	BH1-BH6	13.00 to 16.40	Proved to base of all boreholes 8.80 to 12.10

## 4 Hydrogeology and Hydrology Information

### 4.1 Aquifers

Information regarding aquifers beneath the site is presented in **Table 4.1** below.

Table 4.1 Aquifers

Item	Distance/Direction	Designation
Superficial Deposits	On site	Unproductive.
Solid Geology	On site	Secondary B Aquifer.

### 4.2 Abstraction Licences

Information regarding abstraction licences within 250m of the site is presented in **Table 4.2** below.

Table 4.2 Abstraction Licences

Item	Distance/Direction	Details
Groundwater Abstraction	-	None recorded.
Surface Water Abstraction	-	None recorded.
Potable Water Abstraction	-	None recorded.

### 4.3 Source Protection Zones and Groundwater Vulnerability

Information regarding source protection zones (SPZs) and groundwater vulnerability within 250m of the site are presented in **Table 4.3** below.

Table 4.3 SPZs and Groundwater Vulnerability

Item	Distance/Direction	Classification / Soil Vulnerability Category
SPZs	-	None recorded.
SPZs within Confined Aquifers	-	None recorded.
Groundwater Vulnerability and Leaching Potential	On site	Secondary bedrock aquifer; low vulnerability and high leaching class.

#### 4.4 Detailed River Network and Surface Water Features

Information regarding river networks and surface water features within 250m of the site are presented in **Table 4.4** below.

Table 4.4 Detailed River Network and Surface Water Features

Item	Distance/Direction	Details
Ordnance Survey MasterMap Water Network	84-244m east, north-east, south and south-west	Inland river not influenced by normal tidal action (26 records).
	239m south-west	Lake, loch or reservoir.
Surface Water Features	Within 250m	9 records; no further details given.
Water Framework Directive (WFD) Surface Water Body Catchments	On site	Lower Severn Vale, coastal catchment. Water body ID 139.
WFD Surface Water bodies	-	None recorded.
WFD Groundwater bodies	On site	Avonmouth Mercia Mudstone. Water body ID GB40902G30100 (2 records).

#### 4.5 Flooding

Information regarding flooding within 250m of the site is presented in **Table 4.5** below.

Table 4.5 Flooding

Item	Details
Environment Agency Zone 2 and Zone 3 Floodplains	Environment Agency Zone 2 and Zone 3 floodplains are present on site.
Risk of Flooding from Rivers and the Sea (RoFRaS) Flood Rating	There is a low risk on site and within 50m of RoFRaS.
Historical Flood Events	There are no historical flood events within 250m of the site.
Flood Defences	There are no recorded flood defences within 250m of the site.
Areas benefitting from Flood Defences	The site is benefitting from flood defences.
Areas benefitting from Flood Storage	There are no areas used for flood storage within 250m of the site.
Surface Water Flooding	The highest risk of surface water flooding on site is negligible.
Groundwater Flooding Susceptibility Areas and Flooding Confidence Areas	There is a negligible risk of groundwater flooding on site and within 50m of the site.

## 5 Historical Information

### 5.1 Historical Industrial Sites and Landfills

Information regarding historical industrial sites and landfills within 250m of the site is provided in **Table 5.1.**

Table 5.1 Historical Potentially Contaminative Uses

Item	Distance/Direction	Use
Potentially Contaminative Uses	On site	Trading estate, railway sidings and unspecified commercial/ industrial (4 records).
Historical Tank Database	178m south-west	Tanks.
Historical Energy Features Database	64-41m south-east and north-	Electricity substation (2 records).
Historical Petrol and Fuel Database	-	None recorded.
Historical Garage and Motor Vehicle Repair Database	-	None recorded.
Historical Military Sites	On site	Chittening, circa WW1 activities include National Filing Factory (chemical), charging and assembling 6-inch chemical shell.
Environment Agency Landfills	-	None recorded.
Environment Agency Historical Landfills	-	None recorded.
BGS/DoE Non-operational Landfill Sites	-	None recorded.
Landfills from Local Authority and Historical Mapping Records	-	None recorded.
Waste treatment, transfer or disposal sites	39-100m north and north-east	Chittening Industrial Estate; recycling and office, waste transfer/workshops and waste management (3 records).
Environment Agency Licensed Waste Sites	145m north	PR Exports Imports Limited; 75kte vehicle depollution facility.
	145m north	PR Recycling Ltd; 75kte vehicle depollution facility.
	244m north-east	Units A, B and C Estuary Park; use of waste to manufacture timber 75,000 tpy, 75kte HCl waste transfer station and treatment (6 records).
Waste Exemptions	123m south-west	Smoke Lane, Bristol. Storing waste and treating waste exemptions (4 records).
	218m north-west	Kuehne Nagel Ltd. Storing waste and treating waste exemptions (3 records).
	219m north-west	Chittening Industrial Estate. Storing waste and treating waste exemptions (5 records).

Item	Distance/Direction	Use
	238m north	Unit 8 Chittening Industrial Estate. Storing waste and treating waste exemptions (2 records).
	239m north	Lyreco RDC Chittening Industrial Estate. Storing waste and treating waste exemptions (2 records).

## 5.2 Site History

The site history is summarised below in **Table 5.2** and determined from the GroundSure historical mapping.

Table 5.2 Site History

Map Date	Map Scale	On Site	Off Site
1880-1884 1881 1886-1887	1:10,560 1:2,500 1:10,560	The site comprises an open plot of land.	A well is 10m north-east and several buildings in an L-shape are 30m north-east. Washingpool Lane and other small lanes surround the site in all directions from 20-250m. A pond is 70m north-west. A woodland with pond is 200m north-west. The remaining area comprises fields with associated tree lined and hedgerow boundaries.
1901 1903	1:10,560 1:2,500	Part of the barn is in the east.	Barns associated with Green Splot Farm are immediately north-east.
1912 1912-1916 1912-1916 1915 1918-1921	1:10,560 1:10,560 1:10,560 1:2,500 1:10,560	No significant change has occurred since the previous mapping editions.	Earthworks possibly associated with a railway or road are 220m south-west orientated roughly north-west to south-east.
1935-1938	1:10,560	A small building is adjacent to the southern boundary.	The earthworks to the south-west are associated with a railway. Many rectangular buildings are 100-250m west and north associated with military production.
1954-1955	1:10,560	No significant change has occurred since the previous mapping editions.	The buildings to the north appear to be warehouses associated with Chittening Trading Estate.
1964 1969-1970*	1:10,560 1:1,250	The buildings have been demolished and part of a larger warehouse from the Docks Industrial Estate covers the site. Railway sidings cross the site orientated north to south in the western section.	Warehouses and railway sidings are 10-250m south, west and north. Smoke Lane and Chittening Road are 70m south and east extending beyond 250m respectively. A transport depot is 80m south-west. A works is 130m north.
1971 1972*	1:2,500 1:2,500	No significant change has occurred since the previous mapping editions.	A metal works is 95m south-east. A tyre factory is 200m south-east and a further warehouse 230m south-east.



Map Date	Map Scale	On Site	Off Site
1973 1977*	1:10,000 1:1,250		An engineering works with electricity substation is 245m north.
1992* 1994* 1994*	1:2,500 1:1,250 1:1,250	No significant change has occurred since the previous mapping editions.	An electricity substation is 90m south-east.
2001 2003	1:10,000 1:1,250	No significant change has occurred since the previous mapping editions.	An additional electricity substation is 90m south-east.
2010	1:10,000	No significant change has occurred since the previous mapping editions.	No significant change has occurred since the previous mapping editions.
2021	1:10,000	The warehouse is no longer present and the site appears to be open land, likely Made Ground associated with an industrial estate setting.	No significant change has occurred since the previous mapping editions.

\*Partial map

### 5.3 Railways and Tunnels

Information regarding railways and tunnels on or within 250m of the site are presented in **Table 5.3** below.

Table 5.3 Railways and Tunnels

Feature	Distance/Direction	Use / Detail
Tunnels	-	None recorded.
Historical Railway and Tunnel Features	On site	Railway sidings (5 records).
	16-237m north-east, south-east and north-west	Railway sidings (7 records).
Historical Railways	-	None recorded.
Royal Mail Tunnels	-	None recorded.
Active Railways	189-243m west, south-west and south	Single track, rail and multi track (8 records).
Railway Projects	-	None recorded.

## 6 Environmental Information

### 6.1 Environmental Permits, Incidents, Registers and Sensitive Sites

Information regarding environmental permits, incidents, registers and designated sensitive sites are provided in **Table 6.1** below.

Table 6.1 Environmental Permits, Incidents, Registers and Sensitive Sites

Item	Distance/Direction	Detail	
Industrial Sites Holding Licences and/or Authorisations	Historic IPC Authorisations	-	None recorded.
	Part A(1) and IPPC Authorised Activities	162m west	Ross Gordon Engineering Ltd; respraying of road vehicles.
	Red List Discharge Consents	-	None recorded.
	List 1 Dangerous Substances Inventory Sites	-	None recorded.
	List 2 Dangerous Substances Inventory Sites	-	None recorded.
	Part A(2) and Part B Activities and Enforcements	-	None recorded.
	Category 3 or 4 Radioactive Substances Authorisations	-	None recorded.
	Licensed Discharge Consents	195m south	Somerset, Avon and Gloucester Joint, Fire Training Centre. Effluent: sewage and trade combined – unspecified.
	Hazardous Substance Consents and Enforcements	237m north	AEM Avon Ltd and Shell Gas Limited (2 records).
Dangerous or Hazardous Sites	On site	Shell Gas Limited; historical NIHHS site.	
Environment Agency Recorded Pollution Incidents	111m west	Incident date: 08/09/2002. Pollutant: solvents. Impact: category 3 (minor) air impact.	
	111m west	Incident date: 25/10/2001 Pollutant: smoke. Impact: category 3 (minor) air impact.	
	184m west	Incident date: 16/01/2016. Pollutant: contaminated mineral materials and wastes. Impact: category 3 (minor) air impact.	
	194m north-west	Incident date: 18/06/2002. Pollutant: other organic chemical or product. Impact: category 3 (minor) air impact.	

Item	Distance/Direction	Detail
	226m north	Incident date: 22/05/2001. Pollutant: dust. Impact: category 3 (minor) air impact.
Recorded Part 2A Sites	-	None recorded.
Potentially Contaminative Industrial Sites	15m west	Dawson group; vehicle hire and rental.
	71-73m south and south-east	Electricity substation (2 records).
	73m south-west	Mast.
	109m north-west	Stone Hardy; industrial repairs and servicing.
	138m north-west	Ross Gordon; vehicle repair, testing and servicing.
	180m north-west	Brandon Hire; lifting and handling equipment.
	190m south-west	Tanks.
	195m north-west	Recycling Business; recycling centres.
	238m south-east	Malcolm Group; distribution and haulage.
	241m north-west	Granite and Stone Southwest Ltd; stone quarrying and preparation.
Petrol and Fuel Sites	-	None recorded.
Underground Electricity Transmission Cables	-	None recorded.
High Pressure Gas Transmission Pipelines	-	None recorded.
Designated Environmentally Sensitive Sites	On site	Site of Special Scientific Interest (SSSI) Impact Risk Zone (2 records).
	98-246m south-east, east, north-east, south, west and south-west	Coastal and floodplain grazing marsh and no main habitat but additional habitats present (24 records).

## 7 Ground Workings, Mining, Extractions and Cavities

Information regarding historical and current ground workings, mining activities, extractions and cavities on or within 250m of the site are presented in **Table 7.1** below.

Table 7.1 Ground Workings, Mining, Extractions and Cavities

Feature	Distance/Direction	Use/Detail
Historical Surface Ground Working Features	-	None recorded.
Historical Underground Ground Working Features	-	None recorded.
Current Ground Workings	-	None recorded.
Historical Mining	-	None recorded.
Coal Mining	-	None recorded.
Records Held by Johnson Poole and Bloomer	-	The study site is not located within 1000m of an area when Johnson Poole and Bloomer hold information.
Non-coal Mining	-	None recorded.
Non-coal Mining Cavities	-	None recorded.
Natural Cavities	-	None recorded.
Brine Extraction	-	None recorded.
Gypsum Extraction	-	None recorded.
Tin Mining	-	None recorded.
Clay Mining	-	None recorded.

## 8 Hazard Assessment and Preliminary Conceptual Site Model

### 8.1 Hazards Identified with the Proposed Development

The hazard identification assumes that the site is to be developed for commercial use with associated infrastructure. It is assumed that drinking water will not be supplied to site.

#### 8.1.1 Potential Sources of Contamination

Potentially contaminative land uses identified from the Phase 1 desk study are summarised in **Table 8.1**.

**Table 8.1** Potential Contaminative Sources

Item	Detail
Summary of Land Use and Potential Contaminative Sources	<p><u>Historical Site Use</u> Trading estate, railway sidings, unspecified commercial/ industrial, agricultural buildings, historical NIHHS site and Chittening, circa WW1 activities include National Filing Factory (chemical), charging and assembling 6-inch chemical shell.</p>
	<p><u>Current Site Use</u> Open area of commercial/ industrial land.</p>
	<p><u>Historical Land Use / Features Within Vicinity</u> Tanks, Chittening, circa WW1 activities include National Filing Factory (chemical), charging and assembling 6-inch chemical shell, vehicle depollution facility, waste transfer station, waste exemptions, electricity substations, railway sidings, respraying road vehicles, Hazardous Substance Consents and Enforcements and minor air impact pollution incidents.</p>
	<p><u>Current Land Use Within Vicinity</u> Rail and multitrack, vehicle hire and rental, electricity substations, industrial repairs and servicing, lifting and handling equipment, tanks, recycling centres, distribution and haulage, stone quarrying and preparation, SSSI Impact Risk Zone, and coastal and floodplain grazing habitat.</p>

#### 8.1.2 Identification of Pathways

The principal potential pathways for contaminant migration are presented in **Table 8.2**.

**Table 8.2** Pathways

Source	Pathway
Soil / dust / fibres.	Dermal contact, ingestion and inhalation.
Liquid (including surface water / groundwater).	Dermal contact, ingestion, leaching, infiltration and migration.
Harmful ground gases / vapour.	Inhalation, accumulation within confined spaces with subsequent asphyxiation or explosion.

8.1.3 Potential Receptors of Contamination

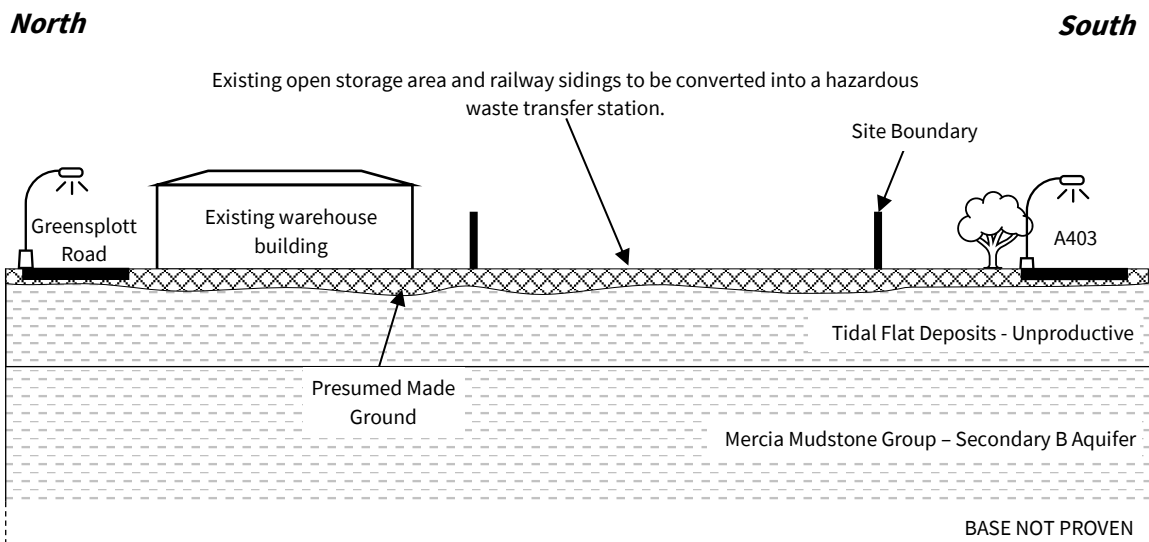
Receptors identified through the desk study are described in **Table 8.3**.

**Table 8.3** Receptors

Receptor	Detail
Site workers	Site workers are anticipated to include those involved with the construction works at the site, particularly ground workers.
End Users	Workers and visitors to the completed development.
Controlled Waters	The site is underlain by unproductive superficial strata overlying a Secondary B Aquifer. The nearest surface water feature is an unknown river 84m east. On site there is the Lower Severn Vale WFD Surface Water Body Catchment and Avonmouth Mercia Mudstone WFD Groundwater Body.
Buildings	Any buildings to be constructed.
Buried services	Potable water pipes are not expected as part of proposals.

8.2 Conceptual Site Model

In accordance with BS 10175, a general schematic section has been developed for the site based on the previously presented data and contaminant linkage assessment. This is shown in **Figure 1**.



**Figure 1** Preliminary Conceptual Site Model based on the proposed development (not to scale).

The model for the site shows the anticipated geology, former site usage and vulnerable receptors. The information presented above represents the preliminary conceptual ground model that may need to be revised based on data obtained during any future investigation, either desk-based or intrusive. The conceptual site model and proposed end use described above should be considered very broadly representative of a residential land use, as a worst case scenario, as defined in SR3 “Updated Technical Model to the CLEA Model” (SC050021/SR3, 2011) for the purpose of this report.



### 8.3 Preliminary Contamination Hazard Assessment

The preliminary hazard assessment is based on current available guidance published by a number of sources and is summarised in **Appendix B**. A preliminary conceptual site model for this site has been established using the desk study information and has been used as a basis for the preliminary hazard assessment. The contaminant linkages have been individually assessed and a summary of the potential geo-environmental risks associated with the site and in the context of the proposed residential development is provided in **Table 8.4**.

**Table 8.4** Summary of Preliminary Qualitative Risk Assessment

Issue	Risk Rating	Justification Comments
<b><i>Contamination Potential</i></b>		
Potential for significant on-site contamination	Low to moderate	Potential contamination sources have been identified on site relating to the former site use.
Potential for contaminants to migrate via soil/air/groundwater pathways to site	Low	The underlying shallow soils are cohesive with low permeability and designated as Unproductive. The underlying solid geology is designated a Secondary B Aquifer.
Potential for contaminants to migrate via soil/air/groundwater pathways off-site	Low	The underlying shallow soils are cohesive with low permeability and designated as Unproductive. The underlying solid geology is designated a Secondary B Aquifer.
<b><i>Geo-environmental Risk</i></b>		
Risk of harm to human health based on anticipated conditions	Low	Potential contamination sources have been identified on site during the walkover and relate to the former site use. However, the site area comprises concrete hardstanding and it is understood the proposed development will build on existing concrete slab. Localised drainage is expected on site and it is understood that surface water will drain into a buried tank, possibly to be located in the south-eastern corner. As buried services are likely to be the only part of the construction which will break ground, a pathway between potential sources of contamination to groundworkers has been identified but no pathway between potential contamination sources and end users.
Risk to site workers	Low	Proposed development to be constructed on existing concrete slab. Drainage is expected to form part of the proposals but will form a minor part of the wider construction. We would therefore recommend a Watching Brief is maintained during the drainage construction works.
Risk of pollution to controlled water	Low	Underlying ground conditions are designated as Unproductive overlying a Secondary B Aquifer.

Issue	Risk Rating	Justification Comments
Hazards to flora and fauna	N/A	Landscaping is not expected on site.
Hazards to building structures and services – excluding ground gas	Low	Proposed development to be constructed on existing concrete slab.
<b><i>Liabilities</i></b>		
Likelihood of designation as Contaminated Land under Part 2A of EPA 1990	Low	Potential for contamination identified but is likely to be addressed under the planning regime.
Liability issues for owner	Low	Liability issues have not been identified based on proposed development.
<b><i>Development Implications</i></b>		
Possible requirement for remediation of soil	Low	Proposed development to be constructed on existing concrete slab although minor drainage works will break ground. As the proposed end use retains the current commercial site usage, the risk for soil remediation is considered low.
Possible requirement for remediation of groundwater	Low	Underlying geology has a low permeability and is designated Unproductive. Proposed development to be constructed on existing concrete slab.
Possible requirement for gas protection	Low	Gas protection is unlikely to be required based on the proposed open structure construction activities. Any office buildings will be raised portacabin like structures.
Special requirements for water supply pipes	N/A	Water supply pipes are not expected to be required for the proposed construction.
Potential limitations on foundation design	N/A	Proposed development to be constructed on existing concrete slab.
Risk of encountering materials classed as hazardous waste	Low	It is considered unlikely that materials classed as hazardous waste will be encountered during construction activities.

## 9 Conclusions

### 9.1 Environmental Risk Assessment

A preliminary risk assessment has been made based on the contaminant - pathway - receptor model, as defined in Part IIA of the Environmental Protection Act 1990 and in accordance with *BS10175: 2011 +A2:2017 "Investigation of Potentially Contaminated Sites - Code of Practice"*. A preliminary conceptual site model has been produced to set out the characteristic ground conditions and elements of the surrounding environment and has assisted with identifying potential sources of contamination, potential receptors of the contamination and potential pathways between them.

From the site history, walkover survey and information obtained during the desk study, potential sources of contamination have been identified associated with the former site use including that of the circa WW1 activities include National Filing Factory (chemical), charging and assembling 6-inch chemical shell, and current site use. However, based on the proposed developments which will be built on the existing concrete slab and therefore not break ground, the risk to site workers and future site users is considered low. Further investigation is considered unnecessary for this development.

### 9.2 Recommendations

#### 9.2.1 Watching Brief

It is recommended that a watching brief is maintained on site, particularly during the groundwork stage. During any ground works an appraisal of the exposed soils should be made by a competent person, this as an example could be the site manager. If any material is noted to show visual and/or olfactory signs of contamination it should be stockpiled separately and tested prior to its appropriate removal off-site or re-use. If soils suspected of being contaminated are encountered, it is recommended that a contaminated land specialist is consulted.

#### 9.2.2 Buried Services

Potable water pipework shall comply with the Water Supply Regulations, the agreement of the water provider and Local Authority should also be sought regarding the potable water pipework and fittings selected prior to commencement.

### 9.3 Health & 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 the information used as an input to 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.

In accordance with the Construction Design and Management (CDM) Regulations 2015, Byrne Looby 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, Byrne Looby has discharged and completed all contractual and legal requirements for these positions and has no further involvement with the project. It is the developer's duty, as required by the CDM Regulations, to appoint others to fill these roles for the further development of the site.

## 10 References

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Statutory Instruments: 2012: Health and Safety. The Control of Asbestos Regulations 2012. No. 262 coming into force 6<sup>th</sup> April 2012.

Water Regulations Advisory Scheme. 2002. Information and Guidance Note No. 9-04-03.



Appendix A – Service Constraints, Report Limitations  
and Planning Requirements

**Service Constraints, Report Limitations and Planning Requirements**

This report (the "Services") was compiled and carried out by Byrne Looby Limited (BL) for the client named on the front of the report (the "client") in accordance with the terms of a contract between BL and the "client". The Services were performed by BL with the 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 BL taking into account the limits of the scope of works required by the client, the time scale involved and the resources, including financial and manpower resources, agreed between BL and the client.

Other than that expressly contained in the above paragraph, BL 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 BL. If a third party relies on this report, it does so wholly at its own and sole risk and BL disclaims any liability to such parties.

It is BL'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 BL'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 Byrne Looby 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 BL. In the absence of such written advice of BL, reliance on the report in the future shall be at the client's own and sole risk. Should BL be requested to review the report in the future, BL shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between BL 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 BL. BL has not performed any observations, investigations, studies or testing not specifically set out or mentioned within this report. BL 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, BL did not seek to evaluate the presence on or off the site of asbestos, electromagnetic fields, lead paint, radon gas or other radioactive or hazardous materials.

The Services are based upon BL's observations of existing physical conditions at the site gained from existing documents, together with BL'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 Byrne Looby (South) Limited has 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, BL was not authorised and did

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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. BL 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 BL and including the doing of any independent investigation of the information provided to BL save as otherwise provided in the terms of the contract between the client and BL.

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 BL] 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+A1 2013. For the geotechnical aspects of the report, the general requirements of Eurocode 7 (BS EN 1997-2:2007) providing a desk study assessment. This report shall not be considered as being a Ground Investigation Report (GIR).

### **Planning Requirements**

The National Planning Policy Framework (NPPF, 2012) has twelve core land-use planning principles, two of which directly relate to the potential for pollution and contaminated land:

- Requirement to “*contribute to conserving and enhancing the natural environment and reducing pollution*” and setting out of a preference for developments to be on land of “*lesser environmental value*”; and
- “*encourage the effective use of land by re-using land that has been previously developed (brownfield land), providing that it is not of high environmental value.*”

In accordance with the core principles of NPPF, Paragraph 109 clarifies that enhancing the natural environment includes:

- “*preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability; and*
- *remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.*”

Paragraph 121 of NPPF states that planning policies and decisions for developments should also ensure that:

- *“the site is suitable for its new use taking account of ground conditions and land instability, including from natural hazards or former activities such as mining, pollution arising from previous uses and any proposals for mitigation including land remediation or impacts on the natural environment arising from that remediation;*
- *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*
- *adequate site investigation information, prepared by a competent person, is presented.”.*

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 experienced in the desk study, field investigation and clearance of UXO/UXB.

## Appendix B – Environmental Risk Assessment Methodology & Terminology

## ENVIRONMENTAL RISK ASSESSMENT

## METHODOLOGY &amp; 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 recently 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 and Contaminated Land Statutory Guidance was published by Defra in (Defra, 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 March 2012 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 levels 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 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 satisfactory 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 CLR 11 Model Procedures for the Management of Land Contamination (Environment Agency, 2004), and BS10175:2011+A2 20173. 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

## B

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+A1 2013. The result 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 Phase I Investigation (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 pollution linkage is not of significance then no further assessment or action is required due to this linkage. For each significant and possible 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**

The criteria used for risk assessment are broadly based on those presented in DETR’s “A Guide to Risk Assessment and Risk Management for Environmental Protection” (2000). The Severity of the risk is classified according to the criteria in Table B.1 below:

<b>Table B.1 Severity/Consequence of Risk</b>	
<b>Severe</b>	Acute risks to human health. Catastrophic damage to buildings/property (e.g. by explosion). Direct pollution of sensitive water receptors or serious pollution of other controlled water (watercourses or groundwater) bodies.
<b>Medium</b>	Harm to human health from long-term exposure. Slight pollution of sensitive controlled waters (surface waters or aquifers) or pollution of other water bodies. Significant effects on sensitive ecosystems or species.
<b>Mild</b>	No significant harm to human health in either short or long term. No pollution of sensitive controlled waters, no more than slight pollution of non-sensitive waters. Significant damage to buildings or structures. Requirement for protective equipment during site works to mitigate health effects.
<b>Negligible</b>	Damage to non-sensitive ecosystems or species. Minor damage to buildings or structures. No harm or pollution of water.

The probability of the risk occurring is classified according to criteria given in Table B.2 below:

<b>Table B.2: Probability of Risk Occurring</b>	
<b>High likelihood</b>	Contaminant linkage may be present, and risk is almost certain to occur in the long term, or there is evidence of harm to the receptor.
<b>Medium/Reasonably Foreseeable</b>	Contaminant linkage may be present, and it is probable that the risk will occur over the long term.
<b>Low/Unlikely</b>	Contaminant linkage may be present and there is a possibility of the risk occurring, although there is no certainty that it will do so.
<b>Negligible/ Not credible</b>	Contaminant linkage may be present but the circumstances under which harm would occur are improbable.

An overall evaluation of the level of risk is gained from a comparison of the severity and probability, as shown in Table B.3 below:

<b>Table B.3: Comparison of Severity and Probability</b>					
		<b>Severity</b>			
		<b>Severe</b>	<b>Medium</b>	<b>Mild</b>	<b>Negligible</b>
<b>Probability</b>	<b>High likelihood</b>	Very High Risk	High Risk	Medium/Low Risk	Low Risk
	<b>Medium/Reasonably Foreseeable</b>	High Risk	Medium Risk	Low Risk	Near Zero
	<b>Low/Unlikely</b>	High/Medium Risk	Medium/Low Risk	Low Risk	Near Zero
	<b>Negligible/Not credible</b>	Medium/Low Risk	Low Risk	Low Risk	Near Zero

The various risk rankings provide guidance for recommended actions, whether this is:

- AR - Action Required, Remediation or mitigation or site investigation works required
- SIR - Site Investigation Required, further assessment is required.
- NAR - No Action Required.

A description of the evaluated risk is as follows:

<b>Table B.4 - Description of the Classified Risks and Likely Action Required</b>	
<b>Evaluated Risk</b>	<b>Recommended Actions</b>
<b>Very High Risk</b>	AR: 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.
<b>High Risk</b>	AR: 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 long term.
<b>Moderate Risk</b>	SIR: It is possible that harm could arise to a designated receptor from an identified hazard. However, it is 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.
<b>Low Risk</b>	NAR: It is possible that harm could arise to a designated receptor from an identified hazard, but there is a low likelihood of this hazard occurring and if realised, harm would at worst normally be mild.
<b>Near Zero</b>	NAR: There is a negligible possibility that harm could arise to a receptor. In the event of such harm being realised, it is not likely to be severe.

**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 aquifer 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.

**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 publication CLR11 (2004) “Model Procedures for the Management of Land Contamination.” 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
CIRIA	Construction Industry Research Association		(atmospheric pressure)
CLEA	Contaminated Land Exposure Assessment	l/hr	Litres per hour
CSM	Conceptual Site Model	ha	Hectare (10,000 m <sup>2</sup> )
DNAPL	Dense Non-Aqueous Phase Liquid (chlorinated solvents, PCB)	µg/l	Micrograms per Litre
DWS	Drinking Water Standard		(parts per billion)



EA	Environment Agency	ppb	Parts Per Billion
EQS	Environmental Quality Standard	mg/kg	Milligrams per kilogram
GAC	General Assessment Criteria		(parts per million)
GL	Ground Level	ppm	Parts Per Million
GSV	Gas Screening Value	mg/m <sup>3</sup>	Milligram per metre cubed
HCV	Health Criteria Value	Mg/m <sup>3</sup>	Megagram per metre cubed
LNAPL	Light Non-Aqueous Phase Liquid (petrol, diesel)	µg/m <sup>3</sup>	Microgram per metre cubed
ND	Not Detected	m bgl	Metres Below Ground Level
LMRL	Lower Method Reporting Limit	m bcl	Metre Below Cover Level
NR	Not Recorded	mOD	Metres Above Ordnance Datum (sea level)
OD	Ordnance Datum	kN/m <sup>2</sup>	Kilo Newtons per metre squared
PAH	Poly Aromatic Hydrocarbon	kPa	Kilo Pascal – same as kN/m <sup>2</sup>
PCB	Poly-Chlorinated Biphenyl	µm	Micro metre
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 – Site Photographs



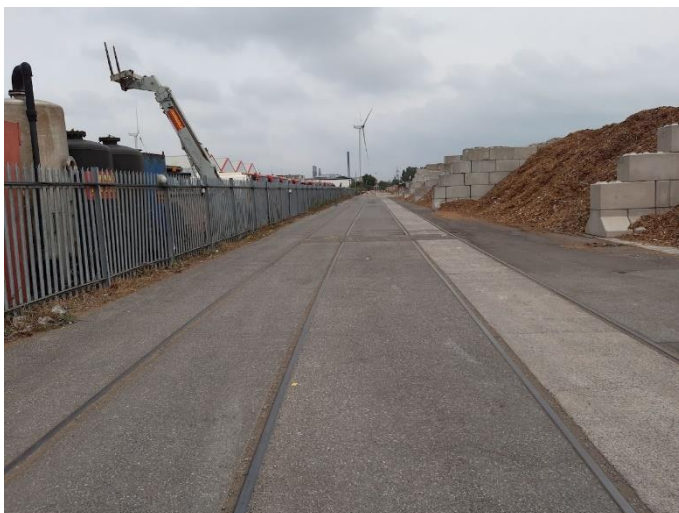
**Figure 1**

View of the site looking south-west along western boundary.



**Figure 2**

View of the site looking south-east from the west boundary.



**Figure 3**

View of the site along the western boundary looking north-east.



**Figure 4**

View of the southern corner of the site.



**Figure 5**

View of the south-east area of the site.



**Figure 6**

View of the site looking north-east from the south-east area.



**Figure 7**

Southern area of site being used for storage area of aggregate material.

