

COWM TOP, CASTLETON.

**Preliminary
PHASE I & PHASE II
Contamination and Geotechnical Assessment**

For: GLP Ltd & Barratt Homes.

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1. Introduction

1.1. Smith Grant LLP (SGP) was instructed by GLP Ltd & Barratt Homes to undertake a Stage 1 Geoenvironmental Appraisal of a parcel of land to the north of Trows Lane Farm, Castleton, Rochdale. Following SGP's report on the site in January 2016 (reference R2228-R01-v1), SGP has been further instructed by GLP Ltd & Barratt Homes to undertake a Phase II Ground Investigation and subsequent Contamination and Geotechnical Assessment. Site details are:

Table 1.1: Site details

Address	Land to north of Trows Farm, Trows Lane, Castleton, OL11 2UF
National Grid Reference	389188, 410262
Local Authority	Rochdale Borough Council
Site Area	Approximately 20 Ha
Current Nature of Site	Open fields use for grazing
Site Access	Off Trows Lane via Trows Farm from south or Cripple Gate Lane from north
Proposed use	Residential development

Figure 1.1: Site Location



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1.2. This report has been produced to identify potential constraints to redevelopment associated with ground conditions at the site and within the surrounding environs. The report describes the findings of Phase I Ground Contamination Assessment (Desk Study) and following Phase II Ground Investigation carried out by SGP, the ground conditions encountered and discusses their implications with regard to the proposed development based on the findings of the desk study, fieldwork and subsequent laboratory testing. The report methodology follows the

framework described in the EA / DEFRA Contaminated Land Report 11: 'Model Procedures for the Management of Land Contamination 2004', BS 5930:2015 Code of Practice for Ground Investigations.

- 1.3. This report also considers potential constraints to redevelopment resulting from physical ground conditions and stability. The assessment relies on information on ground conditions based on limited preliminary site investigation and laboratory.
- 1.4. The assessment comprises a review of readily available information on the environmental setting, the historical development of the site and surrounding land, along with a subsequent Phase II ground investigation and laboratory testing results. This report contains a qualitative and quantitative risk assessment and where appropriate makes recommendations for further investigations appropriate to the current use and future development.

2. Information Sources

2.1. The principle sources of information consulted in the preparation of this report include:

reference and date	author and source	purpose and information content
Topography, geology, hydrogeology and hydrology		
Explorer Sheet 277: Manchester & Salford 2007	Ordnance Survey (OS), Explorer Map, 1:25,000	general mapping information including topography, ground features, rights of way, communications, water features, etc.
http://mapapps.bgs.ac.uk/geologyofbritain/home.html 2015	British Geological Survey (BGS)	distribution of geological units at surface and depth and borehole database records
http://mapapps.bgs.ac.uk/geologyofbritain/home.html?mode=boreholes 2015	British Geological Survey (BGS)	Scanned borehole logs
77317590_1_1 2015	Landmark Information Group	Information relevant to ground stability hazards including mining and natural cavities data, historical land use, ground stability data and ground movement
51001057857001 2015	The Coal Authority	Information and past and present underground, shallow and open cast mining, locations of mine entries, coal mining subsidence claims, and mine gas emissions
http://maps.environment-agency.gov.uk/wiyby/wiybyController?ep=maptopics&language=e 2014	Environment Agency	Aquifer designations, groundwater Source Protection Zones and details of abstractions
HPA-RPD-033: Indicative Radon Atlas of England and Wales 2007	Health Protection Agency	mapping defining radon affected areas in England & Wales

reference and date	author and source	purpose and information content
Historical data		
77317590_1_1 2015	Landmark Information Group	historical mapping at various scales scale from 1849 onwards
Aerial/satellite photography 2000-2013	Various sources	Historical images of site from 2003 & 2006
http://maps.environment-agency.gov.uk/wiyby/wiybyController?ep=maptopics&language=en 2014	Environment Agency	Historical landfills
Environmental Sensitivity		
77317590_1_1 2015	Landmark Information Group	Information on Environment Agency and hydrogeological records, waste, hazardous substances, geology, industrial land use and sensitive land uses
http://maps.environment-agency.gov.uk/wiyby/wiybyController?ep=maptopics&language=en 2016	Natural England	general information on watercourses, groundwater source protection zones and vulnerability, pollution and landfills
www.magic.gov.uk 2016	DEFRA	web-based interactive map containing information on nature conservation areas

2.2. Previous Site Investigations and Consultations

2.2.1. SGP has used a sketch plan of the site boundary provide by GLP Ltd & Barratt Homes. for the purposes of defining the site boundary; all referenced features in relation to the site boundary (including those in the attached Envirocheck and Coal Authority search reports) are therefore approximate. Attached drawings are indicative only and should not be scaled or used for design purposes. "Drawing D01- Site Layout and Ground Investigation Locations" shows the site features as shown on the most recent OS mapping available at the time of writing.

2.2.2. SGP is unaware of any site investigations having been undertaken at the site. SGP has not carried out any consultations with the Local Authority, the Animal & Plant Health Agency, Environment Agency or other regulatory bodies.

2.2.3. SGP carried out a brief consultation with the current site owner, who advised that the site had remained farmland throughout its' recent history as far as they were aware, and had not been subject to potentially contaminative land uses or waste disposal.

2.2.4. SGP has requested plans from the relevant utility providers regarding the major energy infrastructure observed on the site. Utility and services plans including water supplies, drainage or communications equipment were received prior to the Phase II intrusive ground investigation.

2.3. Site Inspection

2.3.1. A preliminary inspection of the site was carried out by Ben Thomas (Partner) of SGP on the 21st December 2015. The inspection was limited to areas visible from viewpoints around the west and north site boundaries.

2.3.2. A second, comprehensive inspection of the site was carried out immediately prior to Phase II site investigation by Ben Thomas (Partner) and C.Salwa (Consultant) of SGP on the 28th June 2016. During the investigation SGP were provided with anecdotal evidence from the landowner that two small tips existed in the central northern parts of the site.

3. Development History and Current Status

3.1. Historical Uses

3.1.1. A summary of significant historical features, developments, and land uses identified is provided in Table 1 below.

Table 1: Summary of Relevant Development History

Map	Site	Surrounds
1851 1:10,560 Drawing D02	The site is divided into several fields and a lane/pathway crosses from a central part of the southern boundary to a building in the north east corner of the site annotated 'Grange Barn'. In the southwest of the site it appears that a building straddles the southern boundary. Lower Trows Lane runs along the inside of the western boundary and Cripple Gate Lane runs along the inside of the northern boundary.	Fields surround the site to the north, west, east and southeast of the site. To the south west of the site 'Trows' and 'Higher Trows' are annotated indicating the presence of a water body. A lane also runs parallel to the western part of the southern border beyond which is the presence of a small collection of buildings approximately 15m from the site boundary. Bordering the centre of the southern boundary is a small collection of buildings and a pond beyond which, 40m from the site, is 'Grange Mill Print Works'.
1890-93 1:2,500	The building which straddles the southern boundary appears to be part of 'Trows Farm'.	The buildings mapped previously which lie adjacent to the southern boundary are annotated 'Trows Farm' and 'The Grange' appearing to be either residential properties or farmhouses. 'Trows House' is now indicated bordering the southwest of the site. Beyond 'Trows Lane' directly to the south of the site a reservoir is mapped. Further reservoirs and 'Mill pond' lie in close proximity to the centre and eastern parts of the southern boundary, bordering the site in some locations. The buildings 15m to the southwest of the site appear to be part of 'Castleton Print Works' which also appear to incorporate the former 'Grange Mill Print Works'. Within the vicinity of these buildings a tank is annotated 120m to the southwest of the site. An 'Old Gravel Pit' is mapped 40m to the northwest of the site.
1894	No significant changes to site.	No significant changes to site.

Map	Site	Surrounds
1:10,560		
1910 1:2,500	A feature that appears to be a pond is situated near the northern boundary in the centre of the site.	The 'Castleton Print Works' are now annotated as 'disused'. The circular feature bordering the south of the site is now labelled as a reservoir. The reservoirs to the south of the site appear to be fed by two streams coming from the east and south east. The reservoirs then appear to discharge westwards via a stream along which, 140m to the southwest of the site, is a building labelled 'Filter Tanks'. The stream then flows towards Rochdale Canal. The 'Old Gravel Pit' to the northwest is now mapped as 'Old Sand Pit' and two other 'Old Sand Pits' are now present between 80 and 160m west of the site boundary. The tank 120m to the southwest of the site is no longer annotated. A tank is indicated 140m to the north east of the site just south of the property 'Top o' th' Hill'.
1910-1911 1:10,560 Drawing D03	No significant changes to site.	No significant changes to surrounds.
1929-1930 1:2,500	The property previously annotated 'Grange Barn' in the north east corner has been demolished. A small unidentified building is now present in the north west corner.	The 'Filter Tanks' are now labelled as 'Disused'. 40m south and 80m southwest of the site, to the east and south of the former 'Castleton Works' building tanks are indicated. To the west of the site two features which appear to be ponds are indicated 100m and 140m from the site boundary. A spring is mapped 140m to the east of the site. A sand pit is annotated 180m south of the site.
1931-32 1:10,560	No significant changes to site.	No significant changes to surrounds.
1937 1:10,560 1938 1:10,560	No significant changes to site.	The buildings 40m south of the site, formerly 'Grange Mill Print Works', are now referred to as 'Trows Upper Works (Engineering)' with an associated chimney. 200m to the southwest of the site a large area annotated 'Sand & Gravel Pits' is present.

Map	Site	Surrounds
		A second tank associated with the property 'Top o' th' Hill' is indicated 140m to the north east of the site. Residential development has expanded to the southwest of the site.
1938 1:10,560 Drawing D04	No significant changes to site.	No significant changes to surrounds.
1956 1:10,000 Drawing D05	No significant changes to site.	The 'Castleton Works' are no longer annotated as 'disused'. Markings indicative of significant residential development to the northeast are present.
1956 1:2,500	The pond feature to the north of the site appears to have been in-filled. Three springs are now annotated in the eastern part of the site one of which is situated in marshy ground towards the northeast of the site. An electricity pylon is indicated along the western boundary.	The reservoir directly to the southeast of the site appears to have shrunk with increased vegetation indicated in the area. The 'Castleton Works' buildings to the southwest of the site are labelled as 'Trows Die-casting Works' and 'Sheet Metal Works' and incorporates an electric sub-station. The tanks indicated to the east of these buildings in previous maps are now annotated as 'Old Tanks'. The 'Filter Tanks' building is now annotated as 'Engineering Works'. The 'Sand & Gravel Pits' to the southwest of the site have expanded and now includes a reservoir. Tanks are no longer indicated surrounding 'Top o' th' Hill'. A spring is mapped 60m to the east of the site. Significant residential development has occurred to the northeast and northwest of the site.
1965-1968 1:10,000	No significant changes to site.	Residential development has expanded to the northeast of the site.
1970 1:2,500 (limited mapping south of site)	No significant changes to site.	No significant changes to surrounds.
1975 1:1,250	Embankments are present along the eastern boundary which lead to a road adjacent to the	A dual carriageway and junction sliproads borders the site to the east, in a cutting.

Map	Site	Surrounds
(limited mapping southeast of site)	site.	To the south of the site another motorway with embankments is present running east to west. This road has been built over part of the 'Sand and Gravel Pits' noted to the southwest of the site in previous mapping. Residential development has expanded to the west and southwest of the site.
1975-1979 1:10,000 Drawing D06	No significant changes to site.	The sand pit annotated 180m south of the site beyond Thornham New Road in previous mapping is now described as 'Active Workings' and is surrounded by a number of ponds.
1983-1988 1:10,000 (limited mapping northwest of site) Drawing D07	No significant changes to site.	The 'Active Workings' to the south are now described as 'Disused Workings'. What remained of the 'Sand and Gravel Pits' to the southwest of the site appears to have been infilled and no development appears to have taken place over this area.
1992 1:1,250	The building which straddled the southern boundary in previous mapping no longer appears to encroach onto the site however another structure forming part of 'Trows Farm' does appear to be present.	'Trows Die-casting Works', the 'Sheet Metal Works' and the 'Engineering Works' to the south and southwest of the site are now generically described as 'Works' and 'Upper Works'. Residential development has expanded to the west of the site with properties lying adjacent to the western boundary.
1990-1993 1:10,000 (limited mapping south and northeast of site)	No significant changes to site.	No significant changes to surrounds.
2000 Satellite Imagery	The structure forming part of 'Trows Farm' in the southwest corner of the site no longer appears to be present.	No significant changes to surrounds.
2003 Satellite Imagery	No significant changes to site.	No significant changes to surrounds.
2005 Satellite Imagery	No significant changes to site.	No significant changes to surrounds.
2006	No significant changes to site.	No significant changes to surrounds.

Map	Site	Surrounds
1:10,000		
2013 Satellite Imagery	No significant changes to site.	Two large unidentified buildings are now present to the north at approximate distances of 120m and 200m from the site boundary.
2015 1:10,000	No significant changes to site.	No significant changes to surrounds.

3.1.2. Whilst there are some gaps in the historical map coverage it is considered that the available information provides adequate coverage of the development history of the site and its' immediate surroundings.

3.2. Current land condition

3.2.1. A summary of existing significant features noted during SGP's inspection and examination of contemporary records is presented below.

Table 3.2: Present Land Condition

Site Description	The site currently comprises open fields, divided by stock fencing. The fields are in use for grazing.
Access	Access to the various areas is gained from Trows Farm off Trows Lane
Boundaries	North: Stock fencing and hedgerows onto a public footpath/track known as Cripple Gate Lane. East: Stock fencing onto top of cutting for A627(M) road. South: Stock fencing and hedgerows onto Trows Lane or properties/land (Trows House, Trows Farm, The Grange) off Trows Lane. West: Stock fencing and hedgerows onto a public footpath to rear of adjacent housing.
Drainage	No surface water was observed on the site during the inspection which was carried out in winter during a period of wet weather and during site investigation carried out in June. A number of reservoirs are present to the south of the site over Trows Lane, occupying the base of a valley which appears to form the upper reaches, or a tributary of Trub Brook. A number of springs, and issues are mapped as arising on the site which appear to flow to the south to the ponds and reservoirs.
Rights of Way	SGP did not identify any public right of way crossing the site, although the site is readily assessable from the adjacent public footpaths to the west and north.
Structures	The only above ground structures visible or identifiable from contemporary satellite imagery is a dilapidated small building in the northwest corner of the site. The dwellings and outbuildings of Trows House, Trows Farm and the Grange all appear to lie outside the site boundary provided to SGP.

Services and Utilities	SGP noted warning signs and marker posts for a high pressure gas main near the western ends of the southern and northern site boundaries: a number of marker posts are also present within the site which appear to link these two locations, indicating the presence of a high pressure gas pipeline crossing the west of the site. The presence of high pressure gas main was confirmed with utility map. Two overhead electricity lines enter the site from the northeast corner and cross the northeast part of the site although the location where they exit the site to the east or south was not confirmed during the site walkover but observed on utility plan. However, the survey does not constitute a comprehensive utility services search and relies on information provided by third parties.
Industrial Land Use	There are no contemporary trade directory entries or indications of industrial use within the site itself. A small commercial estate to the southwest appears to be used for various garage/vehicle repair services and car sales and is associated with four trade directory entries which also include a manufacturer and distributor of floor polishing equipment. Although not listed in the trade directory, the larger industrial premises immediately to the south of the southwest corner of the site is signed as a die casting and metal fabrication works; this facility contains a number of bulk above ground storage tanks, workshops and yards and is subject to of Local Authority Air Pollution Controls. Trows House at the southwest corner of the site is a nursery and Trows Farm and the Grange are farm buildings with residential dwellings, vehicle storage areas and various outbuildings of unknown use.
Surfaces / Vegetation	The large fields which make up the majority of the site areas appear to be grassed with hedgerows and trees internally present at the various field boundaries. Some parts of the site appear to be rough scrub or heath. No invasive species were recorded during the site inspections however the survey does not constitute a comprehensive ecological assessment. Two areas without vegetation and a surface comprising loose black gravel of ash, clinker and coke as well as pieces of mica and drilled stone, cement sheeting and glass were noted during the investigation

3.3. Present land condition

Table 3.3: Environmental Setting

Surrounding Landuse	The site is located immediately west and within 100m (to the north) of two major Roads, the A627(M) and M62 motorways, respectively. In the land between the south of the site and the M62 motorway, a number of buildings, used for farms, dwellings and light industrial use (vehicle repair, manufacturing and metal processing) are present in the base of a valley containing several reservoirs formerly associated with a historical print works. Beyond the motorways is agricultural land, predominantly rough grazing with the residential areas of Balderstone to the northwest. To the north a number of modern warehousing and storage units are present in the Crown Business Park beyond the footpath with further commercial development to the northwest and beyond the residential area of East Castleton which extends to the public footpath bounding the west of the site.
Topography	The site generally slopes down from the highest point at the northeast corner (180m AOD) to the south towards the tributary of Trub Brook and the associated reservoirs in the base of the Valley to the south of Trows Lane (150m AOD). However, the site exhibits significant undulations with a series of internal valleys and spurs changing levels locally by up to 20m in the western areas.

Natural Conditions / Geology	The site lies within a large area of glacial sands and gravels extending from Rochdale to the North of Oldham and west to Heywood. Locally the deposits are classified as Hummocky Glacial Terrain comprising moraines and mounds deposited by meltwaters and subject to scouring and erosion to form undulating deposits of variable sediments but dominated by sands and gravels. In the southwest parts of the site glacial till, likely to be dominated by more cohesive (clay) sediments may be present as these outcrop along the southern boundary. The nearest available borehole log immediately to the north of the site adjacent to Cripple Gate Lane (BHSD81SE421), indicates sandy clay forms at significant depth of the superficial deposits, whereas the nearest borehole to the west, around 100m away off Vicarage Road (BHSD81SE333) indicates sand, clay and gravel overlying stiff clays. Bedrock geology is mapped as the Pennine Lower Coal Measures comprising mudstone siltstone and sandstone. Two thicker, named sandstone units are mapped as sub cropping beneath the site, both marked as the Lawrence Rock formation.
Hydrogeology / Groundwater	Soils on the site are of high leaching potential. The underlying superficial deposits are classed as a Secondary A aquifer. These designations reflect the likely presence of permeable strata within the granular sand and gravel deposits mapped on the site. The bedrock underlying the site is classed as a Secondary A Aquifer, of variable permeability. The Coal Measures are probably mainly of low primary permeability, although the thicker sandstone units mapped on the site may contain more mobile groundwater. The site is not within the catchment of a Groundwater Source Protection Zone within an area classed as of Low Groundwater Vulnerability. The nearest recorded ground water abstraction is over 800m from the site.
Hydrology / Drainage	The soils on the site may be seasonally waterlogged; one small area of standing water was observed within a low point in the site and soils around the various springs and issues are likely to be saturated. The site contains two surface watercourses fed by springs or issues, one of which is classed as a Tertiary River. Both of these flow through gully's or valleys in a south-westerly direction across the site exiting through the southern boundary and feeding the ponds, reservoirs and channels in the base of the adjacent valley which form part of a tributary, or the upper reaches of Trub Brook, itself a tributary of the River Irk, and part of the Irwell/Mersey Catchment.
Flood Risk	The EA flood risk map shows the site to be at very low risk (less than 1 in 1,000 annually) from river flooding events. The site has not been designated by the EA as being at risk of flooding from reservoirs: the reservoirs and ponds near the site are all downgradient in the base of the valley below the site to the south. The vast majority of the site is designated as having a very low risk of flooding from surface water (less than 1 in 1,000 annually) however there are two narrow channels associated with the spring-fed surface watercourses present running north-northeast to south-southwest where the risk ranges from a low (1 in 1,000 to 1 in 100 annually) to a high (greater than 1 in 30 annually) risk of flooding from surface water. The higher risk category is restricted to the southern ends of the channels adjacent to the site southern boundary.

Radon	The radon atlas indicates the site is in an area where <1% of dwellings may be at or above the action level. No radon protection measures are necessary in the construction of new dwellings or residences.
Ecology and Conservation	The site is in a Nitrate Vulnerable Zone. The site lies within 100m of an area of Adopted Green Belt. No statutory nature conservation sites, such as SSSIs, SPAs etc. have been identified within 250m of the site.
Natural Ground Stability Hazards	The site has been assessed by BGS as being at very low risk or no hazard of collapsible ground, landslide, running sand and shrinking or swelling clay, and with no compressible or dissolution ground hazards. Given the potential variability of the hummocky glacial deposits and the presence of springs and issues on the site, SGP considered there may be some risk of running sands and excavation stability in parts of the site and that the stability of some of the steeper slopes could require assessment where these would lie within or adjacent to any development proposals. It is also possible that cohesive soils may be present at or near the surface near the southern boundary, although these locally have a very low potential for generating shrinking or swelling instability hazards. The site would presumably require significant regrading to provide sensibly level development platforms in any case so the engineering properties of the superficial deposits would require assessment to determine their potential for re-use and the impacts of changes in moisture content and density on ground stability taking into account final development levels.
Mining	The site is in an area unaffected by historical coal mining activity according the Coal Authority as no worked seams have been identified at depths with the potential to influence the site. A number of sand pits are marked on the historical plans of the area, the nearest of which is 45m to the northwest of the northwest corner of the site, with several others indicated at greater distances in excess of 100 to the west, south west and south.
Excavation and Land filling	The development history of the site does not indicate that significant extraction of materials or filling has taken place within the site. No Local Authority information on landfills has been identified and the Environment Agency mapping indicates an active inert landfill (Ashfield Valley) around 500m to the north and the nearest historical landfills (Thornhall Old Road & Newhay Farm) being relatively small and at similar distances to the southeast and southwest. Anecdotal two parts of the site were used for unspecified tipping and the presence of ashy materials at the surface in one of these, and a third location supports the conclusion that the site has been subject to at least small scale waste disposal operations in the past. There is evidence of significant earthworks in the surrounding area on the available historical plans; a number of workings, reservoirs and sand pits to the south of the site were backfilled as part of the M62 road construction. A marsh to the northwest may have been infilled to construct the modern industrial estate at the Crown Business Park. The other works to construct the motorways appear to have mainly involved excavations of deep cuttings to the east of the site. In the southeast part of the site, changes in the surface height contours between historical maps which pre-date and post-date the motorway construction may indicate some of the earthworks extended onto the site.

Industrial Land use and Infrastructure	On-site activities appear to have been restricted to agricultural uses of the land. Infrastructure identified within the site are restricted to the high pressure gas pipeline and overhead electricity lines observed during the site walkover, although other utility services could exist. Off-site to the south a large former print works was present, parts of which are now used for vehicle repair, light manufacturing and metal processing. A large, modern industrial estate has been constructed to the north of the site which appears to be mainly used for warehousing and storage. It appears unlikely that either of these would have impacted the site in any way. Major roads exist to the east and south of the site, although these are not immediately adjacent to the potentially developable areas being separated by a large steep cutting slope and the Trows Lane and the adjacent reservoirs and embankment.
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3.4. Development Proposals

3.4.1. The site is being considered for residential development. For the purposes of defining future receptors with the potential to be impacted by land contamination it is assumed that most parts of the site could contain residential properties with private gardens, or amenity land with landscaping, public open space and infrastructure to support any of these uses.

3.4.2. It must therefore be assumed that, in addition to the environmentally sensitive receptors already existing on the site and the surrounds, that development, construction and maintenance workers, and future occupants will be introduced to the site, resulting in the creation of exposure pathways which do not currently exist.

3.4.3. It is also assumed that disturbance of the site necessary to prepare the land for redevelopment could result in the temporary creation of new exposure pathways.

3.4.4. The use of the site for residential purposes necessitates the construction of numerous new buildings, which are assumed to be of low-rise, traditional construction, and supporting infrastructure including roads, drains sewers and utility services. The potential for physical damage to these structures caused by ground movement, or attack of vulnerable materials by aggressive ground conditions is also considered.

4. Preliminary Conceptual Model and Risk Assessment

4.1. Methodology

4.1.1. Information from the desk study has been used to identify the likely source-pathway-target relationships that may exist at the site during and following the proposed development. Principal factors that may determine potential sources of contaminants at the site, receptor vulnerability and potential pathways have been identified and each assessed in turn to derive a Conceptual Site Model (CSM).

4.2. Site Source Risk Assessment

4.2.1. Natural sources of ground contamination appear to be limited, based on the available evidence; the potential for organic soils and peat appears to be limited and the site is an area where less than 1% of residential dwellings can be anticipated to be impacted by radon gas. Natural background levels of specific metals and metalloids are unlikely to approach generic soil criteria for residential land use.

4.2.2. The historical mapping indicates that the site was open fields, and no indications of previous industrial activity, (including Coal Mining) have been identified within the site. There is a low potential for contamination as a result of agricultural activities and these are usually limited to spills or leaks of relatively transient chemicals such as fertiliser, pesticides, small volumes of fuel and oil assuming the site has not been subject to uncontrolled waste disposal activities.

4.2.3. Several buildings have been identified in the historical mapping and satellite imagery around the perimeter of the site, although given the resolution of the available mapping and the boundary location provided to SGP, most of these could have been on the boundary or just outside the site. Some of these buildings were removed before the use of asbestos in structures became widespread however some remained during this time, including the building still present in the northwest corner. It is possible that asbestos residues could be present locally within the remaining building or around the demolished former structures, however volumes are likely to be minimal.

4.2.4. A pond towards the north of the site appears to have been in-filled around 60 years ago. This could contain waste materials, although readily degradable materials would be expected to have largely broken down in the intervening period. At least three areas of tipped wastes have been identified, these may contain materials with a high organic content, specifically unburnt or partially combusted coal or coke, however these are unlikely to degrade and generate ground gas. There is also a minor possibility that polluting substances in liquid wastes deposited in drums or discharged directly has taken place. There is always a small possibility of animal burial on former agricultural sites.

4.2.5. Apart from the locations of the former pond and buildings and the areas indicated to SGP during the site walkover, it would be difficult to identify any minor random waste deposits using discreet investigation entries. Given the size of the site any of the sources considered above, if present, would be likely to be of limited significance.

4.3. Off-Site Sources

4.3.1. Several areas of infilled land in the immediate surrounds may similarly contain degradable materials with the potential to produce hazardous gas, although it is noted that most of these areas have been developed, mainly for residential use. The nearest such potential source deposits are approximately 50m from the northwest corner of the site, and in excess of 100m, to the other side of a valley to the south, southeast and southwest.

4.3.2. Bulk Storage tanks of unknown content are present in the metal works/die-casting works within the former print works buildings close to the west end of the southern parts of the site of the site. The facility also has a number of Local Authority Air Pollution Controls in place suggesting that emissions may take place.

4.3.3. Minor volumes of fuels, hydrocarbons and other potentially mobile contaminants may be associated with the light industry and vehicle repair further up the valley to the south of the eastern parts of the south boundary.

4.3.4. The other identified local industrial land uses generally have a limited potential to cause significant ground contamination, particularly of mobile pollutants with the potential to migrate towards the site.

4.3.5. Although not related to land quality, it is noted that the entire site falls within an Air Quality Management Area (AQMA) designated by the local authority due to the probability of local air quality failing one or more national air quality objectives (see http://www.gmtu.gov.uk/gam_maps/). This is due to the proximity of major highways and the effects of vehicle exhaust emissions. It is likely that an air quality assessment will be required in support of any planning application for the site.

4.4. Potential Receptors

4.4.1. The site is in an area of medium/low environmental sensitivity as far as groundwater is concerned; the underlying bedrock supports a Secondary A Aquifer which may be locally extracted but no nearby abstractions for groundwater supply have been identified. The aquifer and the overlying superficial deposits, probably readily allow infiltration and migration, and therefore probably generate sufficient flows to feed springs on the site which give rise to two small watercourses and also probably support matrix base flow to the watercourse to the south. The surface watercourses are also likely to receive surface water run-off or field drainage and

are therefore sensitive to potential site sources of pollution, if present.

4.4.2. The surrounding area consists of residential land use to the west, and also to the east although this area is separated from the site by a major road. A small number of dwellings, a nursery and small number of dwellings is present off the site's southern boundary and public rights of way bound the west and north boundary, although there is no evidence that public access to the site takes place.

4.4.3. A number of commercial properties exist nearby including a number of commercial properties to the south and a larger industrial estate primarily used for storage and warehousing to the north.

4.4.4. Apart from farm workers and the potential for some occupation of the various enclosures and buildings in the south of the site, there is probably minimal potential for exposure of people to soils on the site under existing conditions, however redevelopment of the site will introduce new receptors, comprising a construction workforce, maintenance workers, visitors and residents, the latter being the most sensitive due to the presence of children resident on the site for long periods of time.

4.4.5. The principal vulnerable receptors for the existing and proposed uses will be:

- the surface watercourses on the site and the larger watercourse/reservoirs to the south;
- construction workers who may be exposed to any contaminants during preparatory and construction works, via direct contact and dust ingestion/inhalation;
- future site users and building occupants, primarily assumed to be residents including infants and children; exposure routes may through ingestion of soil and soil-derived dust, direct skin contact, inhalation of any ground gases / vapours, and uptake of soil contaminants to garden vegetables with subsequent consumption; and,
- future maintenance workers via direct contact

4.5. Controlled Waters Risk Assessment

4.5.1. Mobile groundwater is likely to be present within the underlying natural superficial deposits, and appears to emerge locally at springs and seeps within and adjacent to the site. Groundwater flows within the underlying Coal Deposits are likely to be minimal and are considered to be of low sensitivity.

4.5.2. Flow to the watercourses is probably via surface runoff or preferential flow paths such as drains, however sufficient shallow groundwater flow exists to feed permanent springs and probably also provides base flow to the larger watercourse to the south. Where such pathways exist these could form routes for direct migration of pollutants released from discrete sources (such as spills and leaks of fuel from storage facilities, or releases of other chemicals such as fertilisers or pesticides), however the potential for significant storage facilities within the site itself (which

excludes most of the farm buildings and yards off Trows Lane) is considered low and risks are consequently also assessed as low.

4.6. Human Health Risk Assessment

4.6.1. A development layout has not been produced for the site; for the purposes of human health risk assessment it is assumed that most parts of the site are intended to contain dwellings or areas of publicly accessible land.

4.6.2. The potential for significant contamination to be present that may pose an acute risk to construction workers during the development is low. Similarly, future maintenance workers are unlikely to be exposed to materials with the potential to cause short-term impacts.

4.6.3. Asbestos containing materials could be present in the fabric of the single remaining building and reported tipping areas localised to the north of the site and if so could include damaged and therefore friable materials. Any loose fibrous asbestos on the site could pose a health risk to site workers if disturbed and not properly managed; furthermore, the potential from off-site migration via windblown dust exists from such materials. If the historical buildings present on or near the site boundary contained such materials and were demolished in an uncontrolled manner asbestos residues could be present in shallow soils. There is a general requirement to reduce asbestos exposure to as low as is reasonably practicable and the presence of any detectable concentrations of asbestos is not generally tolerated in shallow soils in a residential setting, in the absence of robust and defensible risk assessment techniques/criteria.

4.6.4. Ash and clinker deposits could contain elevated metals, metalloids and polycyclic aromatic hydrocarbons. Such sources would only normally be considered unacceptable if present at shallow depth in garden areas.

4.6.5. Should any elevated contamination caused through fuel spillages / leakages or storage drums, other discharges of other liquids including pesticides have occurred there could be a potential risk of exposure through direct contact, inhalation and ingestion site users. Again, these are likely to be dominated by long term exposure of residents, particularly children.

4.6.6. Gas generation rates within the natural soils are probably very low; and there is no evidence of significant thicknesses of uncharacterised made ground, although this should be confirmed by site investigation, particularly in the former pond location. Risks associated with other ground gasses are likely to be low; however, the presence of deep fills associated with a former sand pit in close proximity to the site to the northwest may require gas monitoring adjacent to this location.

4.6.7. Other potential areas of deep made ground at further distances to the west, southwest, south and southeast, have been identified. Whilst under certain circumstances these can pose a high

risk of generating significant flows of ground gas with the potential to cause fire, explosion, asphyxia or poisoning, the time since the infilling has taken place, the presence of closer residential dwellings or intervening barriers such as cohesive soils and a watercourse means migration onto the site is considered unlikely.

4.6.8. Similarly, off-site sources of pollutants within the farms immediately to the south and the historical and contemporary commercial and industrial sites to the south beyond Trows Lane could be mobile within the environment however these are down (hydraulic) gradient from the site and migration is likely to be to the south or to the southwest/west, away from the site and impacts are not considered likely. Air pollution from the nearby major roads and possibly the adjacent metal works could influence the site.

4.7. Site Conceptual Model

4.7.1. Potential pollution linkages between the identified contamination sources and existing and future receptors are summarised in Table 4.1 below:

Table 4.1: Conceptual Site Model

Hazardous Source		Receptor	Pathway	Risk Assessment			Notes
Origin	Contaminant			Consequence	Probability	Risk	
Hazardous substances present as discrete deposits as a result of uncontrolled waste disposal	metals, PAHs, fuels, oils, organic pesticides and asbestos present as discrete deposits within made ground as a result of uncontrolled waste disposal	current / future site users including residents, construction workers / future maintenance workers	direct contact / dust & soil ingestion and inhalation	severe	unlikely	low	Solid or adsorbed contaminants may be locally present; relatively low concentrations could be unacceptable within residential garden soils. The potential for more significant sources is difficult to quantify, risks are likely to be dominated by long term exposure of future residents rather than transient and short term exposure of construction or maintenance workers confirm absence through investigation in former pond and building areas and/or watching brief during development but readily mitigated under most reasonably anticipated circumstances through provision of clean soils in areas of soft landscaping and gardens
		Controlled water receptors, mainly the watercourse to the south and its tributaries within the site	leaching and infiltration through unsaturated zone, enrichment of groundwater and discharge into the site watercourses	medium	unlikely	low	Most readily anticipated sources are of low solubility and mobility in the sub-surface environment, here is a low probability that more polluting materials such as tipped drums or tanks may be present confirm through monitoring of receptors and/or intermediate pathways; but readily mitigated through source removal if encountered
Hazardous ground gas from sources within made ground or similar off-site sources	Methane, carbon dioxide, carbon monoxide and depressed oxygen conditions	Site workers: construction stage or future maintenance workers	inhalation risk	severe	unlikely	low	The potential for sources within discrete areas of made ground and fill both externally and internally to the site is recognised but is considered low. Further assessment of risks from ground gas is only likely to be required in the northwest corner or if organic soils/wastes are encountered in investigations in the former pond or other areas during preparatory earthworks; but readily mitigated under most reasonably anticipated circumstances through provision of basic gas protection measures
		future site users / unventilated voids in future buildings	inhalation risk	severe	unlikely	low	
		Buildings and structures	Accumulation to explosive concentrations	severe	unlikely	low	

Note: Risk Assessment based on guidance provided in CIRIA 552, 2001, 'Contaminated Land Risk Assessment: Guide to Good Practice'

4.8. Property Risk Assessment

- 4.8.1. The underlying natural strata are classed by the BGS as being at very low or no risk of collapsible ground, landslide, running sand and shrinking or swelling clay, compressible or dissolution ground hazards. It is noted, however that the local superficial deposits are characteristically variable and the likely presence of a shallow water table in lower-lying areas (as indicated by the presence of several springs) could locally contain soft ground where hollows have been filled with soft sediment or plant materials / peat, and possible instability in steep slopes via spring-sapping. Glacial sands can be loose in nature and subject to immediate settlement when loaded, whereas any pockets of soft silts, clays or peats may be subject to longer-term consolidation. However, in general it is considered that the superficial deposits are likely to be competent and amenable to traditional construction techniques if undisturbed.
- 4.8.2. The site does not appear to have has been subject to significant land-raising or infilling; there is one recorded pond on the site which has been backfilled and other low areas may have been infilled. These activities are unlikely to have been carried out in a controlled manner and therefore any fills present must be assumed to contain variously oversized materials, voids and possibly otherwise deleterious or degradable materials. These are likely to be highly localised, and in the context and scale of any redevelopment of the whole site, readily addressed during preparatory earthworks.
- 4.8.3. Such potential conditions, and the existing topography raise uncertainty as to the likely appropriate foundation solution and infrastructure design for particular areas; furthermore, the land on the site undulates substantially and is likely to require significant regrading. An assessment of the above risks must take into account the cut/fill profiles of proposed preparatory earthworks and proven ground conditions rather than placing reliance on mapped deposits and existing topography.
- 4.8.4. The existing spring fed watercourses, drains and other utilities, in particular the high pressure gas main and overhead electricity cables present on the site will form constraints to building and infrastructure layout.
- 4.8.5. There is a significant risk of surface water flooding in localised, low-lying areas around the existing watercourses in the south of the site.
- 4.8.6. Aggressive ground conditions for concrete are considered unlikely to be present but should be assessed through site investigation. It is unlikely that any hydrocarbon or other organic contamination is present which could constrain the use of certain polymers or require protected water mains.