Appendix D – Groundsure Report



## Avonmouth

### Order Details

**Date:** 19/08/2021  
**Your ref:** 16-10459-000  
**Our Ref:** GS-8137912  
**Client:** Byrne Looby Partners (UK) Limited

### Site Details

**Location:** 353079 181164  
**Area:** 0.13 ha  
**Authority:** [Bristol City Council](#)



**Summary of findings**

p. 2

**Aerial image**

p. 8

**OS MasterMap site plan**

p.13

[groundsure.com/insightuserguide](https://groundsure.com/insightuserguide)

Contact us with any questions at:

[info@groundsure.com](mailto:info@groundsure.com)

08444 159 000

## Summary of findings

Page	Section	Past land use	On site	0-50m	50-250m	250-500m	500-2000m
<a href="#">14</a>	<a href="#">1.1</a>	<b><u>Historical industrial land uses</u></b>	4	0	3	1	-
<a href="#">15</a>	<a href="#">1.2</a>	<b><u>Historical tanks</u></b>	0	0	1	2	-
<a href="#">15</a>	<a href="#">1.3</a>	<b><u>Historical energy features</u></b>	0	0	2	1	-
16	1.4	Historical petrol stations	0	0	0	0	-
16	1.5	Historical garages	0	0	0	0	-
<a href="#">16</a>	<a href="#">1.6</a>	<b><u>Historical military land</u></b>	1	0	0	0	-
Page	Section	Past land use - un-grouped	On site	0-50m	50-250m	250-500m	500-2000m
<a href="#">18</a>	<a href="#">2.1</a>	<b><u>Historical industrial land uses</u></b>	6	0	3	1	-
<a href="#">19</a>	<a href="#">2.2</a>	<b><u>Historical tanks</u></b>	0	0	2	5	-
<a href="#">20</a>	<a href="#">2.3</a>	<b><u>Historical energy features</u></b>	0	0	6	4	-
20	2.4	Historical petrol stations	0	0	0	0	-
20	2.5	Historical garages	0	0	0	0	-
Page	Section	Waste and landfill	On site	0-50m	50-250m	250-500m	500-2000m
22	3.1	Active or recent landfill	0	0	0	0	-
22	3.2	Historical landfill (BGS records)	0	0	0	0	-
23	3.3	Historical landfill (LA/mapping records)	0	0	0	0	-
23	3.4	Historical landfill (EA/NRW records)	0	0	0	0	-
<a href="#">23</a>	<a href="#">3.5</a>	<b><u>Historical waste sites</u></b>	0	2	1	3	-
<a href="#">25</a>	<a href="#">3.6</a>	<b><u>Licensed waste sites</u></b>	0	0	8	6	-
<a href="#">29</a>	<a href="#">3.7</a>	<b><u>Waste exemptions</u></b>	0	0	16	38	-
Page	Section	Current industrial land use	On site	0-50m	50-250m	250-500m	500-2000m
<a href="#">35</a>	<a href="#">4.1</a>	<b><u>Recent industrial land uses</u></b>	0	1	10	-	-
36	4.2	Current or recent petrol stations	0	0	0	0	-
36	4.3	Electricity cables	0	0	0	0	-
37	4.4	Gas pipelines	0	0	0	0	-
37	4.5	Sites determined as Contaminated Land	0	0	0	0	-



<b>37</b>	<b>4.6</b>	<b><u>Control of Major Accident Hazards (COMAH)</u></b>	1	0	0	2	-
37	4.7	Regulated explosive sites	0	0	0	0	-
<b>38</b>	<b>4.8</b>	<b><u>Hazardous substance storage/usage</u></b>	0	0	2	0	-
38	4.9	Historical licensed industrial activities (IPC)	0	0	0	0	-
38	4.10	Licensed industrial activities (Part A(1))	0	0	0	0	-
<b>39</b>	<b>4.11</b>	<b><u>Licensed pollutant release (Part A(2)/B)</u></b>	0	0	1	0	-
39	4.12	Radioactive Substance Authorisations	0	0	0	0	-
<b>39</b>	<b>4.13</b>	<b><u>Licensed Discharges to controlled waters</u></b>	0	0	1	8	-
41	4.14	Pollutant release to surface waters (Red List)	0	0	0	0	-
41	4.15	Pollutant release to public sewer	0	0	0	0	-
41	4.16	List 1 Dangerous Substances	0	0	0	0	-
41	4.17	List 2 Dangerous Substances	0	0	0	0	-
<b>41</b>	<b>4.18</b>	<b><u>Pollution Incidents (EA/NRW)</u></b>	0	0	5	2	-
42	4.19	Pollution inventory substances	0	0	0	0	-
43	4.20	Pollution inventory waste transfers	0	0	0	0	-
43	4.21	Pollution inventory radioactive waste	0	0	0	0	-
Page	Section	Hydrogeology	On site	0-50m	50-250m	250-500m	500-2000m
<b>44</b>	<b>5.1</b>	<b><u>Superficial aquifer</u></b>	Identified (within 500m)				
<b>45</b>	<b>5.2</b>	<b><u>Bedrock aquifer</u></b>	Identified (within 500m)				
<b>46</b>	<b>5.3</b>	<b><u>Groundwater vulnerability</u></b>	Identified (within 50m)				
47	5.4	Groundwater vulnerability- soluble rock risk	None (within 0m)				
47	5.5	Groundwater vulnerability- local information	None (within 0m)				
<b>48</b>	<b>5.6</b>	<b><u>Groundwater abstractions</u></b>	0	0	0	0	6
50	5.7	Surface water abstractions	0	0	0	0	0
50	5.8	Potable abstractions	0	0	0	0	0
50	5.9	Source Protection Zones	0	0	0	0	-
51	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-
Page	Section	Hydrology	On site	0-50m	50-250m	250-500m	500-2000m
<b>52</b>	<b>6.1</b>	<b><u>Water Network (OS MasterMap)</u></b>	0	0	27	-	-



55	<b>6.2</b>	<b><u>Surface water features</u></b>	0	0	9	-	-
55	<b>6.3</b>	<b><u>WFD Surface water body catchments</u></b>	1	-	-	-	-
55	6.4	WFD Surface water bodies	0	0	0	-	-
56	<b>6.5</b>	<b><u>WFD Groundwater bodies</u></b>	2	-	-	-	-
Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
57	<b>7.1</b>	<b><u>Risk of Flooding from Rivers and Sea (RoFRaS)</u></b>	Low (within 50m)				
58	7.2	Historical Flood Events	0	0	0	-	-
58	7.3	Flood Defences	0	0	0	-	-
58	<b>7.4</b>	<b><u>Areas Benefiting from Flood Defences</u></b>	1	0	0	-	-
58	7.5	Flood Storage Areas	0	0	0	-	-
59	<b>7.6</b>	<b><u>Flood Zone 2</u></b>	Identified (within 50m)				
60	<b>7.7</b>	<b><u>Flood Zone 3</u></b>	Identified (within 50m)				
Page	Section	Surface water flooding					
61	<b>8.1</b>	<b><u>Surface water flooding</u></b>	1 in 100 year, 0.1m - 0.3m (within 50m)				
Page	Section	Groundwater flooding					
63	<b>9.1</b>	<b><u>Groundwater flooding</u></b>	Negligible (within 50m)				
Page	Section	Environmental designations	On site	0-50m	50-250m	250-500m	500-2000m
64	<b>10.1</b>	<b><u>Sites of Special Scientific Interest (SSSI)</u></b>	0	0	0	1	1
65	<b>10.2</b>	<b><u>Conserved wetland sites (Ramsar sites)</u></b>	0	0	0	2	0
68	<b>10.3</b>	<b><u>Special Areas of Conservation (SAC)</u></b>	0	0	0	2	0
68	<b>10.4</b>	<b><u>Special Protection Areas (SPA)</u></b>	0	0	0	2	0
69	10.5	National Nature Reserves (NNR)	0	0	0	0	0
69	10.6	Local Nature Reserves (LNR)	0	0	0	0	0
69	10.7	Designated Ancient Woodland	0	0	0	0	0
70	10.8	Biosphere Reserves	0	0	0	0	0
70	10.9	Forest Parks	0	0	0	0	0
70	10.10	Marine Conservation Zones	0	0	0	0	0
70	<b>10.11</b>	<b><u>Green Belt</u></b>	0	0	0	0	1
71	10.12	Proposed Ramsar sites	0	0	0	0	0



71	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
71	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
71	10.15	Nitrate Sensitive Areas	0	0	0	0	0
72	10.16	Nitrate Vulnerable Zones	0	0	0	0	0
<b>73</b>	<b>10.17</b>	<b><u>SSSI Impact Risk Zones</u></b>	2	-	-	-	-
<b>75</b>	<b>10.18</b>	<b><u>SSSI Units</u></b>	0	0	0	1	3

Page	Section	Visual and cultural designations	On site	0-50m	50-250m	250-500m	500-2000m
78	11.1	World Heritage Sites	0	0	0	-	-
78	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
78	11.3	National Parks	0	0	0	-	-
78	11.4	Listed Buildings	0	0	0	-	-
79	11.5	Conservation Areas	0	0	0	-	-
79	11.6	Scheduled Ancient Monuments	0	0	0	-	-
79	11.7	Registered Parks and Gardens	0	0	0	-	-

Page	Section	Agricultural designations	On site	0-50m	50-250m	250-500m	500-2000m
<b>80</b>	<b>12.1</b>	<b><u>Agricultural Land Classification</u></b>	Urban (within 250m)				
81	12.2	Open Access Land	0	0	0	-	-
81	12.3	Tree Felling Licences	0	0	0	-	-
81	12.4	Environmental Stewardship Schemes	0	0	0	-	-
81	12.5	Countryside Stewardship Schemes	0	0	0	-	-

Page	Section	Habitat designations	On site	0-50m	50-250m	250-500m	500-2000m
<b>82</b>	<b>13.1</b>	<b><u>Priority Habitat Inventory</u></b>	0	0	24	-	-
83	13.2	Habitat Networks	0	0	0	-	-
84	13.3	Open Mosaic Habitat	0	0	0	-	-
84	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
<b>85</b>	<b>14.1</b>	<b><u>10k Availability</u></b>	Identified (within 500m)				
<b>86</b>	<b>14.2</b>	<b><u>Artificial and made ground (10k)</u></b>	0	0	1	2	-
<b>87</b>	<b>14.3</b>	<b><u>Superficial geology (10k)</u></b>	1	0	0	0	-



88	14.4	Landslip (10k)	0	0	0	0	-
<b>89</b>	<b>14.5</b>	<b><u>Bedrock geology (10k)</u></b>	1	0	0	0	-
90	14.6	Bedrock faults and other linear features (10k)	0	0	0	0	-
Page	Section	Geology 1:50,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
<b>91</b>	<b>15.1</b>	<b><u>50k Availability</u></b>	Identified (within 500m)				
<b>92</b>	<b>15.2</b>	<b><u>Artificial and made ground (50k)</u></b>	0	0	0	2	-
93	15.3	Artificial ground permeability (50k)	0	0	-	-	-
<b>94</b>	<b>15.4</b>	<b><u>Superficial geology (50k)</u></b>	1	0	0	0	-
<b>95</b>	<b>15.5</b>	<b><u>Superficial permeability (50k)</u></b>	Identified (within 50m)				
95	15.6	Landslip (50k)	0	0	0	0	-
95	15.7	Landslip permeability (50k)	None (within 50m)				
<b>96</b>	<b>15.8</b>	<b><u>Bedrock geology (50k)</u></b>	1	0	0	0	-
<b>97</b>	<b>15.9</b>	<b><u>Bedrock permeability (50k)</u></b>	Identified (within 50m)				
97	15.10	Bedrock faults and other linear features (50k)	0	0	0	0	-
Page	Section	Boreholes	On site	0-50m	50-250m	250-500m	500-2000m
<b>98</b>	<b>16.1</b>	<b><u>BGS Boreholes</u></b>	0	0	4	-	-
Page	Section	Natural ground subsidence					
<b>100</b>	<b>17.1</b>	<b><u>Shrink swell clays</u></b>	Low (within 50m)				
<b>101</b>	<b>17.2</b>	<b><u>Running sands</u></b>	Moderate (within 50m)				
<b>102</b>	<b>17.3</b>	<b><u>Compressible deposits</u></b>	Moderate (within 50m)				
<b>103</b>	<b>17.4</b>	<b><u>Collapsible deposits</u></b>	Negligible (within 50m)				
<b>104</b>	<b>17.5</b>	<b><u>Landslides</u></b>	Very low (within 50m)				
<b>105</b>	<b>17.6</b>	<b><u>Ground dissolution of soluble rocks</u></b>	Negligible (within 50m)				
Page	Section	Mining, ground workings and natural cavities	On site	0-50m	50-250m	250-500m	500-2000m
107	18.1	Natural cavities	0	0	0	0	-
107	18.2	BritPits	0	0	0	0	-
107	18.3	Surface ground workings	0	0	0	-	-
107	18.4	Underground workings	0	0	0	0	0
108	18.5	Historical Mineral Planning Areas	0	0	0	0	-





108	18.6	Non-coal mining	0	0	0	0	0
108	18.7	Mining cavities	0	0	0	0	0
108	18.8	JPB mining areas	None (within 0m)				
108	18.9	Coal mining	None (within 0m)				
109	18.10	Brine areas	None (within 0m)				
109	18.11	Gypsum areas	None (within 0m)				
109	18.12	Tin mining	None (within 0m)				
109	18.13	Clay mining	None (within 0m)				

Page	Section	Radon					
------	---------	-------	--	--	--	--	--

**110**    **19.1**    **Radon**    Less than 1% (within 0m)

Page	Section	Soil chemistry	On site	0-50m	50-250m	250-500m	500-2000m
<b>111</b>	<b>20.1</b>	<b>BGS Estimated Background Soil Chemistry</b>	1	0	-	-	-
111	20.2	BGS Estimated Urban Soil Chemistry	0	0	-	-	-
111	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
112	21.1	Underground railways (London)	0	0	0	-	-
112	21.2	Underground railways (Non-London)	0	0	0	-	-
113	21.3	Railway tunnels	0	0	0	-	-
<b>113</b>	<b>21.4</b>	<b>Historical railway and tunnel features</b>	5	1	6	-	-
114	21.5	Royal Mail tunnels	0	0	0	-	-
114	21.6	Historical railways	0	0	0	-	-
<b>114</b>	<b>21.7</b>	<b>Railways</b>	0	0	8	-	-
115	21.8	Crossrail 1	0	0	0	0	-
115	21.9	Crossrail 2	0	0	0	0	-
115	21.10	HS2	0	0	0	0	-



## Recent aerial photograph



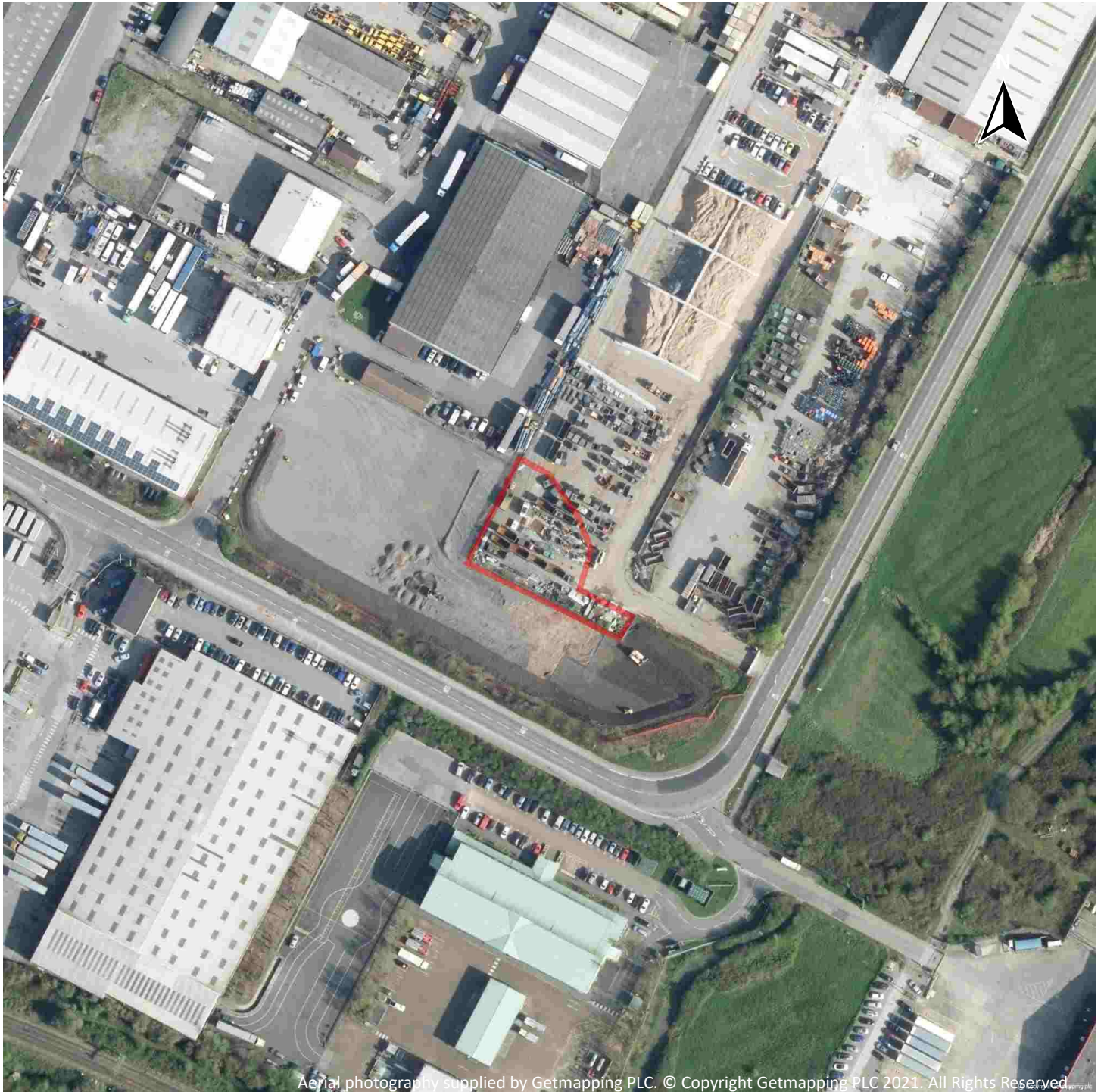
Capture Date: 06/05/2020

Site Area: 0.13ha





## Recent site history - 2017 aerial photograph



Capture Date: 03/04/2017

Site Area: 0.13ha



## Recent site history - 2014 aerial photograph



Capture Date: 29/07/2014

Site Area: 0.13ha





## Recent site history - 2008 aerial photograph



Capture Date: 27/07/2008

Site Area: 0.13ha



## Recent site history - 1999 aerial photograph



Aerial photography supplied by Getmapping PLC. © Copyright Getmapping PLC 2021. All Rights Reserved

Capture Date: 24/07/1999

Site Area: 0.13ha



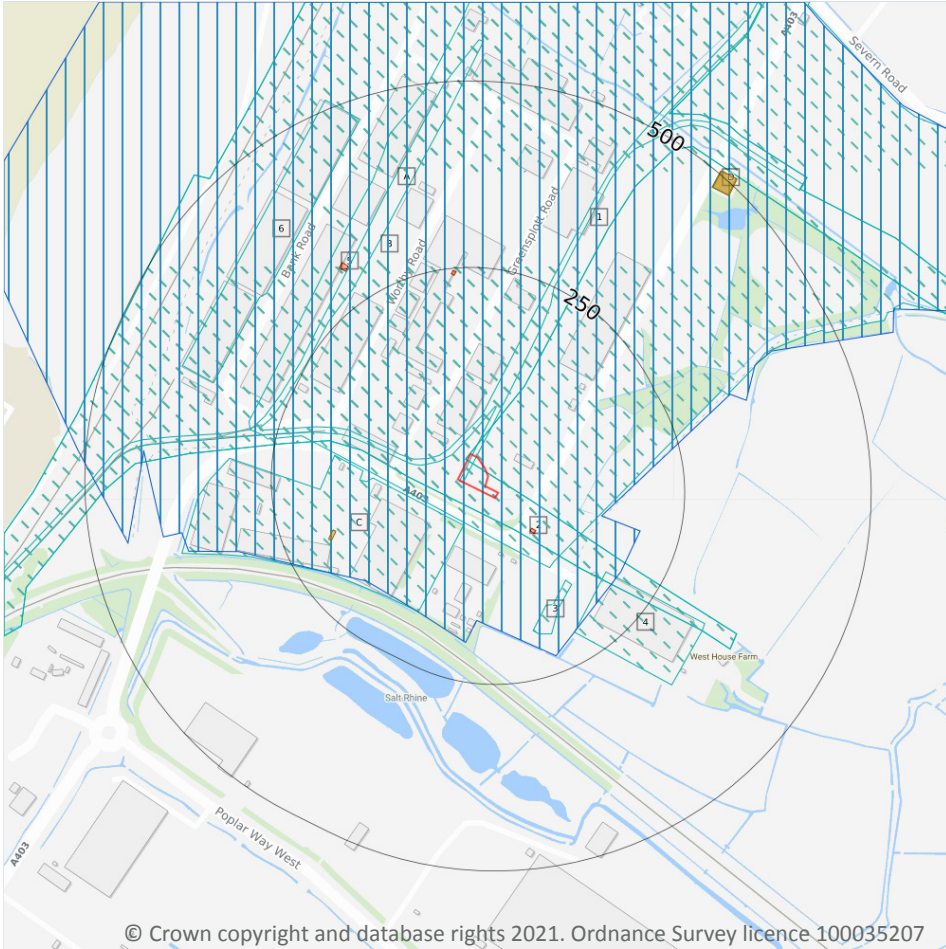


## OS MasterMap site plan



Site Area: 0.13ha

# 1 Past land use



**Site Outline**

**Search buffers in metres (m)**

- Historical industrial land uses
- Historical tanks
- Historical energy features
- Historical military land

## 1.1 Historical industrial land uses

**Records within 500m** **8**

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 14**

ID	Location	Land use	Dates present	Group ID
1	On site	Trading Estate	1964	1253802



ID	Location	Land use	Dates present	Group ID
A	On site	Railway Sidings	1964	1210222
B	On site	Railway Sidings	1973	1252997
B	On site	Unspecified Commercial/Industrial	1973	1263402
C	51m SW	Transport Depot	1973	1164374
3	145m SE	Tyre Factory	1973	1182507
4	179m SE	Unspecified Warehouse	1973	1164587
6	348m NW	Unspecified Warehouses	1973	1167745

This data is sourced from Ordnance Survey / Groundsure.

## 1.2 Historical tanks

### Records within 500m

**3**

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 14**

ID	Location	Land use	Dates present	Group ID
C	178m SW	Tanks	1994 - 1997	187007
D	480m NE	Unspecified Tank	1989	191742
D	480m NE	Unspecified Tank	1969 - 1992	182681

This data is sourced from Ordnance Survey / Groundsure.

## 1.3 Historical energy features

### Records within 500m

**3**

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 14**



ID	Location	Land use	Dates present	Group ID
2	64m SE	Electricity Substation	1969 - 1992	104905
A	241m N	Electricity Substation	1969 - 1992	104486
5	296m NW	Electricity Substation	1970 - 1997	108128

*This data is sourced from Ordnance Survey / Groundsure.*

## 1.4 Historical petrol stations

<b>Records within 500m</b>	<b>0</b>
----------------------------	----------

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

<b>Records within 500m</b>	<b>0</b>
----------------------------	----------

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

<b>Records within 500m</b>	<b>1</b>
----------------------------	----------

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.

Features are displayed on the Past land use map on **page 14**

ID	Location	Site Name	Date of Operation	Activities
A	On site	Chittening	circa WWI	National Filling Factory (Chemical); Charging and assembling 6in chemical shell

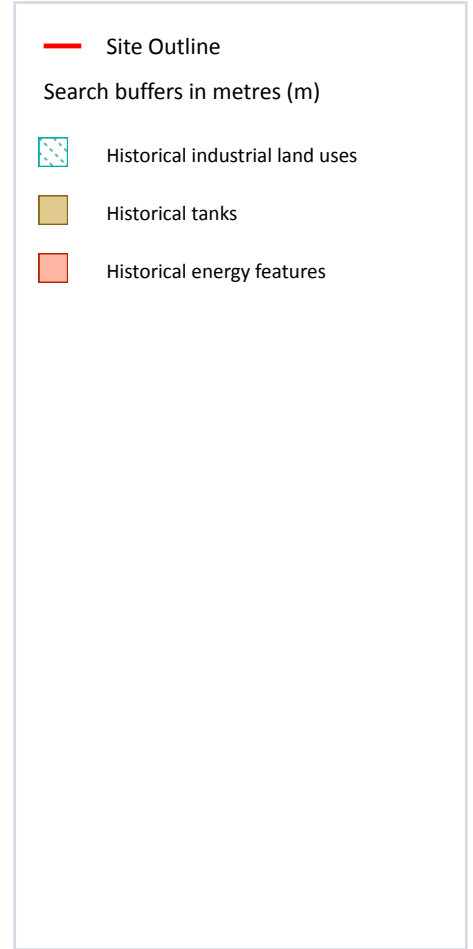


*This data is sourced from Ordnance Survey / Groundsure / other sources.*





## 2 Past land use - un-grouped



### 2.1 Historical industrial land uses

**Records within 500m** **10**

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 18**

ID	Location	Land Use	Date	Group ID
A	On site	Railway Sidings	1964	1210222
A	On site	Railway Sidings	1964	1210222
B	On site	Unspecified Commercial/Industrial	1973	1263402



ID	Location	Land Use	Date	Group ID
B	On site	Railway Sidings	1973	1252997
C	On site	Trading Estate	1964	1253802
C	On site	Trading Estate	1964	1253802
D	51m SW	Transport Depot	1973	1164374
1	145m SE	Tyre Factory	1973	1182507
2	179m SE	Unspecified Warehouse	1973	1164587
3	348m NW	Unspecified Warehouses	1973	1167745

*This data is sourced from Ordnance Survey / Groundsure.*

## 2.2 Historical tanks

### Records within 500m

7

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 18**

ID	Location	Land Use	Date	Group ID
D	178m SW	Tanks	1997	187007
D	178m SW	Tanks	1994	187007
G	480m NE	Unspecified Tank	1989	191742
G	480m NE	Unspecified Tank	1992	182681
G	480m NE	Unspecified Tank	1973	182681
G	481m NE	Unspecified Tank	1969	182681
G	481m NE	Unspecified Tank	1971	182681

*This data is sourced from Ordnance Survey / Groundsure.*



## 2.3 Historical energy features

<b>Records within 500m</b>	<b>10</b>
----------------------------	-----------

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 18**

ID	Location	Land Use	Date	Group ID
E	64m SE	Electricity Substation	1969	104905
E	64m SE	Electricity Substation	1971	104905
E	64m SE	Electricity Substation	1992	104905
A	241m N	Electricity Substation	1969	104486
A	241m N	Electricity Substation	1971	104486
A	241m N	Electricity Substation	1992	104486
F	296m NW	Electricity Substation	1971	108128
F	297m NW	Electricity Substation	1970	108128
F	297m NW	Electricity Substation	1997	108128
F	297m NW	Electricity Substation	1994	108128

*This data is sourced from Ordnance Survey / Groundsure.*

## 2.4 Historical petrol stations

<b>Records within 500m</b>	<b>0</b>
----------------------------	----------

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

<b>Records within 500m</b>	<b>0</b>
----------------------------	----------

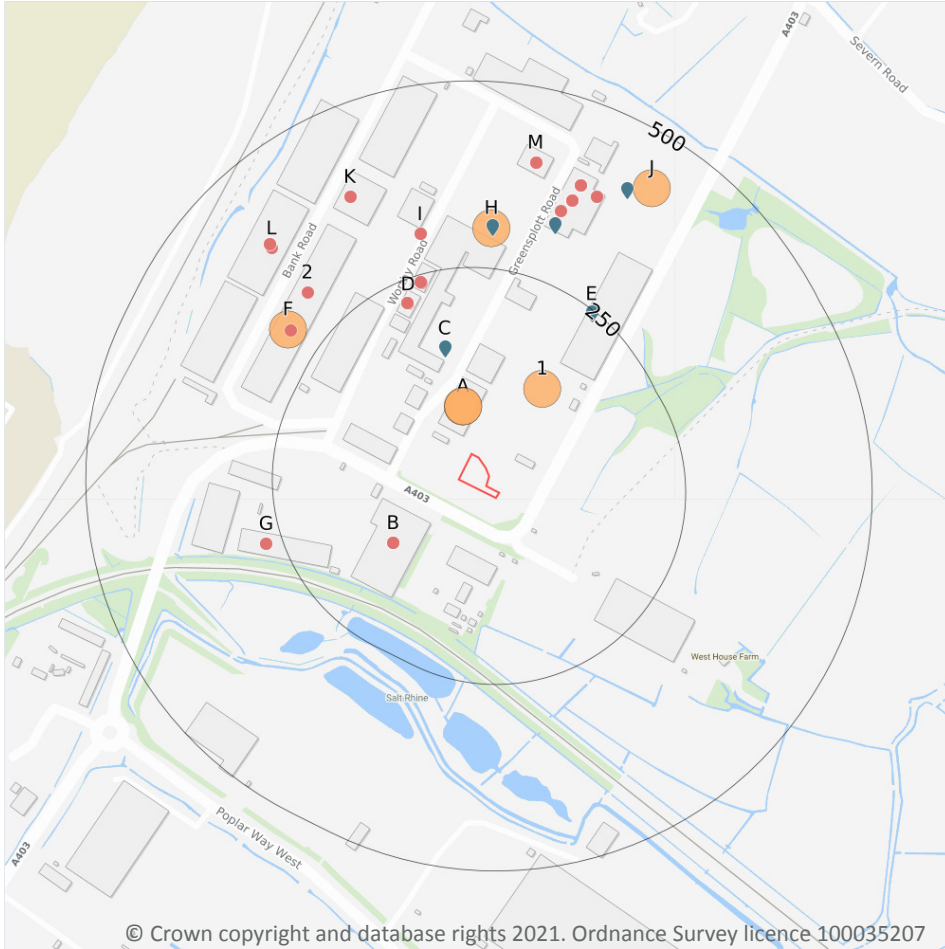
Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.



*This data is sourced from Ordnance Survey / Groundsure.*



### 3 Waste and landfill



**Site Outline**

**Search buffers in metres (m)**

- Historical waste sites
- Licensed waste sites
- Waste exemptions

#### 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

0

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.

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

### 3.5 Historical waste sites

Records within 500m

6

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

Features are displayed on the Waste and landfill map on **page 22**

ID	Location	Address	Further Details	Date
A	39m N	Site Address: Chittening Industrial Estate, Chittening Road, Avonmouth, BRISTOL, Avon, BS11 0YB	Type of Site: Recycling & Office Planning application reference: 05/03469/F/N Description: Scheme comprises proposed use of site as recycling depot, grading/screening of materials and construction of office building, landscaping, new entrance. Construction - planting site works. An application (ref: 05/03469/F/N) for detailed planning permis on was withdrawn from Bristol C.C. Planning decision obtained Data source: Historic Planning Application Data Type: Point	-
A	40m N	Site Address: Chittening Estate, Greensplott Road, Avonmouth, BRISTOL, Avon, BS11	Type of Site: Waste Transfer/Workshops Planning application reference: 0316F/95N Description: Construction of a waste transfer station and workshops with 2 storey offices. An application (ref: 0316F/95N) for Detailed Planning permission was submitted to Bristol C.C. on 15th February 1995. Data source: Historic Planning Application Data Type: Point	-

ID	Location	Address	Further Details	Date
1	100m NE	Site Address: Veolia Resource Recovery Facil, Chittening Road, Chittening, Bristol, Avon, BS11 0YB	Type of Site: Waste Management Planning application reference: 19/04171/F Description: Scheme comprises part retrospective installation of a depot building, weighbridge office, weighbridge, fire suppression system (comprising a pump house and water tank) and vehicle maintenance workshop. This project also includes associated infrastructure works and access roads. Data source: Historic Planning Application Data Type: Point	03/09/2019
F	272m NW	Site Address: CCT Building,4, Chittening Industrial Estate, Greensplott Road,Chittening, BRISTOL, Avon, BS11 0YB	Type of Site: Waste Transfer Station Planning application reference: 10/01733/F Description: Scheme comprises change of use of an industrial unit to include a clinical waste and health care waste treatment and transfer station. An application (ref: 10/01733/F) for detailed planning permission was granted by Bristol C.C. The start date, contract period and project value are for guideline only. Detailed plans approved. Data source: Historic Planning Application Data Type: Point	16/01/2012
H	278m N	Site Address: Durston Waste Management, Chittening Estate, Avonmouth, BRISTOL, Avon, BS11 0YB	Type of Site: Waste Transfer Station (Extension) Planning application reference: 00/03609/F/N Description: Scheme comprises construction of a single storey, steel framed, steel clad extension of 408 sqm. Construction - profiled steel cladding walls; profiled steel cladding roof; steel frame. An application (ref: 00/03609/F/N) for Detailed Planning permission was submitted to Bristol C.C. on 2nd November 2000. Data source: Historic Planning Application Data Type: Point	-
J	404m NE	Site Address: Chittening Road, BRISTOL, Avon, BS11	Type of Site: Recycling Facility Planning application reference: 08/01749/F Description: Scheme comprises change of use from vacant industrial land to recycling facility including reprofiling site levels and construction of site portacabins (partly in retrospect), cycle shed and office. An application (ref: 08/01749/F) for detailed planning permission was submitted to Bristol C.C. Data source: Historic Planning Application Data Type: Point	-

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





### 3.6 Licensed waste sites

**Records within 500m**
**14**

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

 Features are displayed on the Waste and landfill map on **page 22**

ID	Location	Details		
C	145m N	Site Name: Pr Exports Imports Limited Site Address: Greensplott Road, Chittening Industrial Estate, Avonmouth, Bristol, Avon, BS11 0YB Correspondence Address: -	Type of Site: 75kte Vehicle Depollution Facility Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: PRE113 EPR reference: EA/EPR/BB3508HF/A001 Operator: P R Export Import Limited Waste Management licence No: 401406 Annual Tonnage: 75000	Issue Date: 24/06/2014 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued
C	145m N	Site Name: P R Recycling Ltd Site Address: Greensplott Road, Chittening Industrial Estate, Avonmouth, Bristol, Avon, BS11 0YB Correspondence Address: -	Type of Site: 75kte Vehicle Depollution Facility Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: PRE113 EPR reference: EA/EPR/BB3508HF/S002 Operator: P R Recycling Ltd Waste Management licence No: 401406 Annual Tonnage: 0	Issue Date: 24/06/2014 Effective Date: - Modified: - Surrendered Date: Oct 18 2019 12:00AM Expiry Date: - Cancelled Date: - Status: Surrendered
E	244m NE	Site Name: Units A, B & C Estuary Park Site Address: Units A, B & C Estuary Park, Chittening Road, Avonmouth, Bristol, Avon, BS11 0YB Correspondence Address: -	Type of Site: Use of waste to manufacture timber 75,000 tpy Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: BOO043 EPR reference: EA/EPR/FB3733RJ/V003 Operator: Boomeco Limited Waste Management licence No: 104006 Annual Tonnage: 74999	Issue Date: 24/05/2012 Effective Date: - Modified: 24/06/2013 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified



ID	Location	Details		
E	244m NE	Site Name: Units A, B & C Estuary Park Site Address: Units A, B & C Estuary Park, Chittening Road, Avonmouth, Bristol, Avon, BS11 0YB Correspondence Address: -	Type of Site: 75kte HCI Waste TS + treatment Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: BOO041 EPR reference: EA/EPR/SP3591EP/A001 Operator: Boomeco Ltd Waste Management licence No: 102356 Annual Tonnage: 74999	Issue Date: 12/03/2012 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued
E	244m NE	Site Name: Units A, B & C Estuary Park Site Address: Units A, B & C Estuary Park, Chittening Road, Avonmouth, Bristol, Avon, BS11 0YB Correspondence Address: -	Type of Site: 75kte HCI Waste TS + treatment Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: VES038 EPR reference: EA/EPR/DB3805US/T001 Operator: Veolia E S ( U K ) Ltd Waste Management licence No: 102356 Annual Tonnage: 74999	Issue Date: 12/03/2012 Effective Date: 03/02/2016 Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Transferred
E	244m NE	Site Name: Units A, B & C Estuary Park Site Address: Units A, B & C Estuary Park, Chittening Road, Avonmouth, Bristol, Avon, BS11 0YB Correspondence Address: -	Type of Site: Use of waste to manufacture timber 75,000 tpy Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: VES040 EPR reference: EA/EPR/DB3806FZ/T001 Operator: Veolia E S ( U K ) Limited Waste Management licence No: 104006 Annual Tonnage: 74999	Issue Date: 24/05/2012 Effective Date: 17/02/2016 Modified: 24/06/2013 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Transferred
E	244m NE	Site Name: Units A, B & C Estuary Park Site Address: Units A, B & C Estuary Park, Chittening Road, Avonmouth, Bristol, Avon, BS11 0YB Correspondence Address: -	Type of Site: 75kte HCI Waste TS + treatment Size: >= 25000 tonnes 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: VES038 EPR reference: EA/EPR/DB3805US/T001 Operator: Veolia E S ( U K ) Ltd Waste Management licence No: 102356 Annual Tonnage: 74999	Issue Date: 12/03/2012 Effective Date: 03/02/2016 Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Transferred



ID	Location	Details		
E	244m NE	Site Name: Units A, B & C Estuary Park Site Address: Units A, B & C Estuary Park, Chittening Road, Avonmouth, Bristol, Avon, BS11 0YB Correspondence Address: -	Type of Site: Use of waste to manufacture timber 75,000 tpy Size: >= 25000 tonnes 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: VES040 EPR reference: EA/EPR/DB3806FZ/T001 Operator: Veolia E S ( U K ) Limited Waste Management licence No: 104006 Annual Tonnage: 74999	Issue Date: 24/05/2012 Effective Date: 17/02/2016 Modified: 24/06/2013 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Transferred
H	304m N	Site Name: Durston T/s Site Address: Greensplott Road, Greensplott Rd, Chittening Estate, Avonmouth, Bristol, Avon, BS11 0YB Correspondence Address: -	Type of Site: Special Waste Transfer Station Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: DUR326 EPR reference: EA/EPR/DP3990FV/S002 Operator: Durston Waste Management Ltd Waste Management licence No: 27161 Annual Tonnage: 75000	Issue Date: 05/02/1996 Effective Date: - Modified: - Surrendered Date: May 24 2006 12:00AM Expiry Date: - Cancelled Date: - Status: Surrendered
H	304m N	Site Name: Durston T/s Site Address: Greensplott Road, Greensplott Rd, Chittening Estate, Avonmouth, Bristol, Avon, BS11 0YB Correspondence Address: -	Type of Site: Special Waste Transfer Station Size: >= 25000 tonnes 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: DUR326 EPR reference: EA/EPR/DP3990FV/S002 Operator: Durston Waste Management Ltd Waste Management licence No: 27161 Annual Tonnage: 75000	Issue Date: 05/02/1996 Effective Date: - Modified: - Surrendered Date: May 24 2006 12:00AM Expiry Date: - Cancelled Date: - Status: Surrendered



ID	Location	Details		
J	325m N	Site Name: Professional Hygiene Ltd Site Address: C C T Building, Unit 3, Greensplott Road, Chittening Ind Est, Bristol, Avon, BS11 0YB Correspondence Address: -	Type of Site: Clinical Waste Transfer Station Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: PRO066 EPR reference: EA/EPR/DB3409FF/A001 Operator: Professional Hygiene Limited Waste Management licence No: 402801 Annual Tonnage: 74999	Issue Date: 04/04/2016 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued
J	325m N	Site Name: Professional Hygiene Ltd Site Address: Unit 3, C C T Building, Greensplott Road, Chittening Ind Est, Bristol, BS11 0YB Correspondence Address: -	Type of Site: Clinical Waste Transfer Station Size: >= 25000 tonnes 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: PRO066 EPR reference: EA/EPR/DB3409FF/V002 Operator: Professional Hygiene Limited Waste Management licence No: 402801 Annual Tonnage: 74999	Issue Date: 04/04/2016 Effective Date: - Modified: 05/11/2020 Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified
J	409m NE	Site Name: Chittening Road Recycling Centre Site Address: Chittening Road Recycling Centre, Chittening Road Ind Est, Avonmouth, Bristol, Avon, BS11 0YU Correspondence Address: -	Type of Site: Metal Recycling Site (mixed MRS's) Size: 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: BRI118 EPR reference: EA/EPR/LP3596SW/S002 Operator: Bristol & Avon Remediation Ltd Waste Management licence No: 100449 Annual Tonnage: 0	Issue Date: 30/10/2009 Effective Date: - Modified: - Surrendered Date: Jun 7 2019 12:00AM Expiry Date: - Cancelled Date: - Status: Surrendered



ID	Location	Details		
J	409m NE	Site Name: Chittening Road Recycling Centre Site Address: Chittening Road Recycling Centre, Chittening Road Ind Est, Avonmouth, Bristol, Avon, BS11 0YU Correspondence Address: -	Type of Site: Metal Recycling Site (mixed MRS's) Size: >= 75000 tonnes Environmental Permitting Regulations (Waste) Licence Number: BRI118 EPR reference: EA/EPR/LP3596SW/S002 Operator: Bristol & Avon Remediation Ltd Waste Management licence No: 100449 Annual Tonnage: 0	Issue Date: 30/10/2009 Effective Date: - Modified: - Surrendered Date: Jun 7 2019 12:00AM Expiry Date: - Cancelled Date: - Status: Surrendered

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

### 3.7 Waste exemptions

<b>Records within 500m</b>	<b>54</b>
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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 22**

ID	Location	Site	Reference	Category	Sub-Category	Description
B	123m SW	-	WEX268725	Storing waste exemption	Not on a farm	Storage of waste in a secure place
B	123m SW	SMOKE LANE, BRISTOL, BS11 0YA	WEX179504	Storing waste exemption	Not on a farm	Storage of waste in a secure place
B	123m SW	SMOKE LANE, BRISTOL, BS11 0YA	WEX179504	Treating waste exemption	Not on a farm	Sorting mixed waste
B	123m SW	SMOKE LANE, BRISTOL, BS11 0YA	WEX179504	Treating waste exemption	Not on a farm	Preparatory treatments (baling, sorting, shredding etc)
D	218m NW	Kuehne Nagel Ltd, Bank Road, Chittening Industrial Estate, Avonmouth, BS11 0YB	WEX121545	Storing waste exemption	Not on a farm	Storage of waste in secure containers
D	218m NW	Kuehne Nagel Ltd, Bank Road, Chittening Industrial Estate, Avonmouth, BS11 0YB	WEX121545	Storing waste exemption	Not on a farm	Storage of waste in a secure place



ID	Location	Site	Reference	Category	Sub-Category	Description
D	218m NW	Kuehne Nagel Ltd, Bank Road, Chittening Industrial Estate, Avonmouth, BS11 0YB	WEX121545	Treating waste exemption	Not on a farm	Treatment of waste food
D	219m NW	Chittening Industrial Estate Greensplott Road Bristol BS11 0YB	EPR/TF0507KF /A001	Storing waste exemption	Non-Agricultural Waste Only	Storage of waste in secure containers
D	219m NW	Chittening Industrial Estate Greensplott Road Bristol BS11 0YB	EPR/TF0507KF /A001	Storing waste exemption	Non-Agricultural Waste Only	Storage of waste in a secure place
D	219m NW	Chittening Industrial Estate Greensplott Road Bristol BS11 0YB	EPR/TF0507KF /A001	Treating waste exemption	Non-Agricultural Waste Only	Preparatory treatments (baling, sorting, shredding etc)
D	219m NW	Chittening Industrial Estate Greensplott Road Bristol BS11 0YB	EPR/BF0508M Y/A001	Storing waste exemption	Non-Agricultural Waste Only	Storage of waste in a secure place
D	219m NW	Chittening Industrial Estate Greensplott Road Bristol BS11 0YB	EPR/BF0508M Y/A001	Treating waste exemption	Non-Agricultural Waste Only	Recovery of scrap metal
D	238m N	Unit 8 Chittening Industrial Estate Bristol Bristol BS11 0YB	EPR/VF0709EE /A001	Storing waste exemption	Non-Agricultural Waste Only	Storage of waste in a secure place
D	238m N	Unit 8 Chittening Industrial Estate Bristol Bristol BS11 0YB	EPR/VF0709EE /A001	Treating waste exemption	Non-Agricultural Waste Only	Recovery of scrap metal
D	239m N	Lyreco RDC Chittening Industrial Estate Bristol Avon BS11 0YB	EPR/AF0933CF /A001	Storing waste exemption	Non-Agricultural Waste Only	Storage of waste in a secure place
D	239m N	Lyreco RDC Chittening Industrial Estate Bristol Avon BS11 0YB	EPR/AF0933CF /A001	Treating waste exemption	Non-Agricultural Waste Only	Preparatory treatments (baling, sorting, shredding etc)
G	272m W	SMOKE LANE, BRISTOL, BS11 0YA	WEX245482	Storing waste exemption	Not on a farm	Storage of waste in a secure place
G	272m W	HERITAGE HOUSE, 345, SOUTHBURY ROAD, ENFIELD, EN1 1TW	WEX097318	Storing waste exemption	Not on a farm	Storage of waste in a secure place
F	294m NW	Prompt Anstey Ltd, Chittening Industrial Estate, Avonmouth, Bristol, BS11 0YD	WEX209201	Using waste exemption	Not on a farm	Use of waste in construction





ID	Location	Site	Reference	Category	Sub-Category	Description
I	302m N	Unit 3 C C T Building Chittening Industrial Estate Bristol Bristol BS11 0YB	EPR/EF0701NE /A001	Storing waste exemption	Non- Agricultural Waste Only	Storage of waste in a secure place
I	302m N	CCT Building Unit 5 Greensplott Road Avonmouth BS11 0YB	EPR/EF0101NL /A001	Treating waste exemption	Non- Agricultural Waste Only	Preparatory treatments (baling, sorting, shredding etc)
2	309m NW	Unit C, Canada Warehouse, Chittening Ind Est, Avonmouth, Bristol, BS11 0YD	WEX150055	Using waste exemption	Not on a farm	Burning of waste as a fuel in a small appliance
J	347m N	Unit 3 C C T Building Chittening Industrial Estate Bristol Bristol BS11 0YB	EPR/VF0301N P/A001	Treating waste exemption	Non- Agricultural Waste Only	Preparatory treatments (baling, sorting, shredding etc)
J	365m N	C C T BUILDING, UNIT 5, CHITTENING INDUSTRIAL ESTATE, CHITTENING, BRISTOL, BS11 0YB	WEX151291	Storing waste exemption	Not on a farm	Storage of waste in secure containers
J	365m N	C C T BUILDING, UNIT 5, CHITTENING INDUSTRIAL ESTATE, CHITTENING, BRISTOL, BS11 0YB	WEX151291	Treating waste exemption	Not on a farm	Preparatory treatments (baling, sorting, shredding etc)
J	365m N	C C T BUILDING, UNIT 5, CHITTENING INDUSTRIAL ESTATE, CHITTENING, BRISTOL, BS11 0YB	WEX151291	Storing waste exemption	Not on a farm	Storage of waste in a secure place
J	365m N	C C T BUILDING, UNIT 3, CHITTENING INDUSTRIAL ESTATE, CHITTENING, BRISTOL, BS11 0YB	WEX257864	Storing waste exemption	Not on a farm	Storage of sludge
J	365m N	C C T BUILDING, UNIT 3, CHITTENING INDUSTRIAL ESTATE, CHITTENING, BRISTOL, BS11 0YB	WEX257864	Storing waste exemption	Not on a farm	Storage of waste in a secure place
J	365m N	C C T BUILDING, UNIT 3, CHITTENING INDUSTRIAL ESTATE, CHITTENING, BRISTOL, BS11 0YB	WEX257864	Storing waste exemption	Not on a farm	Storage of waste in secure containers
J	365m N	C C T BUILDING, UNIT 3, CHITTENING INDUSTRIAL ESTATE, CHITTENING, BRISTOL, BS11 0YB	WEX257864	Treating waste exemption	Not on a farm	Sorting mixed waste



ID	Location	Site	Reference	Category	Sub-Category	Description
J	365m N	C C T BUILDING, UNIT 3, CHITTENING INDUSTRIAL ESTATE, CHITTENING, BRISTOL, BS11 0YB	WEX257864	Treating waste exemption	Not on a farm	Preparatory treatments (baling, sorting, shredding etc)
J	365m N	C C T BUILDING, UNIT 3, CHITTENING INDUSTRIAL ESTATE, CHITTENING, BRISTOL, BS11 0YB	WEX115355	Storing waste exemption	Not on a farm	Storage of waste in secure containers
J	365m N	C C T BUILDING, UNIT 3, CHITTENING INDUSTRIAL ESTATE, CHITTENING, BRISTOL, BS11 0YB	WEX115355	Storing waste exemption	Not on a farm	Storage of waste in a secure place
J	365m N	C C T BUILDING, UNIT 3, CHITTENING INDUSTRIAL ESTATE, CHITTENING, BRISTOL, BS11 0YB	WEX115355	Storing waste exemption	Not on a farm	Storage of sludge
J	365m N	C C T BUILDING, UNIT 3, CHITTENING INDUSTRIAL ESTATE, CHITTENING, BRISTOL, BS11 0YB	WEX115355	Treating waste exemption	Not on a farm	Sorting mixed waste
J	365m N	C C T BUILDING, UNIT 3, CHITTENING INDUSTRIAL ESTATE, CHITTENING, BRISTOL, BS11 0YB	WEX115355	Treating waste exemption	Not on a farm	Preparatory treatments (baling, sorting, shredding etc)
K	381m NW	DS Smith Chittening Industrial Estate Bristol Avon BS11 0YB	EPR/DF0308V M/A001	Treating waste exemption	Non-Agricultural Waste Only	Sorting mixed waste
K	381m NW	DS Smith Chittening Industrial Estate Bristol Avon BS11 0YB	EPR/DF0308V M/A001	Treating waste exemption	Non-Agricultural Waste Only	Preparatory treatments (baling, sorting, shredding etc)
J	383m NE	CCT Building Unit 5 Greensplott Road Avonmouth BS11 0YB	EPR/GF0538JS /A001	Storing waste exemption	Non-Agricultural Waste Only	Storage of waste in a secure place
J	383m NE	CCT Building Unit 5 Greensplott Road Avonmouth BS11 0YB	EPR/MF0131J H/A001	Storing waste exemption	Non-Agricultural Waste Only	Storage of waste in secure containers
L	384m NW	Massey Wilcox Transport Ltd Chittening Industrial Estate BRISTOL BS11 0YB	EPR/LH0915D U/A001	Storing waste exemption	Non-Agricultural Waste Only	Storage of waste in a secure place
J	388m N	-	WEX265225	Using waste exemption	Not on a farm	Use of waste in construction



ID	Location	Site	Reference	Category	Sub-Category	Description
J	388m N	XPO Logistics Limited, Bank Road, Chittening Industrial Estate, Avonmouth, BS11 0YB	WEX257075	Treating waste exemption	Not on a farm	Treatment of waste food
J	388m N	XPO Logistics Limited, Bank Road, Chittening Industrial Estate, Avonmouth, BS11 0YB	WEX257075	Storing waste exemption	Not on a farm	Storage of waste in secure containers
J	388m N	XPO Logistics Limited, Bank Road, Chittening Industrial Estate, Avonmouth, BS11 0YB	WEX257075	Storing waste exemption	Not on a farm	Storage of waste in a secure place
J	388m N	Pluto Holdings Logistics Limited, Bank Road, Chittening Industrial Estate, Avonmouth, BS11 0YB	WEX246367	Treating waste exemption	Not on a farm	Treatment of waste food
J	388m N	Pluto Holdings Logistics Limited, Bank Road, Chittening Industrial Estate, Avonmouth, BS11 0YB	WEX246367	Storing waste exemption	Not on a farm	Storage of waste in secure containers
J	388m N	Pluto Holdings Logistics Limited, Bank Road, Chittening Industrial Estate, Avonmouth, BS11 0YB	WEX246367	Storing waste exemption	Not on a farm	Storage of waste in a secure place
L	389m NW	UNIT 3, CHITTENING INDUSTRIAL ESTATE, CHITTENING, BRISTOL, BS11 0YB	WEX159829	Treating waste exemption	Not on a Farm	Preparatory treatments (baling, sorting, shredding etc)
L	389m NW	UNIT 3, CHITTENING INDUSTRIAL ESTATE, CHITTENING, BRISTOL, BS11 0YB	WEX159829	Treating waste exemption	Not on a Farm	Sorting mixed waste
L	389m NW	UNIT 3, CHITTENING INDUSTRIAL ESTATE, CHITTENING, BRISTOL, BS11 0YB	WEX159829	Storing waste exemption	Not on a Farm	Storage of waste in a secure place
M	400m N	CHITTENING INDUSTRIAL ESTATE, CHITTENING, BRISTOL, BS11 0YB	WEX132561	Storing waste exemption	Not on a farm	Storage of waste in a secure place

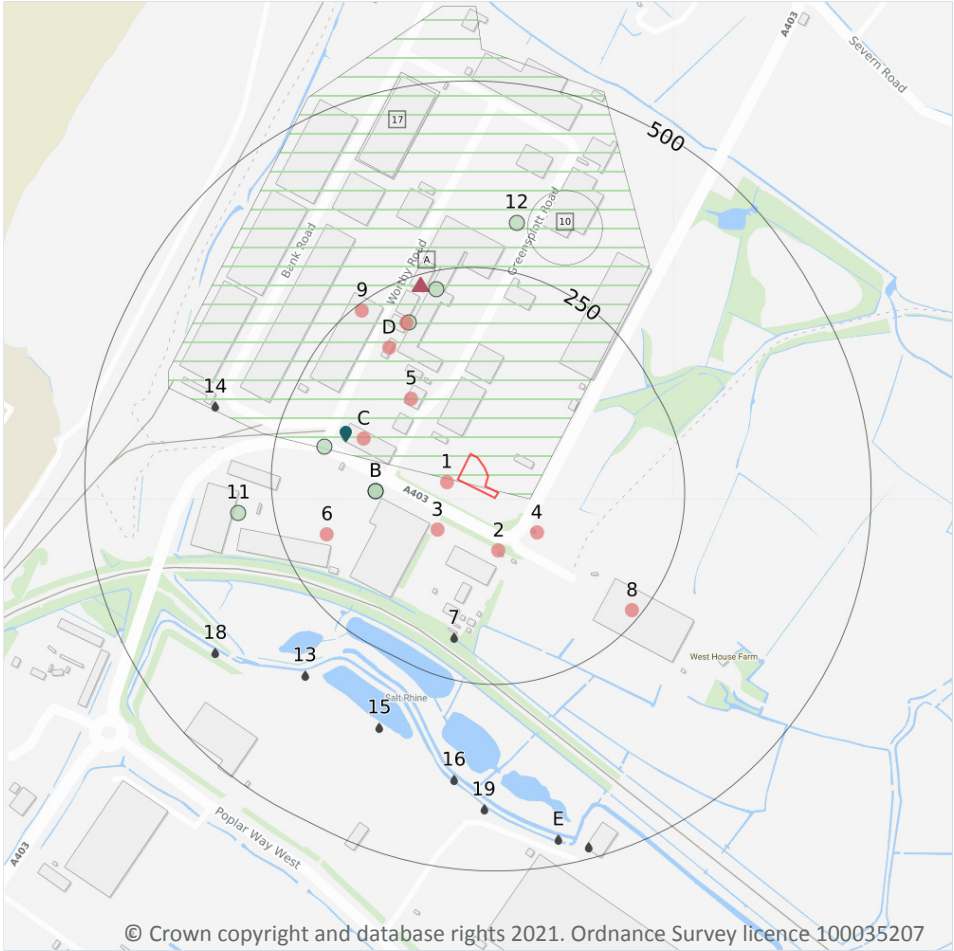


ID	Location	Site	Reference	Category	Sub-Category	Description
M	400m N	CHITTENING INDUSTRIAL ESTATE, CHITTENING, BRISTOL, BS11 0YB	WEX132561	Treating waste exemption	Not on a farm	Preparatory treatments (baling, sorting, shredding etc)
M	400m N	CHITTENING INDUSTRIAL ESTATE, CHITTENING, BRISTOL, BS11 0YB	WEX132561	Storing waste exemption	Not on a farm	Storage of waste in secure containers

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



## 4 Current industrial land use



- Site Outline
- Search buffers in metres (m)
- Recent industrial land uses
- Control of Major Accident Hazards
- ▲ Hazardous substance storage/usage
- ◆ Licensed pollutant release (Part A(2)/B)
- Licensed Discharges to controlled waters
- Pollution Incidents (EA/NRW)

### 4.1 Recent industrial land uses

**Records within 250m** **11**

Current potentially contaminative industrial sites.

Features are displayed on the Current industrial land use map on **page 35**

ID	Location	Company	Address	Activity	Category
1	15m W	Dawson Group	Chittening Industrial Estate, Chittening, Bristol, Bristol, BS11 0YB	Vehicle Hire and Rental	Hire Services
2	71m S	Electricity Sub Station	Bristol, BS11	Electrical Features	Infrastructure and Facilities
3	73m SW	Mast	Bristol, BS11	Telecommunications Features	Infrastructure and Facilities

ID	Location	Company	Address	Activity	Category
4	73m SE	Electricity Sub Station	Bristol, BS11	Electrical Features	Infrastructure and Facilities
5	109m NW	Stone Hardy	London House, Chittening Industrial Estate, Chittening, Bristol, Bristol, BS11 0YB	Industrial Repairs and Servicing	Repair and Servicing
C	138m NW	Ross Gordon	Chittening Industrial Estate, Chittening, Bristol, Bristol, BS11 0YB	Vehicle Repair, Testing and Servicing	Repair and Servicing
D	180m NW	Brandon Hire	Unit 2, Chittening Industrial Estate, Chittening, Bristol, Bristol, BS11 0YB	Lifting and Handling Equipment	Industrial Products
6	190m SW	Tanks	Bristol, BS11	Tanks (Generic)	Industrial Features
D	195m NW	Recycling Business	Bristol, BS11	Recycling Centres	Infrastructure and Facilities
8	238m SE	Malcolm Group	The Link Building, Smoke Lane, Bristol, Bristol, BS11 0YA	Distribution and Haulage	Transport, Storage and Delivery
9	241m NW	Granite & Stone Southwest Ltd	Unit E Canada Warehouse, Chittening Industrial Estate, Chittening, Bristol, Bristol, BS11 0YB	Stone Quarrying and Preparation	Extractive Industries

*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**

**0**

High voltage underground electricity transmission cables.

*This data is sourced from National Grid.*





#### 4.4 Gas pipelines

**Records within 500m** **0**

High pressure underground gas transmission pipelines.

*This data is sourced from National Grid.*

#### 4.5 Sites determined as Contaminated Land

**Records within 500m** **0**

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** **3**

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.

Features are displayed on the Current industrial land use map on **page 35**

ID	Location	Company	Address	Operational status	Tier
A	On site	Shell Gas Ltd	Shell Gas Ltd, Chittening Industrial Estate, Bristol, BS11 0YB	Historical NIHHS Site	-
10	279m NE	A E Murphy Ltd	A E Murphy Ltd, Chittening Industrial Estate, Avonmouth, Bristol, BS11 0YB	Historical NIHHS Site	-
17	382m N	Avongas Ltd	Avongas Ltd, Bank Road, Avonmouth Docks Estate, Chittening, Avonmouth	Historical NIHHS Site	-

*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

2

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.

Features are displayed on the Current industrial land use map on **page 35**

ID	Location	Details	
A	237m N	Application reference number: No Details Application status: Approved Application date: No Details Address: A.E.M. (Avon) Ltd, Redstone, Canada & Buchanan Warehouses, Chittening Estate, Avonmouth, Bristol, England, BS11 0YB	Details: No Details Enforcement: Data Requested, not received. Date of enforcement: Data Requested, not received. Comment: Data Requested, not received.
A	237m N	Application reference number: No Details Application status: Approved Application date: No Details Address: Shell Gas Limited, Bank Road, Chittening Ind. Estate Avonmouth, Bristol, Avon, England, BS11 0YB	Details: No Details Enforcement: Data Requested, not received. Date of enforcement: Data Requested, not received. Comment: Data Requested, not received.

*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

0

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

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



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

Records within 500m

1

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.

Features are displayed on the Current industrial land use map on **page 35**

ID	Location	Address	Details	
C	162m W	Ross Gordon Engineering Ltd, Worthy Road, Chittening Industrial Estate, BS11 0YB	Process: Respraying of Road Vehicles Status: Current Permit Permit Type: Part B	Enforcement: No Enforcement Notice Date of enforcement: No Enforcement Notice Comment: No Enforcement Notice

*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

9

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 35**

ID	Location	Address	Details	
7	195m S	SOMERSET, AVON & GLOUCESTER JOINT, FIRE TRAINING CENTRE, SMOKE LANE, AVONMOUTH, BRISTOL	Effluent Type: SEWAGE & TRADE COMBINED - UNSPECIFIED Permit Number: 101872 Permit Version: 1 Receiving Water: AVONMOUTH RHINE SYSTEM	Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 11/07/2002 Effective Date: 10/06/2002 Revocation Date: -
13	333m SW	SEVEN GATES, LAWRENCE WESTON ROAD, AVONMOUTH, BRISTOL, BS11 0YW	Effluent Type: MISCELLANEOUS DISCHARGES - SURFACE WATER Permit Number: 100491 Permit Version: 1 Receiving Water: SALT RHYNE	Status: REVOKED UNDER EPR 2010 Issue date: 17/02/1998 Effective Date: 17/02/1998 Revocation Date: 04/03/2016

ID	Location	Address	Details	
14	339m W	P B A INDUSTRIAL ESTATE, SMOKE LANE, BRISTOL	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: 011196 Permit Version: 1 Receiving Water: RIVER BRISTOL AVON	Status: SURRENDERED UNDER EPR 2010 Issue date: - Effective Date: 12/09/1989 Revocation Date: 31/07/2014
15	344m SW	SEVEN GATES, LAWRENCE WESTON ROAD, AVONMOUTH, BRISTOL, BS11 0YW	Effluent Type: MISCELLANEOUS DISCHARGES - SURFACE WATER Permit Number: 100492 Permit Version: 1 Receiving Water: SALT RHYNE	Status: REVOKED UNDER EPR 2010 Issue date: 17/02/1998 Effective Date: 17/02/1998 Revocation Date: 04/03/2016
16	381m S	SEVEN GATES, LAWRENCE WESTON ROAD, AVONMOUTH, BRISTOL, BS11 0YW	Effluent Type: MISCELLANEOUS DISCHARGES - SURFACE WATER Permit Number: 100493 Permit Version: 1 Receiving Water: SALT RHYNE	Status: REVOKED UNDER EPR 2010 Issue date: 17/02/1998 Effective Date: 17/02/1998 Revocation Date: 04/03/2016
18	399m SW	SEVEN GATES, LAWRENCE WESTON ROAD, AVONMOUTH, BRISTOL, BS11 0YW	Effluent Type: MISCELLANEOUS DISCHARGES - SURFACE WATER Permit Number: 100490 Permit Version: 1 Receiving Water: UNNAMED WATERCOURSE	Status: REVOKED UNDER EPR 2010 Issue date: 17/02/1998 Effective Date: 17/02/1998 Revocation Date: 04/03/2016
19	418m S	SEVEN GATES, LAWRENCE WESTON ROAD, AVONMOUTH, BRISTOL, BS11 0YW	Effluent Type: MISCELLANEOUS DISCHARGES - SURFACE WATER Permit Number: 100494 Permit Version: 1 Receiving Water: SALT RHYNE	Status: REVOKED UNDER EPR 2010 Issue date: 17/02/1998 Effective Date: 17/02/1998 Revocation Date: 04/03/2016
E	465m S	SEVEN GATES, LAWRENCE WESTON ROAD, AVONMOUTH, BRISTOL, BS11 0YW	Effluent Type: MISCELLANEOUS DISCHARGES - SURFACE WATER Permit Number: 100495 Permit Version: 1 Receiving Water: SALT RHYNE	Status: REVOKED UNDER EPR 2010 Issue date: 17/02/1998 Effective Date: 17/02/1998 Revocation Date: 04/03/2016
E	484m S	SEVEN GATES, LAWRENCE WESTON ROAD, AVONMOUTH, BRISTOL, BS11 0YW	Effluent Type: MISCELLANEOUS DISCHARGES - SURFACE WATER Permit Number: 100496 Permit Version: 1 Receiving Water: SALT RHYNE	Status: REVOKED UNDER EPR 2010 Issue date: 17/02/1998 Effective Date: 17/02/1998 Revocation Date: 04/03/2016

*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	7
---------------------	---

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 35**

ID	Location	Details	
B	111m W	Incident Date: 08/09/2002 Incident Identification: 106216 Pollutant: Organic Chemicals/Products Pollutant Description: Solvents	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
B	111m W	Incident Date: 25/10/2001 Incident Identification: 39162 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Smoke	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
C	184m W	Incident Date: 16/01/2016 Incident Identification: 1403414 Pollutant: Specific Waste Materials Pollutant Description: Contaminated Mineral materials and Wastes	Water Impact: Category 4 (No Impact) Land Impact: Category 2 (Significant) Air Impact: Category 4 (No Impact)
D	194m NW	Incident Date: 18/06/2002 Incident Identification: 85718 Pollutant: Organic Chemicals/Products Pollutant Description: Other Organic Chemical or Product	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
A	226m N	Incident Date: 22/05/2001 Incident Identification: 6353 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Dust	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
11	297m W	Incident Date: 12/11/2002 Incident Identification: 120319 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Fumes	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)
12	316m N	Incident Date: 02/07/2001 Incident Identification: 12920 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Dust	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 3 (Minor)

*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

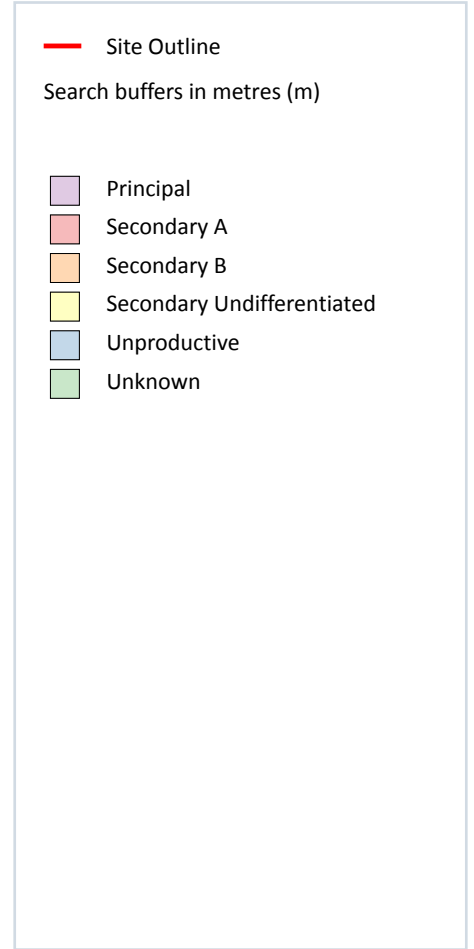
Records within 500m

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



### 5.1 Superficial aquifer

Records within 500m

1

Aquifer status of groundwater held within superficial geology.

Features are displayed on the Hydrogeology map on **page 44**

ID	Location	Designation	Description
1	On site	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

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

## Bedrock aquifer



**Site Outline**

Search buffers in metres (m)

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

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### 5.2 Bedrock aquifer

Records within 500m

1

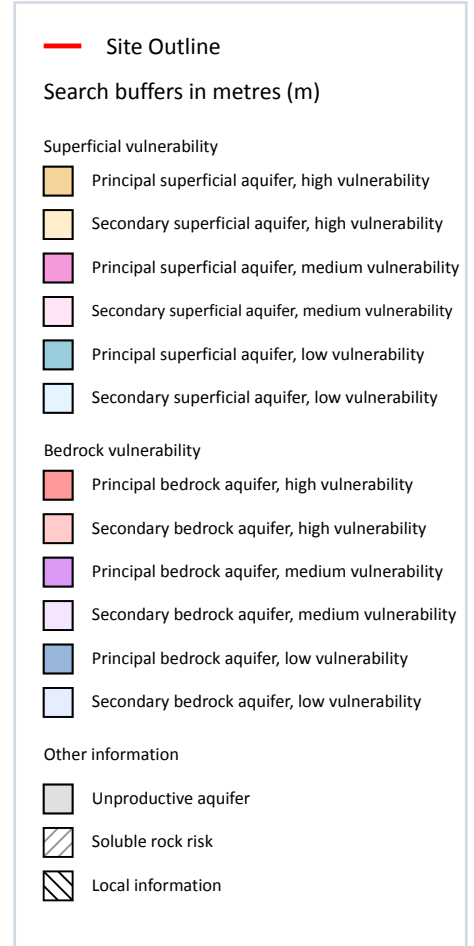
Aquifer status of groundwater held within bedrock geology.

Features are displayed on the Bedrock aquifer map on **page 45**

ID	Location	Designation	Description
1	On site	Secondary B	Predominantly lower permeability layers which may store/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

*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

1

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 46**

ID	Location	Summary	Soil / surface	Superficial geology	Bedrock geology
1	On site	<b>Summary Classification:</b> Secondary bedrock aquifer - Low Vulnerability <b>Combined classification:</b> Productive Bedrock Aquifer, Unproductive Superficial Aquifer	<b>Leaching class: High</b> <b>Infiltration value:</b> >70% <b>Dilution value: 300-</b> 550mm/year	<b>Vulnerability: Unproductive</b> <b>Aquifer type: Unproductive</b> <b>Thickness: 3-10m</b> <b>Patchiness value: &gt;90%</b> <b>Recharge potential: Low</b>	<b>Vulnerability: Low</b> <b>Aquifer type:</b> Secondary <b>Flow mechanism: Well connected fractures</b>

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

## 5.4 Groundwater vulnerability- soluble rock risk

<b>Records on site</b>	<b>0</b>
------------------------	----------

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

<b>Records on site</b>	<b>0</b>
------------------------	----------

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](mailto:enquiries@environment-agency.gov.uk).

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

## Abstractions and Source Protection Zones



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### 5.6 Groundwater abstractions

Records within 2000m

6

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 48**



ID	Location	Details	
A	526m SW	Status: Historical Licence No: SW/054/0020/005 Details: Dust Suppression Direct Source: Ground Water - Fresh Point: ABSTRACTION POINT Data Type: Point Name: John Wainwright & Co Ltd Easting: 352580 Northing: 180937	Annual Volume (m <sup>3</sup> ): 9,000 Max Daily Volume (m <sup>3</sup> ): 40 Original Application No: - Original Start Date: 21/08/2019 Expiry Date: - Issue No: 1 Version Start Date: 21/08/2019 Version End Date: -
A	526m SW	Status: Active Licence No: SW/054/0020/005/1 Details: Dust Suppression Direct Source: Ground Water - Fresh Point: ABSTRACTION POINT Data Type: Point Name: John Wainwright & Co Ltd Easting: 352580 Northing: 180937	Annual Volume (m <sup>3</sup> ): 9,000 Max Daily Volume (m <sup>3</sup> ): 40 Original Application No: - Original Start Date: 21/08/2019 Expiry Date: - Issue No: 1 Version Start Date: 01/04/2020 Version End Date: -
-	988m S	Status: Historical Licence No: 18/54/020/G/132 Details: Non-Evaporative Cooling Direct Source: Ground Water - Fresh Point: MADAM FARM (BOREHOLE NO 9) Data Type: Point Name: Rhodia UK Limited Easting: 353150 Northing: 180150	Annual Volume (m <sup>3</sup> ): 398236 Max Daily Volume (m <sup>3</sup> ): 1091.06 Original Application No: - Original Start Date: 08/07/1966 Expiry Date: - Issue No: 101 Version Start Date: 01/01/2005 Version End Date: -
-	988m S	Status: Historical Licence No: 18/54/020/G/132 Details: Process Water Direct Source: Ground Water - Fresh Point: MADAM FARM (BOREHOLE NO 9) Data Type: Point Name: Rhodia UK Limited Easting: 353150 Northing: 180150	Annual Volume (m <sup>3</sup> ): 398236 Max Daily Volume (m <sup>3</sup> ): 1091.06 Original Application No: - Original Start Date: 08/07/1966 Expiry Date: - Issue No: 101 Version Start Date: 01/01/2005 Version End Date: -
-	1887m S	Status: Historical Licence No: 18/54/020/G/130 Details: Process Water Direct Source: Ground Water - Fresh Point: MEREBANK (BOREHOLE NO 6) Data Type: Point Name: Rhodia UK Limited Easting: 353300 Northing: 179260	Annual Volume (m <sup>3</sup> ): 716826 Max Daily Volume (m <sup>3</sup> ): 1963.91 Original Application No: - Original Start Date: 08/07/1966 Expiry Date: - Issue No: 101 Version Start Date: 01/01/2005 Version End Date: -



ID	Location	Details	
-	1887m S	Status: Historical Licence No: 18/54/020/G/130 Details: Non-Evaporative Cooling Direct Source: Ground Water - Fresh Point: MEREBANK (BOREHOLE NO 6) Data Type: Point Name: Rhodia UK Limited Easting: 353300 Northing: 179260	Annual Volume (m <sup>3</sup> ): 716826 Max Daily Volume (m <sup>3</sup> ): 1963.91 Original Application No: - Original Start Date: 08/07/1966 Expiry Date: - Issue No: 101 Version Start Date: 01/01/2005 Version End Date: -

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

## 5.7 Surface water abstractions

<b>Records within 2000m</b>	<b>0</b>
-----------------------------	----------

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.

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

## 5.8 Potable abstractions

<b>Records within 2000m</b>	<b>0</b>
-----------------------------	----------

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.

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

## 5.9 Source Protection Zones

<b>Records within 500m</b>	<b>0</b>
----------------------------	----------

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

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

## 5.10 Source Protection Zones (confined aquifer)

Records within 500m

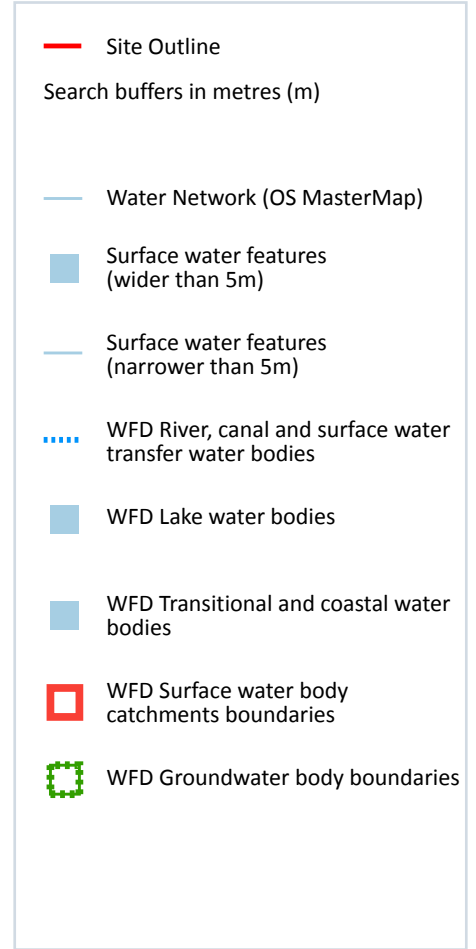
0

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



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### 6.1 Water Network (OS MasterMap)

Records within 250m

27

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 52**

ID	Location	Type of water feature	Ground level	Permanence	Name
B	84m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-

ID	Location	Type of water feature	Ground level	Permanence	Name
B	112m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
C	112m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
1	152m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
D	165m NE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
F	172m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
D	178m NE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
H	184m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
G	193m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
H	193m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
F	196m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
H	201m SW	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
F	210m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
F	214m S	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-



ID	Location	Type of water feature	Ground level	Permanence	Name
F	215m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
2	216m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
F	218m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
F	218m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
H	218m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
D	221m NE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
H	225m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
G	226m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
H	226m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
F	230m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
I	239m SW	Lake, loch or reservoir.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
D	244m NE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
D	244m NE	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**

**9**

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 52**

*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 52**

ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
A	On site	Coastal Catchment	Not part of a river WB catchment	139	Lower Severn Vale	Avon Bristol and North Somerset Streams

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

## 6.4 WFD Surface water bodies

**Records identified**

**0**

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.

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



## 6.5 WFD Groundwater bodies

<b>Records on site</b>	<b>2</b>
------------------------	----------

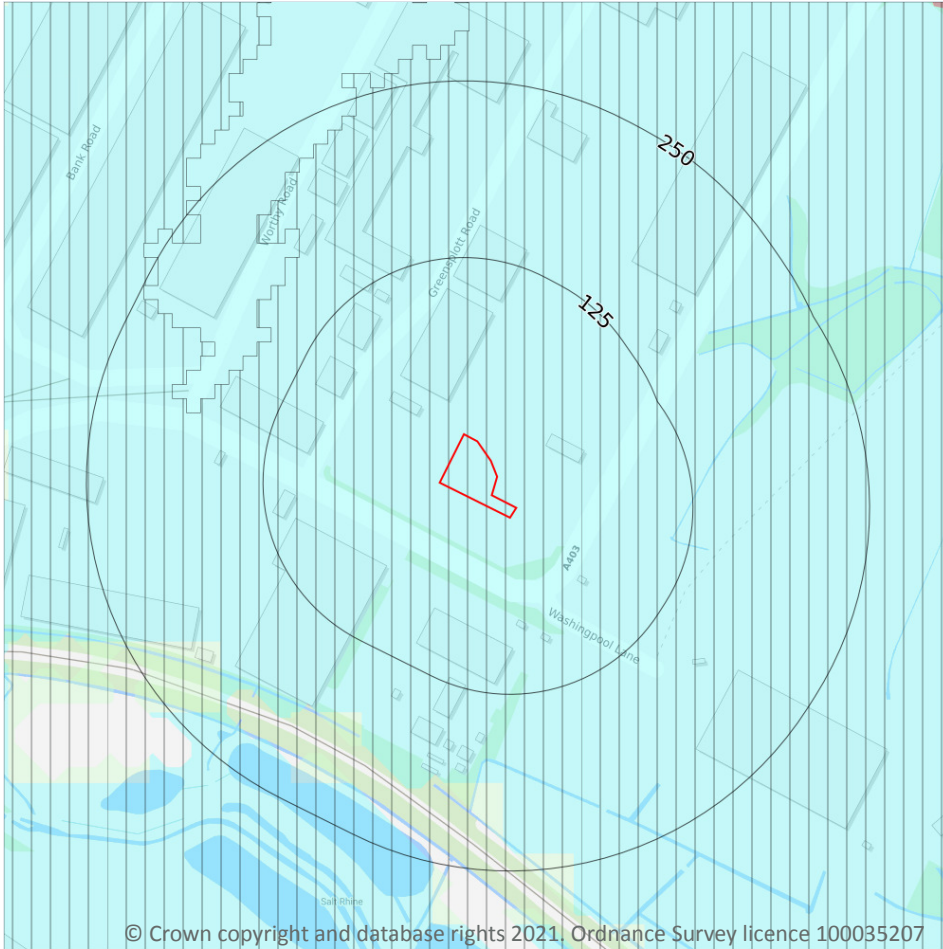
Groundwater bodies are also covered by the Directive and the same regime of objectives and reporting detailed in the previous section is in place. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each groundwater body listed.