5. Investigation Methodology

5.1. General

5.1.1. A total of 21 machine excavated trial pits were formed at the site between the 28th and 30th June 2016. The logs are provided in Appendix A. National Grid representative marked out the route of the high pressure gas pipeline on the site and advised on the appropriate stand-off distance and crossing procedures, apart from this the locations of the entries were not significantly constrained.

5.2. Sampling Strategy

5.2.1. The positions of the exploratory holes were selected by SGP to provide a wide coverage of information on the site area. In general, exploratory holes were positioned to create a semi regular pattern across the site, in order to provide even coverage in all available areas of the site (except within proximity to the high pressure gas main).

5.2.2. As the desk study and site inspection had identified two potential tips at the northern part of the site three of the exploratory holes were targeted on these sources. These included TP06, TP07 and TP08. Some of the exploratory holes were positioned to target low-lying areas to assess thickness of potential soft soils.

5.2.3. Intrusive investigations have therefore been undertaken to:

- confirm the ground conditions underlying the site;
- determine the presence, extent and nature of made ground and soil contamination;
- obtain information if possible on the presence and depth of groundwater;
- obtain preliminary geotechnical information for relevant to the intended development.

5.3. Methodology

5.3.1. The trial pits, TP01 to TP21 were excavated with a Yanmar 8T tracked midi excavator to a maximum depth of 3.4m below ground level. The position of all exploratory holes undertaken at the site as part of this investigation can be seen on the Exploratory Hole Location Plans in Drawing 01.

5.3.2. Ten environmental jar samples of shallow Topsoil and Made Ground, and eleven small-disturbed samples of natural soils for chemical testing, and nine bulk samples for geotechnical testing were taken at regular intervals down to the base of the entries for subsequent laboratory testing and inspection.

5.3.3. Two groundwater samples were collected from two springs present on site and one sample was taken from water supply immediately southwest of the site which is spring fed. The position of sampled spring and water supply can be seen on the Exploratory Hole Location Plans in Drawing 01. The purpose of targeting the groundwater at the springs was that these probably

represent the main discharges for groundwater flows through, or arising on, the site and detection of pollutants in these locations would provide a good indicator that a viable source exists on the site. Conversely if the springs are clean then a viable contaminant linkage with the potential to cause pollution at other receptors probably does not exist.

5.3.4. Sample collection was designed to:

- include samples from the upper layers of Topsoil and Made Ground of the ground profile, for human health assessment purposes;
- include samples from underlying natural ground for geotechnical assessment;
- include any soils having contamination indicators; and
- include water samples from local springs and a water supply for chemical assessment.

5.3.5. The investigation was undertaken in accordance with appropriate guidance (BS5930, BS1377, BS10175 and CLR11). On completion, all trial pits were carefully backfilled with arisings in thin layers, ensuring that excavated material was replaced in the same order as it had been removed.

5.3.6. Engineering and Geoenvironmental conclusions given in this report are based on data obtained from these sources but it should be noted that variations, which affect these conclusions, may occur between and beyond the test locations. Also water levels may vary with time.

5.4. Chemical Analysis

5.4.1. Chemical analysis of soils and waters was carried out by Jones Environmental Laboratories, Deeside, working where possible to MCERTS and / or ISO 17025 accreditation. Soil and water samples were stored in appropriate containers as advised by the laboratory, placed in a chilled cool box, and delivered to the laboratory within 48 hours. Chain of custody documentation was completed and is retained by SGP.

5.4.2. Representative soil samples were taken from the following horizons and submitted for a standard suite (pH, soil organic matter (SOM), pH, metals / metalloids & PAHs), asbestos screen, hydrocarbons (TPHCWG), and/or pH and total sulphate.

Table 5.1: Summary of Soil Chemical Analysis

Strata	Description	Sample ref	Depth (m bgl)	Analytical suite
Topsoil	Blackish dark grey slightly clayey sandy TOPSOIL with rootlets.	TP01 J1	0.20	Main Suite*
		TP06 J1	0.10	Main Suite*
		TP07 J1	0.10	Main Suite*
		TP11 J1	0.10	Main Suite*
		TP17 J	0.10	Main Suite*
		TP18 J1	0.10	Main Suite*

Strata	Description	Sample ref	Depth (m bgl)	Analytical suite
Made Ground	Black sandy gravel of slag, clinker and brick with ash.	TP03 J1	0.30	Main Suite*
	Sand with rags, brick and wood.	TP08 J1	0.20	Main Suite*
	Slag, brick, glass, nails, iron frames and rags	TP08 D	0.70	Sulphate and pH
	Greyish brown slightly sandy gravelly clay. Gravel is brick.	TP13 J1	0.30	Main Suite*
	Blackish dark brown slightly gravelly clay. Gravel is brick, ceramic and decayed wood.	TP15 J1	0.30	Main Suite*
Clay (possible fill)	Very soft grey slightly gravelly CLAY.	TP13 D	3.00	Sulphate and pH
Alluvium	Very soft light grey slightly gravelly CLAY.	TP03 D	1.30	Sulphate and pH
		TP05 D	0.60	Sulphate and pH
Natural Hummocky Deposit	Slightly clayey slightly gravelly SAND	TP07 D	0.60	Sulphate and pH
	Slightly gravelly SAND	TP11 D	1.60	Sulphate and pH
	Sandy CLAY	TP12 D	0.90	Sulphate and pH
	Slightly clayey gravelly SAND	TP15 D	1.30	Sulphate and pH
	SAND	TP17 D	1.10	Sulphate and pH
	Gravelly SAND	TP20 D	1.00	Sulphate and pH
	Slightly gravelly SAND	TP21 D	1.50	Sulphate and pH

* Main analytical suite comprising of Metals (9), PAHs, asbestos, TPHCWG, MTBE, CrVI, organic matter and pH

5.4.3. Three water samples were submitted for chemical analysis for metals, extractable petroleum hydrocarbons (EPH), sulphates, pH and a comprehensive suite of volatile and semi-volatile organic compounds (VOCs & SVOCs) which represent many common industrial pollutants. The results of the laboratory testing are included within Appendix E.

5.5. Geotechnical Laboratory Testing.

5.5.1. Geotechnical analysis of selected soil samples was carried out by Testconsult Ltd laboratory, Warrington. Tests were performed in accord to British Standards BS 1377: Part 2: 1990.

5.5.2. Representative soil samples were taken from granular and cohesive horizons of Hummocky Glacial Deposits and submitted for a standard classification tests i.e. Atterberg Limits and Particle Size Distribution Tests, as well as moisture content.

Table 5.2: Summary of Soil Geotechnical Testing

Strata	Description	Sample ref	Depth (m bgl)	Testing
Cohesive strata of Hummocky	Slightly gravelly slightly sandy CLAY	TP06 B	1.1	Atterberg Limits and Moisture Content.
	SAND with lenses of clay	TP16 B	1.0	

Strata	Description	Sample ref	Depth (m bgl)	Testing
Deposits	CLAY.	TP18 B	2.5	
Granular strata of Hummocky Deposits	Very clayey SAND with occasional gravel	TP04 B	0.8	Particle Size Distribution
	Gravelly clayey SAND	TP09 B	0.9	
	Gravelly clayey SAND	TP10 B	1.3	
	Clayey SAND with occasional gravel	TP14 B	1.5	
	Slightly gravelly sandy CLAY	TP18 B	1.0	
	Slightly clayey very gravelly SAND	TP19 B	1.4	

6. Investigation Observations

6.1. Ground conditions

6.1.1. The site and laboratory test work revealed that the general succession of strata can be represented by sand and gravel, and locally clay of the Hummocky Glacial Deposits overlain by Topsoil or locally Made Ground, and Alluvium deposits in some of the low-lying areas. It may be summarised as follows:

6.1.2. Topsoil – encountered at 16 of the 21 test locations from ground level down to depths of between 0.25m and 0.7m, with a typically observed thickness of 0.4m. Represented in general by blackish dark grey clayey or sandy loam, locally slightly gravelly, with rootlets. Tree roots were observed in TP04 and TP18.

6.1.3. Made Ground - encountered at 5 of the 21 test locations from ground level down to depths of between 0.7m and 2.2m. Represented by a washed material of gravel of slag, clinker and brick with ash overlying thin alluvium deposit in TP03, waste material in TP08 comprising gravel of slag and brick with rags, wood, bottles, glass, nails, iron frames and shoes. In holes TP13, TP14 and TP15 Made Ground comprises variable mix slightly sandy gravelly clay or topsoil, gravel is angular sandstone, brick and ceramic with decayed wood in TP15.

6.1.4. Alluvium encountered within low-lying areas at TP03 and TP05 from between 0.4m and 1.1m depth down to depths of between 1.5m 1.2m. The thickness is of 0.4m in TP03 and of 0.8m in TP05. Represented by very soft slightly gravelly, locally slightly sandy clay.

6.1.5. Possible fill; very soft clay – very soft slightly gravelly clay overlain by Made Ground was encountered in TP08 and TP13, from 2.2m down to the base of the trial pit TP08 at 3.1m and from 1.8m down to the base of TP13 at 3.4m. Considering the proximity of the A627(M) motorway this deposit could be related to the motorway earthworks.

6.1.6. Hummocky Glacial Deposits – encountered at 19 of the 21 test locations test from between 0.25m and 1.5m down to the base of the trial pits. Represented in general by characteristically variable materials; from clay to occasional boulders but in most of the trial pits observed as slightly laminated, locally slightly cemented fine sand, locally slightly gravelly to gravelly sand, occasionally slightly clayey or containing lenses of clay. Locally were encountered firm to stiff slightly gravelly slightly sandy clay, sandy clay or sandy gravel and gravel with boulders.

6.1.7. Because of intrinsic features of hummocky deposits, the site is characterised by uneven topography comprising some small rounded hills, locally relatively steep slopes and some low-lying areas. The latter frequently contain bogs or minor/seasonal watercourses and morphologically from small valleys. The land near the central and southern parts of the eastern boundary is less hummocky forming a broad slope to the south.

6.2. Groundwater

6.2.1. Groundwater was encountered as seepages or inflows in 5 of the 21 exploratory holes, typically in low-lying areas, during the fieldwork, mainly as seepages and inflows within the sandy layers of Hummocky Glacial Deposits and in alluvium layer in TP05.

6.2.2. The groundwater levels are summarised below:

Table 6.1: Summary of groundwater levels.

Exploratory hole	GW level (m bgl)	Type	Material	Total depth (m)	Approximate hole ground elevation (m)
TP03	1.8	Inflow	Sand (Hummocky)	3.0	~155
TP05	0.6	Inflow	Made Ground	2.6	~158
	1.3	Inflow	Alluvium		
	2.4	Standing level after 10min	Sand (Hummocky)		
TP09	2.7	Seepage	Sand (Hummocky)	2.7	~152
TP10	2.0	Seepage	Sand (Hummocky)	2.0	~167
TP16	0.8	Seepage	Sand (Hummocky)	3.0	~166
	1.3	Seepage	Sand (Hummocky)		
	1.8	Seepage	Sand (Hummocky)		
Spring 1	-	spring	Sand (Hummocky)	-	~155
Spring 2	-	spring	Sand (Hummocky)	-	~164
Water supply	-	Supply draining groundwater from Sand (Hummocky)	Sand (Hummocky)	-	~155

6.3. Soil Contamination Indicators

6.3.1. Made ground was encountered in during the fieldwork in exploratory holes TP03, TP08, TP13, TP14 and TP15. The depths and type of Made Ground are summarised in the table below:

Table 6.2: Depths and type of Made Ground.

Hole ID	Made Ground depth	Description
TP03	1.1	Washed material of gravel of slag, clinker, brick with ash.
TP08	2.2	Waste material ; gravel of brick, with rags, wood down to 0.6m. From 0.6 down to 2.2m gravel of slag, brick, glass, bottles, iron frames, nails, shoes and rags.

7. Investigation Results

7.1. Results of Geotechnical Laboratory test results.

7.1.1. Classification tests on selected samples of cohesive layers of Hummocky Glacial Deposits revealed moisture contents of 16%, 23% and 35% and the modified plasticity index I_p of 11, 19 and 27, with the fines fraction classified as a soil of low and medium volume change potential. See NHBC Building Standards, Chapter 4.2.

7.1.2. Particle Size Distribution tests on samples of granular layers of Hummocky Glacial Deposits revealed soil fraction of fines between 4.8% and 39%.

7.1.3. The clayey layers were classified as CL – low plasticity clay and CH – high plasticity clay.

7.2. Results of Soil Chemical Analysis

7.2.1. The complete soil analytical data are presented in Appendix E. The results of the soil analyses are compared to human health critical values (CVs) for initial screening purposes. The CVs adopted are appropriate to the environmental setting and proposed future residential use of the site, and are taken primarily from the LQM / CIEH Suitable for Use Levels (S4ULs) which are used to define land that is 'not contaminated'. These are derived for a sandy loam soil; reference is initially made to the S4ULs derived for a soil with 1% organic matter as a conservative assumption for screening purposes.

7.2.2. The Defra Category 4 Screening Level (C4SL) for lead in soils under residential land-use has been utilised to allow an initial screening for risk to human health. This is intended to demonstrate that land is definitely not Contaminated Land as defined under Part IIA of the Environmental Protection Act. The adoption of the C4SL in a planning scenario has not been universally accepted, however in the absence of other generic screening criteria for lead following the withdrawal of the SGV by the EA it is considered appropriate to utilise the screening criterion.

7.2.3. Where published human health critical values are unavailable or inappropriate (because the substance does not significantly affect human health but might have an effect on other receptors), then other commonly-used screening values are used, as noted below.

7.2.4. Given the high sensitivity of the planned residential development, the presence of any detectable asbestos in shallow soils is unlikely to be acceptable so the limit of detection has been adopted as a screening value.

7.2.5. All sampled material has been assessed from within the upper 600mm relevant to human health and analysed for a comprehensive analysis suite. It is not known what the development plans for the site entail with regard to a possible material strip from the site, therefore all the sampled

material has been assumed to be relevant to the human health assessment.

7.2.6. Results are summarised below:

Table 7.1: Summary of Soils Analysis

Contaminant	Number of Samples	Range of Concentrations (mg/kg or indicated)	Soil standard adopted and concentration (residential) (mg/kg or indicated)	Exceedances
pH	21	4.91-8	-	-
arsenic	10	5.1-98.9	LQM/CIEH S4UL 37	TP08 0.2m
cadmium	10	<0.1-5.3	LQM/CIEH S4UL 11	None
chromium III	10	53.9-529.4	LQM/CIEH S4UL 910	None
chromium VI	10	<0.3	LQM/CIEH S4UL 6	None
copper	10	17-1011	LQM/CIEH S4UL 2400	None
			DEFRA (MAFF) Plant 200	TP03 0.3m, TP08 0.2m
lead	10	21-887	C4SL 200	TP03 0.3m, TP08 0.2m
mercury	10	<0.1-0.5	LQM/CIEH S4UL 40 (inorganic Hg used)	None
nickel	10	16.1-168.1	LQM/CIEH S4UL 130	TP08 0.2m
Se	10	<1-3	LQM/CIEH S4UL 250	None
zinc	10	46-872	LQM/CIEH S4UL 3700	None
			DEFRA (MAFF) Plant 300	TP02 0.2m, TP08 0.2m
Soil Organic Matter %	10	1.4-34.6	EA inert waste limit 6%	None
asbestos screen	10	NAD	Fibres present	None
naphthalene	10	0.04-0.2	LQM/CIEH S4UL 2.3	None
benzo(a)pyrene	10	0.04-0.46	LQM/CIEH S4UL 2.2	None
dibenzo(ah)anthracene	10	0.04-0.2	LQM/CIEH S4UL 0.24	None
benzo(b)fluoranthene	10	<0.05-0.77	LQM/CIEH S4UL 2.6	None
MTBE	9	<0.005	None	None
benzene	9	<0.005	LQM/CIEH S4UL 0.087	None
toluene	9	<0.005	LQM/CIEH S4UL 130	None
m/p-xylene	9	<0.005	LQM/CIEH S4UL 56 (most stringent 'p' used)	None
o-xylene	9	<0.005	LQM/CIEH S4UL 60	None
aliphatic C5-C6	10	<0.1	LQM/CIEH S4UL 42	None
aliphatic C6-C8	10	<0.1	LQM/CIEH S4UL 100	None
aliphatic C8-C10	10	<0.1	LQM/CIEH S4UL 27	None
aliphatic C10-C12	10	<0.2	LQM/CIEH S4UL 130 (48 vap) ¹	None
aliphatic C12-C16	10	<4	LQM/CIEH S4UL 1100 (24 sol) ¹	None
aliphatic C16-C21	10	<7-155	LQM/CIEH S4UL 5000 ²	None
aliphatic C21-C35	10	<7-1504	LQM/CIEH S4UL 5000 ²	None
aromatic C6-C7	10	<0.1	LQM/CIEH S4UL 70	None
aromatic C7-C8	10	<0.1	LQM/CIEH S4UL 130	None

Contaminant	Number of Samples	Range of Concentrations (mg/kg or indicated)	Soil standard adopted and concentration (residential) (mg/kg or indicated)	Exceedances
aromatic C8-C10	10	<0.1	LQM/CIEH S4UL 34	None
aromatic C10-C12	10	<0.2-8.1	LQM/CIEH S4UL 74	None
aromatic C12-C16	10	<4	LQM/CIEH S4UL 140	None
aromatic C16-C21	10	<7-82	LQM/CIEH S4UL 260	None
aromatic C21-C35	10	<7-1278	LQM/CIEH S4UL 1100	TP08 0.2m

Notes to table:

LQM / CIEH: Generic assessment criteria published by Chartered Institute of Environmental Health and Land Quality Management Ltd, residential with plant uptake scenario (1% SOM); copyright Land Quality Management Ltd reproduced with permission publication number S4UL3102. All rights reserved.

DEFRA plant Threshold guideline for the protection of sensitive plant species used by MAFF
¹: CV exceeds solubility saturation limit provided in (), i.e. possibility of free product at this level
²: Maximum limit of 5000mg/kg used for reasons of amenity

7.2.7. Elevated concentrations above residential soil screening values occurred in three locations, as below; all other samples were uncontaminated.

- TP03 – Made Ground for lead;
- TP08 – Made Ground for arsenic, lead, and certain fractions of aromatic hydrocarbons, all of which are likely to be associated with waste material present in TP08 down to 2.2m.

7.2.8. Specific SOM tests revealed an organic content in Made Ground of between 1.4% and 34.6%. The two incidences of highly elevated content in excess of 30% were recorded within Made Ground (ash) in TP03 and TP08. This is likely to be due to the presence of uncombusted coal or coke in the ash.

7.2.9. Soil pH varies between 4.91- high acidity to 8 – alkaline.

7.2.10. Asbestos was not identified in soil samples in any location, however analysis results from samples of discrete fragments of suspect materials present in the tip areas indicated the presence of chrysotile in the form of cement sheeting.

7.3. Results of Groundwater Analysis

7.3.1. There are no existing water quality standards for groundwater. As the main pollution risk from the site was considered to be impacts on local surface watercourses, groundwater results are compared against Environmental Quality Standards (EQSs) provided for surface waters¹. Where an EQS has not been published under the WFD, reference has been made to the EQSs referred to under the EC Dangerous Substances Directive 76/464/EEC. Maximum allowable concentrations are used for “priority substances” and long-term mean standards for “Specific Pollutants”

7.3.2. In the absence of an EQS reference has been made to the standards provided for groundwater

¹ Water Framework Directive (Standards & Classification) Directions (England & Wales) 2015

drinking water protected areas or in the Water Supply (Water Quality) Regulations 2000, (typically referred to as the UK Drinking Water Standards or UK DWS). It should be noted that these are particularly stringent as they are used to protect drinking water consumers and hence, although they provide an indication of the presence of any contamination, they are not necessarily directly applicable to risks posed to receptors associated with the site itself.

7.3.3. Three groundwater samples were collected from two springs on site and water supply draining groundwater from on-site, located immediately southwest of the site border. The results of groundwater analysis are summarized below:

Table 7.2: Summary of Groundwater Results

Determinant	Number of samples	Range of Concentrations (µg/l)	Quality standard adopted and concentration (µg/l)	Exceedances
EPH (C8-40)	3	<10	10 DWS	None
Dissolved Arsenic	3	<2.5	50 EQS WFD	None
Dissolved Cadmium	3	<0.5	1.5 EQS WFD ¹	None
Dissolved Copper	3	<7 – 16	28 EQS WFD ¹	None
Dissolved Lead	3	<5 – 9	14 EQS WFD ¹	None
Dissolved Nickel	3	<2– 8	34 EQS WFD ¹	None
Total Chromium	3	<1.5 – 5	4.7 GW	Spring 1
Total Zinc	3	19 – 23	125 EQS WFD ¹	None
Mercury	3	<1	0.07 EQS WFD ¹	LOD > EQS
Hexavalent Chromium	3	<6	3.4 EQS WFD	LOD > EQS
Naphthalene	3	<1	130 EQS WFD	None
Acenaphthylene	3	<0.5	No EQS	N/A
Acenaphthene	3	<1	No EQS	N/A
Fluorene	3	<0.5	No EQS	N/A
Phenanthrene	3	<0.5	No EQS	N/A
Anthracene	3	<0.5	0.1 EQS WFD	LOD > EQS
Fluoranthene	3	<0.5	0.12 EQS WFD	LOD > EQS
Pyrene	3	<0.5	No EQS	N/A
Benzo(a)anthracene	3	<0.5	No EQS	N/A
Chrysene	3	<0.5	No EQS	N/A
Benzo(bk)fluoranthene	3	<1	0.0017 EQS WFD	LOD > EQS*
Benzo(a)pyrene	3	<1	0.27 EQS WFD	LOD > EQS*
Indeno(123cd)pyrene	3	<1	No EQS	LOD > EQS *
Dibenzo(ah)anthracene	3	<0.01	0.002 EQS WFD	LOD > EQS *
Benzo(ghi)perylene	3	<0.5	0.002 EQS WFD	LOD > EQS*
Carbazole	3	<0.5	No EQS	N/A
Dibenzofuran	3	<0.5	No EQS	N/A

Notes:

EQS: National Environmental Quality Standard for inland surface waters, maximum allowable concentration or long-term mean

UK DWS:	Water Supply (Water Quality) Regulations 2000
LOD	Limit of detection; variable for individual VOCs and SVOCs
^{1.}	Hardness related; reference made to hardness band 50 Ca mg/l
*	For this group of priority substances benzo(a)pyrene is considered a marker
HCN	Value for hydrogen cyanide
GW	Groundwater Threshold Values for UK River Basin Criteria

7.3.4. Concentrations of metals were generally low, with the only slight exceedance of total chromium in Spring 1. In the absence of likely pollution sources for this substance, this value is considered unlikely to pose any risks to controlled waters and may be natural in origin.

7.3.5. Potential exceedances of some PAHs cannot be determined due to limits of detection (LOD) higher than EQS standard values. None of the wide range of other organic (VOCs & SVOCs) were detected above the respective LODs.

7.4. Results of Soluble Sulphate Analysis and pH

7.4.1. Chemical tests on selected soil samples have recorded soluble sulphate concentrations ranging from <1.5mg/l to 0.168mg/l and pH values ranging from 4.91 to 8.0.

7.4.2. The groundwater samples have recorded values of sulphate concentrations ranging from 0.55mg/l to 15.41mg/l and pH values ranging from 5.96 to 7.17.

8. Geotechnical Assessment

8.1. General

8.1.1. We understand the proposed development comprises the construction low-rise residential dwellings with supporting infrastructure and that the site will have to be regraded to sensibly level development platforms and appropriate gradients for access roads.

8.1.2. The exploratory work from this investigation has proven the expected general strata sequence comprising sand, clay and locally gravel of Hummocky Glacial Deposits locally overlain locally by Made Ground and alluvium in a small but significant minority of entries. Where present in the entries completed to date, Made Ground thickness varies between 0.7m and 2.2m.

8.1.3. Topsoil occurs as a veneer down to depths of between 0.25m and 0.7m, typically 0.4m.

8.1.4. Very soft clay was observed in TP08 and TP13 overlain by Made Ground. Very soft clay underlies deeper Made Ground on site, of 1.8m and 2.2m thickness. In the case of TP13, due to elevated thickness of overlying Made Ground in comparison to the rest of the site, proximity of the motorway A627(M) and historical earthworks it is deemed that layers of very soft clay are a product of earthworks in the area and this deposit may comprise a substantial volume present over a large area in the southwest of the site. The total depth of this deposit was not proved but changes to historical contours indicates it may be several meters thick.

8.1.5. Thin alluvium layers were observed only in TP03 and TP05 with thickness of 0.4m and 0.8m following the local water course on the western part of the site.

8.1.6. The groundwater is typically observed in low-lying areas at depths between 0.6m and 2.7m depending upon ground elevation and preferential groundwater flows into a water course on the western part of the site, local springs feed minor watercourses, piped water supplies and ultimately the ponds and river to the south.

8.1.7. Only classification tests were performed on retrieved samples. At this stage resistance and deformation testing was not carried out. Discussion of the soils geotechnical properties is therefore based solely on site observations, laboratory classification testing results and the application of commonly adopted principles generally.

8.2. Site Excavation

8.2.1. Conventional hydraulic plant should be satisfactory for excavating foundation and service trenches within the encountered deposits.

8.2.2. In line with HSE guidelines, all excavations requiring personnel access should be adequately supported to avoid the risk of collapse. Excavations within the Hummocky Glacial Deposits over the groundwater level are likely to remain stable in the short term. Excavations below the

groundwater level are likely to be unstable.

8.2.3. Groundwater is expected to be encountered as seepages at depths greater than about 0.6m in low-lying areas and dewatering may be required. Conventional pumping from sumps should be satisfactory in order to maintain a dry excavation. Problems of running sand and loss of fines potentially may be expected.

8.2.4. Shallow excavations in elevated areas are likely to remain dry in the short term. It should be appreciated however that seasonal variations may exist and hence groundwater entries may occur particularly during wetter months or after periods of inclement weather.

8.3. Foundation Solutions

8.3.1. The Made Ground, identified in at least two areas, is considered unsuitable as a bearing stratum due to its variability, and potential for unacceptable total and differential settlement under applied foundation loadings.

8.3.2. The very soft clay (possible fill) encountered in the holes TP08 and TP13 below Made Ground is not considered suitable as a bearing stratum due to potential for unacceptable settlement. Where encountered beneath proposed structures it is recommended that the Made Ground is dug out and replaced with suitable engineered fill. This is likely only to be appropriate where Made Ground deposits are thin; less than 2-3m.

8.3.3. Ground improvement using replacement with granular fill may be considered in deleterious areas where Made Ground is underlain by very soft clay (possible fill in TP08 and TP13), as an alternative to shallow foundations. However, the depths of strata must be confirmed at depth in further ground investigation.

8.3.4. Alluvial deposits are indicated to be present along the water courses in the western part of the site and are likely to be encountered in other low-lying areas. Alluvium tends to have low bearing (presumed allowable bearing pressures of circa 50kPa-100kPa, but often less) and high compressibility, with the potential for long term creep characteristics if the clays are very soft or have a high organic content.

8.3.5. The thickness of Alluvium proven to date on site varies between 0.4m and 0.8m, and it is probably highly localised, therefore it is recommended, as Made Ground and fill, it is either dug out or replaced where encountered beneath proposed paved areas or structures. The excavated material is not normally acceptable for re-use as an engineered fill given its low strength, high moisture content, and often high organic content.

8.3.6. The Hummocky Glacial Deposits, sand and clay, are considered not to pose significant

engineering problems. Although not confirmed by in-situ or laboratory testing, this material is likely to be a suitable bearing stratum for conventional shallow foundations at not less than 0.75m below existing ground level in clay or 0.20m into the top of the formation, whichever is the deeper.

8.3.7. At this stage bearing capacity cannot be assessed due lack of resistance in-situ or laboratory testing. However rough estimations based on observation during the excavation of trial holes could indicate possibly medium dense sands and gravels (not confirmed with SPT testing), and firm to stiff clay, except soft becoming firm clay in TP12.

8.3.8. Typical possible values for this kind of Glacial deposits are likely to have the bearing capacity of approximately of 150kPa, considering the upper weathered layers to have bearing capacity in most cases lowered to 80kPa. These roughly estimated values are not confirmed by any resistance in-situ or laboratory testing and should be considered as a preliminary indication.

8.3.9. Where structures are placed on the granular materials it is assumed all settlement will take place almost immediately as the loading is imposed. However, if cohesive layers are present in the materials (TP06, TP07, TP12 and TP18) these may reduce the bearing capacity and introduce a time element to settlements that will need to be considered in design (although the granular nature of the surrounding materials tends to produce drainage paths and therefore improve consolidation rates).

8.3.10. Classification tests on selected samples of cohesive layers of Hummocky Glacial Deposits classified as a soil of low and medium volume change potential. See NHBC Building Standards, Chapter 4.2.

8.3.11. Where foundations are to be constructed in clays within the vicinity of trees or shrubs on this site then they will require deepening in accord with guidelines given in NHBC Building Standards Chapter 4.2. In order to minimise differential settlement of spread foundations spanning sand and localised clay deposits it is recommended that light reinforcing be placed in the base of foundation excavations to avoid the occurrence of localised movement.

8.3.12. Ground floor slabs: provided all the Topsoil and Made Ground is stripped off, ground bearing floor slabs could be constructed placed on a layer of well compacted granular fill over the natural sand, suspended floors may have to be considered elsewhere.

8.4. Regrading & Preparatory Earthworks

8.4.1. The above assessment on foundations is based on a formation level concurrent with existing surfaces. However, the site presents uneven topography related to Hummocky Glacial Deposits, for future development the site will be regraded to accommodate dwellings, gardens and provide acceptable gradients for access roads.

- 8.4.2. The previous bearing capacity estimations are only based on the preliminary site investigation which was carried out from current ground surface levels; the site will undergo considerable grading consequently adequate assessment of bearing capacities should be done for the regraded site.
- 8.4.3. For fill areas, the specification will typically require that the in-situ density is a percentage of maximum dry density, usually 95%. It is recommended Proctor test to be performed in order to determine optimum dry density to inform the required compaction regime for placed engineered fills. The strength of the formation for road construction will usually be specified as a percentage California Bearing Ratio.
- 8.4.4. Areas of made ground, and soft soils, specifically alluvium and soft clays may be less amenable to disturbance and the design of the overall earthworks should take into account any re-distribution of these materials and their effect on the proposed layout.
- 8.4.5. Earthworks potentially will affect the slope stability; typical grading-related problems include differential performance at cut-fill transitions; landslides created by filling at the head or cutting at the toe of a natural slope; soil creep; settlement, differential settlement, or heave of fills; heave of potentially expansive clayey layers in cuts, and diversion of surface drainage. Grading the site can exacerbate hidden existing stability problems and mask natural topographic indications of potential hazards such as existing landslides
- 8.4.6. Cuts potentially will intercept zones of groundwater, which can cause problems ranging from nuisance seepage to slope instability and possible running sand conditions where sand loses its effective pressure. During the preliminary site investigation seepages and inflows were observed at approximate ground elevations between 152m and 167m aod.
- 8.4.7. It is advised to bear in mind that clay layers within sand may create lubrication surfaces and preferential filtration paths along the contacts between clay and sand.
- 8.4.8. Shallow excavations within the Hummocky Glacial Deposits over the groundwater level are likely to remain stable in the short term. Excavations below the groundwater level are likely to be unstable, although much of the 'cut' in a large scale regrade would be anticipated to come from the higher and dryer parts of the site.
- 8.4.9. It should be appreciated however that seasonal variations may exist and hence groundwater entries may occur particularly during wetter months or after periods of inclement weather.
- 8.4.10. Fills in areas of existing watercourses, especially the watercourse located on the western part of the site, can block watercourses, causing sedimentation and posing a risk of upstream and downstream flooding. Impeded or exacerbated flows of groundwater through newly placed fill

materials could alter the hydrogeological regime sufficiently to cause instability. An appropriate drainage design scheme for the site must be integrated into the preparatory earthworks scheme to ensure that medium to long-term stability risks are not created from the interaction of groundwater flows with the newly created geomorphology of the site.

8.5. Re-use of material on site.

8.5.1. The large scale earthworks anticipated as required to provide suitable development platforms and acceptable gradients is anticipated to involve the use of site generated materials, usually a balance of cut and fill is desired to prevent costs and unsustainable use of resources in terms of waste generation and use of resources.

8.5.2. The excavations on site from foundation and services trenches will produce a considerable amount of surplus soil. Under current waste management legislation if this soil is surplus to requirements it will be classified as waste and needs disposing of at a licensed facility. However, if consideration of this is made during the site reprofiling design then some or all of the arisings may be able to be re-used on-site in an area left purposely low to accommodate the materials.

8.5.3. Based upon the human health and groundwater risk assessments, the soils on this site are considered to be suitable to be re-used on site for landscaping purposes, and placement of materials during both the preparatory earthworks and the construction stage of redevelopment would usually be covered by a materials management Plan (MMP) under the Definition of Waste: Development Industry Code of Practice. Surplus disposal or import requirements may also be covered by such a scheme as long as only natural uncontaminated materials are transferred between development sites.

8.6. Subsurface Concrete

8.6.1. The chemical test results are assessed in accord with BRE Special Digest 1 and appropriate action taken for any new sub-surface concrete requirements.

8.6.2. Chemical tests on selected soil samples have recorded soluble sulphate concentrations ranging from <0.0015g/l to 0.168g/l and pH values ranging from 4.91 to 8.0. This would correspond to a Design Sulphate Class of DS-1.

8.6.3. In terms of BRE Special Digest 1, the land has never been developed and may be considered to be natural ground. The groundwater beneath the site should be considered as mobile.

8.6.4. The results correspond to Aggressive Chemical Environment for Concrete (ACEC) class AC-1, for locations TP05, TP06, TP07, TP15 and TP17 the results correspond to ACEC class AC-2z.

9. Revised Conceptual Model and Risk Assessment

9.1. Methodology

9.1.1. Information from the current site investigation has been used to refine the likely source-pathway-target relationships identified in the preliminary Conceptual Site Model (CSM). Tier 1 risk assessment has been undertaken by comparison of contaminant concentrations in various media (soil and ground water) to generic screening criteria. These are values appropriate to the intended residential end-use of the site, and indicate whether potentially unacceptable risks to receptors are likely to exist, requiring either more detailed site-specific risk assessment or remediation to break the potential contaminant linkage.

9.2. Source Risk Assessment

9.2.1. The desk study assessment of the site identified no significant development to have taken place on the site. Surrounding past and current land uses have not been identified as likely to pose a significant risk to the redevelopment of the site as housing, however industrial buildings development is identified north of Cripple Gate Lane and A627(M) construction in the late 60s and early 70s.

9.2.2. A pond in north of the site appears to have been in-filled around 60 years ago. This could contain waste materials, although readily degradable materials would be expected to have largely broken down in the intervening period. No other potentially contaminative activity is known to have occurred on the site. Off-site sources are considered to present similarly low risk.

9.2.3. At least three areas of tipped inert waste materials have been encountered; one of these might be associated with the pond and anecdotally two areas of the site have received waste in historical 'tips'. Based on the observations much of the material is ash, clinker and coke with smaller quantities of industrial wastes.

9.2.4. Analysis from the areas indicate concentrations of arsenic (encountered in TP08), copper and lead (encountered in TP03 and TP08), nickel (in TP08) and zinc (in TP02 and TP08), which might be unacceptable in a garden area. Analysis of samples of discrete fragments of suspect materials for asbestos has indicated the presence of asbestos cement sheeting and observations indicate that this material may be widespread in the three areas of tipped materials identified to date; the presence of similar materials elsewhere cannot be discounted.