Features are displayed on the Hydrology map on **page 52**

ID	Location	Name	Water body ID	Overall rating	Chemical rating	Quantitative	Year
A	On site	Avonmouth Mercia Mudstone	<a href="#">GB40902G303100</a>	Good	Good	Good	2015
A	On site	Avonmouth Mercia Mudstone	<a href="#">GB40902G303100</a>	Good	Good	Good	2016

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

## 7 River and coastal flooding



- Site Outline
- Search buffers in metres (m)
- Environment Agency river and coastal flooding:
  - High
  - Medium
  - Low
  - Very Low
- Historical Flood Events
- Areas Used for Flood Storage
- Areas Benefiting from Flood Defences
- Flood Defences

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### 7.1 Risk of Flooding from Rivers and Sea (RoFRaS)

Records within 50m

1

The chance of flooding from rivers and/or the sea in any given year, based on cells of 50m. Each cell is allocated one of four flood risk categories, taking into account flood defences and their condition; 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).

Features are displayed on the River and coastal flooding map on **page 57**

Distance	RoFRaS flood risk
On site	Low
0 - 50m	Low



*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

1

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.

Features are displayed on the River and coastal flooding map on **page 57**

ID	Location	
A	On site	Area benefiting from flood defences

*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



- Site Outline
- Search buffers in metres (m)
- Flood zone 2
- Flood zone 3

### 7.6 Flood Zone 2

**Records within 50m**

**1**

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.

Features are displayed on the River and coastal flooding map on **page 57**

Location	Type
On site	Zone 2 - (Fluvial /Tidal Models)

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

## 7.7 Flood Zone 3

Records within 50m

1

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.

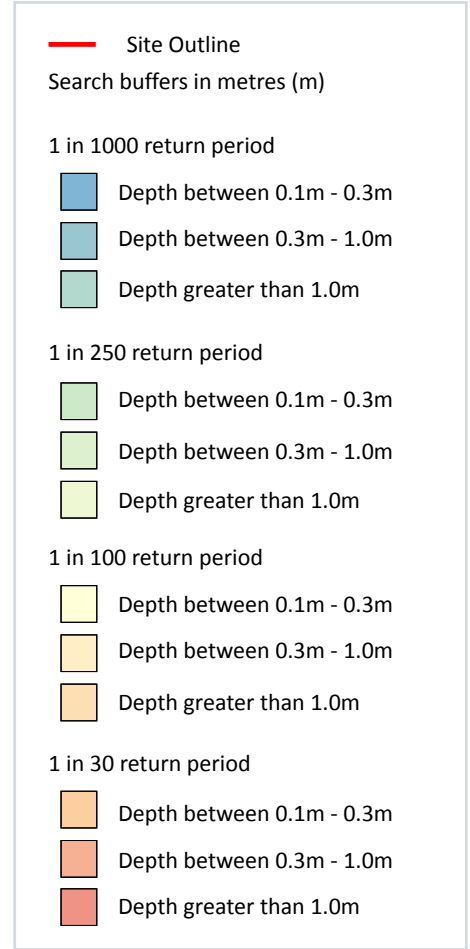
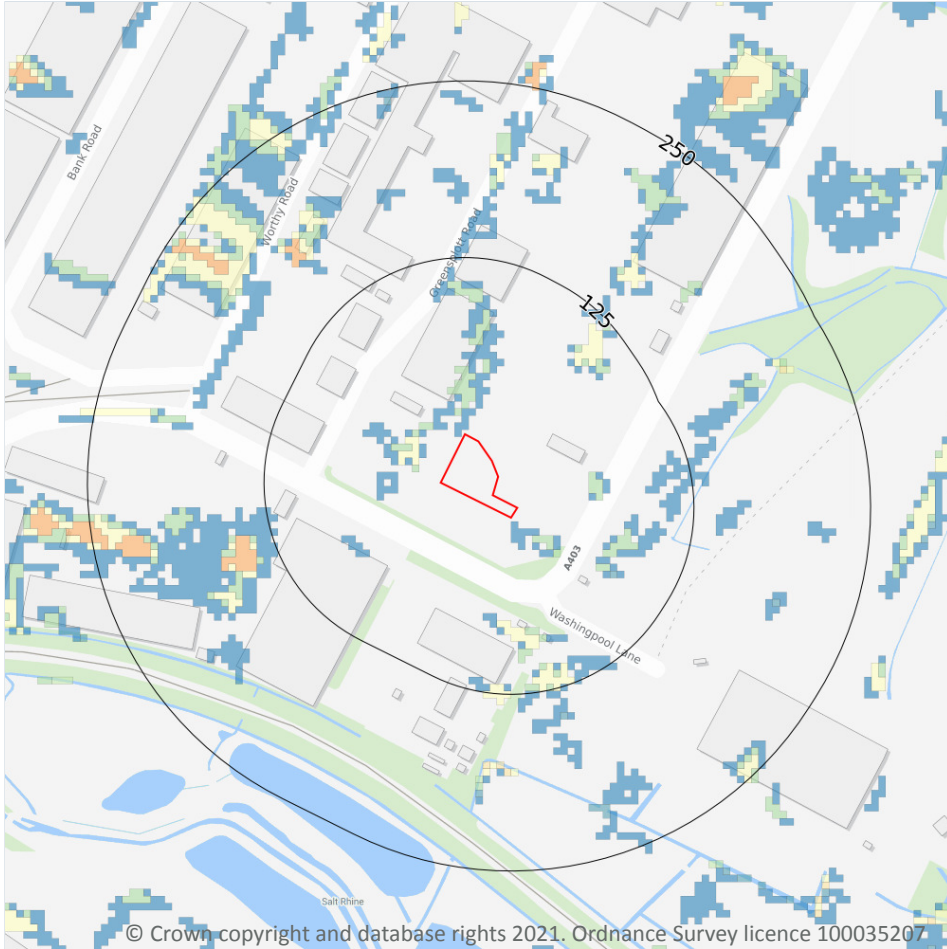
Features are displayed on the River and coastal flooding map on **page 57**

Location	Type
On site	Zone 3 - (Fluvial Models)

*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

Negligible

Highest risk within 50m

1 in 100 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 61**

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	Negligible
1 in 250 year	Negligible
1 in 100 year	Negligible
1 in 30 year	Negligible

*This data is sourced from Ambiental Risk Analytics.*



## 9 Groundwater flooding



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### 9.1 Groundwater flooding

**Highest risk on site**

**Negligible**

**Highest risk within 50m**

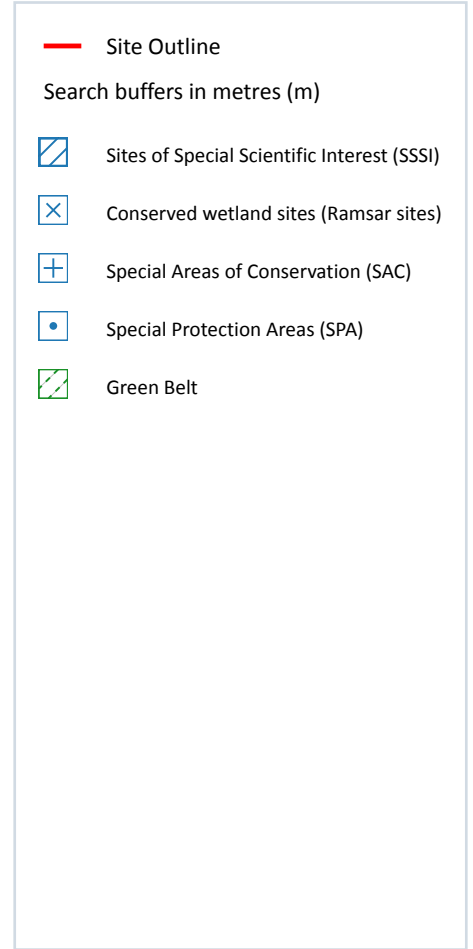
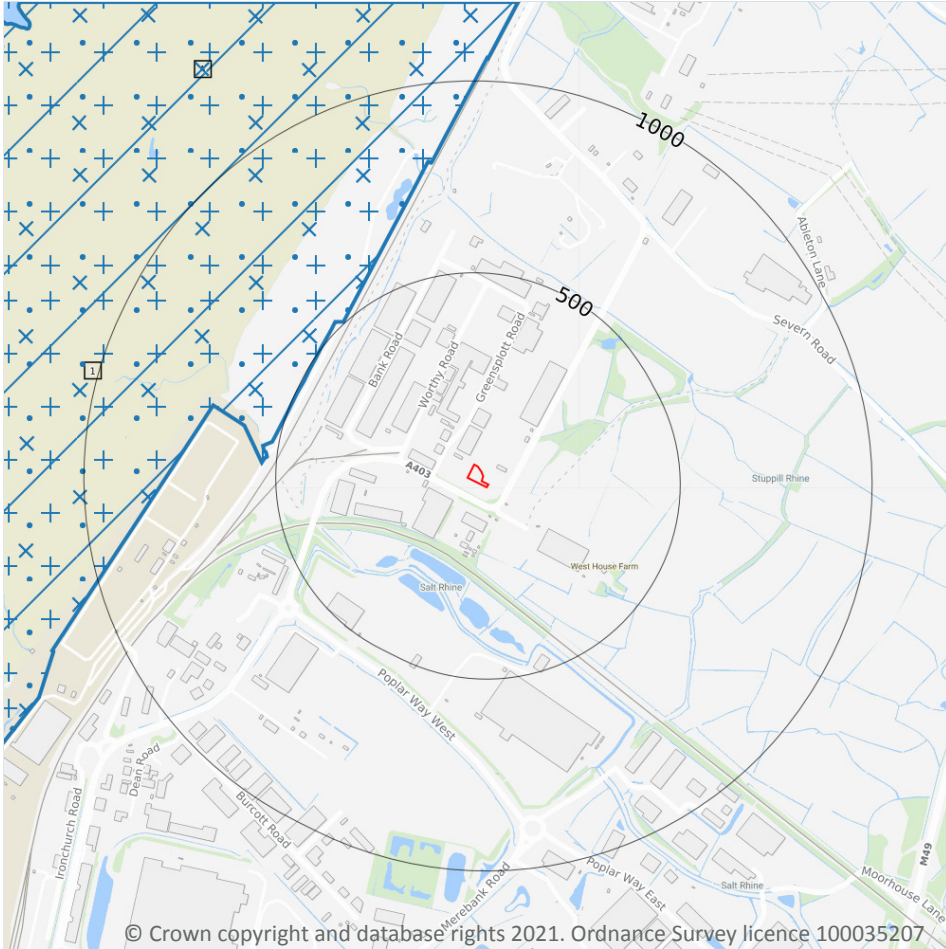
**Negligible**

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 63**

*This data is sourced from Ambiantal Risk Analytics.*

## 10 Environmental designations



### 10.1 Sites of Special Scientific Interest (SSSI)

Records within 2000m

2

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.

Features are displayed on the Environmental designations map on **page 64**

ID	Location	Name	Data source
1	494m NW	Severn Estuary	Natural England

ID	Location	Name	Data source
2	1205m N	Severn Estuary	Natural England

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

## 10.2 Conserved wetland sites (Ramsar sites)

Records within 2000m

2

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.

Features are displayed on the Environmental designations map on **page 64**



ID	Location	Site	Details
A	494m NW	Name: Severn Estuary Site status: Listed Data source: Natural England	<p>Overview: The estuary's classic funnel shape, unique in Britain, is a factor causing the Severn to have the second-largest tidal range in the world (after the Bay of Fundy, Canada). This tidal regime results in plant and animal communities typical of the extreme physical conditions of liquid mud and tide swept sand and rock. The species-poor invertebrate community includes high densities of ragworms, lugworms and other invertebrates forming an important food source for passage and wintering waders. A further consequence of the large tidal range is the extensive intertidal zone, one of the largest in the UK, comprising mudflats, sand banks, shingle, and rocky platforms. Glassworts and annual sea-blite colonise the open mud, with beds of all three species of eelgrass <i>Zostera</i> occurring on more sheltered mud and sandbanks. Large expanses of common cord-grass also occur on the outer marshes. Heavily grazed saltmarsh fringes the estuary with a range of saltmarsh types present. The middle marsh sward is dominated by common saltmarsh-grass with typical associated species. In the upper marsh, red fescue and saltmarsh rush become more prominent.</p> <p>Ramsar criteria: Ramsar criterion 1 Due to immense tidal range (second-largest in world), this affects both the physical environment and biological communities. Habitats Directive Annex I features present on the pSAC include: H1110 Sandbanks which are slightly covered by sea water all the time H1130 Estuaries H1140 Mudflats and sandflats not covered by seawater at low tide H1330 Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>)</p> <p>Ramsar criterion 3 Due to unusual estuarine communities, reduced diversity and high productivity.</p> <p>Ramsar criterion 4 This site is important for the run of migratory fish between sea and river via estuary. Species include Salmon <i>Salmo salar</i>, sea trout <i>S. trutta</i>, sea lamprey <i>Petromyzon marinus</i>, river lamprey <i>Lampetra fluviatilis</i>, allis shad <i>Alosa alosa</i>, twaite shad <i>A. fallax</i>, and eel <i>Anguilla anguilla</i>. It is also of particular importance for migratory birds during spring and autumn. Ramsar criterion 8</p> <p>The fish of the whole estuarine and river system is one of the most diverse in Britain, with over 110 species recorded. Salmon <i>Salmo salar</i>, sea trout <i>S. trutta</i>, sea lamprey <i>Petromyzon marinus</i>, river lamprey <i>Lampetra fluviatilis</i>, allis shad <i>Alosa alosa</i>, twaite shad <i>A. fallax</i>, and eel <i>Anguilla anguilla</i> use the Severn Estuary as a key migration route to their spawning grounds in the many tributaries that flow into the estuary. The site is important as a feeding and nursery ground for many fish species particularly allis shad <i>Alosa alosa</i> and twaite shad <i>A. fallax</i> which feed on mysid shrimps in the salt wedge.</p>





ID	Location	Site	Details
A	494m NW	Name: Severn Estuary (England) Site status: - Data source: Natural Resources Wales	<p>Overview: The estuary's classic funnel shape, unique in Britain, is a factor causing the Severn to have the second-largest tidal range in the world (after the Bay of Fundy, Canada). This tidal regime results in plant and animal communities typical of the extreme physical conditions of liquid mud and tide swept sand and rock. The species-poor invertebrate community includes high densities of ragworms, lugworms and other invertebrates forming an important food source for passage and wintering waders. A further consequence of the large tidal range is the extensive intertidal zone, one of the largest in the UK, comprising mudflats, sand banks, shingle, and rocky platforms. Glassworts and annual sea-blite colonise the open mud, with beds of all three species of eelgrass <i>Zostera</i> occurring on more sheltered mud and sandbanks. Large expanses of common cord-grass also occur on the outer marshes. Heavily grazed saltmarsh fringes the estuary with a range of saltmarsh types present. The middle marsh sward is dominated by common saltmarsh-grass with typical associated species. In the upper marsh, red fescue and saltmarsh rush become more prominent.</p> <p>Ramsar criteria: Ramsar criterion 1 Due to immense tidal range (second-largest in world), this affects both the physical environment and biological communities. Habitats Directive Annex I features present on the pSAC include: H1110 Sandbanks which are slightly covered by sea water all the time H1130 Estuaries H1140 Mudflats and sandflats not covered by seawater at low tide H1330 Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>)</p> <p>Ramsar criterion 3 Due to unusual estuarine communities, reduced diversity and high productivity.</p> <p>Ramsar criterion 4 This site is important for the run of migratory fish between sea and river via estuary. Species include Salmon <i>Salmo salar</i>, sea trout <i>S. trutta</i>, sea lamprey <i>Petromyzon marinus</i>, river lamprey <i>Lampetra fluviatilis</i>, allis shad <i>Alosa alosa</i>, twaite shad <i>A. fallax</i>, and eel <i>Anguilla anguilla</i>. It is also of particular importance for migratory birds during spring and autumn. Ramsar criterion 8</p> <p>The fish of the whole estuarine and river system is one of the most diverse in Britain, with over 110 species recorded. Salmon <i>Salmo salar</i>, sea trout <i>S. trutta</i>, sea lamprey <i>Petromyzon marinus</i>, river lamprey <i>Lampetra fluviatilis</i>, allis shad <i>Alosa alosa</i>, twaite shad <i>A. fallax</i>, and eel <i>Anguilla anguilla</i> use the Severn Estuary as a key migration route to their spawning grounds in the many tributaries that flow into the estuary. The site is important as a feeding and nursery ground for many fish species particularly allis shad <i>Alosa alosa</i> and twaite shad <i>A. fallax</i> which feed on mysid shrimps in the salt wedge.</p>

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



### 10.3 Special Areas of Conservation (SAC)

<b>Records within 2000m</b>	<b>2</b>
-----------------------------	----------

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.

Features are displayed on the Environmental designations map on **page 64**

ID	Location	Name	Features of interest	Habitat description	Data source
B	494m NW	Severn Estuary (England)	Subtidal sandbanks; Estuaries; Intertidal mudflats and sandflats; Reefs; Glasswort and other annuals colonising mud and sand; Cord-grass swards; Atlantic salt meadows; Shifting dunes; Sea lamprey; River lamprey; Allis shad; Twaite shad.	Salt marshes, Salt pastures, Salt steppes; Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins)	Natural Resources Wales
B	494m NW	Severn Estuary	Subtidal sandbanks; Estuaries; Intertidal mudflats and sandflats; Reefs; Glasswort and other annuals colonising mud and sand; Cord-grass swards; Atlantic salt meadows; Shifting dunes; Sea lamprey; River lamprey; Allis shad; Twaite shad.	Salt marshes, Salt pastures, Salt steppes; Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins)	Natural England

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

### 10.4 Special Protection Areas (SPA)

<b>Records within 2000m</b>	<b>2</b>
-----------------------------	----------

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.

Features are displayed on the Environmental designations map on **page 64**

ID	Location	Name	Species of interest	Habitat description	Data source
A	494m NW	Severn Estuary (England)	Tundra swan; Common shelduck; Gadwall; Common redshank; Greater white-fronted goose; Dunlin	Coastal sand dunes, Sand beaches, Machair; Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins); Improved grassland; Salt marshes, Salt pastures, Salt steppes	



ID	Location	Name	Species of interest	Habitat description	Data source
A	494m NW	Severn Estuary	Tundra swan; Common shelduck; Gadwall; Common redshank; Greater white-fronted goose; Dunlin	Coastal sand dunes, Sand beaches, Machair; Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins); Improved grassland; Salt marshes, Salt pastures, Salt steppes	Natural England

*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**

**0**

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.

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

## 10.7 Designated Ancient Woodland

**Records within 2000m**

**0**

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.

*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 64**

ID	Location	Name	Local Authority name
-	1767m E	Bath and Bristol	South Gloucestershire

*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

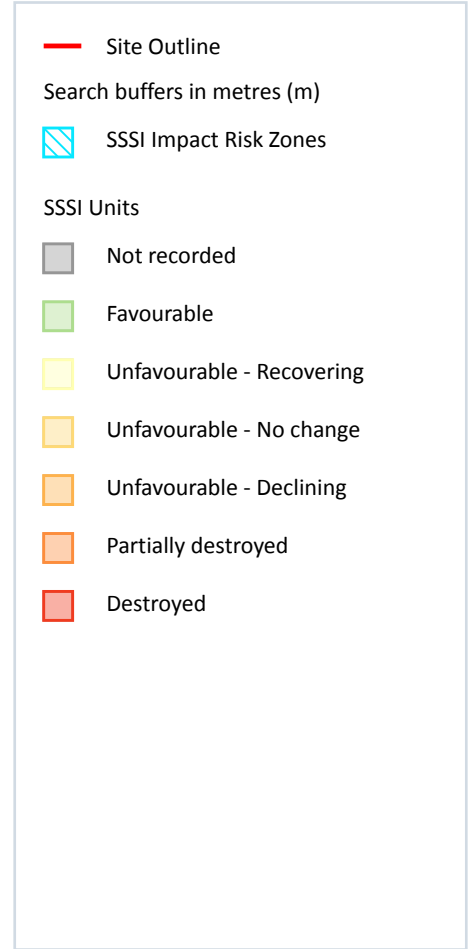
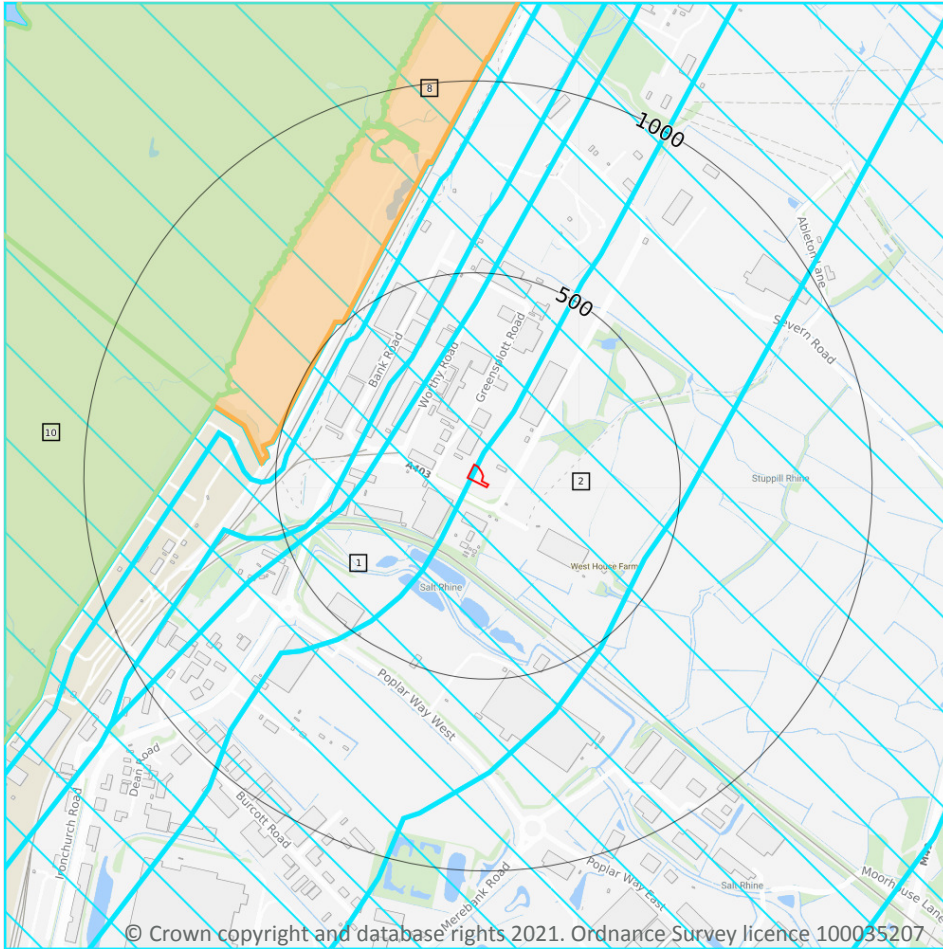
Areas at risk from agricultural nitrate pollution designated under the EC Nitrate Directive (91/676/EEC). These are areas of land that drain into waters polluted by nitrates. Farmers operating within these areas have to follow mandatory rules to tackle nitrate loss from agriculture.

*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

2

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.

Features are displayed on the SSSI Impact Zones and Units map on **page 73**

ID	Location	Type of developments requiring consultation
1	On site	<p>All applications - All Planning Applications (Except Householder) Outside Or Extending Outside Existing Settlements/urban Areas Affecting Greenspace, Farmland, Semi Natural Habitats Or Landscape Features Such As Trees, Hedges, Streams, Rural Buildings/structures</p> <p>Infrastructure - Pipelines, pylons and overhead cables. Any transport proposal including road, rail and by water (excluding routine maintenance). Airports, helipads and other aviation proposals</p> <p>Wind and Solar - Solar schemes with footprint &gt; 0.5ha, all wind turbines</p> <p>Minerals, Oil and Gas - Planning applications for quarries, including: new proposals, Review of Minerals Permissions (ROMP), extensions, variations to conditions etc. Oil &amp; gas exploration/extraction.</p> <p>Rural non-residential - Large non residential developments outside existing settlements/urban areas where net additional gross internal floorspace is &gt; 1,000m<sup>2</sup> or footprint exceeds 0.2ha</p> <p>Residential - Residential development of 50 units or more.</p> <p>Rural residential - Any residential developments outside of existing settlements/urban areas with a total net gain in residential units</p> <p>Air pollution - Any development that could cause AIR POLLUTION (incl: industrial/commercial processes, livestock &amp; poultry units, slurry lagoons/manure stores).</p> <p>Combustion - All general combustion processes. Incl: energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion.</p> <p>Waste - Mechanical and biological waste treatment, inert landfill, non-hazardous landfill, hazardous landfill, household civic amenity recycling facilities construction, demolition and excavation waste, other waste management</p> <p>Composting - Any composting proposal. Incl: open windrow composting, in-vessel composting, anaerobic digestion, other waste management.</p> <p>Discharges - Any discharge of water or liquid waste that is discharged to ground (ie to seep away) or to surface water, such as a beck or stream (NB this does not include discharges to mains sewer which are unlikely to pose a risk at this location).</p> <p>Water supply - Large infrastructure such as warehousing / industry where net additional gross internal floorspace is &gt; 1,000m<sup>2</sup> or any development needing its own water supply</p>

ID	Location	Type of developments requiring consultation
2	On site	<p>All applications - All Planning Applications (Except Householder) Outside Or Extending Outside Existing Settlements/urban Areas Affecting Greenspace, Farmland, Semi Natural Habitats Or Landscape Features Such As Trees, Hedges, Streams, Rural Buildings/structures</p> <p>Infrastructure - Pipelines, pylons and overhead cables. Any transport proposal including road, rail and by water (excluding routine maintenance). Airports, helipads and other aviation proposals</p> <p>Wind and Solar - Solar schemes with footprint &gt; 0.5ha, all wind turbines</p> <p>Minerals, Oil and Gas - Planning applications for quarries, including: new proposals, Review of Minerals Permissions (ROMP), extensions, variations to conditions etc. Oil &amp; gas exploration/extraction.</p> <p>Rural non-residential - Large non residential developments outside existing settlements/urban areas where net additional gross internal floorspace is &gt; 1,000m<sup>2</sup> or footprint exceeds 0.2ha</p> <p>Residential - Residential development of 50 units or more.</p> <p>Rural residential - Any residential developments outside of existing settlements/urban areas with a total net gain in residential units</p> <p>Air pollution - Any industrial/agricultural development that could cause AIR POLLUTION (incl: industrial processes, livestock &amp; poultry units with floorspace &gt; 500m<sup>2</sup>, slurry lagoons &gt; 200m<sup>2</sup> &amp; manure stores &gt; 250t).</p> <p>Combustion - General combustion processes &gt;20MW energy input. Incl: energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion</p> <p>Waste - Landfill. Incl: inert landfill, non-hazardous landfill, hazardous landfill.</p> <p>Composting - Any composting proposal with more than 500 tonnes maximum annual operational throughput. Incl: open windrow composting, in-vessel composting, anaerobic digestion, other waste management.</p> <p>Discharges - Any discharge of water or liquid waste of more than 2m<sup>3</sup>/day to ground (ie to seep away) or to surface water, such as a beck or stream (NB This does not include discharges to mains sewer which are unlikely to pose a risk at this location).</p> <p>Water supply - Large infrastructure such as warehousing / industry where net additional gross internal floorspace is &gt; 1,000m<sup>2</sup> or any development needing its own water supply</p>

*This data is sourced from Natural England.*

## 10.18 SSSI Units

Records within 2000m

4

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.

Features are displayed on the SSSI Impact Zones and Units map on **page 73**

ID: 8  
 Location: 494m NW  
 SSSI name: Severn Estuary  
 Unit name: Chittening Warth  
 Broad habitat: Littoral Sediment  
 Condition: Unfavourable - Declining  
 Reportable features:



Feature name	Feature condition	Date of assessment
>20,000 Non-breeding waterbirds	Favourable	13/09/2010
Aggregations of non-breeding birds - Curlew, Numenius arquata	Favourable	13/09/2010
Aggregations of non-breeding birds - Dunlin, Calidris alpina alpina	Favourable	13/09/2010
Aggregations of non-breeding birds - Redshank, Tringa totanus	Favourable	13/09/2010
Aggregations of non-breeding birds - Shelduck, Tadorna tadorna	Favourable	13/09/2010
SM4-28 - Saltmarsh	Unfavourable - Declining	08/09/2009

ID: 9  
 Location: 642m W  
 SSSI name: Severn Estuary  
 Unit name: Gravel Banks  
 Broad habitat: Littoral Sediment  
 Condition: Favourable  
 Reportable features:

Feature name	Feature condition	Date of assessment
>20,000 Non-breeding waterbirds	Favourable	13/09/2010
Aggregations of non-breeding birds - Curlew, Numenius arquata	Favourable	13/09/2010
Aggregations of non-breeding birds - Dunlin, Calidris alpina alpina	Favourable	13/09/2010
Aggregations of non-breeding birds - Redshank, Tringa totanus	Favourable	13/09/2010
Aggregations of non-breeding birds - Shelduck, Tadorna tadorna	Favourable	13/09/2010
Allis shad, Alosa alosa	Favourable	13/09/2010
Littoral rock and inshore sublittoral rock	Favourable	08/09/2009
Littoral sediment	Favourable	08/09/2009
Twaite shad, Alosa fallax	Favourable	13/09/2010

ID: 10  
 Location: 689m W  
 SSSI name: Severn Estuary  
 Unit name: Avonmouth  
 Broad habitat: Littoral Sediment  
 Condition: Favourable  
 Reportable features:



Feature name	Feature condition	Date of assessment
>20,000 Non-breeding waterbirds	Favourable	13/09/2010
Aggregations of non-breeding birds - Curlew, Numenius arquata	Favourable	13/09/2010
Aggregations of non-breeding birds - Dunlin, Calidris alpina alpina	Favourable	13/09/2010
Aggregations of non-breeding birds - Redshank, Tringa totanus	Favourable	13/09/2010
Aggregations of non-breeding birds - Shelduck, Tadorna tadorna	Favourable	13/09/2010
Allis shad, Alosa alosa	Favourable	13/09/2010
Littoral sediment	Favourable	15/09/2009
SM4-28 - Saltmarsh	Favourable	15/09/2009
Twaite shad, Alosa fallax	Favourable	13/09/2010

ID: -  
 Location: 1959m N  
 SSSI name: Severn Estuary  
 Unit name: New Pill  
 Broad habitat: Littoral Sediment  
 Condition: Favourable  
 Reportable features:

Feature name	Feature condition	Date of assessment
>20,000 Non-breeding waterbirds	Favourable	11/12/2012
Aggregations of non-breeding birds - Curlew, Numenius arquata	Favourable	11/12/2012
Aggregations of non-breeding birds - Dunlin, Calidris alpina alpina	Favourable	11/12/2012
Aggregations of non-breeding birds - Redshank, Tringa totanus	Favourable	11/12/2012
Aggregations of non-breeding birds - Shelduck, Tadorna tadorna	Favourable	11/12/2012
SM4-28 - Saltmarsh	Favourable	11/12/2012

*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

0

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.





*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**

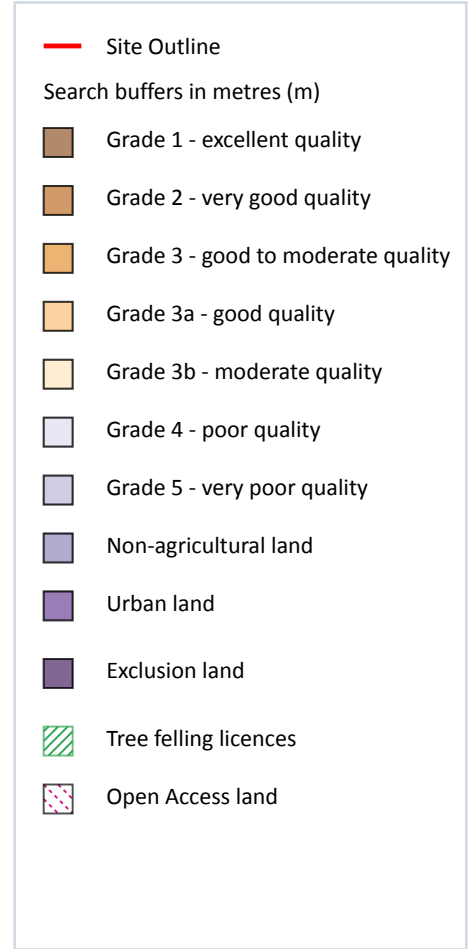
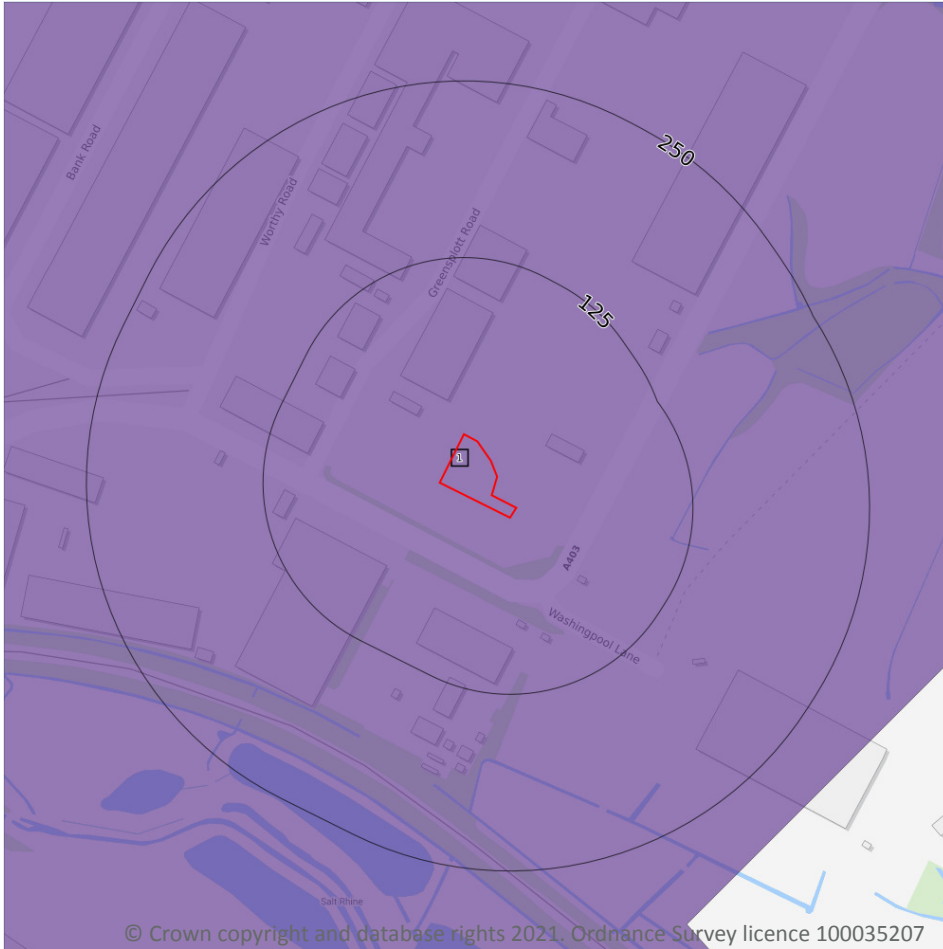
**0**

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.

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



## 12 Agricultural designations



### 12.1 Agricultural Land Classification

Records within 250m

1

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 80**

ID	Location	Classification	Description
----	----------	----------------	-------------

1	On site	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

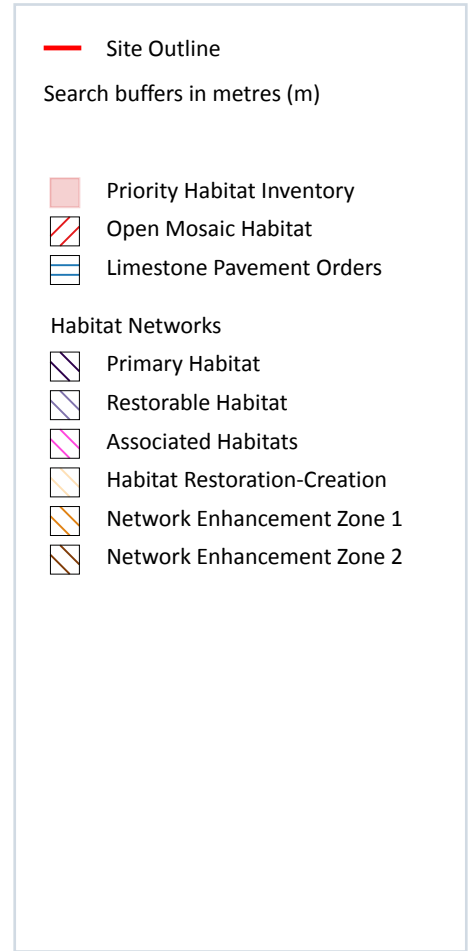
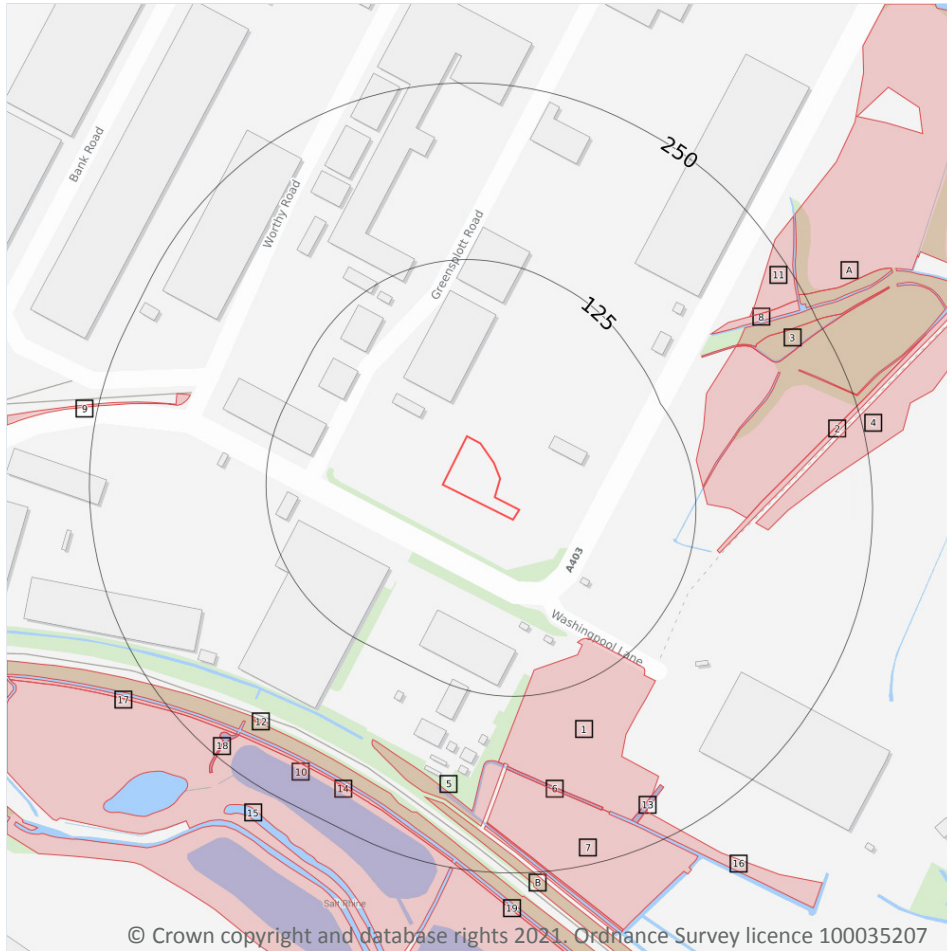
Records within 250m

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

24

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 82**

ID	Location	Main Habitat	Other habitats
1	98m SE	Coastal and floodplain grazing marsh	Main habitat: CFPGM (INV > 50%)
A	130m E	Coastal and floodplain grazing marsh	Main habitat: CFPGM (INV > 50%)
2	143m E	Coastal and floodplain grazing marsh	Main habitat: CFPGM (INV > 50%)
3	165m NE	Coastal and floodplain grazing marsh	Main habitat: CFPGM (INV > 50%)

ID	Location	Main Habitat	Other habitats
4	168m E	Coastal and floodplain grazing marsh	Main habitat: CFPGM (INV > 50%)
5	171m S	Coastal and floodplain grazing marsh	Main habitat: CFPGM (INV > 50%)
6	175m S	Coastal and floodplain grazing marsh	Main habitat: CFPGM (INV > 50%)
7	177m S	Coastal and floodplain grazing marsh	Main habitat: CFPGM (INV > 50%)
8	179m NE	Coastal and floodplain grazing marsh	Main habitat: CFPGM (INV > 50%)
9	190m W	No main habitat but additional habitats present	Additional: CFPGM (INV 50%)
B	206m S	Coastal and floodplain grazing marsh	Main habitat: CFPGM (INV > 50%)
10	208m SW	Coastal and floodplain grazing marsh	Main habitat: CFPGM (INV > 50%)
11	209m NE	Coastal and floodplain grazing marsh	Main habitat: CFPGM (INV > 50%)
12	209m SW	Coastal and floodplain grazing marsh	Main habitat: CFPGM (INV > 50%)
13	215m SE	Coastal and floodplain grazing marsh	Main habitat: CFPGM (INV > 50%)
B	215m S	Coastal and floodplain grazing marsh	Main habitat: CFPGM (INV > 50%)
B	218m S	Coastal and floodplain grazing marsh	Main habitat: CFPGM (INV > 50%)
14	219m SW	Coastal and floodplain grazing marsh	Main habitat: CFPGM (INV > 50%)
15	221m SW	Coastal and floodplain grazing marsh	Main habitat: CFPGM (INV > 50%)
16	226m SE	Coastal and floodplain grazing marsh	Main habitat: CFPGM (INV > 50%)
17	227m SW	Coastal and floodplain grazing marsh	Main habitat: CFPGM (INV > 50%)
18	228m SW	Coastal and floodplain grazing marsh	Main habitat: CFPGM (INV > 50%)
A	245m NE	Coastal and floodplain grazing marsh	Main habitat: CFPGM (INV > 50%)
19	246m S	Coastal and floodplain grazing marsh	Main habitat: CFPGM (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

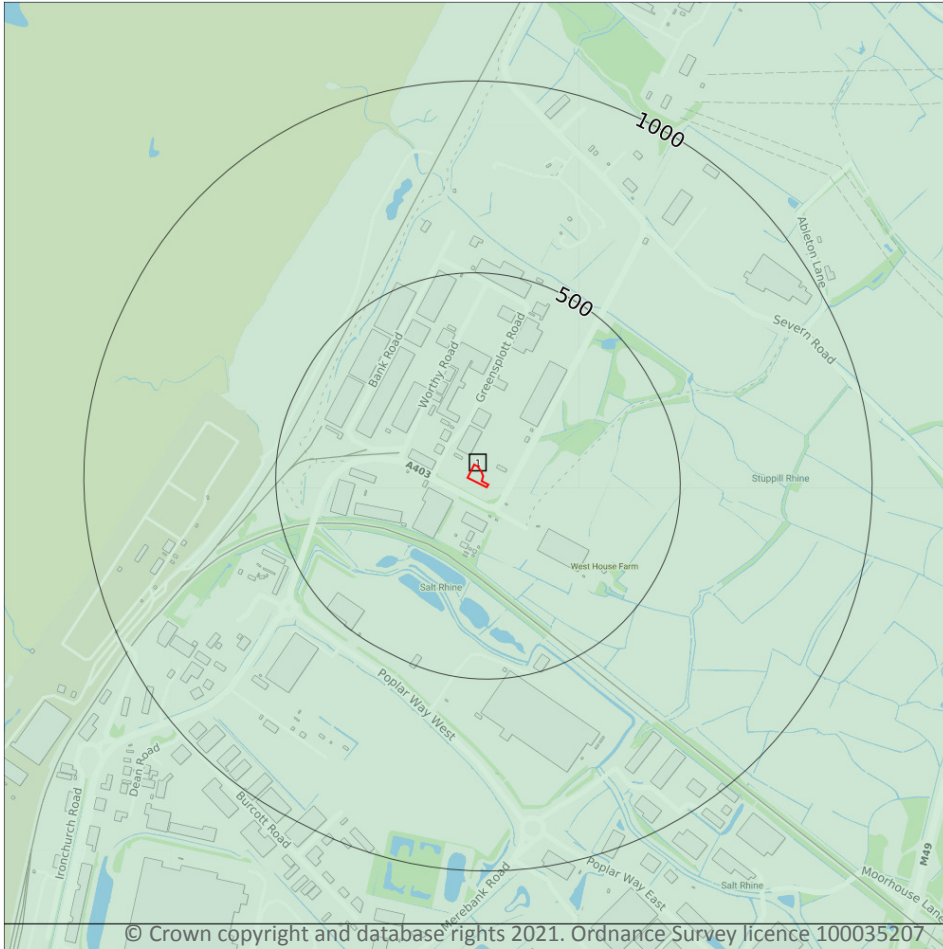
Limestone pavements are outcrops of limestone where the surface has been worn away by natural means over millennia. These rocks have the appearance of paving blocks, hence their name. Not only do they have geological interest, they also provide valuable habitats for wildlife. These habitats are threatened 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.

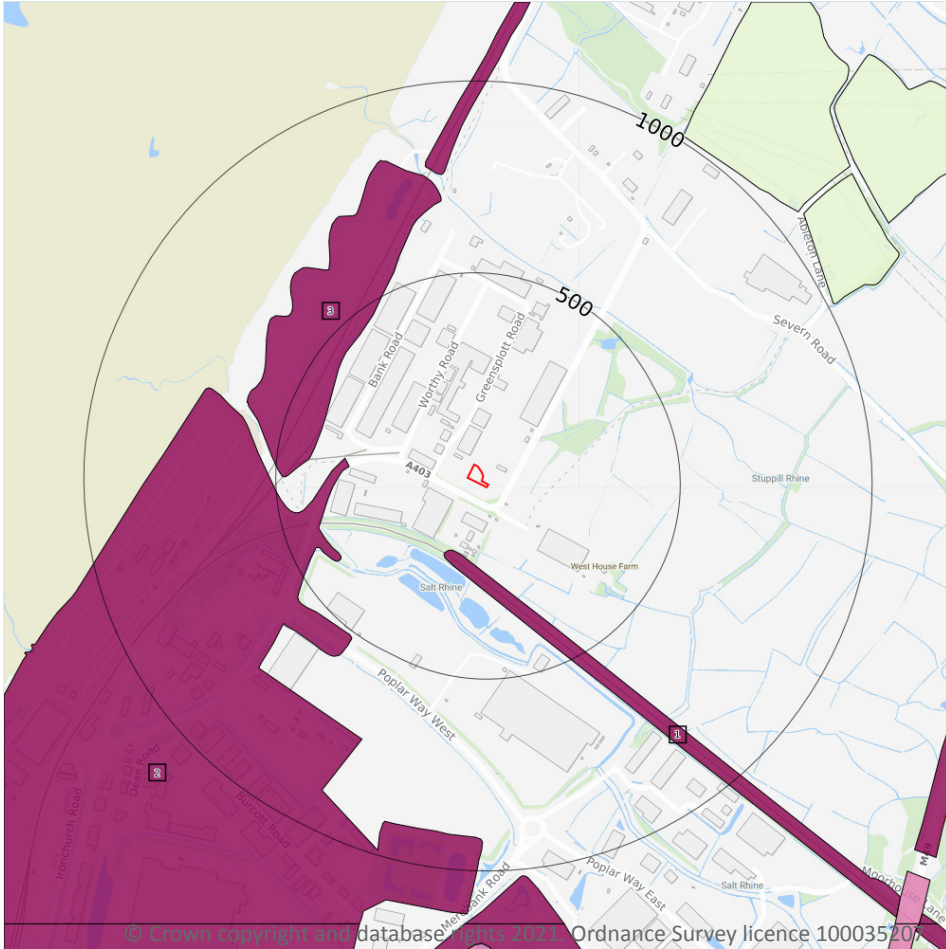
Features are displayed on the Geology 1:10,000 scale - Availability map on **page 85**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	On site	Full	Full	Full	No coverage	ST58SW

*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

3

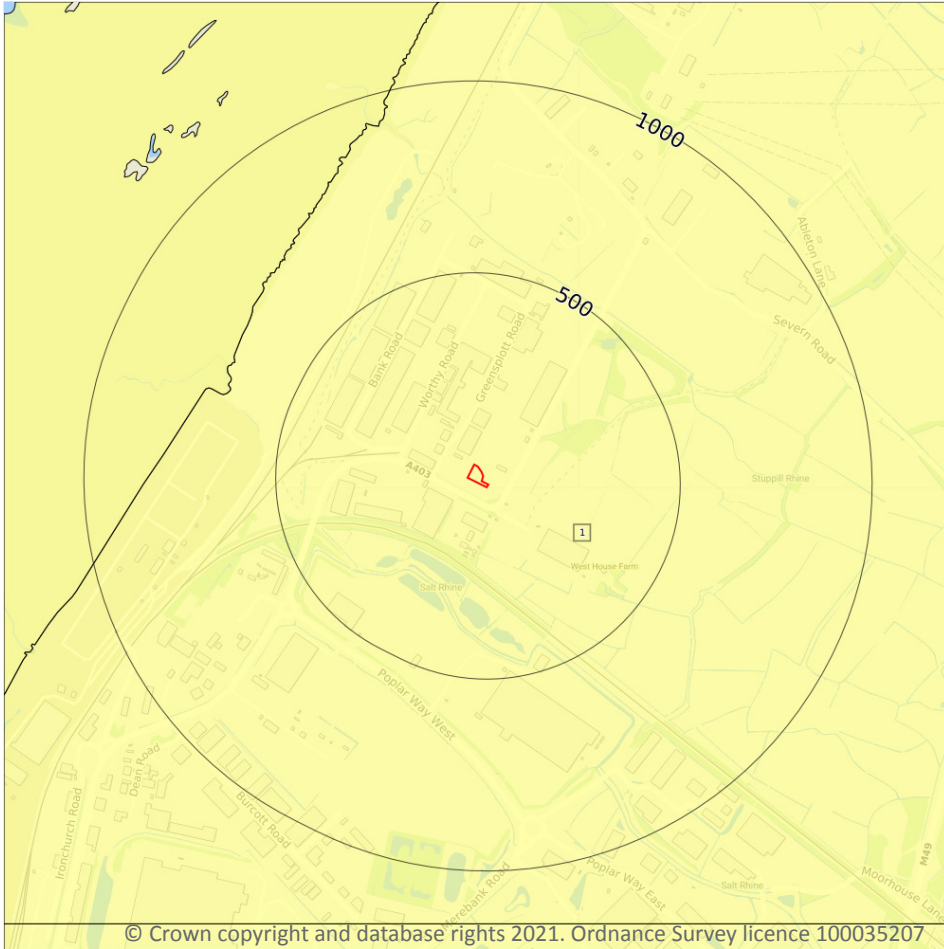
Details of made, worked, infilled, disturbed and landscaped ground at 1:10,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

Features are displayed on the Geology 1:10,000 scale - Artificial and made ground map on **page 86**

ID	Location	LEX Code	Description	Rock description
1	187m SW	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
2	310m W	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
3	400m W	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit

*This data is sourced from the British Geological Survey.*

## Geology 1:10,000 scale - Superficial



**— Site Outline**

Search buffers in metres (m)

**▨ Landslip (10k)**

**P Superficial geology (10k)**  
Please see table for more details.

### 14.3 Superficial geology (10k)

Records within 500m

1

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 87**

ID	Location	LEX Code	Description	Rock description
1	On site	TFD-XCZ	Tidal Flat Deposits - Clay And Silt	Clay And Silt

*This data is sourced from the British Geological Survey.*

## 14.4 Landslip (10k)

Records within 500m

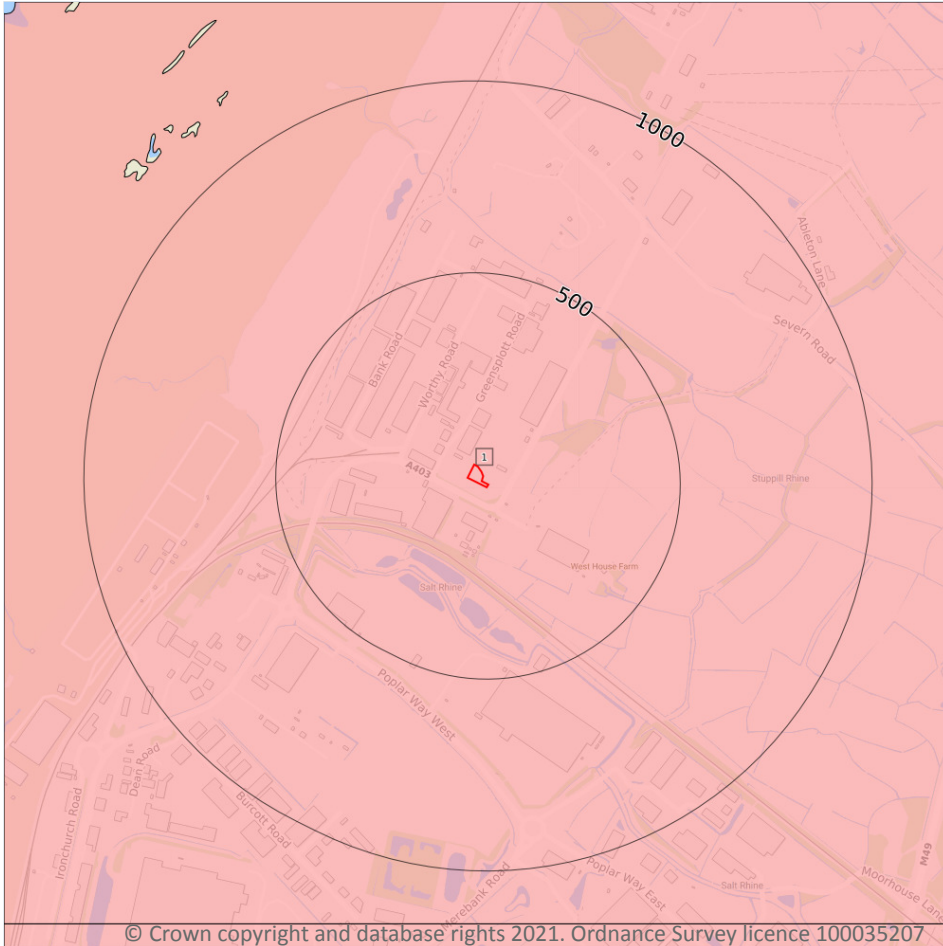
0

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.

*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** **1**

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 89**

ID	Location	LEX Code	Description	Rock age
1	On site	MMG-MDST	Mercia Mudstone Group - Mudstone	Rhaetian Age - Early Triassic Epoch

*This data is sourced from the British Geological Survey.*

## 14.6 Bedrock faults and other linear features (10k)

Records within 500m

0

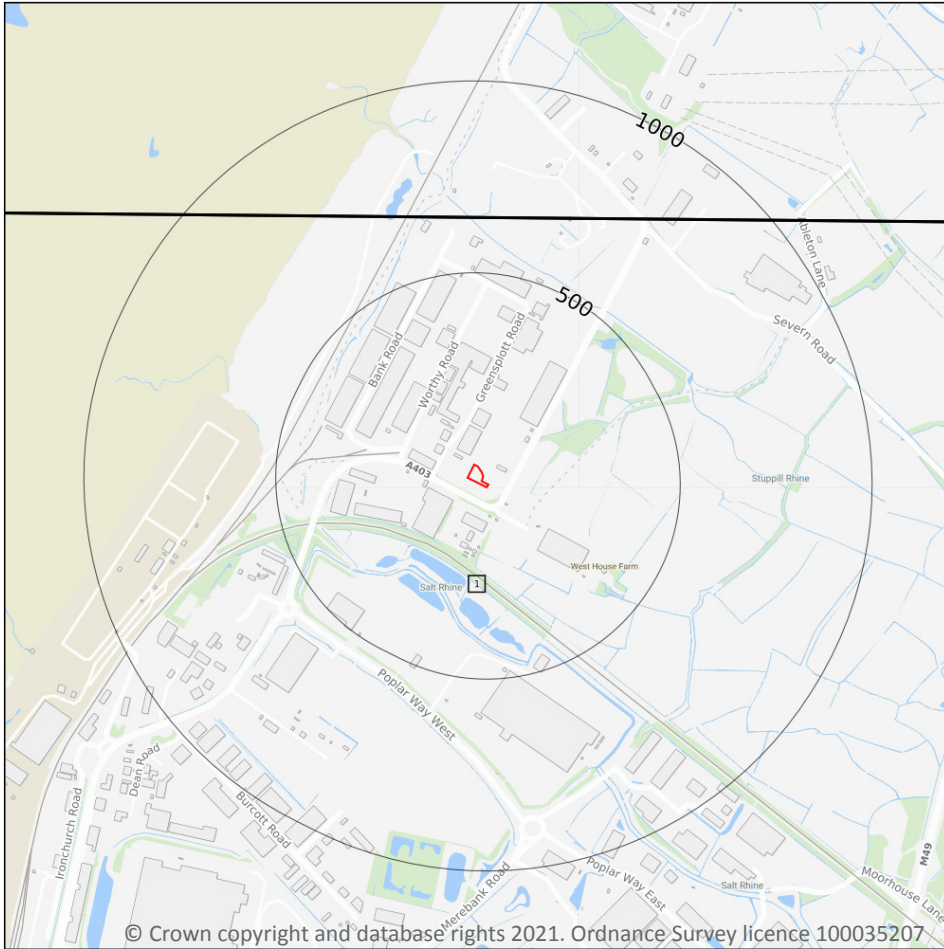
Linear features at the ground or bedrock surface at 1:10,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

*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.

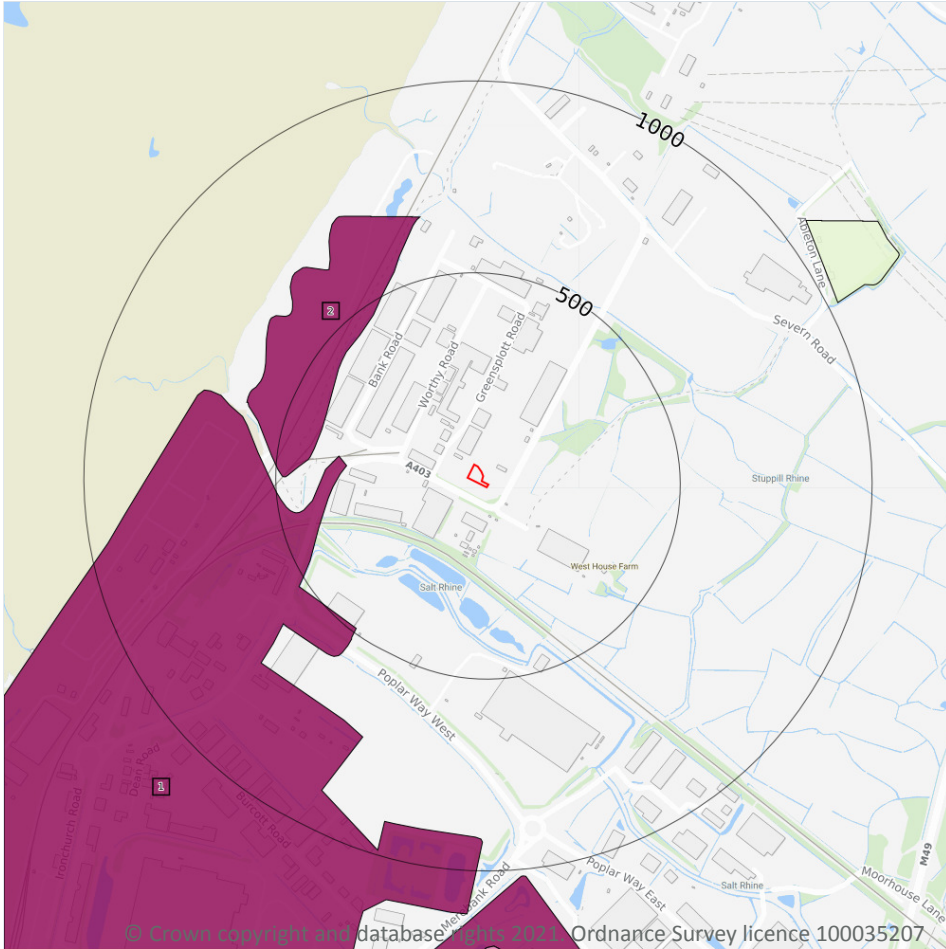
Features are displayed on the Geology 1:50,000 scale - Availability map on **page 91**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	On site	Full	Full	Full	Full	EW264_bristol_v4

*This data is sourced from the British Geological Survey.*



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



— Site Outline

Search buffers in metres (m)

- Made ground
- Worked ground
- Infilled ground
- Disturbed ground
- Landscaped ground

### 15.2 Artificial and made ground (50k)

**Records within 500m** **2**

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.

Features are displayed on the Geology 1:50,000 scale - Artificial and made ground map on **page 92**

ID	Location	LEX Code	Description	Rock description
1	317m W	MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT
2	400m W	MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT

*This data is sourced from the British Geological Survey.*

### 15.3 Artificial ground permeability (50k)

Records within 50m

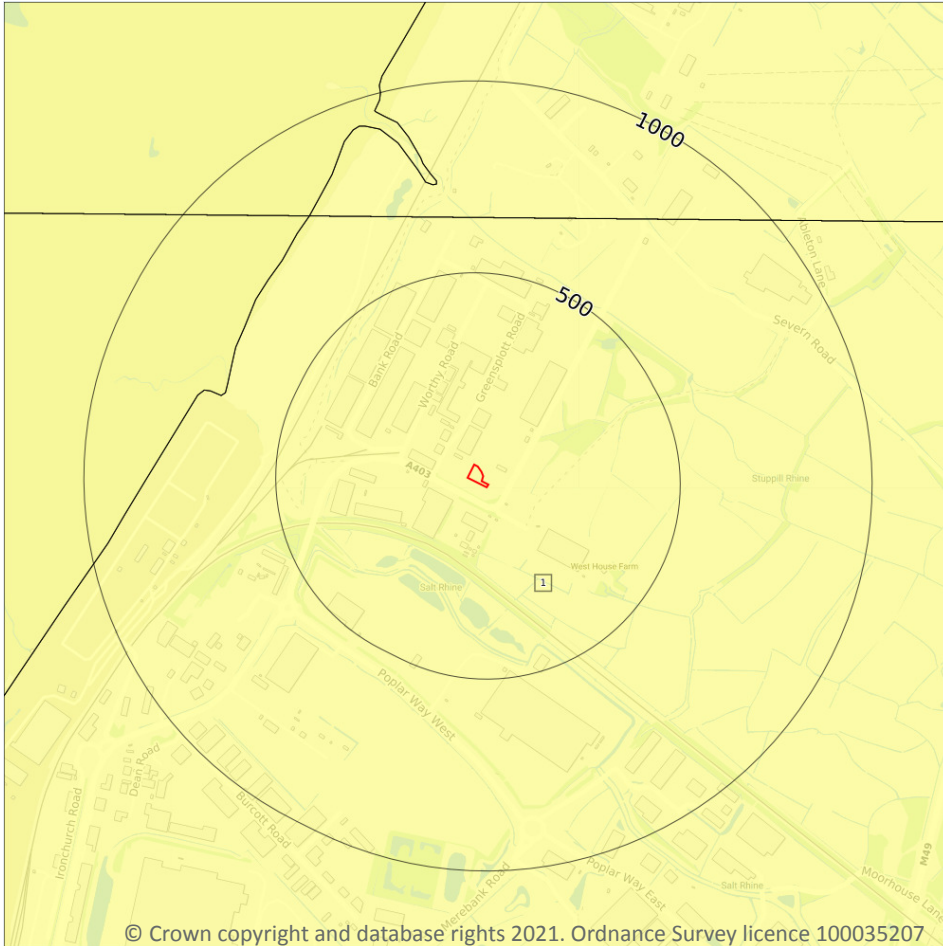
0

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)
- 1 Landslip (50k)
- Superficial geology (50k)  
Please see table for more details.

### 15.4 Superficial geology (50k)

Records within 500m

1

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 94**

ID	Location	LEX Code	Description	Rock description
1	On site	TFD-XCZ	TIDAL FLAT DEPOSITS	CLAY AND SILT

*This data is sourced from the British Geological Survey.*

## 15.5 Superficial permeability (50k)

<b>Records within 50m</b>	<b>1</b>
---------------------------	----------

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	Low	Very Low

*This data is sourced from the British Geological Survey.*

## 15.6 Landslip (50k)

<b>Records within 500m</b>	<b>0</b>
----------------------------	----------

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)

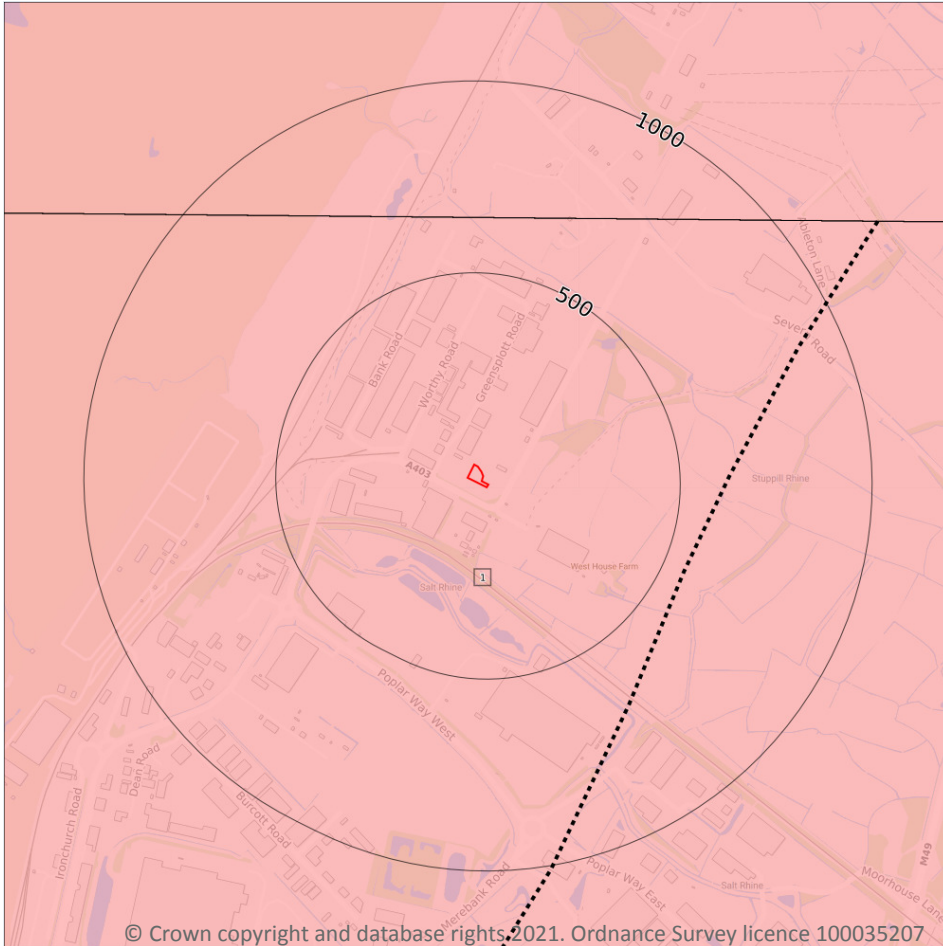
<b>Records within 50m</b>	<b>0</b>
---------------------------	----------

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

1

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 96**

ID	Location	LEX Code	Description	Rock age
1	On site	MMG-MDHA	MERCIA MUDSTONE GROUP - MUDSTONE AND HALITE-STONE	-

*This data is sourced from the British Geological Survey.*



## 15.9 Bedrock permeability (50k)

<b>Records within 50m</b>	<b>1</b>
---------------------------	----------

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	Fracture	Low	Low

*This data is sourced from the British Geological Survey.*

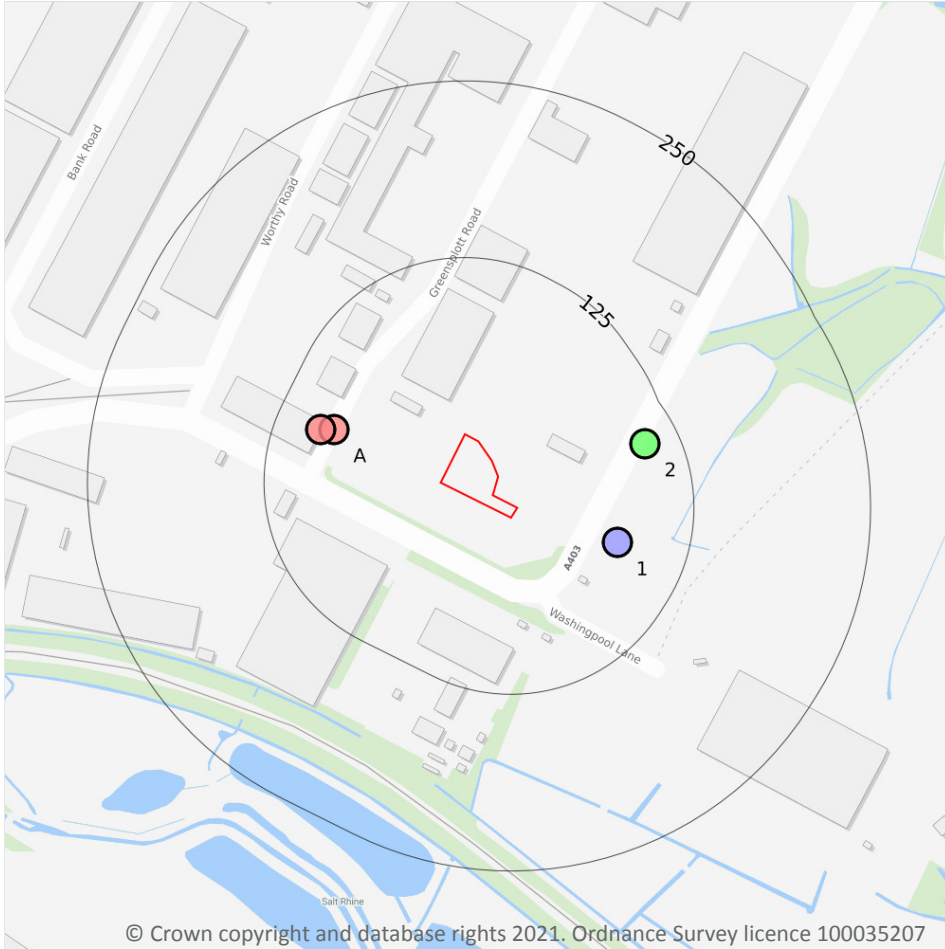
## 15.10 Bedrock faults and other linear features (50k)

<b>Records within 500m</b>	<b>0</b>
----------------------------	----------

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.

*This data is sourced from the British Geological Survey.*

## 16 Boreholes



- Site Outline
- Search buffers in metres (m)
- Confidential
- 0 - 10m
- 10 - 30m
- 30m+
- Unknown

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### 16.1 BGS Boreholes

#### Records within 250m

4

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 98**

ID	Location	Grid reference	Name	Length	Confidential	Web link
1	75m E	353180 181120	CHITTENING ESTATE NO.6	-2.0	N	<a href="#">389519</a>
A	84m NW	352980 181200	GREEN SPLOT FARM NO.1	38.1	N	<a href="#">389527</a>
A	93m NW	352970 181200	GREENS PLOT	38.1	N	<a href="#">389401</a>

ID	Location	Grid reference	Name	Length	Confidential	Web link
2	101m NE	353200 181190	PORT OF BRISTOL AUTHORITY 6	17.67	N	<a href="#">389402</a>

*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**

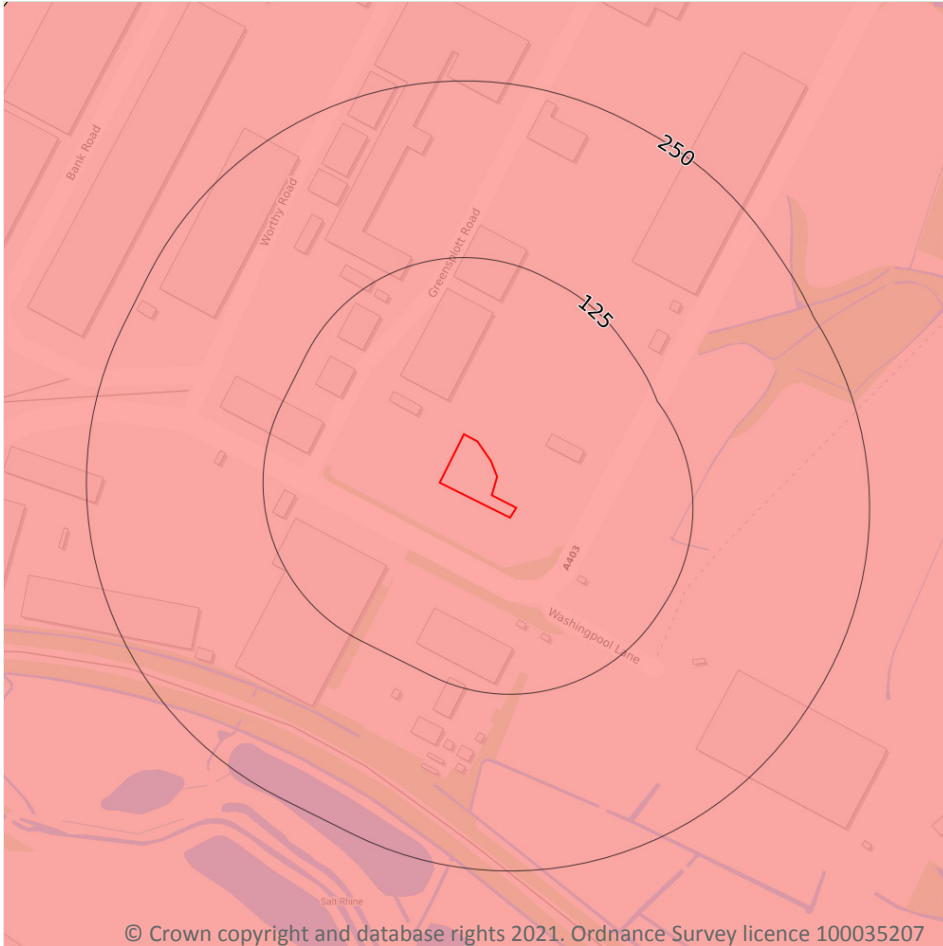
The potential hazard presented by soils that absorb water when wet (making them swell), and lose water as they dry (making them shrink). This shrink-swell behaviour is controlled by the type and amount of clay in the soil, and by seasonal changes in the soil moisture content (related to rainfall and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

Features are displayed on the Natural ground subsidence - Shrink swell clays map on **page 100**

Location	Hazard rating	Details
On site	Low	Ground conditions predominantly medium plasticity.