9.2.5. These comprised principally inert materials and as such are unlikely to be a significant source of ground gas. Within two locations, TP08 and TP13, a greater thickness of very soft clay was encountered. One of these is interpreted as a result of earthworks for the A627(M) and may represent similar conditions over a substantial part of the southwest of the site.

9.2.6. There were no exceedances of screening criteria associated with natural ground (topsoil).

9.2.7. Groundwater sampling and analysis encountered relatively low exceedances of screening criteria within Spring 1 for total Chromium.

9.2.8. Groundwater from the site is likely to migrate towards the south and the southwest in the direction of the watercourse trending north – south located on the western part of the site and towards the existing ponds located south and southeast.

9.3. Potential Targets

9.3.1. The principal vulnerable receptors, following residential development of the site will be:

- construction workforce;
- future site users (residents);
- on-site building structures and infrastructure (buildings; roadways; services);
- soft landscaping areas (gardens); and,
- neighbouring residential properties;
- ground water;
- surface waters.

9.3.2. Controlled waters (groundwater and surface waters) are not considered to be potential targets due to the classification of both solid and drift geology in the area as unproductive and the apparent absence of viable pollution sources within the site.

9.4. Human Health Risk Assessment

9.4.1. Potential risks identified are limited to those associated with direct exposure to the ashy made ground present in multiple, but laterally limited areas. The short term and transient effect on construction and maintenance workers is considered minimal but concentrations are higher than screening criteria for gardens where more frequent and longer term exposure of more sensitive children may take place

9.4.2. Asbestos cement sheeting has been identified in areas of tipped made ground, the material is broken up and could present a risk to both construction operatives and future residents if it remains exposed and subject to mechanical disturbance (excavation, trafficking, wind erosion, etc.).

9.5. Property Risk Assessment

9.5.1. To our knowledge the development of the site will comprise buildings (houses), car parking, drainage infrastructure, utility services and areas of soft landscaping (gardens). An assessment of the site for aggressive ground conditions has identified a low likelihood on concrete attack,

and as such a concrete design class recommendation of DS-1 AC-1 and AC-2z has been made. Further assessment may be required on a more detailed basis within housing footprints.

9.6. Controlled Waters Risk Assessment

9.6.1. Concentration of total Chromium have slightly exceeded GW value within the Spring 1. Both the solid and drift geology in the area are classified by the EA as unproductive strata, and as such are not considered to be at risk from the marginal contamination identified on the site. The nearest surface water feature is located on the western part of the site. Other surface water features, including ponds are located south and southeast of the site. Considering marginal exceedance of total Chromium surface waters are not likely to be at risk.

9.7. Site Conceptual Model

9.7.1. Potential pollution linkages between the identified contamination sources and existing and future receptors are summarised in Table 9.1 below:

Table 9.1: Revised Conceptual Site Model

Hazardous Source		Receptor	Pathway	Risk Assessment			Notes
Origin	Contaminant			Consequence	Probability	Risk	
Hazardous substances present as discrete deposits as a result of uncontrolled waste disposal	metals, PAHS, fuels, oils, organic pesticides and asbestos present as discrete deposits within made ground as a result of uncontrolled waste disposal	current / future site users including residents, construction workers / future maintenance workers	direct contact / dust & soil ingestion and inhalation	severe	unlikely	low	Slight exceedance of metals within Made Ground encountered in TP03 and TP08, these materials, and other similar materials on the site would require exclusion from future garden areas as would the asbestos cement sheeting identified in the tip areas, however the natural topsoil present on the site appears likely to be suitable for inclusion in gardens such a scenario
		Controlled water receptors, mainly the watercourse to the south and its tributaries within the site	leaching and infiltration through unsaturated zone, enrichment of groundwater and discharge into the site watercourses	medium	unlikely	low	No significant contaminants encountered.
Hazardous ground gas from sources within made ground or similar off-site sources	Methane, carbon dioxide, carbon monoxide and depressed oxygen conditions	Site workers: construction stage or future maintenance workers	inhalation risk	severe	unlikely	low	No significant risk is expected.
		future site users / unventilated voids in future buildings	inhalation risk	severe	unlikely	low	
		Buildings and structures	Accumulation to explosive concentrations	severe	unlikely	low	

Note: Risk Assessment based on guidance provided in CIRIA 552, 2001, 'Contaminated Land Risk Assessment: Guide to Good Practice'

10. Conclusions and Recommendations

10.1. Conclusions: Contamination

10.1.1. The historical uses of the site appear to have been solely agricultural. No significant potential natural or manmade sources of contamination have been identified within or adjacent to the site. Apart from some, probably small scale tipping of ashy but largely inert industrial wastes in at least three parts of the site soils would generally be suitable for inclusion in future garden areas.

10.1.2. A more widespread area of made ground may be present in the southwest of the site, however this is likely to comprise mainly re-worked natural materials associated with the construction of the adjacent motorway, and as such is likely to be dominated by reworked natural soils with a low potential for contamination.

10.1.3. No asbestos was identified in tested samples. However, there is always the possibility of discreet deposits of asbestos containing materials within the Made Ground and some fragments of asbestos cement sheeting have been identified to date which will need to be removed or isolated before the introduction of new receptors (including both construction operatives and residents) before disturbance and exposure can occur.

10.1.4. The ground investigation and consequent laboratory testing confirmed no significant presence of highly mobile contaminants and low likelihood of risk of any pollution associated with the site.

10.1.5. There is limited potential for the presence of other contaminants and pollutants; if uncontrolled waste deposition has occurred on the site there is a low potential for hazardous substances or materials within infilled pits, ponds etc. Volumes of impacted materials are likely to be limited within the context of the overall potential development area. The land surrounding the site does not appear to have been subject to significant polluting industrial land use or surface tipping, and migration from sources in the nearby environment is probably precluded by the local hydrological and hydrogeological gradients.

10.1.6. The site is therefore currently assessed as presenting generally low risks associated with land contamination, where these do exist they are likely to be limited in extent and readily managed in the context of redevelopment of a site of the scale of that under consideration.

10.2. Conclusions: Stability

10.2.1. The ground on the site appears to be dominated by undisturbed natural granular strata which has been assessed as generally unlikely to cause instability due to compressible, collapsible or otherwise unstable soils away from steep valley sides and low-lying areas where interactions with the shallow water table and the presence of local deposits of soft soils or made ground may

cause instability. Outside of these areas traditional strip foundations and ground bearing slabs are likely to be appropriate minimising abnormal groundworks costs.

10.2.2. The site is likely to require significant regrading to achieve viable development levels and gradients. Although low or very low risks from ground stability hazards have been identified associated with the dominant granular soils present over much of the site, the combination of large scale earthworks with the presence of soft deposits in valley bases, areas of made ground/fill, and shallow groundwater and associated springs and issues, requires further assessment to allow design of development foundations and infrastructure.

10.2.3. In particular, the interaction between the areas of potentially soft or heterogeneous ground (in the tips and low-lying/infilled areas identified), preparatory earthworks scheme, proposed layout and drainage/hydrogeological regime will require careful consideration

10.3. Conclusions: Other Constraints

10.3.1. The high pressure gas main and overhead electricity cables are existing constraints within the site; externally the impacts on the development from noise and pollution from the nearby major roads and nearby industrial/commercial land use should be taken into consideration.

10.3.2. The declared AQMA encompassing the site may present a constraint to residential development that could require assessment and possible mitigation measures. Mitigation might entail the adoption of a stand-off zone for development near to the motorways.

10.4. Recommendations

10.4.1. While it can be recommended that the dominant granular soils on the site are likely to make them acceptable as a bearing stratum at shallow depth, this requires confirmation by further investigation and a number of constraints do exist including the presence of substantial areas of softer or otherwise heterogeneous soils.

10.4.2. Where structures are placed on the natural, undisturbed granular materials it is assumed all settlement will take place almost immediately as the loading is imposed. However, if cohesive layers are present these may reduce the bearing capacity and introduce a time element to settlements that will need to be considered in design. The selection of foundation solution will require appropriate design, supervision and validation at the preparatory earthworks stage, particularly for areas where levels are to be raised.

10.4.3. To fully characterise the geotechnical properties of the ground, and inform the preparatory earthworks scheme some further more detailed investigations will be required.

10.4.4. The depths of very soft clay (possible fill) were not confirmed beyond 3.1m and 3.4m. It is

recommended drilling techniques are applied to confirm soil variations and attempt to delineate the lateral extent of the deposits, further trial trenching may also be useful in this regard. Similarly, the extent of the tips may be determined by trenching to produce an accurate volume of the materials which must be isolated from future garden areas.

10.4.5. Additional detailed intrusive investigation is likely to include drilling deeper boreholes with SPT in-situ testing to at least 6m below the floor levels of proposed dwellings (where foundations are likely to be at, or below existing levels). Samples should be collected of soils above potential regrade surfaces to assess the amenability of the materials for placement as engineered fill in the low-lying areas (where foundations are likely to be above existing levels).

10.4.6. Consideration should be given to undertaking additional sulphate testing across the site on a more detailed basis within the proposed building footprints.

10.4.7. The drainage requirements for any development should be considered carefully: the presence of a number of springs, groundwater levels observed in trial pits indicate the presence of a shallow water table and locally saturated ground in low-lying areas, and should inform the geotechnical assessment of the site given the implications for local instability and running sands.

10.4.8. A hydrological assessment to determine the drainage requirements for the site following any planned redevelopment, and any attenuation to reduce impacts downstream should be carried out. The existing high risk of surface water flooding in two small areas of the site should inform the drainage proposals. An assessment of the feasibility of soakaways should form part of the intrusive site investigation, as although the superficial deposits are largely granular soakaways should be feasible. For many parts of the site.

10.4.9. Consultation with the Animal & Plant Health Agency should take place before any excavations in farmland but in any case, the provision set out in the DEFRA "Code of Practice for Civil Engineers, Surveyors and Contractors: Precautions to Prevent the Spread of Animal & Poultry Disease" should be adhered to.

10.4.10. The high pressure gas main present in the east of the site probably forms a significant constraint to development as it will require a substantial stand-off and/or diversion. Given the size of the site it may be cost effective to leave the surrounding land as open space, however the depth to the pipe must be taken into consideration when designing local regrade levels. In the context of a large development, diversion could be considered, particularly if the pipeline requires upgrading or replacement in any case. A stand-off, diversion or rerouting to underground cables could be considered for the overhead electricity lines present on the site. Searches for the presence of other services will need to be carried out.

10.4.11. Topsoil won from the site should only require screening for contaminants at a relatively low frequency and there is no current evidence that measures such as clean cover systems, gas protection or source removal/treatment will be required.

10.4.12. An asbestos survey of the dilapidated buildings near the northwest corner of the site should be carried out prior to demolition and clearance; however asbestos cement sheeting has been identified in the made ground in the tip areas and, the presence of damaged potential asbestos containing materials or other wastes such as drums, organic wastes or animal carcasses elsewhere within discrete deposits is possible if unrecorded waste disposal activities have been carried out.

10.4.13. Given the size of the site, and assuming that no further anecdotal evidence or official records of potential contamination sources are identified by further consultation, small deposits are unlikely to be identified by any intrusive site investigations and appropriate training of construction operatives and supervisors during development is probably the most effective means of ensuring any such constraints are identified, although the risk is considered low. Managing the contamination that has been identified to date will probably be relatively straightforward and involve sequestering the impacted material at depths, and in locations, where future disturbance would not be anticipated (outside gardens, utility corridors etc.), this would normally form part of an agreed Remediation Strategy and be carried out under the provisions of a Materials Management Plan in accordance with the 'Definition of Waste: Development industry Code of Practice'.

10.4.14. An ecological survey will be required. Consideration of noise and air quality impacts on the development from the surrounding major road infrastructure and local air pollution controls is likely to be required as is assessment of the environmental impact from the development itself. However, an air quality assessment is likely to be mandatory in any case as the site is within an Air Quality Management Area. If the development is above a specific threshold number of dwellings or area, these elements will have to form part of a wider Environmental Impact Assessment.

10.5. Limitations

10.5.1. The scope of assessment was selected on the basis of the available development proposals by the client, and may be inappropriate to another form of development or scheme. SGP reserves the right to alter any of the foregoing information in the event of new information being disclosed or provided and in the light of changes to legislation, guidelines and responses by the statutory and regulatory authorities.

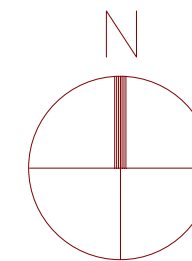
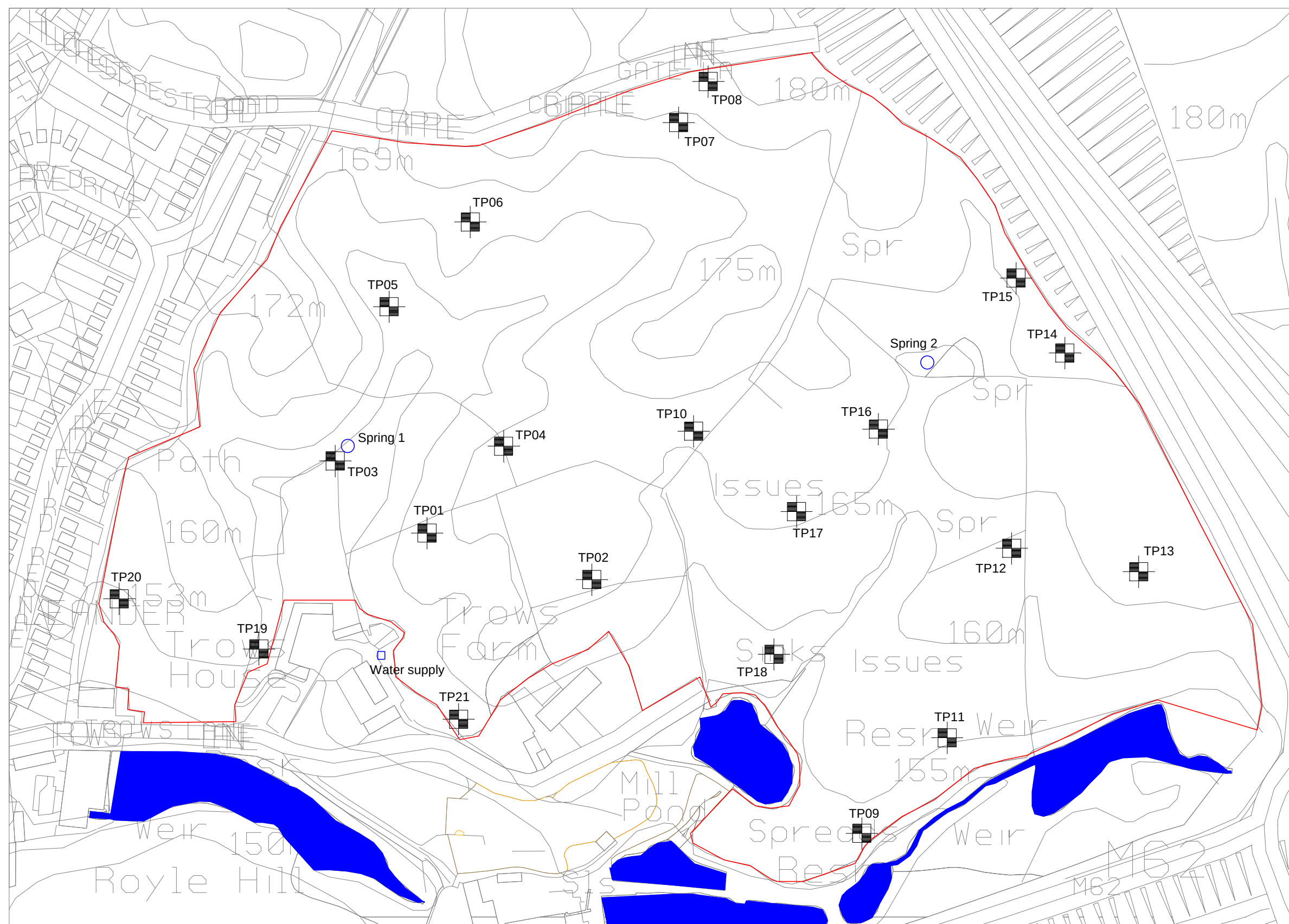
10.5.2. This report partially reviews and relies upon information provided by others. Smith Grant LLP accepts no responsibility for advice given on the basis of incorrect factual information provided

to it.

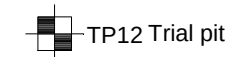
10.5.3. This report has been prepared by Smith Grant LLP, for the sole and exclusive use of GLP Ltd & Barratt Homes. The benefit of this report may not be assigned to any other party without the prior agreement in writing of Smith Grant LLP. Reasonable skill, care and diligence have been exercised within the timescale and budget available, and in accordance with the technical requirements of the brief.

10.5.4. Notwithstanding the efforts made by the professional team in undertaking the assessment and preparing this report, it is possible that other ground conditions and contamination as yet undetected may exist. Reliance on the findings of this report must therefore be limited accordingly. Such reliance must be based on the whole report and not on extracts which may lead to incomplete or incorrect conclusions when taken out of context.