*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

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### 17.2 Running sands

**Records within 50m**

**1**

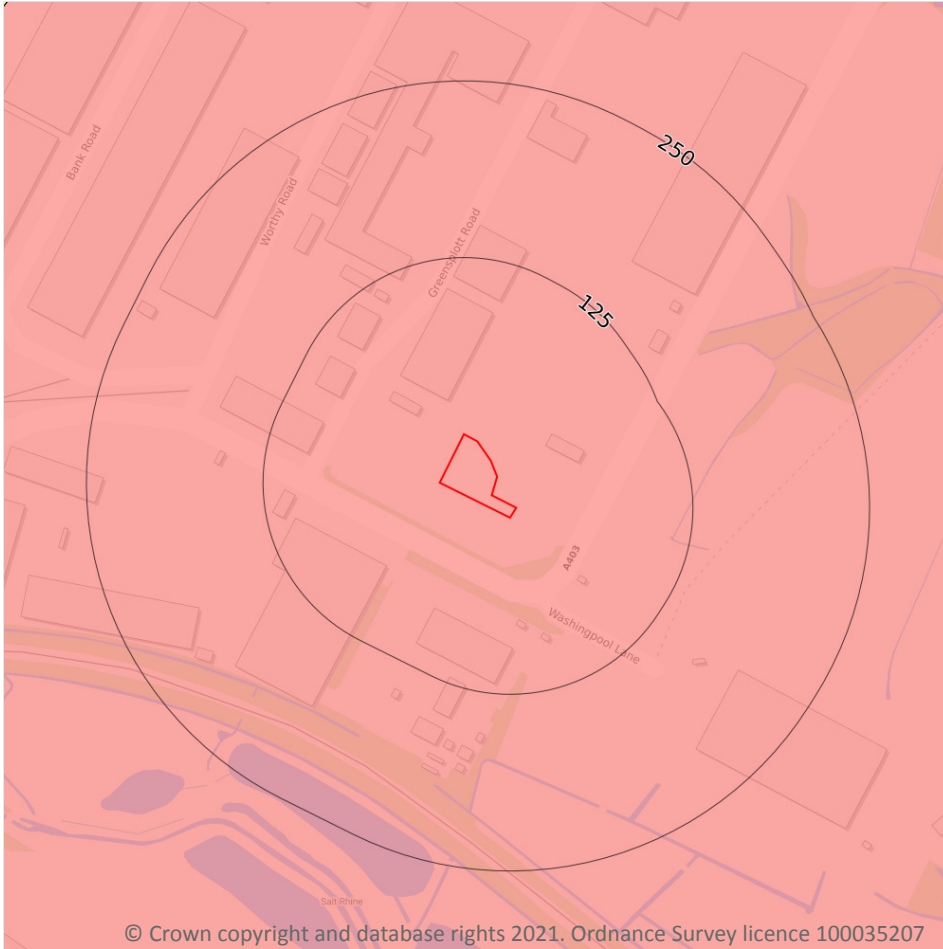
The potential hazard presented by rocks that can contain loosely-packed sandy layers that can become fluidised by water flowing through them. Such sands can 'run', removing support from overlying buildings and causing potential damage.

Features are displayed on the Natural ground subsidence - Running sands map on **page 101**

Location	Hazard rating	Details
On site	Moderate	Running sand conditions are probably present. Constraints may apply to land uses involving excavation or the addition or removal of water.

*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.

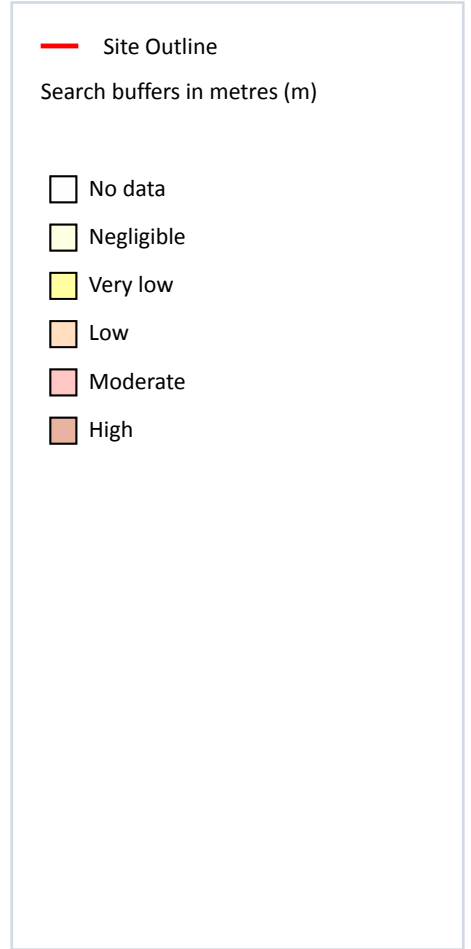
Features are displayed on the Natural ground subsidence - Compressible deposits map on **page 102**

Location	Hazard rating	Details
On site	Moderate	Compressibility and uneven settlement hazards are probably present. Land use should consider specifically the compressibility and variability of the site.

*This data is sourced from the British Geological Survey.*



## Natural ground subsidence - Collapsible deposits



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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.

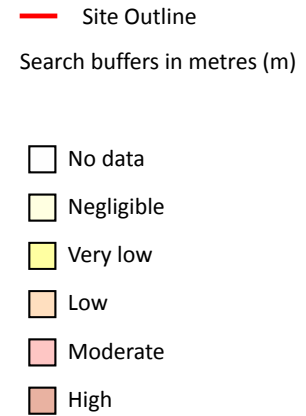
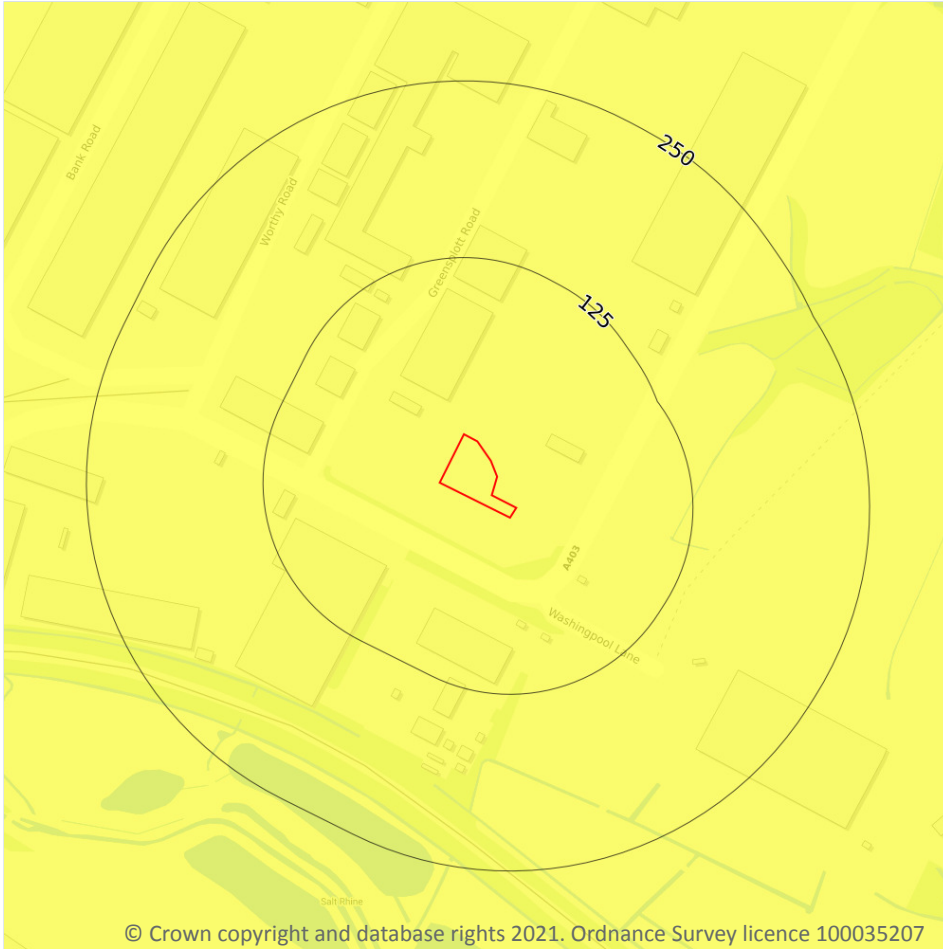
Features are displayed on the Natural ground subsidence - Collapsible deposits map on **page 103**

Location	Hazard rating	Details
----------	---------------	---------

**On site**      **Negligible**      **Deposits with potential to collapse when loaded and saturated are believed not to be present.**

*This data is sourced from the British Geological Survey.*

## Natural ground subsidence - Landslides



### 17.5 Landslides

#### Records within 50m

1

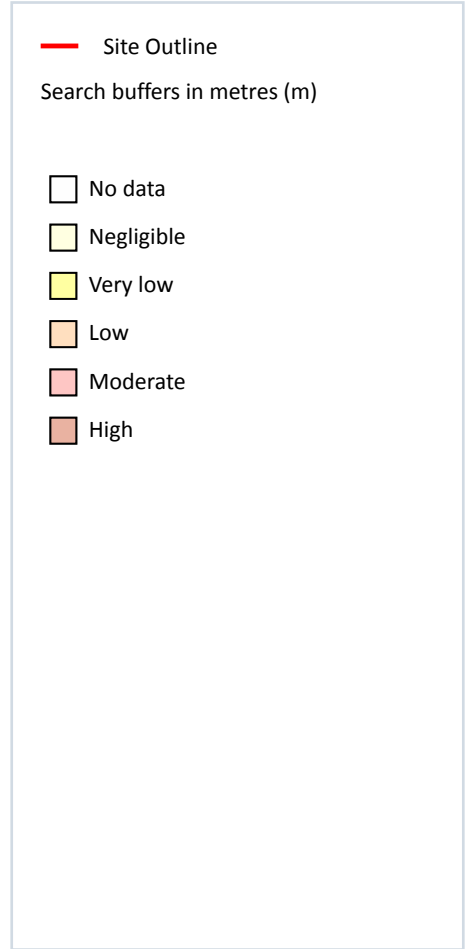
The potential for landsliding (slope instability) to be a hazard assessed using 1:50,000 scale digital maps of superficial and bedrock deposits, combined with information from the BGS National Landslide Database and scientific and engineering reports.

Features are displayed on the Natural ground subsidence - Landslides map on **page 104**

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



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### 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 105**

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

0

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.

*This data is sourced from the British Geological Survey.*

### 18.3 Surface ground workings

Records within 250m

0

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.

*This is data is sourced from Ordnance Survey/Groundsure.*

### 18.4 Underground workings

Records within 1000m

0

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

*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

0

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).

*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

0

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

*This data is sourced from Johnson Poole and Bloomer.*

## 18.9 Coal mining

Records on site

0

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

*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 Mining Searches UK.*

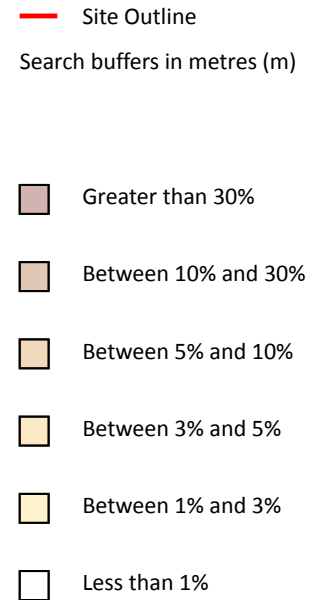
### 18.13 Clay mining

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



### 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 110**

Location	Estimated properties affected	Radon Protection Measures required
On site	Less than 1%	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

1

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 km<sup>2</sup>. 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 km<sup>2</sup>; 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	25 - 35 mg/kg	No data	300 - 600 mg/kg	240 - 360 mg/kg	1.8 mg/kg	90 - 120 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 km<sup>2</sup>).

*This data is sourced from the British Geological Survey.*

### 20.3 BGS Measured Urban Soil Chemistry

Records within 50m

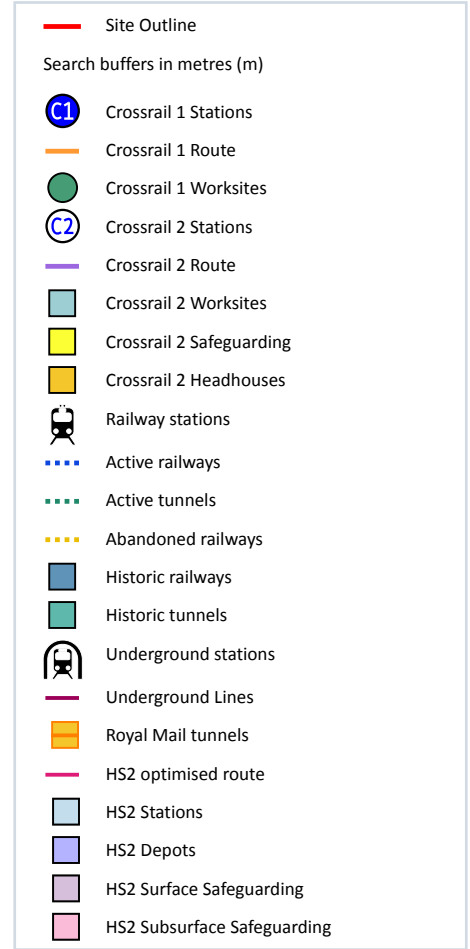
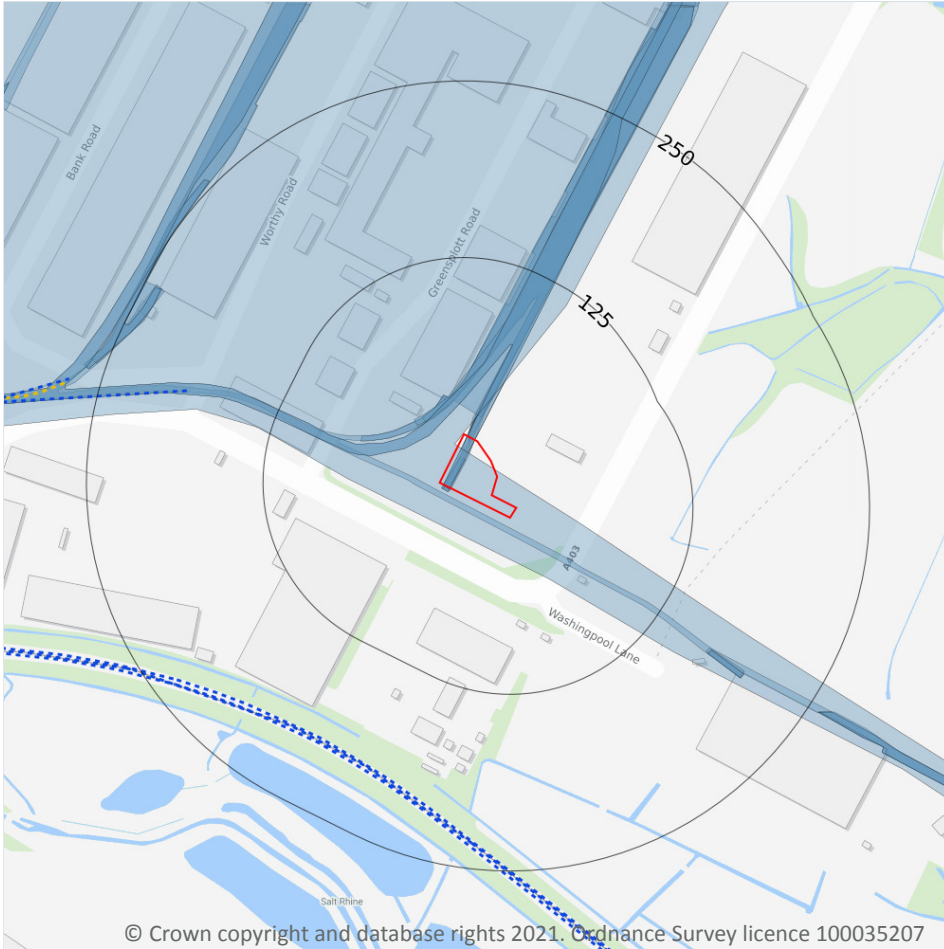
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The locations and measured total concentrations (mg/kg) of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc in urban topsoil samples from 23 urban centres across Great Britain. These are collected at a sample density of 4 per km<sup>2</sup>.

*This data is sourced from the British Geological Survey.*



## 21 Railway infrastructure and projects



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### 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**

**12**

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.

Features are displayed on the Railway infrastructure and projects map on **page 112**

Location	Land Use	Year of mapping	Mapping scale
On site	Railway Sidings	1971	2500
On site	Railway Sidings	1969	1250
On site	Railway Sidings	1992	1250
On site	Railway Sidings	1964	10560
On site	Railway Sidings	1973	10000
16m NE	Railway Sidings	1973	-
168m SE	Railway Sidings	1969	1250
170m SE	Railway Sidings	1992	1250
170m SE	Railway Sidings	1973	-
237m NW	Railway Sidings	1970	1250
237m NW	Railway Sidings	1994	1250
237m NW	Railway Sidings	1997	1250

*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

8

Currently existing railway lines, including standard railways, narrow gauge, funicular, trams and light railways. Features are displayed on the Railway infrastructure and projects map on **page 112**

Location	Name	Type
189m W	Not given	Single Track
199m SW		rail
201m SW	Not given	Multi Track
203m SW		rail
232m S	Not given	Multi Track
233m SW		rail
235m SW		rail
243m S	Not given	Multi Track

*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.*



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## 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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**Grid Ref:** 353082, 181167

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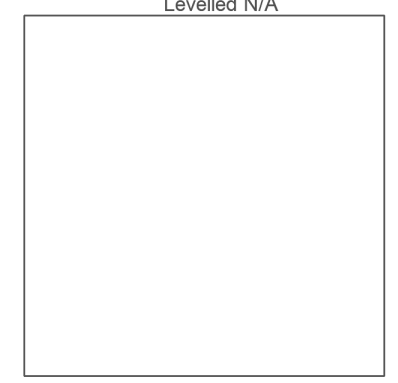
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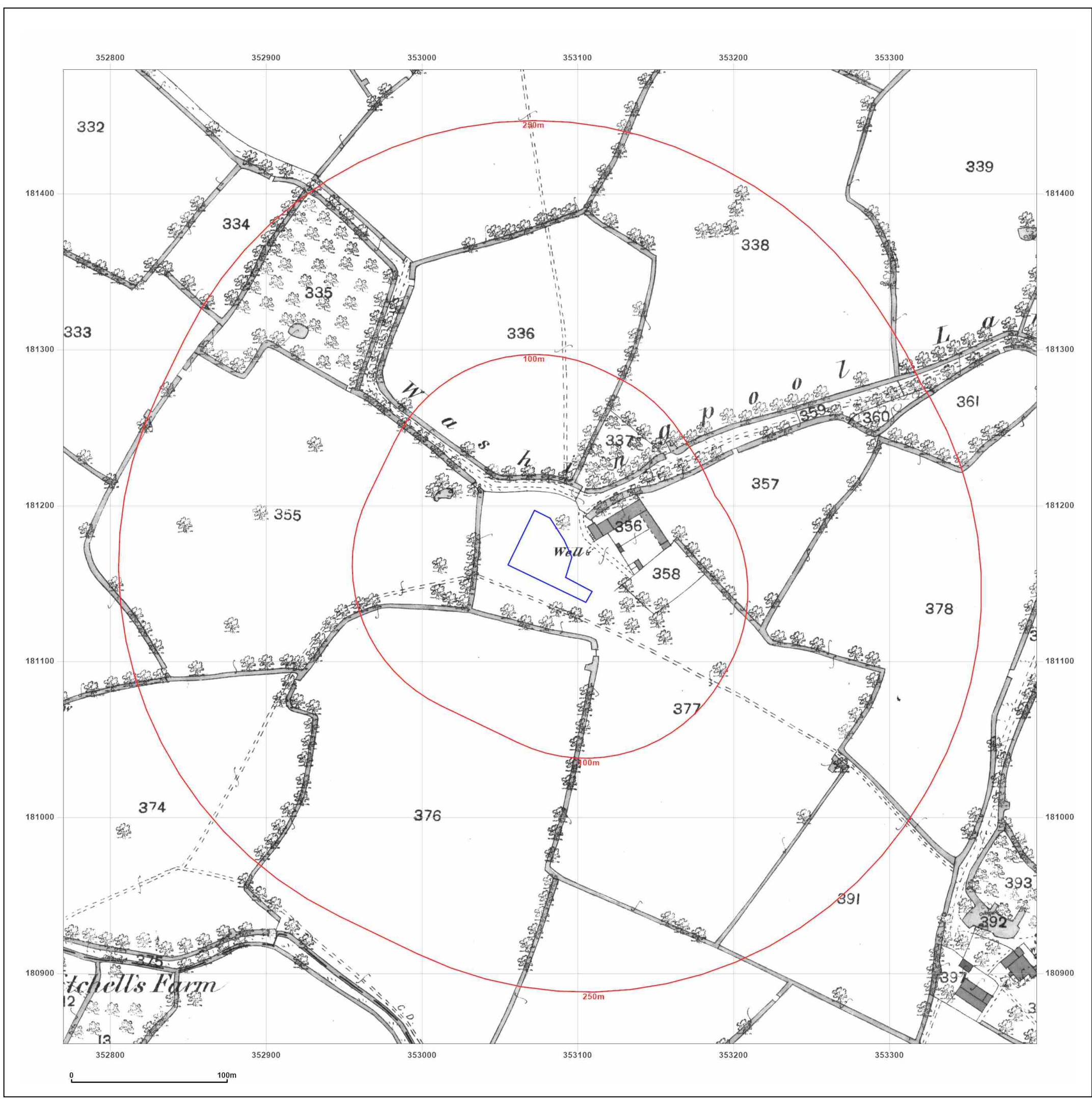


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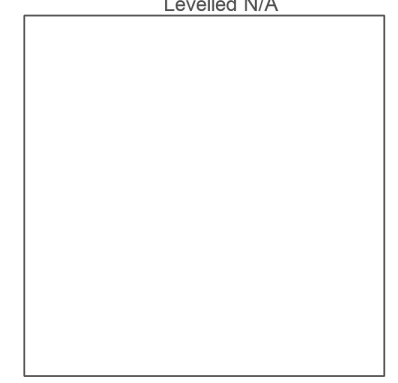
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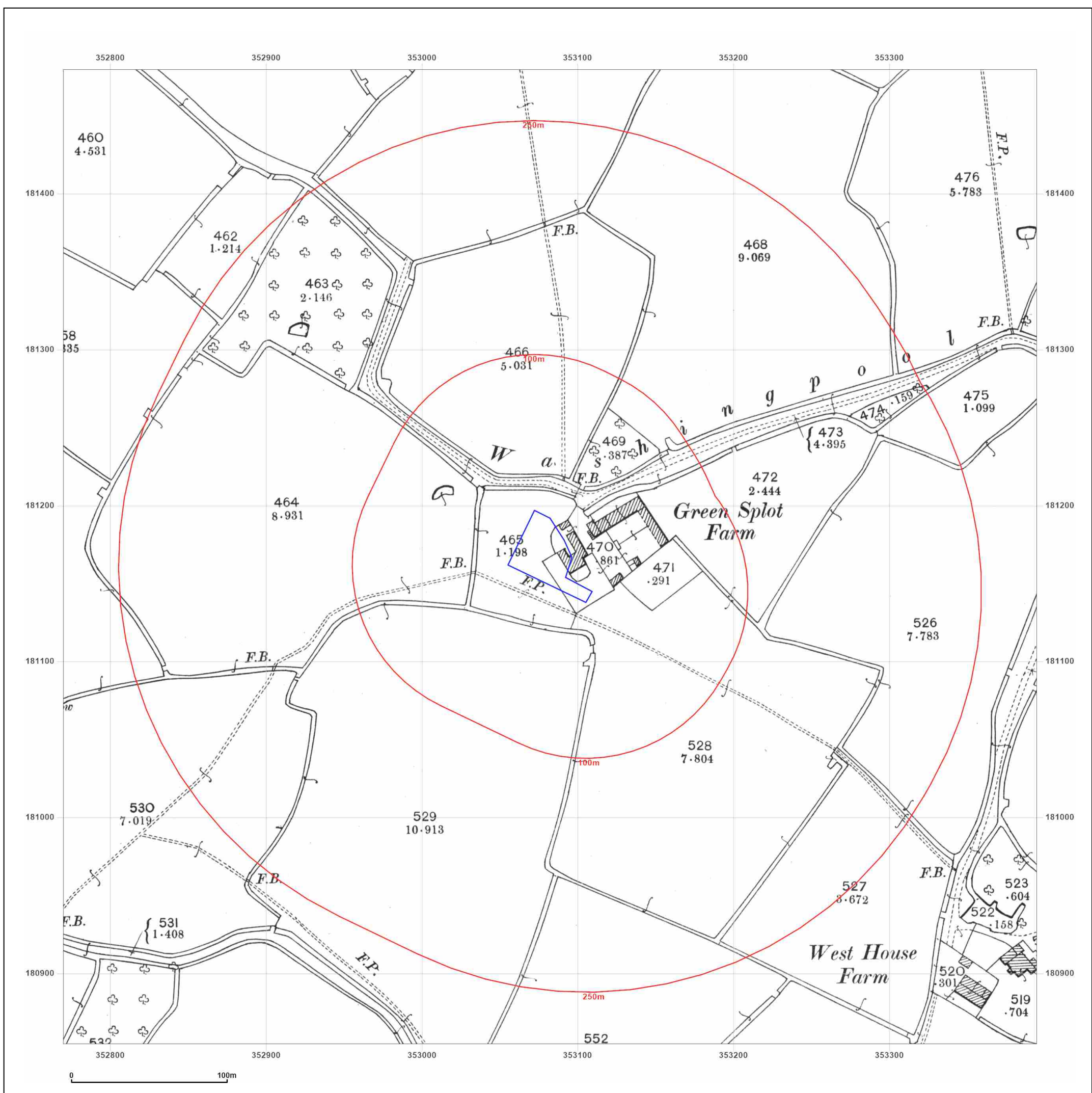


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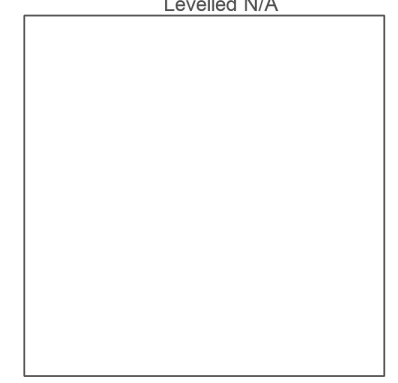
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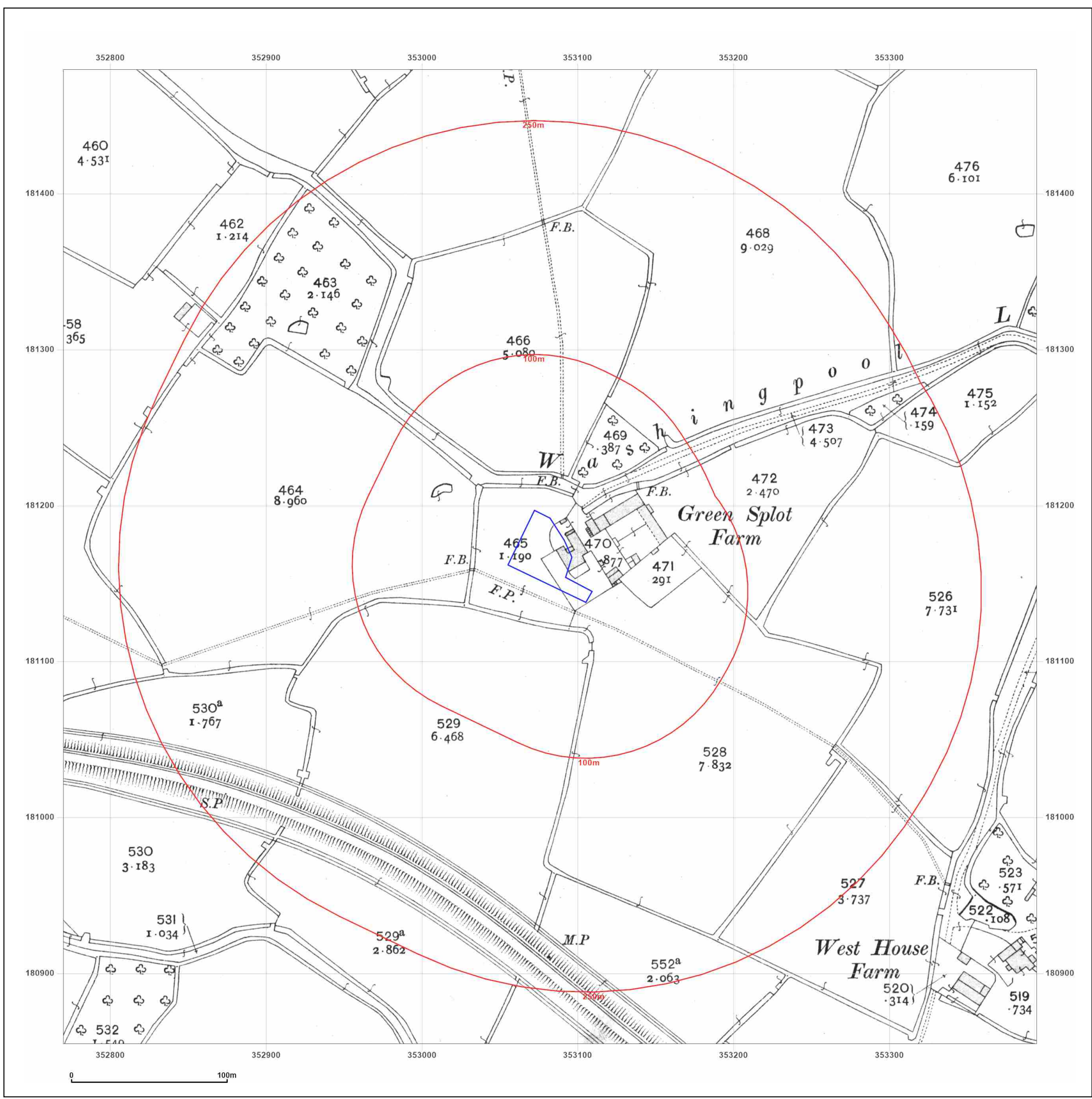


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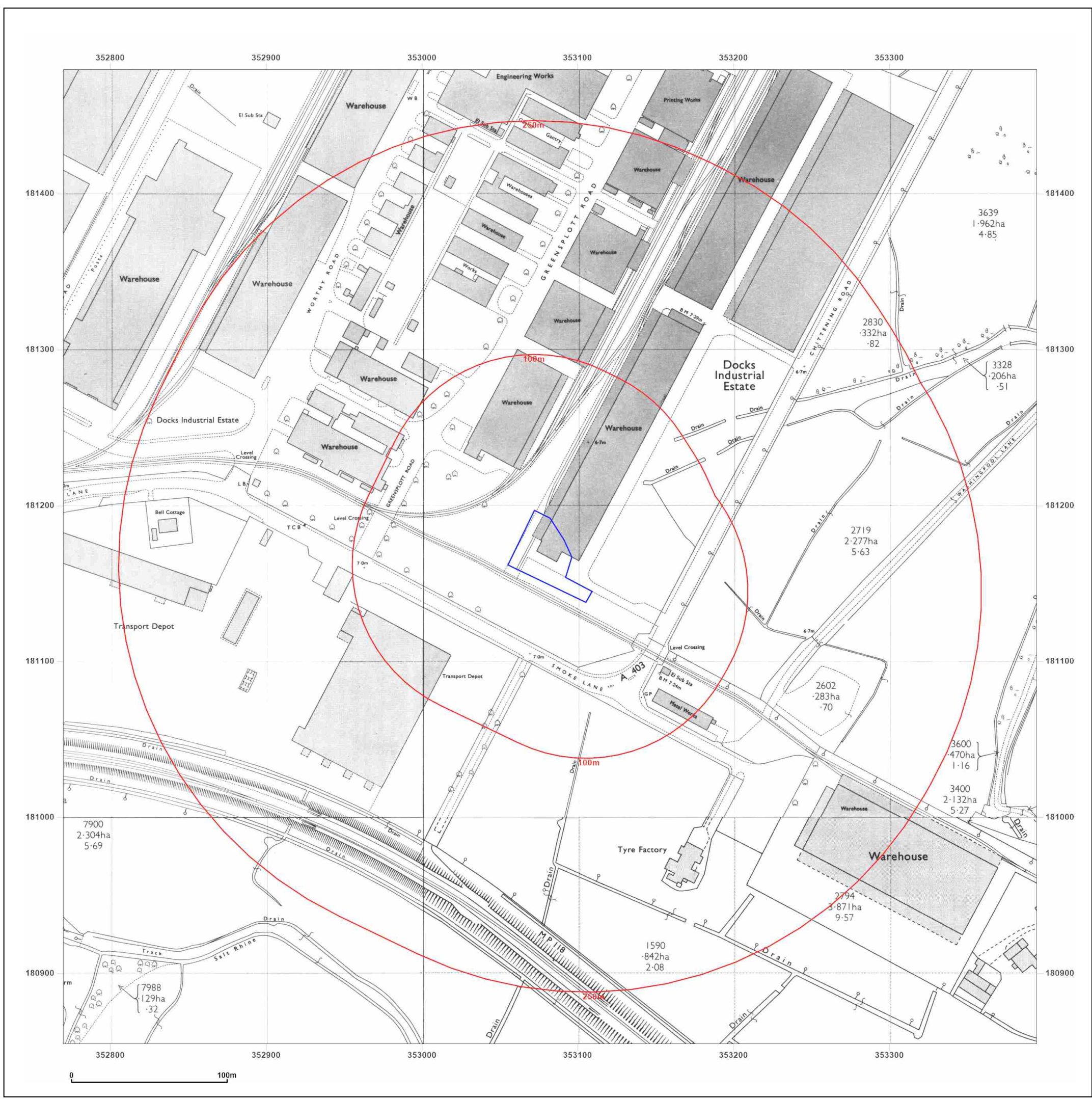


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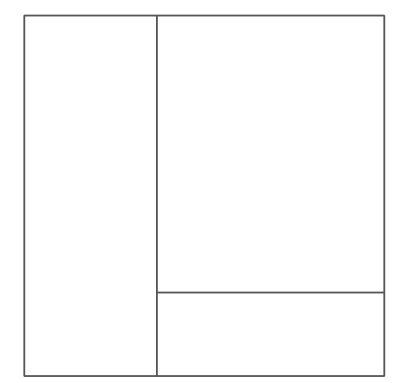
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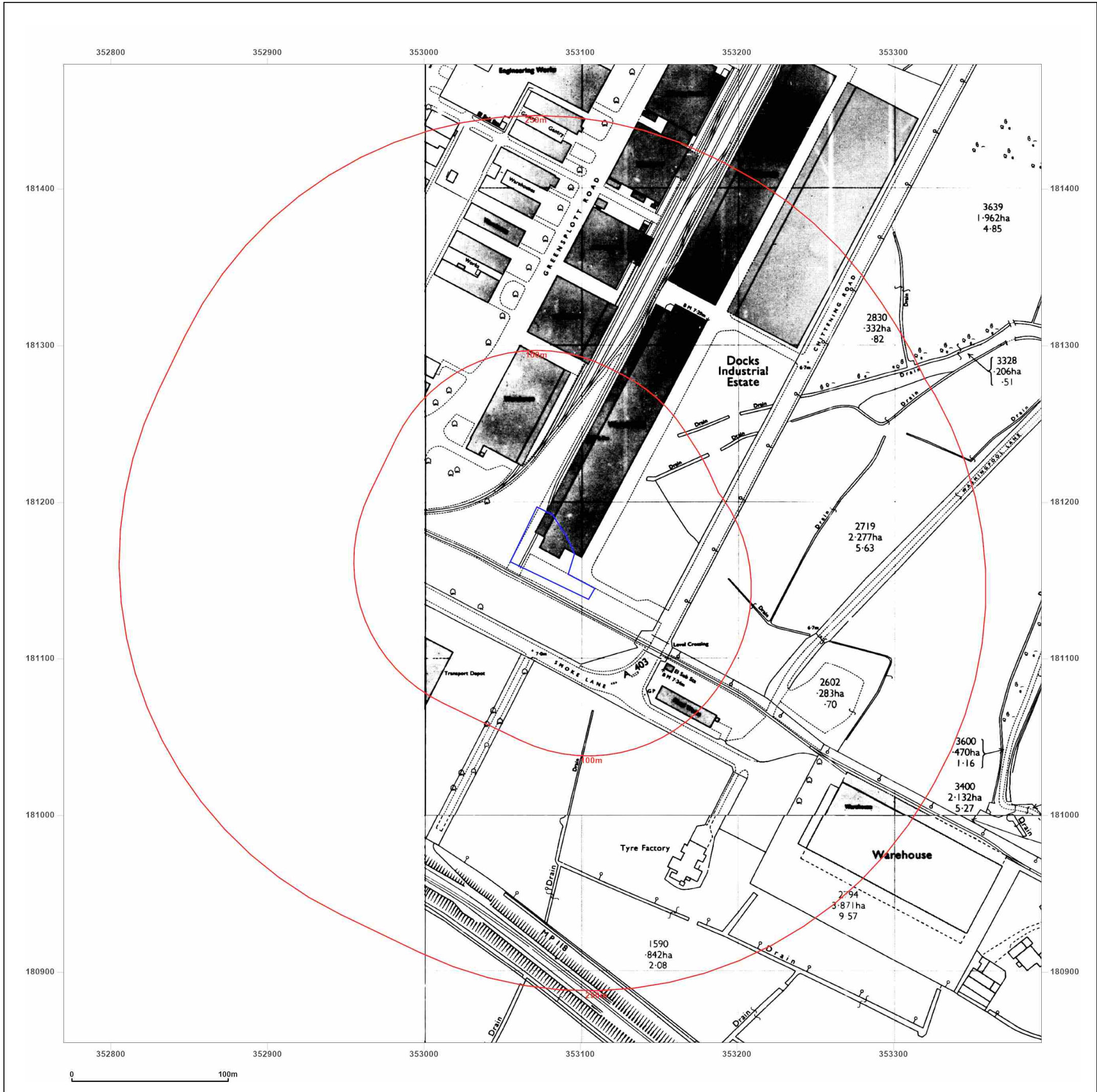