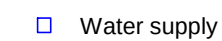
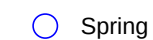
DRAWINGS



Locations of exploratory holes:



Water sampling:



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Project:

Cowm Top, Castleton

Drawing:
SGP Site Investigation Locations

Drawn:	CS	Checked:	BJT
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Date: 08/07/16	Scale: 1:2,500 @ A3
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Job No:	Drg No:
R2228	001



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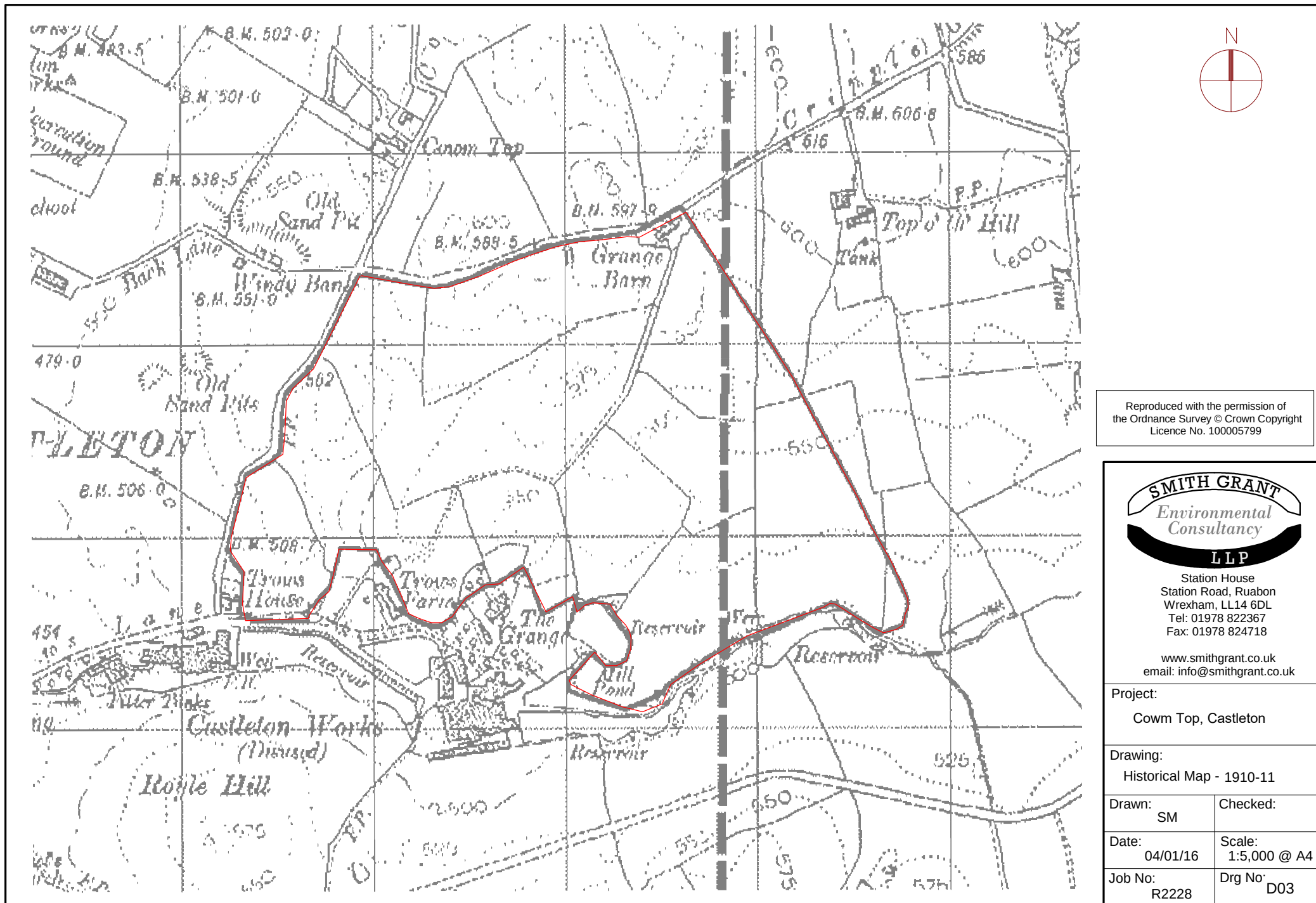
Cowm Top, Castleton

Historical Map -1851

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Drg No:	D02
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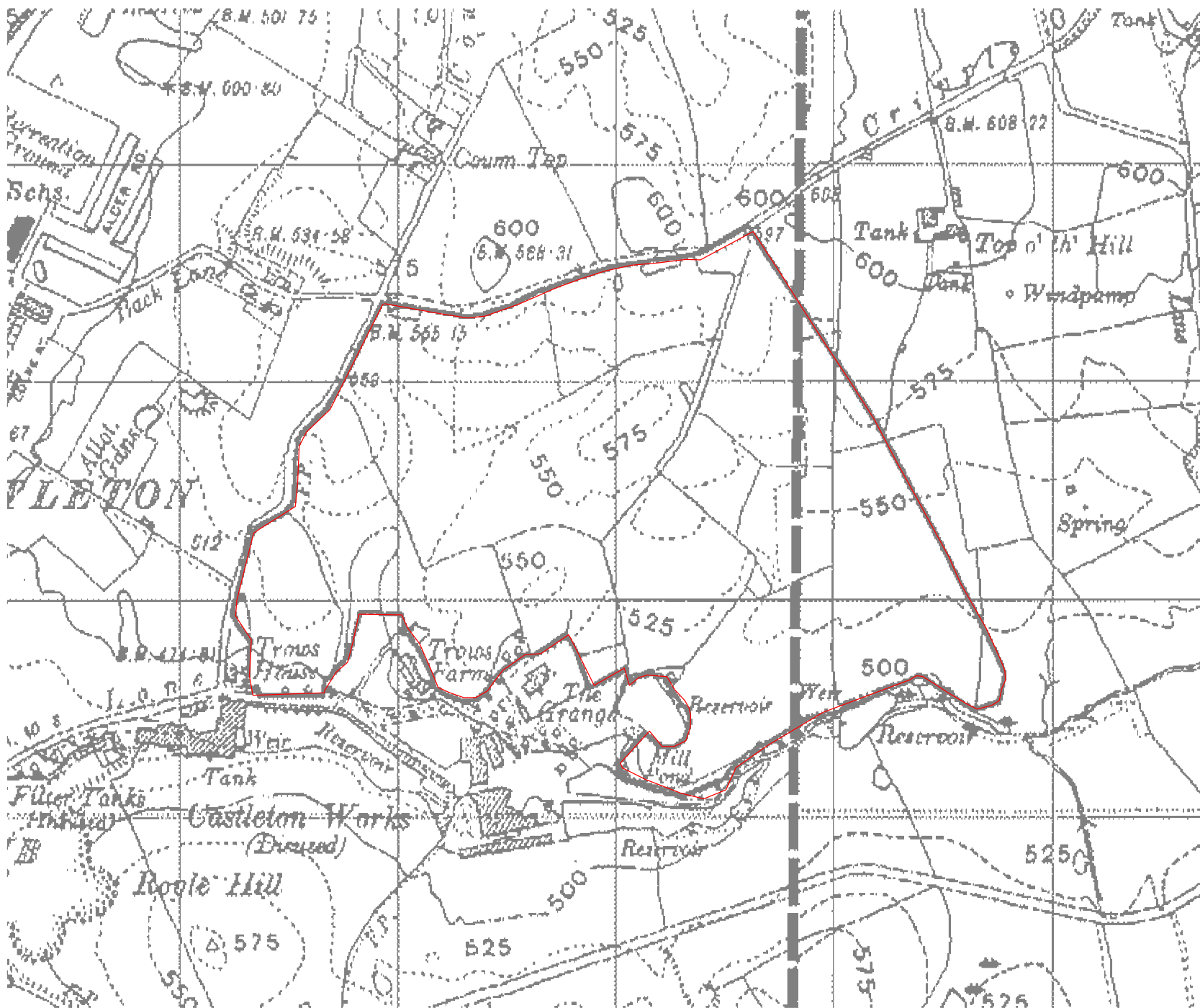
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Project:
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Drawing:
Historical Map - 1910-11

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Project:

Cwm Top, Castleton

Drawing:

Historical Map - 1938

Drawn:

SM

Checked:

Date:

04/01/16

Scale:

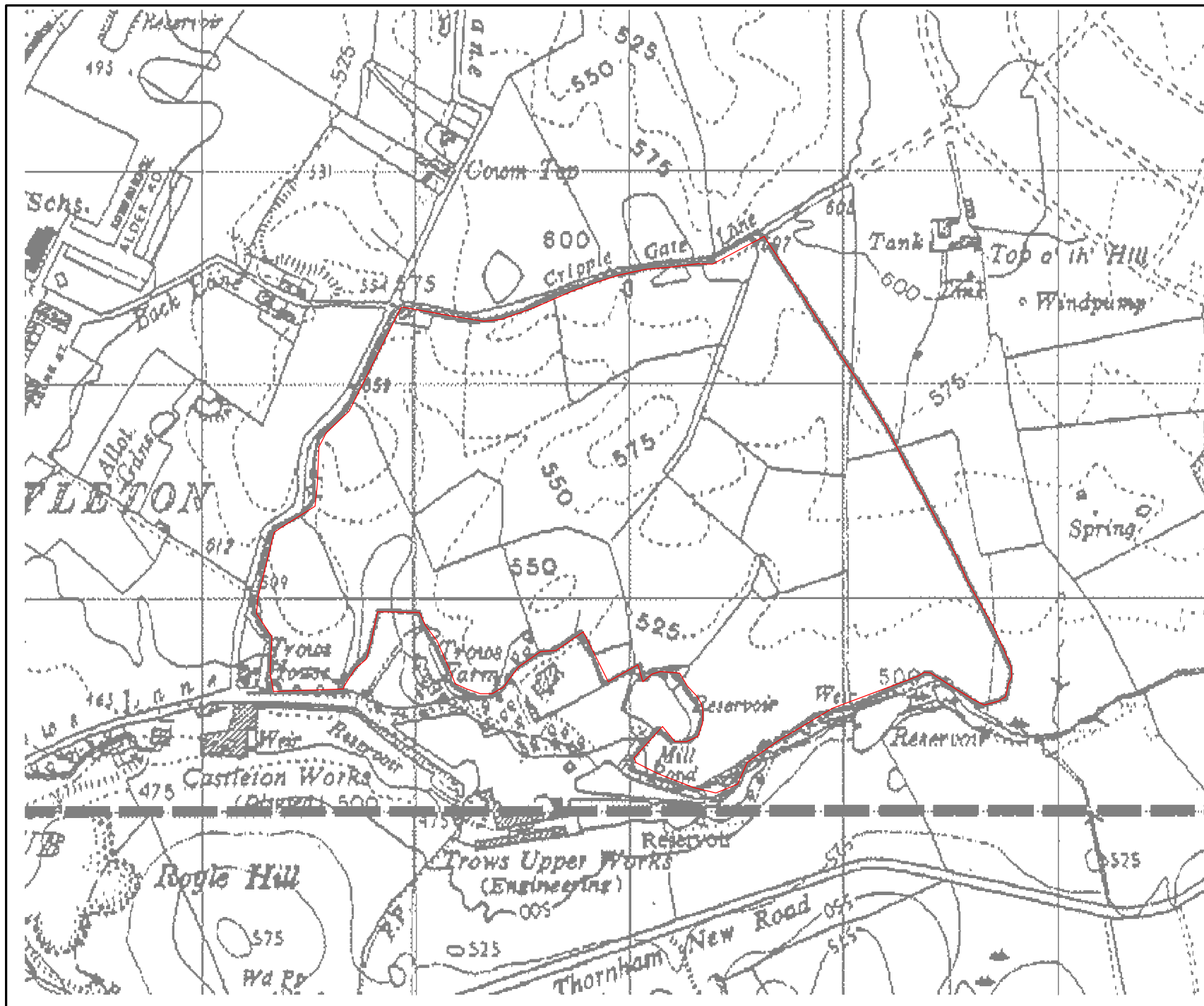
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Job No:

R2228

Drg No:

D04



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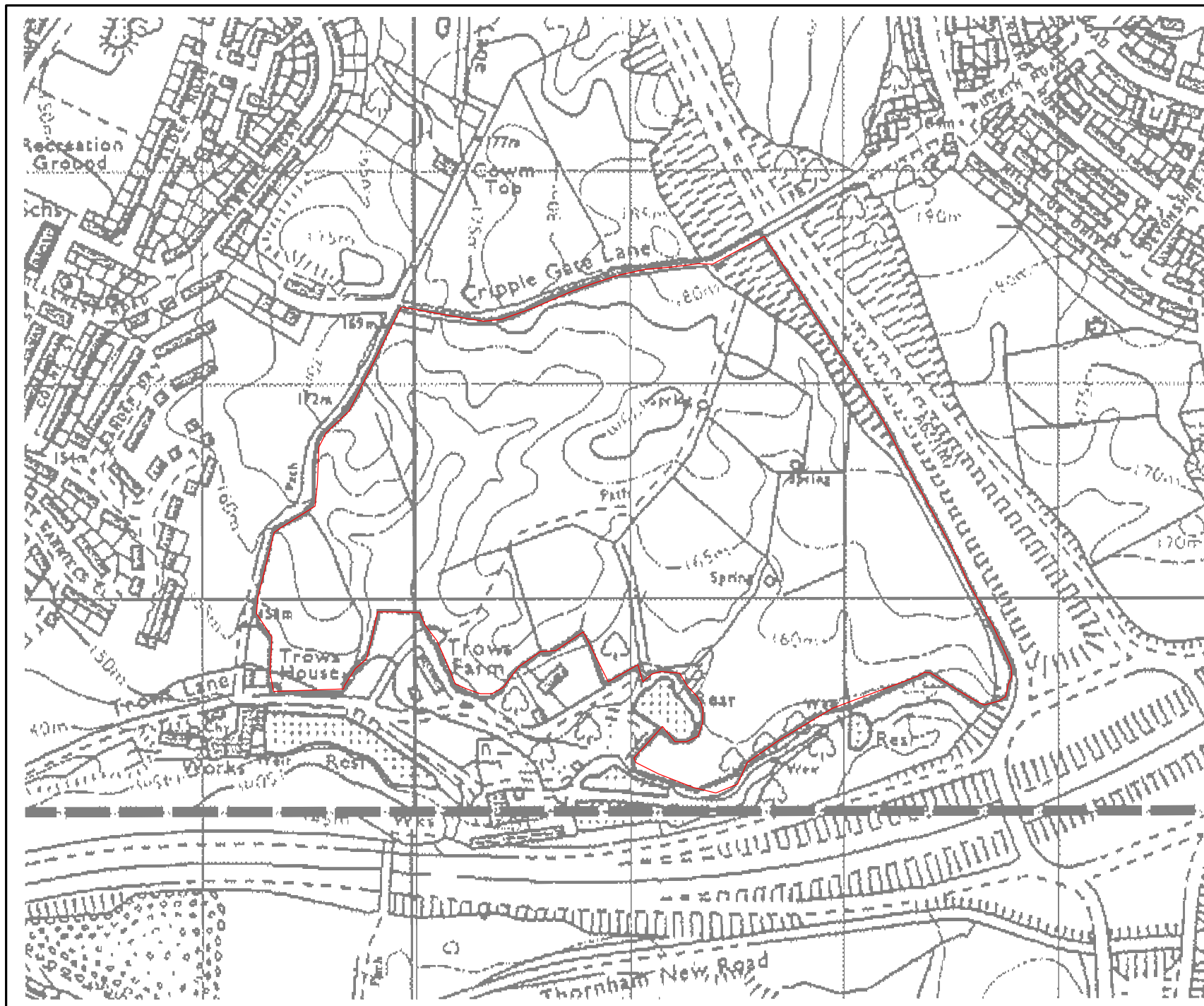
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Project:
Cwm Top, Castleton

Drawing:
Historical Map - 1956

Drawn: SM	Checked:
Date: 04/01/16	Scale: 1:5,000 @ A4
Job No: R2228	Drg No: D05



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Project:

Cowm Top, Castleton

Drawing:

Historical Map - 1975-79

Drawn:

SM

Checked:

Date:

04/01/16

Scale:

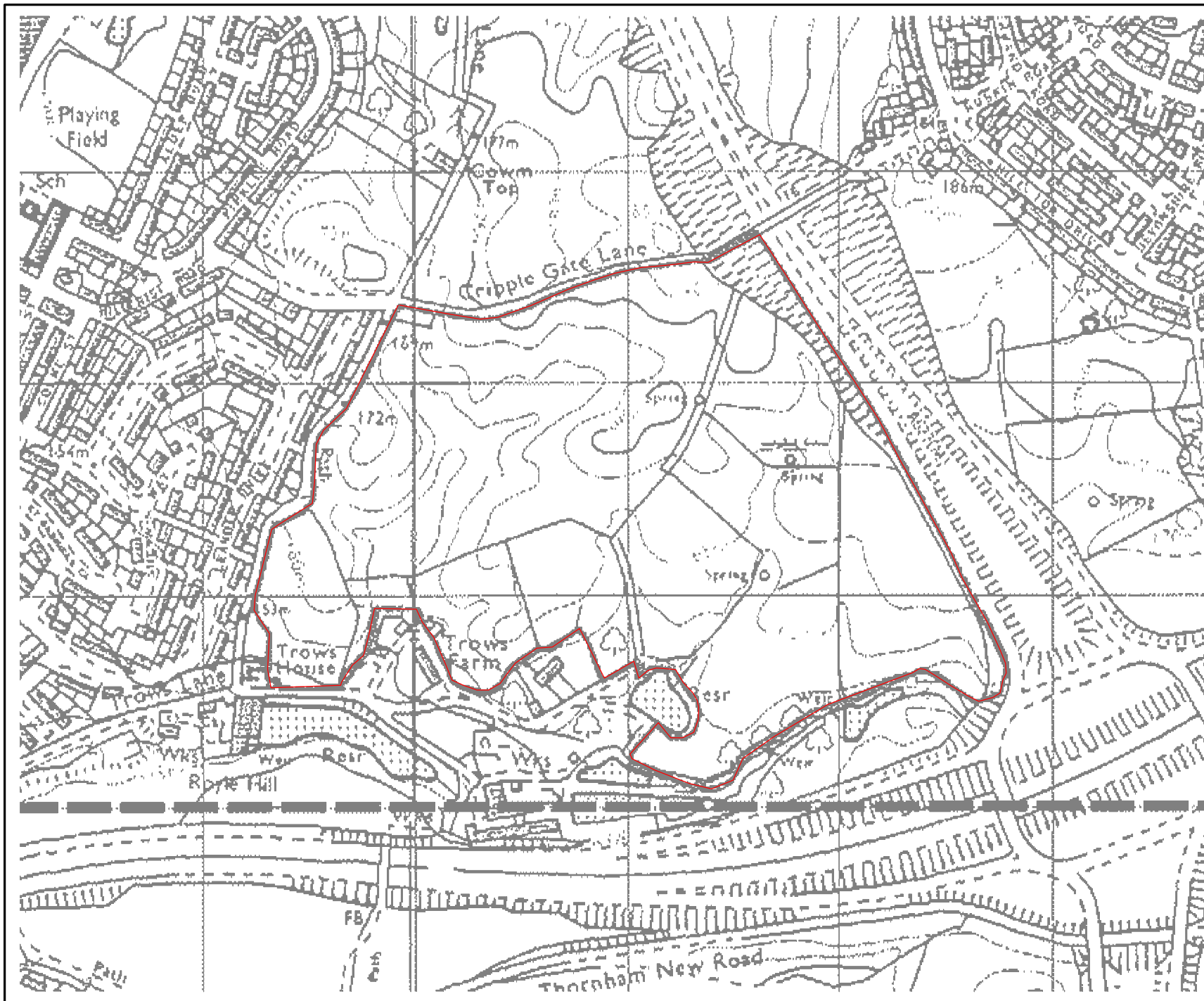
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Job No:

R2228

Drg No:

D06



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Project:

Cwm Top, Castleton

Drawing:

Historical Map - 1983-88

Drawn:

SM

Checked:

Date:

04/01/16

Scale:

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Job No:

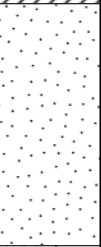
R2228

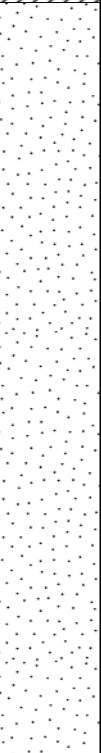
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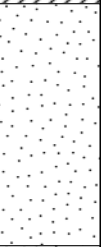
APPENDIX A

Trial Pits Logs and Photographs

SHEET: 1 of 1	LOCATION: See Plan	PROJECT: Cowm Top, Castleton	ENGINEER: CS		JOB NO. R2228	TRIAL PIT NO. TP01
		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: GLP Ltd & Barratt Homes		DATE: 28-30 June 2016	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
			0	Black slightly clayey sandy TOPSOIL with rootlets.		
			0.4	Slightly clayey slightly gravelly SAND. Gravel is fine to coarse subangular to subrounded sandstone (HUMMOCKY GLACIAL DEPOSITS).		
			1.2	Light brown laminated silty SAND (HUMMOCKY GLACIAL DEPOSITS).		
				Base of excavation at 2.9m.		
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk		GROUND WATER: No groundwater encountered				
		REMARKS: Sidewalls stable				
		J: jar sample D: small disturbed sample B: bulk disturbed sample				
SCALE: 1:250		LOGGED BY: CS		FIGURE NO. 1		

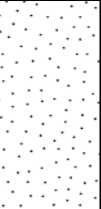
SHEET: 1 of 1	LOCATION: See Plan	PROJECT: Cowm Top, Castleton	ENGINEER: CS		JOB NO. R2228	TRIAL PIT NO. TP02
		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: GLP Ltd & Barratt Homes		DATE: 28-30 June 2016	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
0.2	J1		0	Blackish dark grey slightly clayey sandy TOPSOIL with rootlets.		
			0.3	Light brown weathered reddish brown occasionally laminated fine SAND locally slightly cemented locally with lenses of brown clay (HUMMOCKY GLACIAL DEPOSITS).		
				Base of excavation at 2.8m.		
 SMITH GRANT <i>Environmental Consultancy</i> LLP Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk GROUND WATER: No groundwater encountered REMARKS: Sidewalls stable J: jar sample D: small disturbed sample B: bulk disturbed sample SCALE: 1:250 LOGGED BY: CS FIGURE NO. 1						

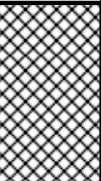
SHEET: 1 of 1	LOCATION: See Plan	PROJECT: Cowm Top, Castleton	ENGINEER: CS	JOB NO. R2228	TRIAL PIT NO. TP03
		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: GLP Ltd & Barratt Homes	DATE: 28-30 June 2016	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
	J1		0	Black clayey slightly sandy TOPSOIL with rootlets.	
0.3			0.1	MADE GROUND:Black sandy GRAVEL of slag, clinker and brick with ash.	
	1.1		Very soft light grey slightly gravelly CLAY. Gravel is fine to coarse subangular to subrounded sandstone (ALLUVIUM).		
1.3	D		1.5	Light brown fine SAND locally with lenses of brown clay (HUMMOCKY GLACIAL DEPOSITS).	
				Base of excavation at 3m.	
 SMITH GRANT <i>Environmental Consultancy</i> LLP Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk GROUND WATER: Inflow of water at 1.8m REMARKS: Side walls collapsing below groundwater inflow. J: jar sample D: small disturbed sample B: bulk disturbed sample SCALE: 1:250 LOGGED BY: CS FIGURE NO. 1					

SHEET: 1 of 1	LOCATION: See Plan	PROJECT: Cowm Top, Castleton	ENGINEER: CS		JOB NO. R2228	TRIAL PIT NO. TP04
		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: GLP Ltd & Barratt Homes		DATE: 28-30 June 2016	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
0.8	B		0	Blackish dark grey slightly gravelly sandy TOPSOIL with rootlets and occasional roots.		
			0.4	Light brown slightly gravelly SAND. Gravel is fine to coarse subrounded sandstone (HUMMOCKY GLACIAL DEPOSITS).		
			1.2	Light brown locally slightly cemented fine SAND (HUMMOCKY GLACIAL DEPOSITS).		
				Base of excavation at 2.8m.		
 SMITH GRANT Environmental Consultancy LLP Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk GROUND WATER: No groundwater encountered REMARKS: Sidewalls stable J: jar sample D: small disturbed sample B: bulk disturbed sample SCALE: 1:250 LOGGED BY: CS FIGURE NO. 1						

SHEET: 1 of 1	LOCATION: See Plan	PROJECT: Cowm Top, Castleton	ENGINEER: CS		JOB NO. R2228	TRIAL PIT NO. TP05
		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: GLP Ltd & Barratt Homes		DATE: 28-30 June 2016	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
0.6	D		0	Very soft blackish dark grey clayey TOPSOIL with rootlets.		
			0.4	Very soft light grey weathered orangish brown slightly gravelly sandy CLAY. Gravel is fine to coarse subrounded sandstone (ALLUVIUM).		
			1.2	Light brown locally slightly cemented fine SAND (HUMMOCKY GLACIAL DEPOSITS).		
				Excavation finished at 2.6m due to sidewalls collapse.		
 SMITH GRANT <i>Environmental Consultancy</i> LLP Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk GROUND WATER: Groundwater inflow between 0.6m and 1.3m. Groundwater at 2.4m after 10min. REMARKS: Sidewalls collapsing below 0.6m. J: jar sample D: small disturbed sample B: bulk disturbed sample SCALE: 1:250 LOGGED BY: CS FIGURE NO. 1						

SHEET: 1 of 1	LOCATION: See Plan	PROJECT: Cowm Top, Castleton	ENGINEER: CS		JOB NO. R2228	TRIAL PIT NO. TP06
		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: GLP Ltd & Barratt Homes		DATE: 28-30 June 2016	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
0.1	J1		0	Blackish dark grey sandy clayey TOPSOIL with rootlets.		
			0.4	Firm becoming stiff light grey weathered orangish brown slightly gravelly slightly sandy CLAY with partings of sand. Gravel is fine to coarse subangular sandstone (HUMMOCKY GLACIAL DEPOSITS).		
1.1	B		1.3	Stiff light grey slightly gravelly slightly sandy CLAY. Gravel is fine to coarse subangular sandstone, occasionally coal (HUMMOCKY GLACIAL DEPOSITS).		
				Difficult excavation at 2.5m due to clay stiffness. Finished at 2.5m.		
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk		GROUND WATER: No groundwater encountered				
		REMARKS: Sidewalls stable				
		J: jar sample D: small disturbed sample B: bulk disturbed sample				
SCALE: 1:250		LOGGED BY: CS		FIGURE NO. 1		

SHEET: 1 of 1	LOCATION: See Plan	PROJECT: Cowm Top, Castleton	ENGINEER: CS		JOB NO. R2228	TRIAL PIT NO. TP07
		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: GLP Ltd & Barratt Homes		DATE: 28-30 June 2016	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
0.1	J1		0	Blackish dark grey slightly clayey sandy TOPSOIL with rootlets.		
	D		0.3	Light grey weathered reddish brown slightly gravelly slightly clayey fine SAND with lenses of brown locally stained black clay. Gravel is fine to coarse subrounded sandstone (HUMMOCKY GLACIAL DEPOSITS).		
0.6			1	Firm reddish brown slightly gravelly slightly sandy CLAY. Gravel is fine to coarse subrounded sandstone (HUMMOCKY GLACIAL DEPOSITS).		
				Base of excavation at 3m.		
 SMITH GRANT Environmental Consultancy LLP Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk GROUND WATER: No groundwater encountered REMARKS: Sidewalls stable J: jar sample D: small disturbed sample B: bulk disturbed sample SCALE: 1:250 LOGGED BY: CS FIGURE NO. 1						

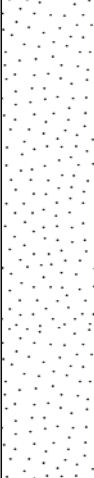
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		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: GLP Ltd & Barratt Homes		DATE: 28-30 June 2016	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND	
0.2	J1		0	MADE GROUND: Brown sand with rags, gravel of brick and wood.		
0.7	D		0.6	MADE GROUND: Gravel of slag and brick, bottle glas, nails, iron frames, shoe soles and rags.		
			2.2	Very soft to soft light grey laminated yellowish grey slightly gravelly CLAY (POSSIBLE FILL).		
				Base of excavation at 3.1m.		
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GROUND WATER: No groundwater encountered REMARKS: Sidewalls unstable within Made Ground J: jar sample D: small disturbed sample B: bulk disturbed sample						
SCALE: 1:250		LOGGED BY: CS		FIGURE NO. 1		

SHEET: 1 of 1	LOCATION: See Plan	PROJECT: Cowm Top, Castleton	ENGINEER: CS		JOB NO. R2228	TRIAL PIT NO. TP09
		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: GLP Ltd & Barratt Homes		DATE: 28-30 June 2016	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
0.9	B		0	Blackish dark grey slightly clayey slightly gravelly sandy TOPSOIL.		
			0.3	Light brown sandy GRAVEL. Gravel is fine to coarse subrounded sandstone and limestone (HUMMOCKY GLACIAL DEPOSIT).		
			1.1	Light brown slightly gravelly SAND. Gravel is fine to coarse subrounded sandstone and limestone (HUMMOCKY GLACIAL DEPOSIT).		
				Base of excavation at 2.8m.		
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk GROUND WATER: Seepage in sand at 2.7m. REMARKS: Sidewalls stable J: jar sample D: small disturbed sample B: bulk disturbed sample						
SCALE: 1:250			LOGGED BY: CS		FIGURE NO. 1	

SHEET: 1 of 1	LOCATION: See Plan	PROJECT: Cowm Top, Castleton	ENGINEER: CS		JOB NO. R2228	TRIAL PIT NO. TP10
		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: GLP Ltd & Barratt Homes		DATE: 28-30 June 2016	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
1.3	B		0	Very soft blackish dark grey clayey TOPSOIL.		
			0.7	Light brown slightly gravelly SAND. Gravel is fine to coarse subangular to subrounded sandstone (HUMMOCKY GLACIAL DEPOSIT).		
			1.7	Orangish light brown locally stained black fine SAND (HUMMOCKY GLACIAL DEPOSIT).		
				Base of excavation at 3.2m.		
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk		GROUND WATER: Seepage from 2m.				
		REMARKS: Sidewalls collapsing from 0.3m.				
		SCALE: 1:250	LOGGED BY: CS		FIGURE NO. 1	

J: jar sample
D: small disturbed sample
B: bulk disturbed sample

SHEET: 1 of 1	LOCATION: See Plan	PROJECT: Cowm Top, Castleton	ENGINEER: CS	JOB NO. R2228	TRIAL PIT NO. TP11
		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: GLP Ltd & Barratt Homes	DATE: 28-30 June 2016	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
0.1	J1		0	Black slightly clayey sandy TOPSOIL with rootlets.	
			0.25	Light brown slightly gravelly SAND. Gravel is fine to coarse subangular to subrounded sandstone (HUMMOCKY GLACIAL DEPOSIT).	
1.6	D			Base of excavation at 2.7m.	
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk		GROUND WATER: No groundwater encountered REMARKS: Sidewalls stable J: jar sample D: small disturbed sample B: bulk disturbed sample			
SCALE: 1:250		LOGGED BY: CS		FIGURE NO. 1	

SHEET: 1 of 1	LOCATION: See Plan	PROJECT: Cowm Top, Castleton	ENGINEER: CS	JOB NO. R2228	TRIAL PIT NO. TP12
		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: GLP Ltd & Barratt Homes	DATE: 28-30 June 2016	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
	D		0	Blackish dark grey sandy clayey TOPSOIL with rootlets.	
			0.4	Soft becoming firm light grey weathered brown sandy CLAY with partings of sand and occasional gravel (HUMMOCKY GLACIAL DEPOSIT).	
0.9			1.1	Light brown locally stained black SAND (HUMMOCKY GLACIAL DEPOSIT).	
				Base of excavation at 2.7m.	



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GROUND WATER:
No groundwater encountered

REMARKS:
Sidewalls stable

J: jar sample
D: small disturbed sample
B: bulk disturbed sample

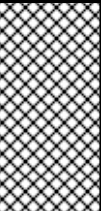
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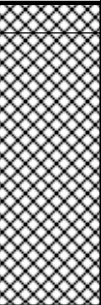
LOGGED BY: **CS**

FIGURE NO. **1**

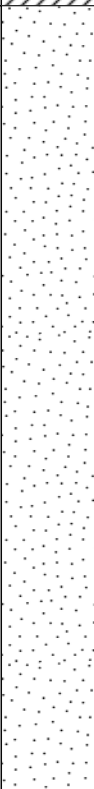
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		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: GLP Ltd & Barratt Homes		DATE: 28-30 June 2016	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
0	J1		0	MADE GROUND: Black slightly clayey sandy TOPSOIL with rootlets.		
0.3			0.1	MADE GROUND: Greyish brown slightly sandy slightly gravelly CLAY. Gravel is angular brick.		
	D					
			1.8	Very soft grey slightly gravelly CLAY. Gravel is fine to coarse subrounded sandstone (POSSIBLE FILL).		
3				Base of excavation at 3.4m.		
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk		GROUND WATER: No groundwater encountered				
		REMARKS: Sidewalls stable				
		SCALE: 1:250 LOGGED BY: CS FIGURE NO. 1				

J: jar sample
D: small disturbed sample
B: bulk disturbed sample

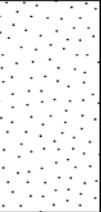
SHEET: 1 of 1	LOCATION: See Plan	PROJECT: Cowm Top, Castleton	ENGINEER: CS		JOB NO. R2228	TRIAL PIT NO. TP14
		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: GLP Ltd & Barratt Homes		DATE: 28-30 June 2016	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
1.5	B		0	MADE GROUND: Blackish dark grey slightly gravelly TOPSOIL. Gravel is sandstone and ceramic.		
			0.7	Reddish brown locally stained black SAND (HUMMOCKY GLACIAL DEPOSIT).		
			1.6	Light brown sandy fine to coarse subrounded GRAVEL of sandstone with boulders ((HUMMOCKY GLACIAL DEPOSIT).		
			2.1	Brown fine SAND (HUMMOCKY GLACIAL DEPOSIT).		
				Base of excavation at 3m.		
 SMITH GRANT Environmental Consultancy LLP Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk GROUND WATER: No groundwater encountered REMARKS: Sidewalls stable SCALE: 1:250 LOGGED BY: CS FIGURE NO. 1 J: jar sample D: small disturbed sample B: bulk disturbed sample						

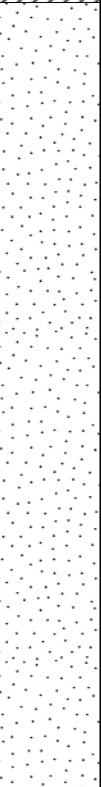
SHEET: 1 of 1	LOCATION: See Plan	PROJECT: Cowm Top, Castleton	ENGINEER: CS	JOB NO. R2228	TRIAL PIT NO. TP15
		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: GLP Ltd & Barratt Homes	DATE: 28-30 June 2016	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
0	J1		0	MADE GROUND: Blackish dark grey slightly gravelly TOPSOIL. Gravel is fine to medium subangular sandstone. MADE GROUND: Blackish dark brown slightly gravelly CLAY. Gravel is brick, ceramic and bits of decayed wood.	
0.3			0.1		
1.3	D		1	Light brown slightly clayey gravelly SAND. Gravel is fine to coarse subrounded sandstone (HUMMOCKY GLACIAL DEPOSIT).	
				Base of excavation at 2.8m.	
 SMITH GRANT Environmental Consultancy LLP Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk GROUND WATER: No groundwater encountered REMARKS: Sidewalls stable J: jar sample D: small disturbed sample B: bulk disturbed sample SCALE: 1:250 LOGGED BY: CS FIGURE NO. 1					

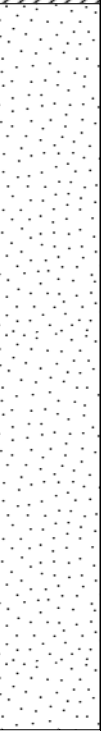
SHEET: 1 of 1	LOCATION: See Plan	PROJECT: Cowm Top, Castleton	ENGINEER: CS		JOB NO. R2228	TRIAL PIT NO. TP16
		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: GLP Ltd & Barratt Homes		DATE: 28-30 June 2016	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
1	B		0	Black slightly clayey sandy TOPSOIL with rootlets.		
			0.4	Light grey slightly gravelly SAND with lenses of clayey sand. Gravel is fine to coarse subrounded sandstone (HUMMOCKY GLACIAL DEPOSIT).		
			1.6	Light brown SAND with lenses of firm orangish brown clay (HUMMOCKY GLACIAL DEPOSIT).		
				Base of excavation at 3m.		
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk GROUND WATER: Seepages observed at 0.8m, 1.3m and 1.8m REMARKS: Sidewalls unstable because of seepage J: jar sample D: small disturbed sample B: bulk disturbed sample SCALE: 1:250 LOGGED BY: CS FIGURE NO. 1						

SHEET: 1 of 1	LOCATION: See Plan	PROJECT: Cowm Top, Castleton	ENGINEER: CS	JOB NO. R2228	TRIAL PIT NO. TP17
		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: GLP Ltd & Barratt Homes	DATE: 28-30 June 2016	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
0.1	J1		0	Blackish dark grey slightly clayey sandy TOPSOIL	
			0.4	Light brown locally stained dark brown locally slightly cemented SAND (HUMMOCKY GLACIAL DEPOSIT).	
1.1	D			Base of excavation at 3m.	
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk		GROUND WATER: No groundwater encountered			
		REMARKS: Sidewalls stable			
		SCALE: 1:250	LOGGED BY: CS	FIGURE NO. 1	
		J: jar sample D: small disturbed sample B: bulk disturbed sample			