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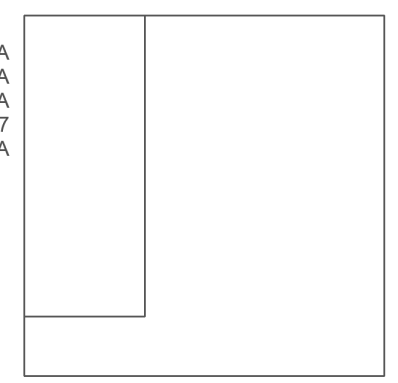
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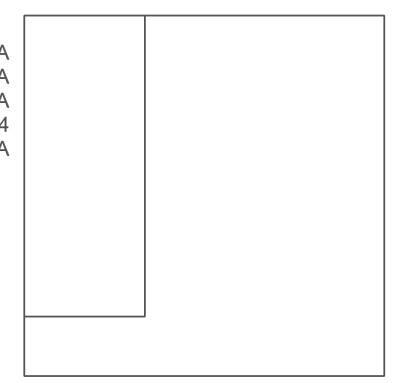
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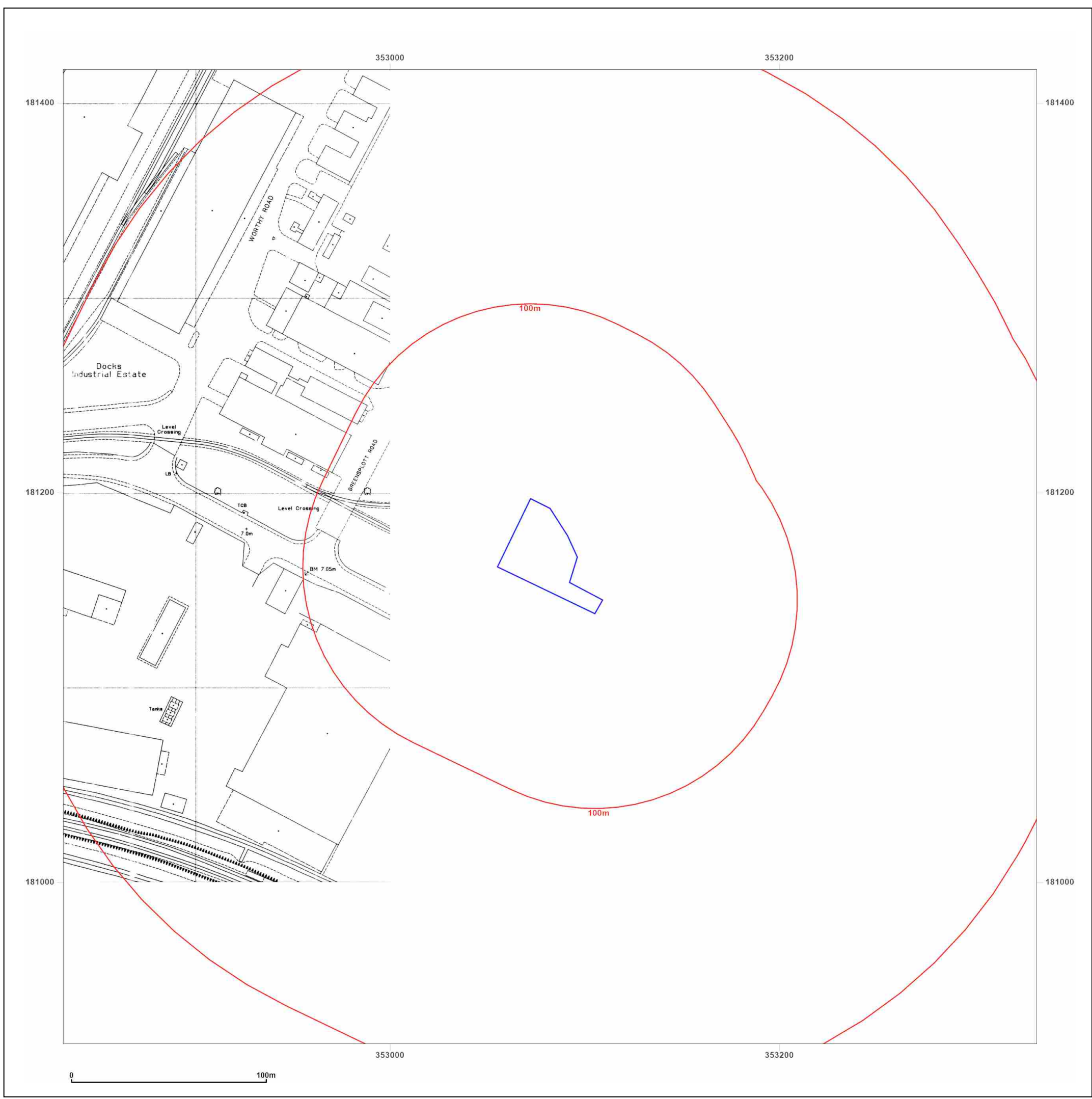


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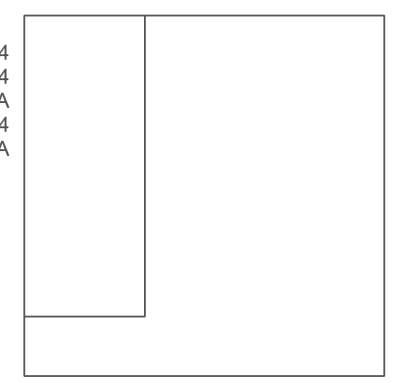
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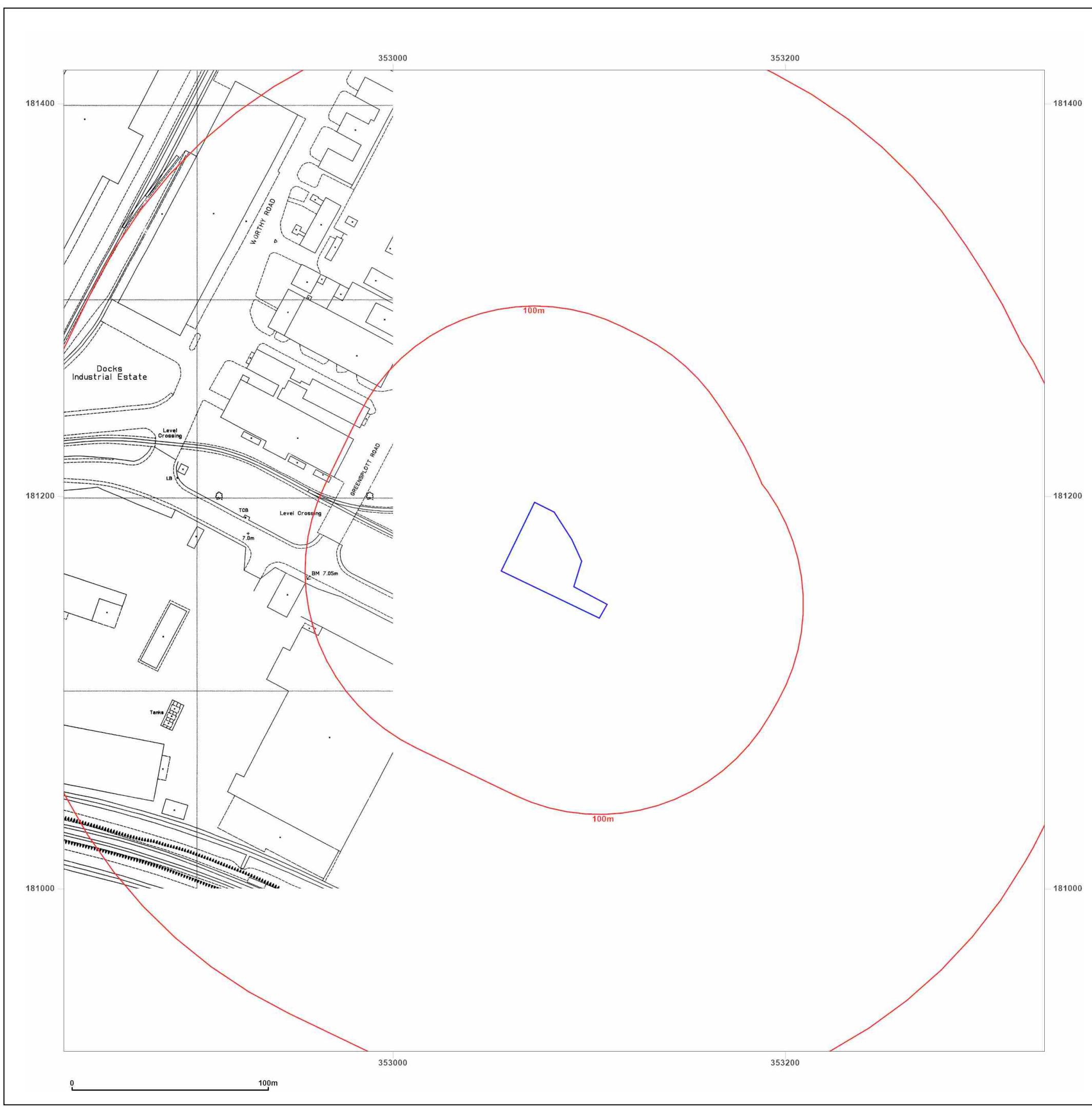


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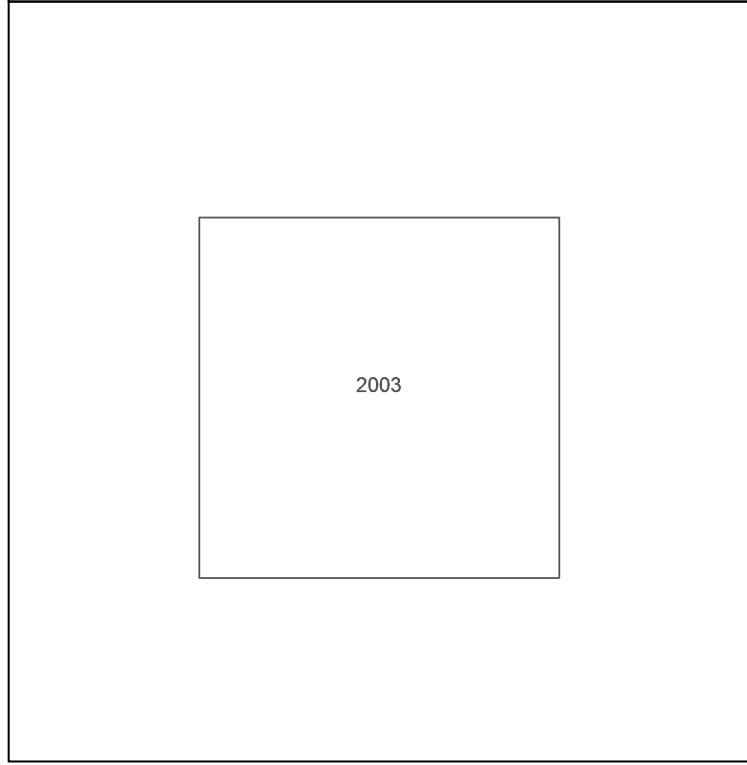
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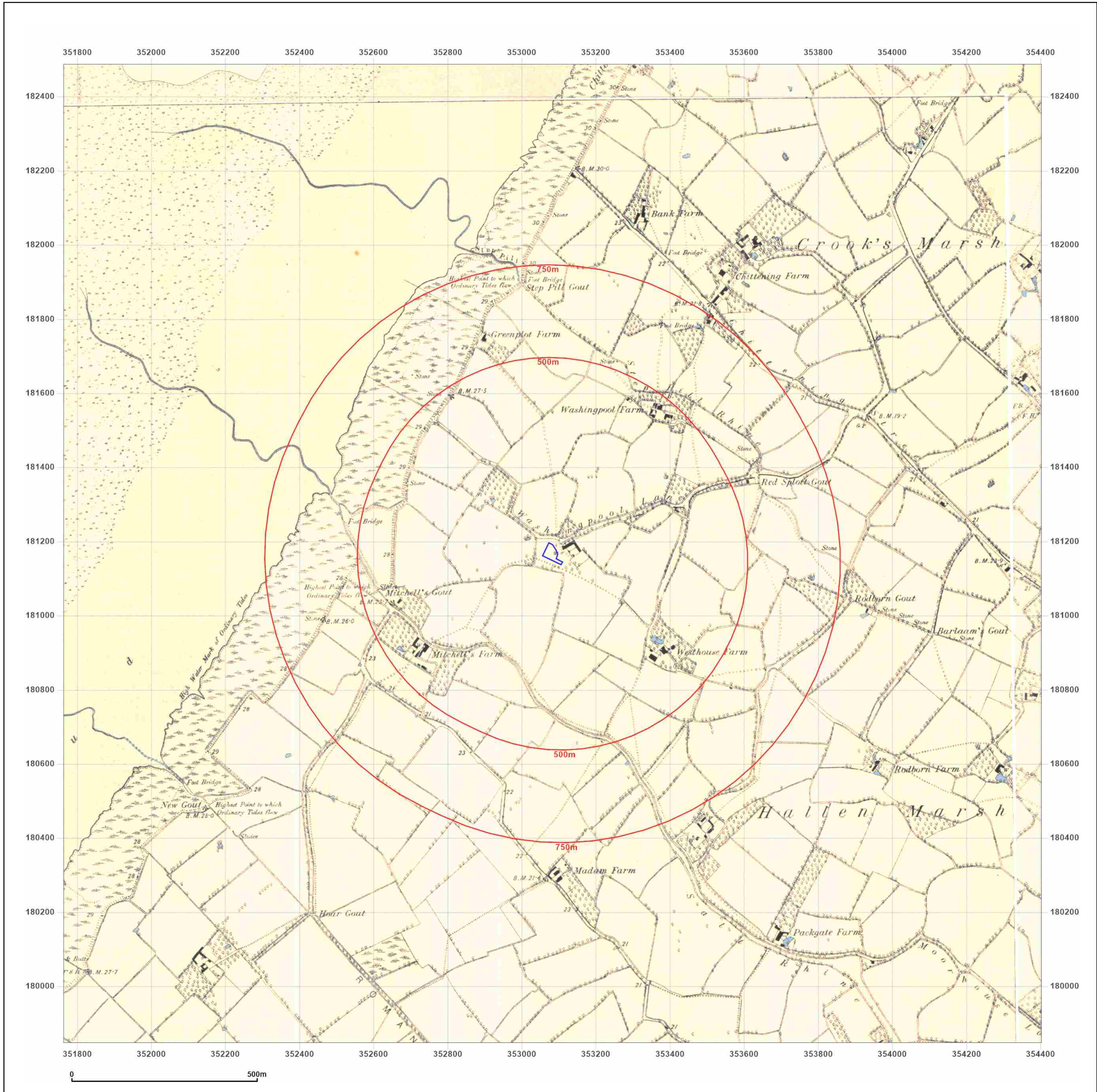


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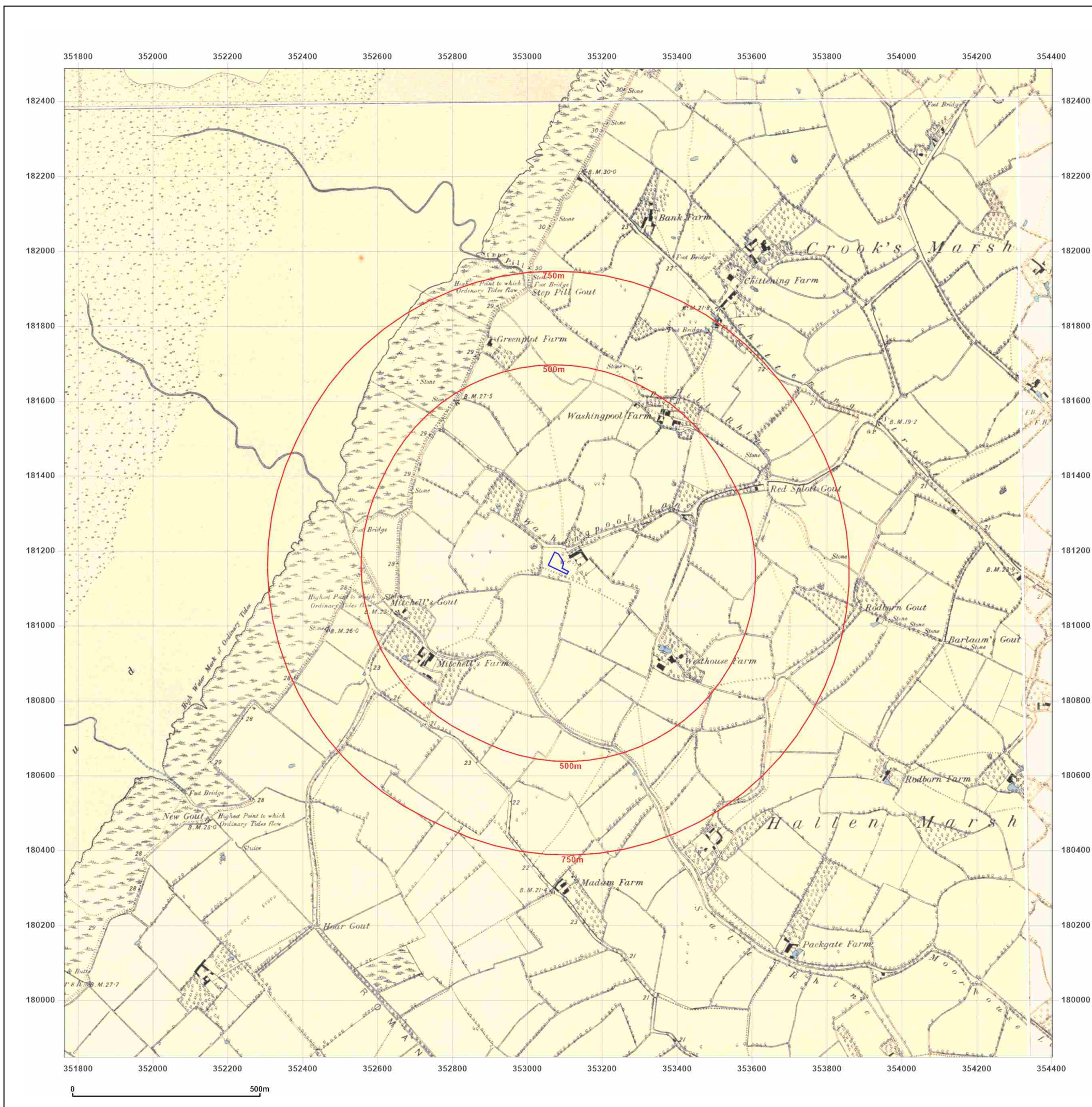


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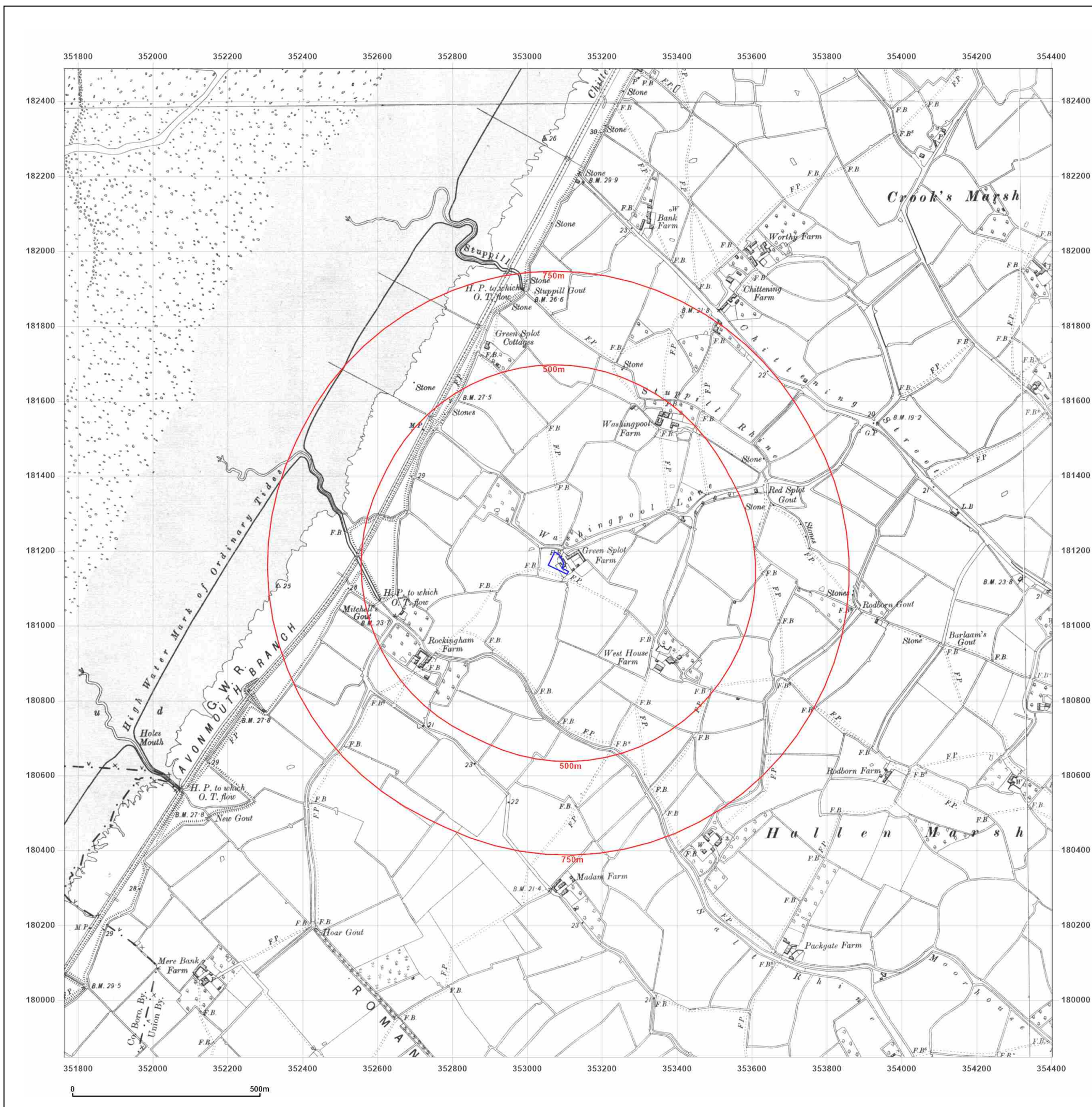


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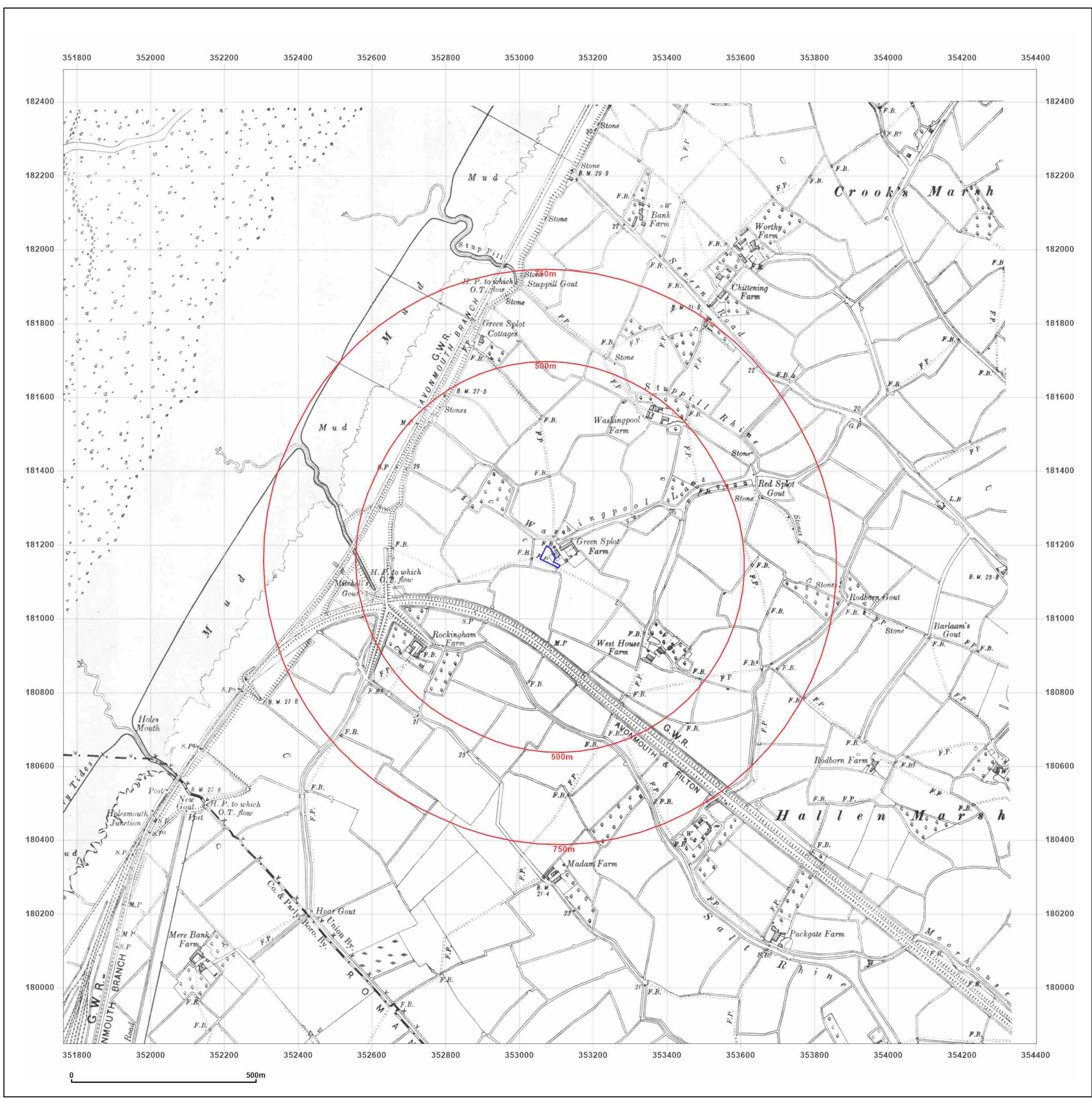


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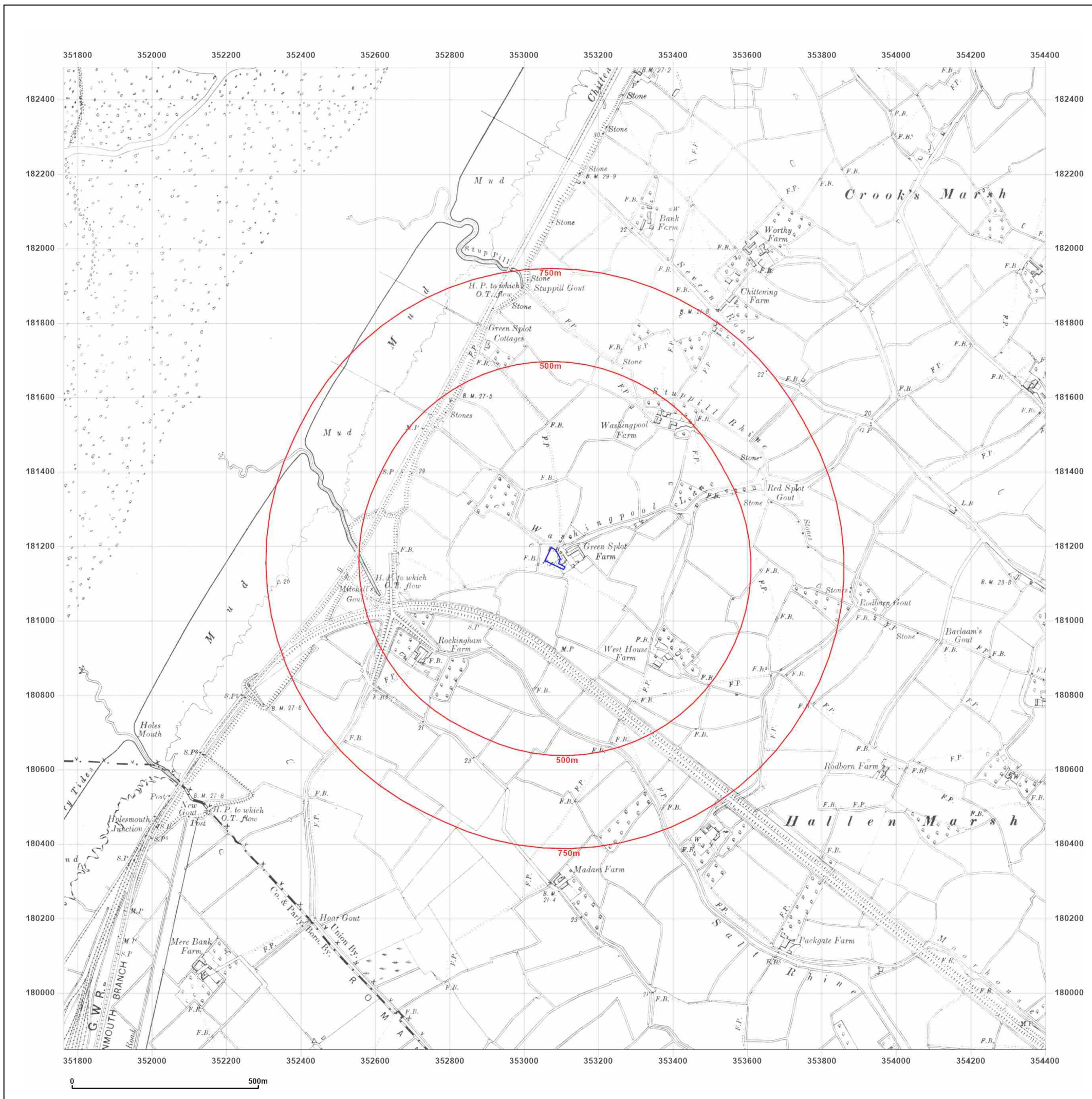


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**Site Details:**

Avonmouth

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**Report Ref:** GS-8137911  
**Grid Ref:** 353082, 181167

**Map Name:** County Series

**Map date:** 1935-1938

**Scale:** 1:10,560

**Printed at:** 1:10,560



Surveyed 1880  
 Revised 1938  
 Edition N/A  
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Surveyed 1879  
 Revised 1935  
 Edition N/A  
 Copyright N/A  
 Levelled N/A

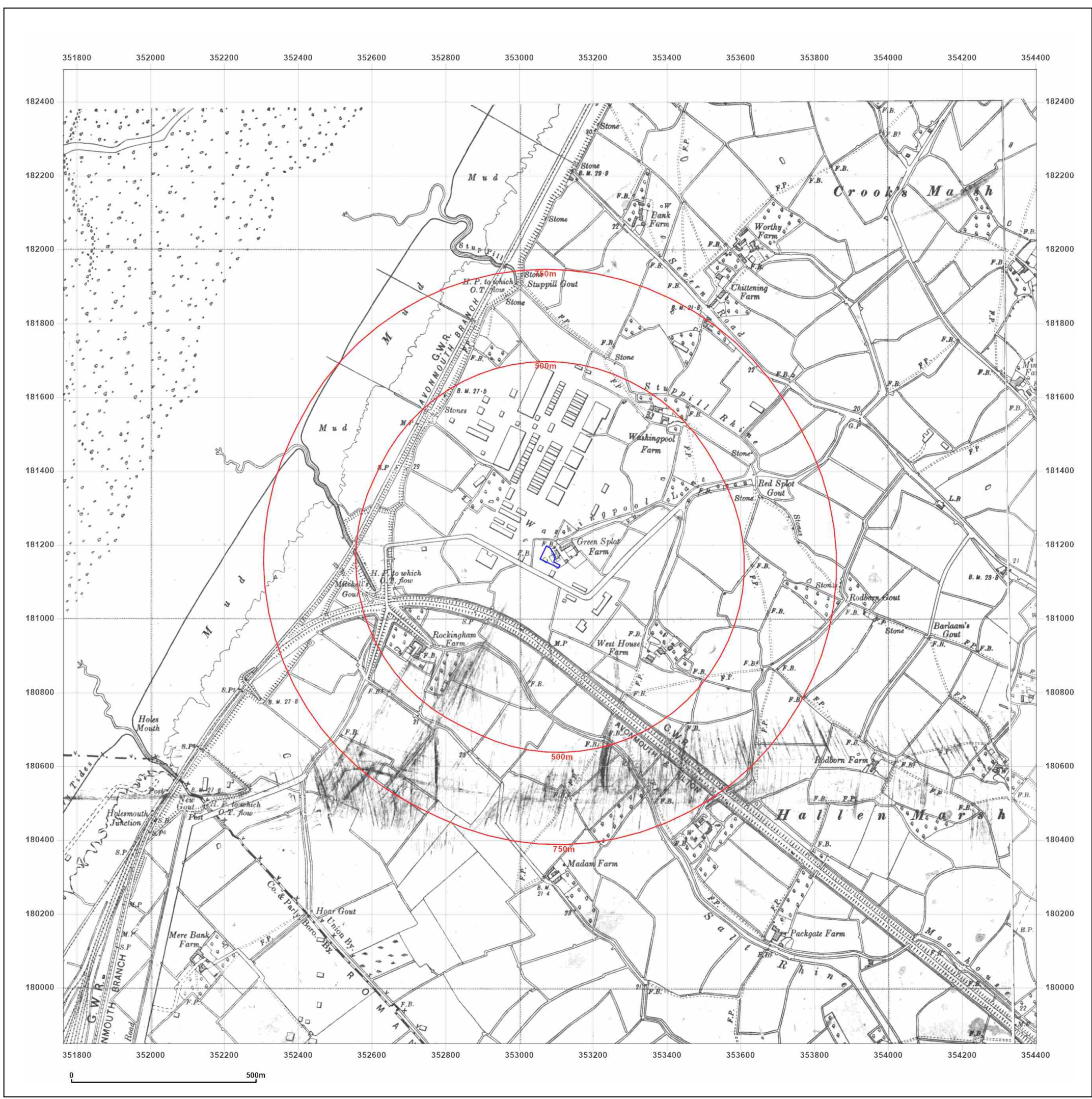


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**Site Details:**

Avonmouth

**Client Ref:** 16-10459-000  
**Report Ref:** GS-8137911  
**Grid Ref:** 353082, 181167

**Map Name:** Provisional

**Map date:** 1954-1955

**Scale:** 1:10,560

**Printed at:** 1:10,560



Surveyed N/A  
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 Edition 1955  
 Copyright N/A  
 Levelled N/A

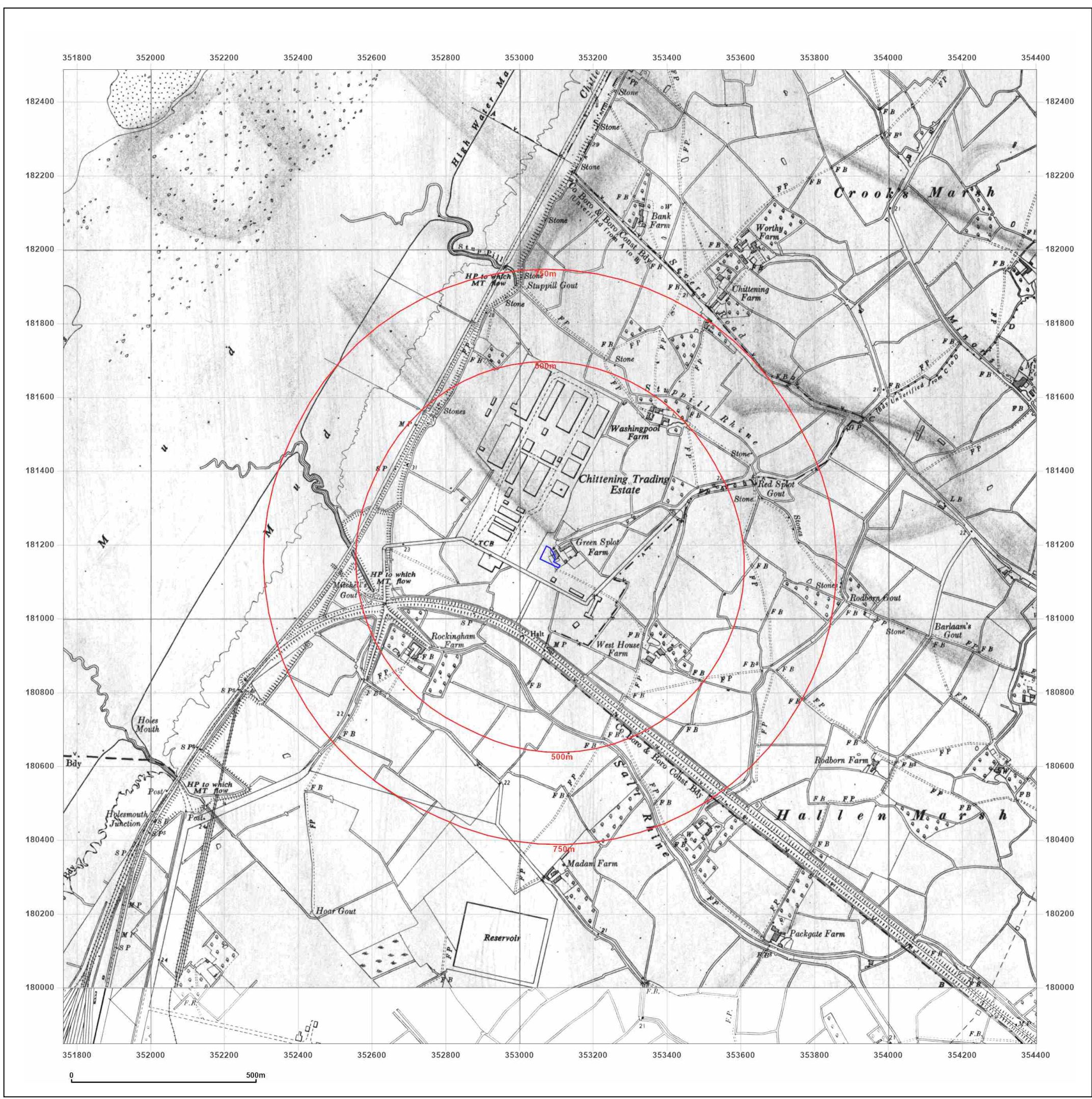


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**Site Details:**

Avonmouth

**Client Ref:** 16-10459-000  
**Report Ref:** GS-8137911  
**Grid Ref:** 353082, 181167

**Map Name:** Provisional

**Map date:** 1964

**Scale:** 1:10,560

**Printed at:** 1:10,560



Surveyed N/A  
 Revised 1964  
 Edition N/A  
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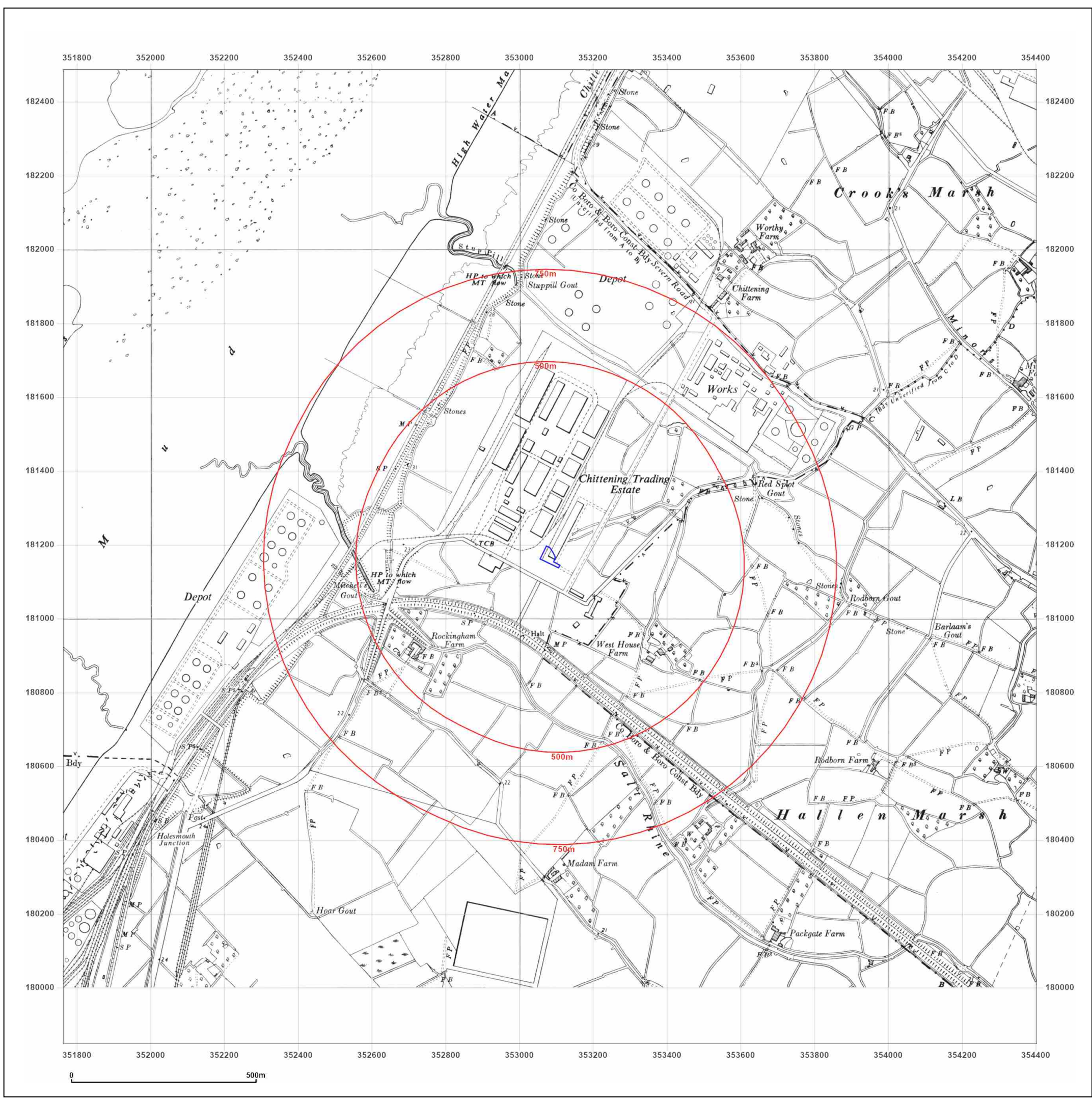


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**Site Details:**

Avonmouth

**Client Ref:** 16-10459-000  
**Report Ref:** GS-8137911  
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**Map Name:** National Grid

**Map date:** 1973

**Scale:** 1:10,000

**Printed at:** 1:10,000



Surveyed 1971  
 Revised 1973  
 Edition N/A  
 Copyright N/A  
 Levelled N/A

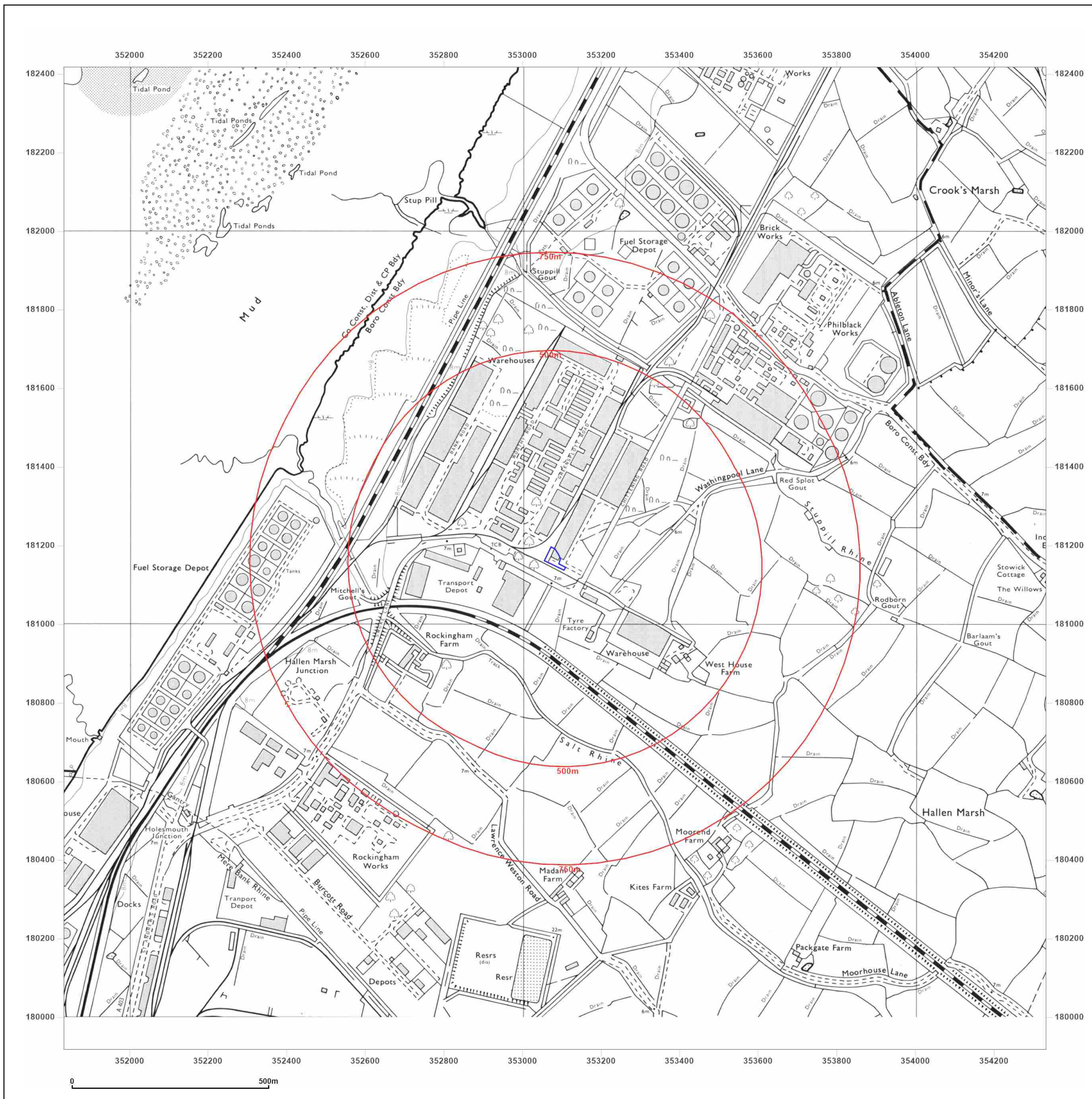


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**Site Details:**

Avonmouth

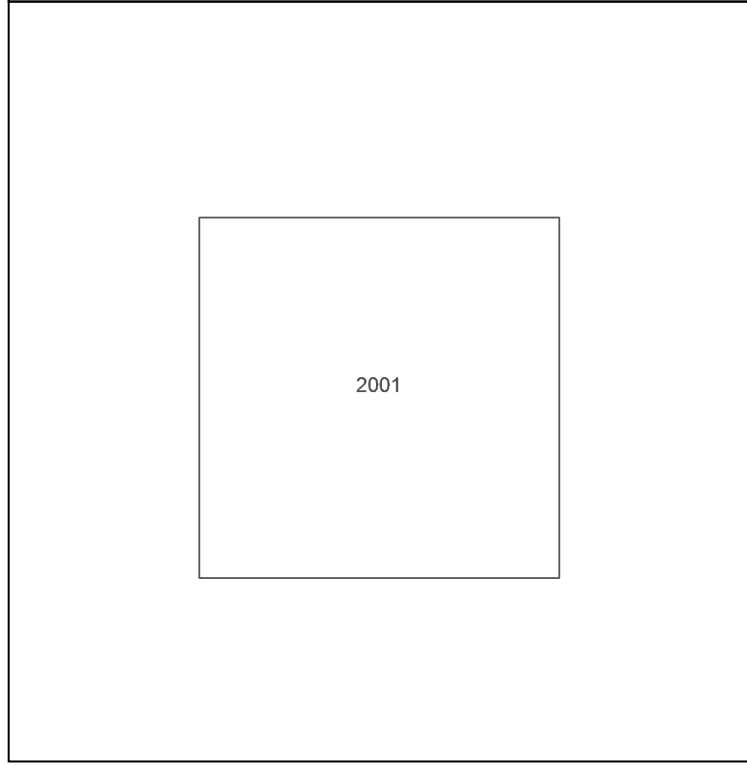
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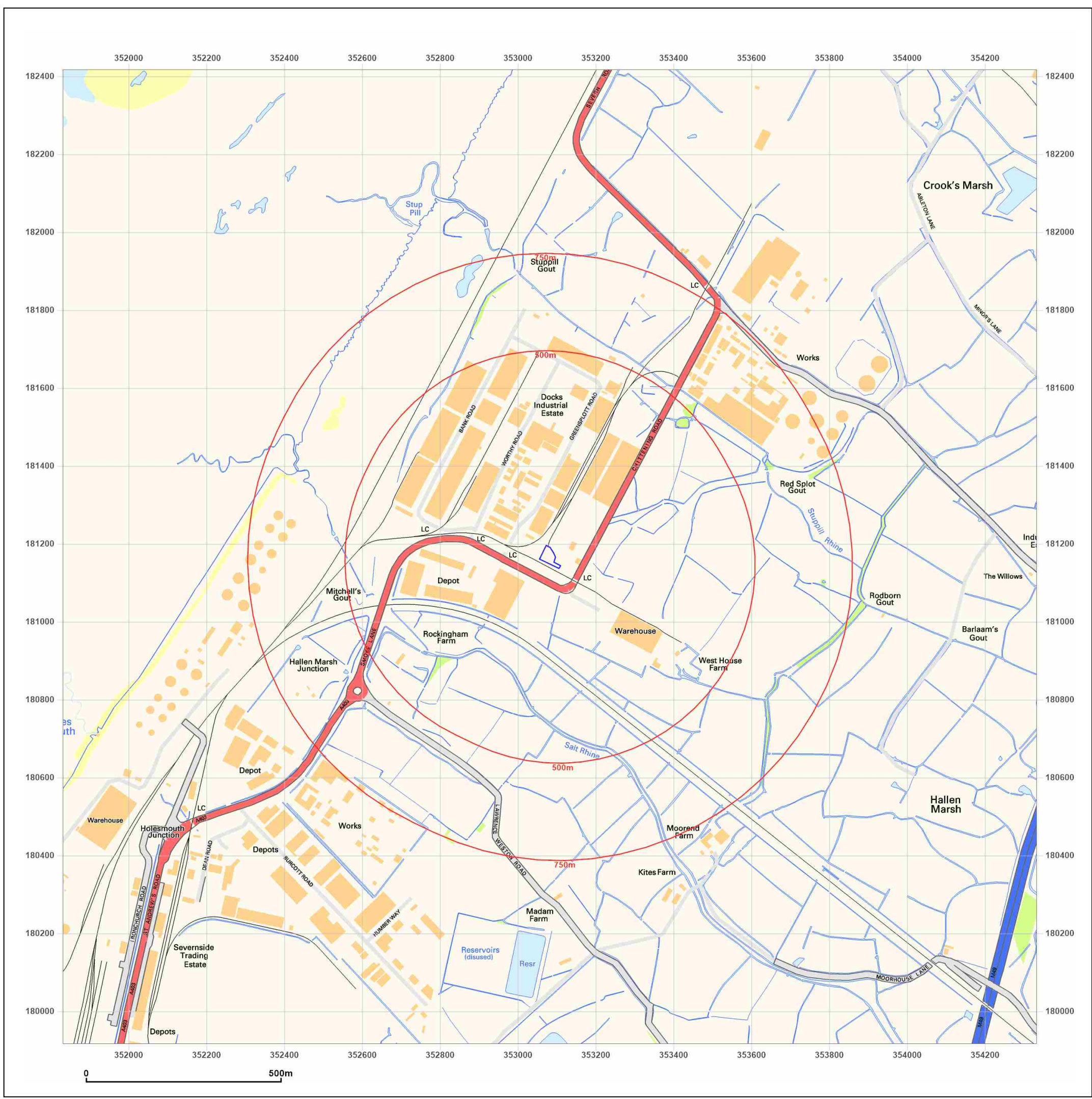


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**Site Details:**

Avonmouth

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**Report Ref:** GS-8137911  
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**Map Name:** National Grid

**Map date:** 2010

**Scale:** 1:10,000

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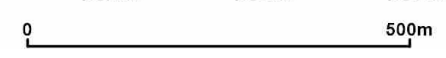
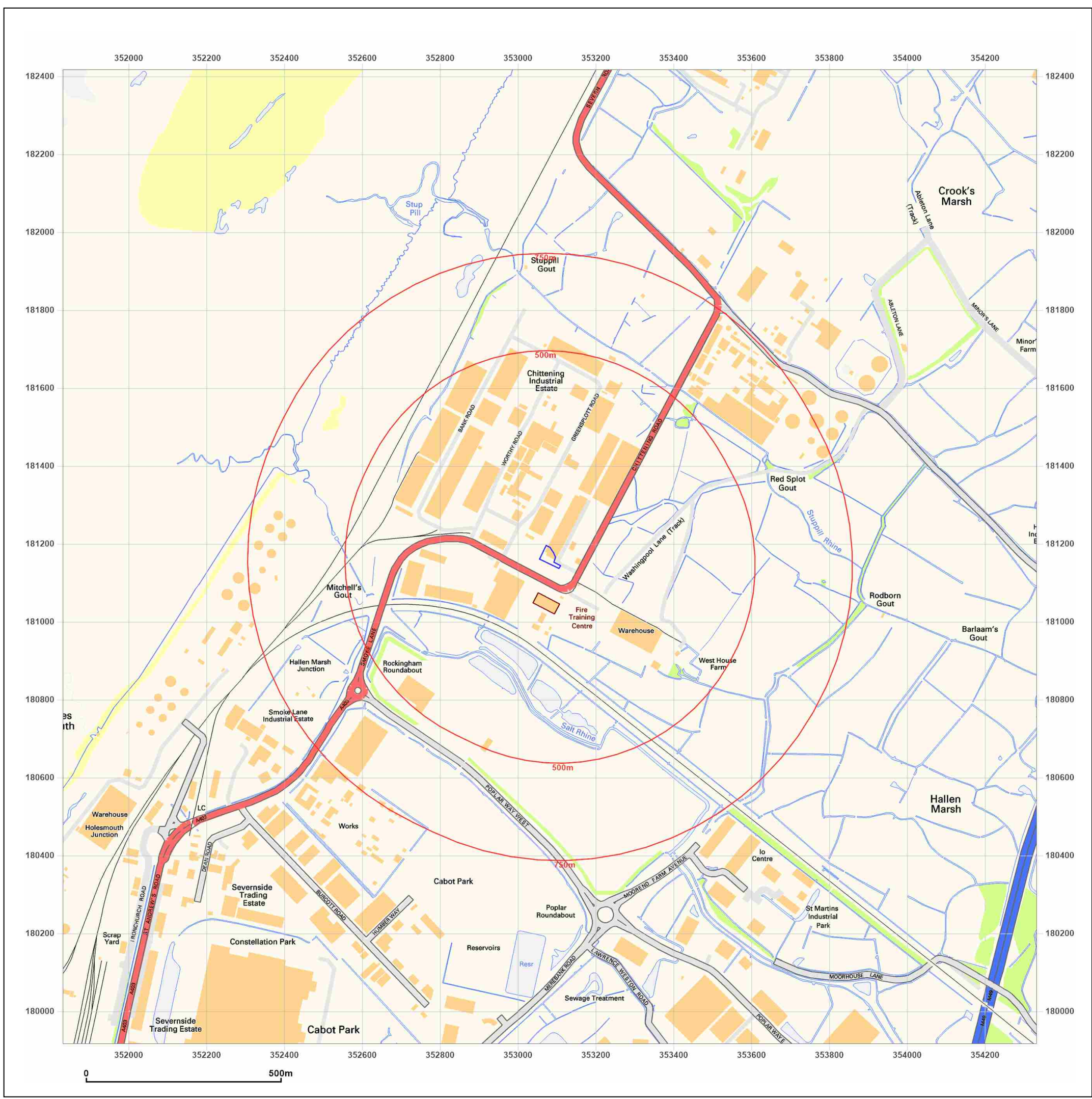


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**Site Details:**

Avonmouth

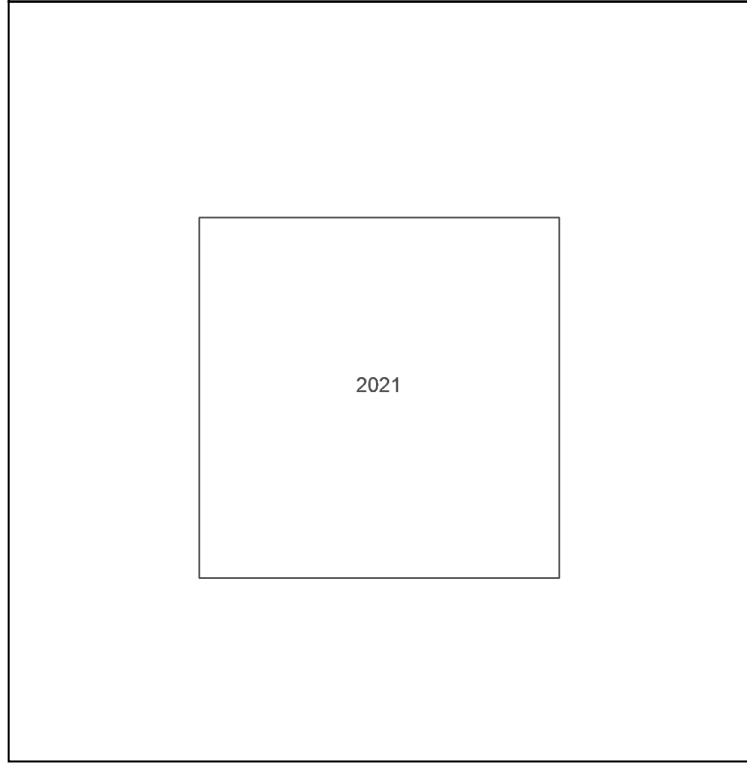
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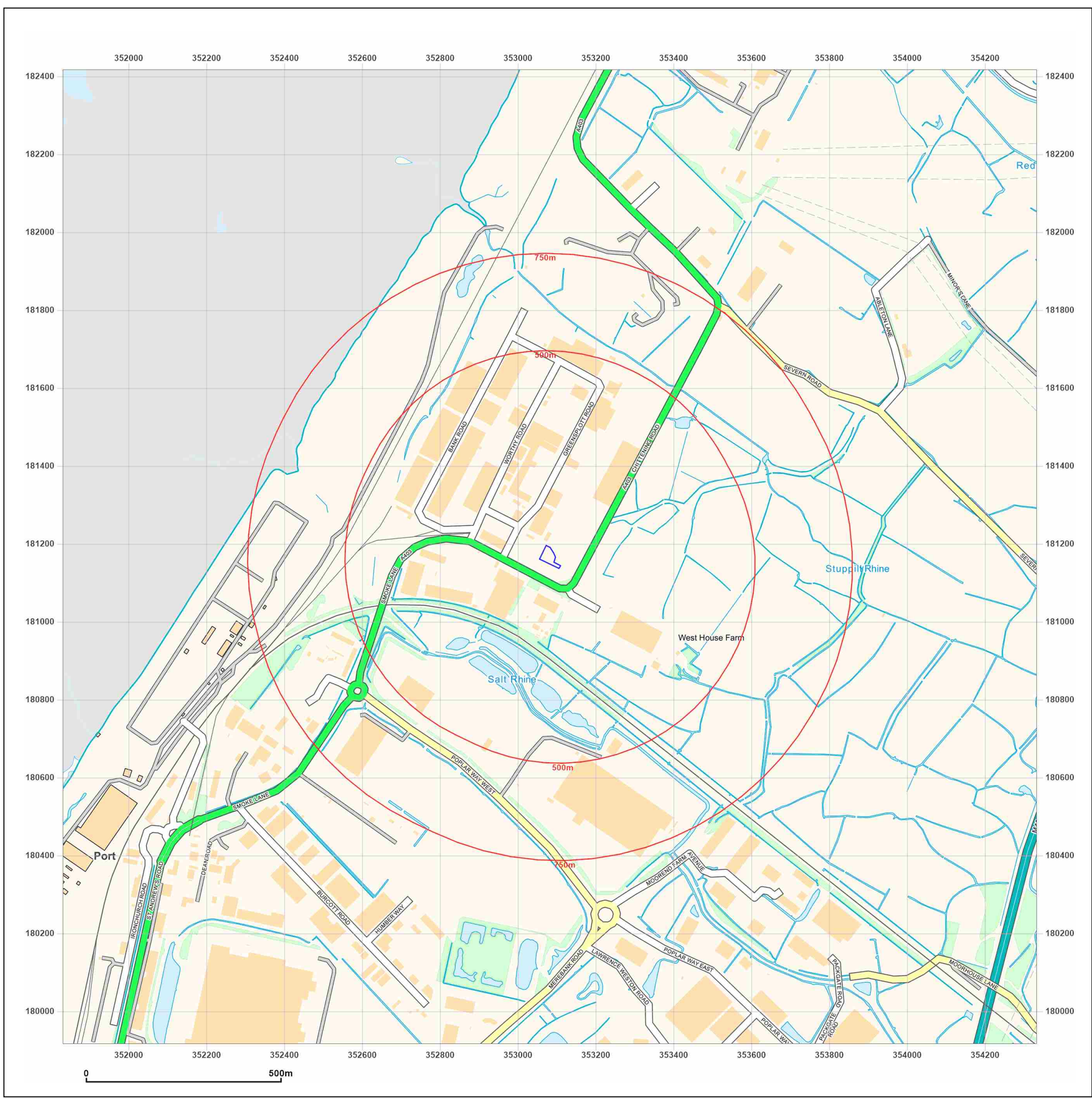


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# Site Condition Report

**Avonmouth Waste Management Centre  
Version 1**



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<b>1.0 SITE DETAILS</b>	
Name of the applicant	Veolia ES (UK) Limited
Activity address	Avonmouth Waste Management Centre Estuary Park, Chittening Road, Avonmouth, Bristol BS11 0YB
National grid reference	ST 53086 81166
Document reference and dates for Site Condition Report at permit application and surrender	Permit Application Supporting Statement (March 2022)  Phase 1 Report: BryneLooby (report ref: 14-K6027-GEO-R000 dated 21st September 2021)  Phase 1 Report: Terraconsult (Bristol Resource Recovery Facility and Depot, Avonmouth, report ref. 10506/R01 Issue 1 dated November 2019)  Interpretative Report on Site Ground Investigation: Balfour Beatty (report ref: 729873 dated August 2015)
Document references for site plans (including location and boundaries)	Permit Application Supporting Statement (March 2022): Appendix A

<b>2.0 Condition of the land at permit issue</b>	
<p>Environmental setting including:</p> <ul style="list-style-type: none"> <li>• geology</li> <li>• hydrogeology</li> <li>• surface waters</li> </ul>	<p><b>2.1 Geology</b></p> <p><b>2.1.1 Anticipated Ground Conditions and Permeability</b></p> <p>The anticipated superficial deposits, underlying solid geology and recorded Made Ground within 250m of the site are summarised below:</p> <ul style="list-style-type: none"> <li>• <b>Made/Artificial Ground:</b> No Made Ground is recorded within the Groundsure report. Made Ground comprising a surface layer of concrete slab was encountered during the site walkover, and a surface covering of asphalt was noted within the previous Phase 1 report. A Made Ground comprising a sandy, silty gravel of limestone was encountered in previously drilled boreholes BH6 and TP12 to depths of 0.50mbgl and 0.47mbgl, which is likely to be present on this site as well.</li> <li>• <b>Superficial Deposits:</b> The site is underlain by Tidal Flat Deposits comprising clay and silt. Estuarine Alluvium was also encountered in previously drilled boreholes to 14.70mbgl which is anticipated to also be present on this site. Tidal Flat Deposits have a low to very low permeability with an intergranular flow type.</li> <li>• <b>Solid Geology:</b> Superficial deposits are underlain by the Mercia Mudstone Group comprising mudstone and halite-stone. This is confirmed in the previous report to depths of 25.00mbgl. Low permeability with a fracture flow type.</li> <li>• <b>Faults:</b> None recorded.</li> </ul> <p><b>2.1.2 Previously Encountered Ground Conditions</b></p> <p>Information regarding previously encountered ground conditions by Balfour Beatty Investments Ltd (report ref. 729873R1, dated August 2015) which is discussed in the previous Phase 1 report (Bristol Resource Recovery Facility and Depot, Avonmouth, report ref. 10506/R01 Issue 1 dated November 2019) are summarised below:</p> <ul style="list-style-type: none"> <li>• <b>Asphalt:</b> BH1, BH2, BH5, BH6, TP1TP4, TP11, TP12 at 0.05 to 0.11m thickness</li> <li>• <b>Made Ground:</b> All locations at 0.30 to 1.82m thickness</li> <li>• <b>Tidal Flat Deposits:</b> BH1-BH6, TP1-TP7, TP9, TP11, TP12 at 4.60 to 6.10m thickness</li> <li>• <b>Estuarine Alluvium:</b> BH1-BH6 at 7.00 to 10.30 thickness</li> </ul> <p><b>2.2 Hydrogeology</b></p> <p><b>2.2.1 Aquifers</b></p>

	<p>Information regarding aquifers beneath the site is presented in below.</p> <ul style="list-style-type: none"> <li>• Superficial Deposits: On site - Unproductive.</li> <li>• Solid Geology: On site - Secondary B Aquifer.</li> </ul> <p>2.2.2 Abstraction licences</p> <p>Non recorded</p> <p>2.2.3 Source Protection Zones and Groundwater Vulnerability</p> <p>Information regarding source protection zones (SPZs) and groundwater vulnerability within 250m of the site are presented below:</p> <ul style="list-style-type: none"> <li>• SPZs - None recorded.</li> <li>• SPZs within Confined Aquifers - None recorded.</li> <li>• Groundwater Vulnerability and Leaching Potential: On site - Secondary bedrock aquifer; low vulnerability and high leaching class.</li> </ul> <p><b>2.3 Hydrology</b></p> <p>2.3.1 Detailed River Network and Surface Water Features</p> <p>Information regarding river networks and surface water features within 250m of the site is summarised below:</p> <ul style="list-style-type: none"> <li>• Ordnance Survey MasterMap Water Network: 84-244m east, northeast, south and south-west - Inland river not influenced by normal tidal action (26 records). 239m south-west - Lake, loch or reservoir.</li> <li>• Surface Water Features: Within 250m - 9 records; no further details given.</li> <li>• Water Framework Directive (WFD) Surface Water Body Catchments: On site - Lower Severn Vale, coastal catchment. Water body ID 139.</li> <li>• WFD Surface Water bodies - None recorded.</li> <li>• WFD Groundwater bodies: On site - Avonmouth Mercia Mudstone. Water body ID GB40902G30100 (2 records).</li> </ul>
<p>Pollution history including:</p> <ul style="list-style-type: none"> <li>• pollution incidents that may have affected land</li> <li>• historical land-uses and associated contaminants</li> <li>• any visual/olfactory evidence of existing contamination</li> <li>• evidence of damage to pollution prevention measures</li> </ul>	<p>Bristol and Region Archaeological Services provided Structural Soils Limited with a series of map excerpts including a 1918 Plan of National Filling Factory No. 23, Chittingen Road from the National Archive. (PRO MUN 4/1753) (contained in Appendix H). It records that the site was formerly within the bounds of a First World War munitions a filling factory (National Filling Factory No. 23). As is common for militarily sensitive sites there is no record of the facility on the Ordnance Survey Mapping of the period.</p> <p>Research into the history of the site suggests that the wider site may have been the location of the original Avonmouth mustard gas factory, construction of which started in 1916/7 and terminated in April 1918 before those activities were relocated to another site in Avonmouth to the south of Kingsweston Lane. After this time the Chittingen</p>

	<p>facility was converted for the filling of shells, and principally mustard gas shells.</p> <p>The factory ceased work following the cessation of hostilities and little appears to be known of the history until the Chittening Industrial Estate was developed after the Second World War. This development re-used a number of the pre-existing structures and was heavily influenced by the layout of the factory.</p> <p>Although within the perimeter of the filling factory, the site was peripheral to the main operation areas. The structures of the Greensplot Farm buildings remain extant on the site throughout this period and are clearly still present and apparently in good condition on the 1946 aerial photography (<a href="http://maps.bristol.gov.uk/knowyourplace/">http://maps.bristol.gov.uk/knowyourplace/</a>), at a time when the filling factory appears largely unused.</p> <p>Structures on the study site relating to the former filling factory are limited to the presence of a store building which straddles the north-eastern site boundary, and the potential presence of sidings/rail infrastructure in a narrow strip adjacent to the north-western site boundary.</p> <p>A petroleum license search was undertaken for the site with the Environmental Protection Team at Bristol City Council. The search returned no records.</p> <p>Potential Sources of Contamination Potentially contaminative land uses identified from the Phase 1 desk study are summarised below:</p> <ul style="list-style-type: none"> <li>• Historical Site Use: Trading estate, railway sidings, unspecified commercial/ industrial, agricultural buildings, historical NIHHS site.and Chittening, circa WW1 activities include National Filing Factory (chemical), charging and assembling 6-inch chemical shell.</li> <li>• Current Site Use: Open area of commercial/ industrial land.</li> <li>• Historical Land Use / Features Within Vicinity: Tanks, Chittening, circa WW1 activities include National Filing Factory (chemical), charging and assembling 6-inch chemical shell, vehicle depollution facility, waste transfer station, waste exemptions, electricity substations, railway sidings, respraying road vehicles, Hazardous Substance Consents and Enforcements and minor air impact pollution incidents.</li> <li>• Current Land Use Within Vicinity: Rail and multitrack, vehicle hire and rental, electricity substations, industrial repairs and servicing, lifting and handling equipment, tanks, recycling centres, distribution and haulage, stone quarrying and preparation, SSSI Impact Risk Zone, and coastal and floodplain grazing habitat.</li> </ul>
<p>Evidence of historic contamination, for example, historical site investigation, assessment, remediation and verification reports (where available)</p>	<p>Phase 1 Report: BryneLooby (report ref: 14-K6027-GEO-R000 dated 21st September 2021)</p> <p>Phase 1 Report: Terraconsult (Bristol Resource Recovery Facility and Depot, Avonmouth, report ref. 10506/R01 Issue 1 dated November 2019)</p>



	Interpretative Report on Site Ground Investigation: Balfour Beatty (report ref: 729873 dated August 2015)
Baseline soil and groundwater reference data	see above

<b>3.0 Permitted activities</b>	
Permitted activities	<p>This application is to apply for a new permit with the following listed activities:</p> <p>Section 5.6 A(1)(a) - Temporary storage of hazardous waste with a total capacity exceeding 50 tonnes pending recovery or disposal. WFD Annex I and II references: D15 and R13</p> <p>Section 5.3 A(1)(a)(iv) - Disposal or recovery of hazardous waste with a capacity exceeding 10 tonnes per day involving repackaging. WFD Annex I and II references: D14 and R12</p> <p>The following Directly Associated Activities will be included:</p> <p>Raw materials storage Surface water management and collection</p> <p>The following Waste Activities will be included:</p> <p>Storage of non-hazardous waste Repackaging of non-hazardous waste</p>
Non-permitted activities undertaken	n/a
<p>Document references for:</p> <ul style="list-style-type: none"> <li>● plan showing activity layout; and</li> <li>● environmental risk assessment.</li> </ul>	<p>Permit Application Supporting Statement: March 2022 – Appendix A (Site Plans)</p> <p>Permit Application Supporting Statement: March 2022 – Appendix C (Environmental Risk Assessment)</p> <p>Permit Application Supporting Statement: March 2022 – Appendix F (Site Condition Report and Updated Phase 1 assessment – ByrneLooby:2021)</p>

<b>4.0 Changes to the activity</b>	
<b>Have there been any changes to the activity boundary?</b>	
<b>Have there been any changes to the permitted activities?</b>	
<b>Have any 'dangerous substances' not identified in the Application Site Condition Report been used or produced as a result of the permitted activities?</b>	
<b>Checklist of supporting information</b>	

<b>5.0 Measures taken to protect land</b>	
<b>Checklist of supporting information</b>	

<b>6.0 Pollution incidents that may have had an impact on land, and their remediation</b>	
<b>Checklist of supporting information</b>	



<b>7.0 Soil gas and water quality monitoring (where undertaken)</b>	
<b>Checklist of supporting information</b>	

<b>8.0 Decommissioning and removal of pollution risk</b>	
<b>Checklist of supporting information</b>	

<b>9.0 Reference data and remediation (where relevant)</b>	
<b>Checklist of supporting information</b>	

<b>10.0 Statement of site condition</b>