SHEET: 1 of 1	LOCATION: See Plan	PROJECT: Cowm Top, Castleton	ENGINEER: CS		JOB NO. R2228	TRIAL PIT NO. TP18
		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: GLP Ltd & Barratt Homes		DATE: 28-30 June 2016	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND	
0.1	J1		0	Blackish dark grey slightly clayey sandy TOPSOIL with tree roots and rootlets.		
			0.3	Light brown gravelly SAND with partings of clayey sand. Gravel is fine to coarse subrounded sandstone (HUMMOCKY GLACIAL DEPOSIT).		
1	B		1.5	Stiff light brown to light grey CLAY (HUMMOCKY GLACIAL DEPOSIT).		
2.5	B			Base of excavation at 2.8m.		
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk		GROUND WATER: No groundwater encountered				
		REMARKS: Sidewalls stable				
		J: jar sample D: small disturbed sample B: bulk disturbed sample				
SCALE: 1:250		LOGGED BY: CS		FIGURE NO. 1		

SHEET: 1 of 1	LOCATION: See Plan	PROJECT: Cowm Top, Castleton	ENGINEER: CS		JOB NO. R2228	TRIAL PIT NO. TP19
		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: GLP Ltd & Barratt Homes		DATE: 28-30 June 2016	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
1.4	B		0	Dark brown slightly gravelly sandy TOPSOIL with rootlets.		
			0.4	Light brown gravelly SAND. Gravel is fine to coarse subrounded sandstone (HUMMOCKY GLACIAL DEPOSIT).		
			2.4	Light brown slightly gravelly SAND. Gravel is fine to coarse subrounded sandstone (HUMMOCKY GLACIAL DEPOSIT).		
				Base of excavation at 3.1m.		
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk GROUND WATER: No groundwater encountered REMARKS: Sidewalls stable J: jar sample D: small disturbed sample B: bulk disturbed sample SCALE: 1:250 LOGGED BY: CS FIGURE NO. 1						

SHEET: 1 of 1	LOCATION: See Plan	PROJECT: Cowm Top, Castleton	ENGINEER: CS		JOB NO. R2228	TRIAL PIT NO. TP20
		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: GLP Ltd & Barratt Homes		DATE: 28-30 June 2016	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
1	D		0	Blackish dark brown slightly gravelly sandy TOPSOIL.		
			0.3	Dark brown becoming light brown gravelly SAND. Gravel is fine to coarse subrounded sandstone and limestone (HUMMOCKY GLACIAL DEPOSIT).		
				Base of excavation at 2.9m.		
 SMITH GRANT <i>Environmental Consultancy</i> LLP Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk GROUND WATER: No groundwater encountered REMARKS: Sidewalls stable J: jar sample D: small disturbed sample B: bulk disturbed sample SCALE: 1:250 LOGGED BY: CS FIGURE NO. 1						

SHEET: 1 of 1	LOCATION: See Plan	PROJECT: Cowm Top, Castleton	ENGINEER: CS		JOB NO. R2228	TRIAL PIT NO. TP21
		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: GLP Ltd & Barratt Homes		DATE: 28-30 June 2016	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
1.5	D		0	Blackish dark brown slightly gravelly sandy TOPSOIL.		
			0.4	Light brown gravelly becoming slightly gravelly SAND. Gravel is fine to coarse subrounded sandstone and limestone (HUMMOCKY GLACIAL DEPOSIT).		
				Base of excavation at 2.8m.		
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk GROUND WATER: No groundwater encountered REMARKS: Sidewalls stable J: jar sample D: small disturbed sample B: bulk disturbed sample SCALE: 1:250 LOGGED BY: CS FIGURE NO. 1						

TP01



TP01



TP02



TP02



TP03



TP04



TP05



TP06



TP07



TP07



TP08



TP08



TP09



TP10



TP11



TP12



TP13



TP14



TP15



TP16



TP17



TP18



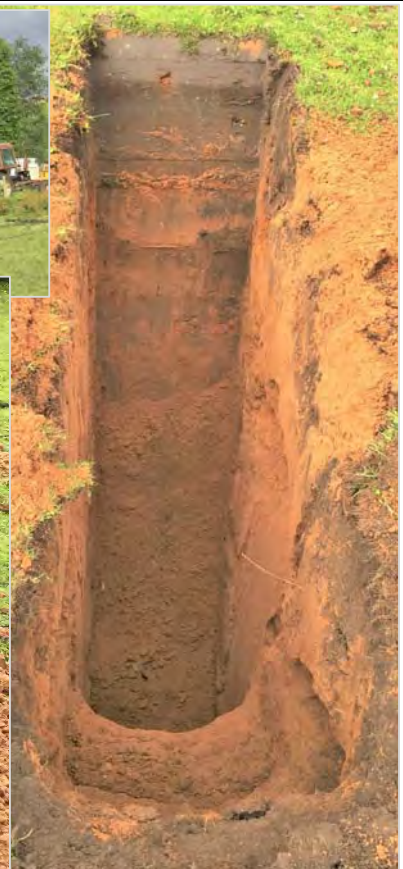
TP19



TP20



TP21



APPENDIX B

Envirocheck Report

Envirocheck[®] Report:

Datasheet

Order Details:

Order Number:

77317590_1_1

Customer Reference:

R2228

National Grid Reference:

389200, 410260

Slice:

A

Site Area (Ha):

21.43

Search Buffer (m):

500

Site Details:

Site at 389190, 410260

Client Details:

Mr S Miller
Smith Grant Partnership
Station House
Station Road
Ruabon
Wrexham
LL14 6DL

Report Section	Page Number
Summary	-
Agency & Hydrological	1
Waste	9
Hazardous Substances	-
Geological	10
Industrial Land Use	16
Sensitive Land Use	17
Data Currency	18
Data Suppliers	22
Useful Contacts	23

Introduction

The Environment Act 1995 has made site sensitivity a key issue, as the legislation pays as much attention to the pathways by which contamination could spread, and to the vulnerable targets of contamination, as it does the potential sources of contamination. For this reason, Landmark's Site Sensitivity maps and Datasheet(s) place great emphasis on statutory data provided by the Environment Agency/Natural Resources Wales and the Scottish Environment Protection Agency; it also incorporates data from Natural England (and the Scottish and Welsh equivalents) and Local Authorities; and highlights hydrogeological features required by environmental and geotechnical consultants. It does not include any information concerning past uses of land. The datasheet is produced by querying the Landmark database to a distance defined by the client from a site boundary provided by the client.

In the attached datasheet the National Grid References (NGRs) are rounded to the nearest 10m in accordance with Landmark's agreements with a number of Data Suppliers.

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Radon Potential dataset Copyright Notice

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Report Version v50.0

Data Type	Page Number	On Site	0 to 250m	251 to 500m (*up to 1000m)
Agency & Hydrological				
Contaminated Land Register Entries and Notices				
Discharge Consents				
Enforcement and Prohibition Notices				
Integrated Pollution Controls	pg 1			2
Integrated Pollution Prevention And Control				
Local Authority Integrated Pollution Prevention And Control				
Local Authority Pollution Prevention and Controls	pg 1		3	1
Local Authority Pollution Prevention and Control Enforcements				
Nearest Surface Water Feature	pg 1	Yes		
Pollution Incidents to Controlled Waters				
Prosecutions Relating to Authorised Processes				
Prosecutions Relating to Controlled Waters				
Registered Radioactive Substances				
River Quality	pg 1			1
River Quality Biology Sampling Points				
River Quality Chemistry Sampling Points				
Substantiated Pollution Incident Register				
Water Abstractions	pg 2			(*3)
Water Industry Act Referrals				
Groundwater Vulnerability	pg 2	Yes	n/a	n/a
Bedrock Aquifer Designations	pg 2	Yes	n/a	n/a
Superficial Aquifer Designations	pg 2	Yes	n/a	n/a
Source Protection Zones				
Extreme Flooding from Rivers or Sea without Defences				n/a
Flooding from Rivers or Sea without Defences				n/a
Areas Benefiting from Flood Defences				n/a
Flood Water Storage Areas				n/a
Flood Defences				n/a
Detailed River Network Lines	pg 3	Yes	Yes	Yes
Detailed River Network Offline Drainage				

Data Type	Page Number	On Site	0 to 250m	251 to 500m (*up to 1000m)
Waste				
BGS Recorded Landfill Sites				
Historical Landfill Sites				
Integrated Pollution Control Registered Waste Sites				
Licensed Waste Management Facilities (Landfill Boundaries)				
Licensed Waste Management Facilities (Locations)				
Local Authority Recorded Landfill Sites				
Registered Landfill Sites				
Registered Waste Transfer Sites				
Registered Waste Treatment or Disposal Sites				
Hazardous Substances				
Control of Major Accident Hazards Sites (COMAH)				
Explosive Sites				
Notification of Installations Handling Hazardous Substances (NIHHS)				
Planning Hazardous Substance Consents				
Planning Hazardous Substance Enforcements				
Geological				
BGS 1:625,000 Solid Geology	pg 10	Yes	n/a	n/a
BGS Estimated Soil Chemistry	pg 10	Yes	Yes	Yes
BGS Recorded Mineral Sites	pg 13		3	1
BGS Urban Soil Chemistry				
BGS Urban Soil Chemistry Averages				
Brine Compensation Area			n/a	n/a
Coal Mining Affected Areas	pg 14	Yes	n/a	n/a
Mining Instability	pg 14	Yes	n/a	n/a
Man-Made Mining Cavities				
Natural Cavities				
Non Coal Mining Areas of Great Britain				n/a
Potential for Collapsible Ground Stability Hazards	pg 14	Yes	Yes	n/a
Potential for Compressible Ground Stability Hazards	pg 14		Yes	n/a
Potential for Ground Dissolution Stability Hazards				n/a
Potential for Landslide Ground Stability Hazards	pg 14	Yes	Yes	n/a
Potential for Running Sand Ground Stability Hazards	pg 14	Yes	Yes	n/a
Potential for Shrinking or Swelling Clay Ground Stability Hazards	pg 14	Yes	Yes	n/a
Radon Potential - Radon Affected Areas			n/a	n/a
Radon Potential - Radon Protection Measures			n/a	n/a

Data Type	Page Number	On Site	0 to 250m	251 to 500m (*up to 1000m)
Industrial Land Use				
Contemporary Trade Directory Entries (50m)	pg 16		4	n/a
Fuel Station Entries				
Sensitive Land Use				
Areas of Adopted Green Belt	pg 17		1	
Areas of Unadopted Green Belt				
Areas of Outstanding Natural Beauty				
Environmentally Sensitive Areas				
Forest Parks				
Local Nature Reserves				
Marine Nature Reserves				
National Nature Reserves				
National Parks				
Nitrate Sensitive Areas				
Nitrate Vulnerable Zones	pg 17	1		
Ramsar Sites				
Sites of Special Scientific Interest				
Special Areas of Conservation				
Special Protection Areas				

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
1	Integrated Pollution Controls Name: Dale Joinery Ltd Location: Queensway, ROCHDALE, Lancashire, OL11 2PR Authority: Environment Agency, North West Region Permit Reference: AV5071 Dated: 2nd December 1996 Process Type: IPC new application Description: 6.7 A (A) Timber processes within Miscellaneous Industries Status: Authorisation superseded by a substantial or non substantial variationSuperseded Positional Accuracy: Unknown	A10NW (NW)	431	2	388705 410800
1	Integrated Pollution Controls Name: Dale Joinery Ltd Location: Queensway, ROCHDALE, Greater Manchester, OL11 2PR Authority: Environment Agency, North West Region Permit Reference: BD5771 Dated: 24th November 1998 Process Type: IPC minor (non-substantial) variation to previous variation Description: 6.7 A (A) Timber processes within Miscellaneous Industries Status: Authorisation revokedRevoked Positional Accuracy: Unknown	A10NW (NW)	435	2	388700 410800
2	Local Authority Pollution Prevention and Controls Name: Lew Diecasting Ltd Location: Trows Lane, Castleton, ROCHDALE, Lancashire, OL11 2UF Authority: Rochdale Metropolitan Borough Council, Environmental Health Department Permit Reference: 37/05 Dated: Not Supplied Process Type: Local Authority Air Pollution Control Description: PG2/4 Iron, steel and non-ferrous metal foundry processes Status: Authorised Positional Accuracy: Manually positioned to the address or location	A6NW (SW)	52	3	388838 410073
2	Local Authority Pollution Prevention and Controls Name: Lew Diecasting Ltd Location: Trows Lane, Castleton, ROCHDALE, Lancashire, OL11 2UF Authority: Rochdale Metropolitan Borough Council, Environmental Health Department Permit Reference: 37/05 Dated: Not Supplied Process Type: Local Authority Air Pollution Control Description: PG2/3 Electrical and rotary furnaces Status: Authorised Positional Accuracy: Manually positioned to the address or location	A6NW (SW)	52	3	388838 410073
2	Local Authority Pollution Prevention and Controls Name: Lew Diecastings Ltd Location: Trows Lane, Rochdale, Lancashire, OL11 2UF Authority: Rochdale Metropolitan Borough Council, Environmental Health Department Permit Reference: 37/05 Dated: Not Supplied Process Type: Local Authority Air Pollution Control Description: PG2/8 Copper and copper alloy processes Status: Permitted Positional Accuracy: Manually positioned to the address or location	A6NW (SW)	52	3	388838 410073
3	Local Authority Pollution Prevention and Controls Name: Omc Ford Location: Manchester Road, Castleton, ROCHDALE, Lancashire, OL11 2TR Authority: Rochdale Metropolitan Borough Council, Environmental Health Department Permit Reference: 58/10 Dated: Not Supplied Process Type: Local Authority Air Pollution Control Description: PG6/34 Respraying of road vehicles Status: Authorised Positional Accuracy: Manually positioned to the address or location	A5NE (W)	374	3	388500 410026
	Nearest Surface Water Feature	A7NW (SE)	0	-	389270 410147
	River Quality Name: Rochdale Canal GQA Grade: River Quality B Reach: Qsl At Summit To Empress Processing Estimated Distance (km): 27.6 Flow Rate: Flow greater than 80 cumecs Flow Type: Canal Year: 2000	A10SW (NW)	408	2	388545 410544

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Water Abstractions Operator: Sonoco Industrial Packaging Licence Number: 2569002024 Permit Version: Not Supplied Location: Rochdale Canal, Castleton, ROCHDALE, Lancashire Authority: Environment Agency, North West Region Abstraction: Cooling Abstraction Type: Not Supplied Source: Canal Daily Rate (m3): 123 Yearly Rate (m3): 30458 Details: Licence Status: Revoked Authorised Start: Not Supplied Authorised End: Not Supplied Permit Start Date: Not Supplied Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A9SE (W)	524	2	388400 410500
	Water Abstractions Operator: Mr M Gadhi And Mr A Raazaq Licence Number: 2569002074 Permit Version: Not Supplied Location: Rochdale Canal At Queensway, Castleton, ROCHDALE, Lancashire Authority: Environment Agency, North West Region Abstraction: Boiler Feed Abstraction Type: Not Supplied Source: Canal Daily Rate (m3): 114 Yearly Rate (m3): 36368 Details: Licence Status: Revoked Authorised Start: Not Supplied Authorised End: Not Supplied Permit Start Date: Not Supplied Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A14SE (N)	722	2	389000 411200
	Water Abstractions Operator: M S Gadhi & A Raazaq Licence Number: 2569002026 Permit Version: Not Supplied Location: Borehole, Crest Mill, Queensway, ROCHDALE, Lancashire Authority: Environment Agency, North West Region Abstraction: Manufacturing Abstraction Type: Not Supplied Source: Groundwater Daily Rate (m3): 655 Yearly Rate (m3): 91829 Details: Licence Status: Revoked Authorised Start: Not Supplied Authorised End: Not Supplied Permit Start Date: Not Supplied Permit End Date: Not Supplied Positional Accuracy: Located by supplier to within 100m	A14NE (N)	817	2	389005 411300
	Groundwater Vulnerability Soil Classification: Soils of High Leaching Potential (U) - Soil information for restored mineral workings and urban areas is based on fewer observations than elsewhere. A worst case vulnerability classification (H) assumed, until proved otherwise Map Sheet: Sheet 11 South Pennines Scale: 1:100,000	A10SE (W)	0	2	388949 410341
	Groundwater Vulnerability Soil Classification: Soils of High Leaching Potential (H2) - Deep, permeable, coarse textured soils which readily transmit a wide range of pollutants because of their rapid drainage and low attenuation potential Map Sheet: Sheet 11 South Pennines Scale: 1:100,000	A6NE (N)	0	2	389200 410258
	Drift Deposits Drift Deposit: Low permeability drift deposits occurring at the surface and overlying Major and Minor Aquifers are head, clay-with-flints, brickearth, peat, river terrace deposits and marine and estuarine alluvium Map Sheet: Sheet 11 South Pennines Scale: 1:100,000	A6NE (SW)	0	2	389024 410112
	Bedrock Aquifer Designations Aquifer Designation: Secondary Aquifer - A	A6NE (N)	0	4	389200 410258
	Superficial Aquifer Designations Aquifer Designation: Secondary Aquifer - A	A6NE (N)	0	4	389200 410258

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Extreme Flooding from Rivers or Sea without Defences None				
	Flooding from Rivers or Sea without Defences None				
	Areas Benefiting from Flood Defences None				
	Flood Water Storage Areas None				
	Flood Defences None				
4	Detailed River Network Lines River Type: Tertiary River River Name: Not Supplied Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A7NW (SE)	0	2	389270 410147
5	Detailed River Network Lines River Type: Tertiary River River Name: Not Supplied Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A6NE (SW)	0	2	389188 410251
6	Detailed River Network Lines River Type: Tertiary River River Name: Not Supplied Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A7NW (S)	3	2	389214 410070
7	Detailed River Network Lines River Type: Secondary River River Name: Not Supplied Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A7NW (S)	4	2	389225 410081

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
8	Detailed River Network Lines River Type: Lake/Reservoir River Name: Not Supplied Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A7NW (S)	5	2	389231 410090
9	Detailed River Network Lines River Type: Secondary River River Name: Not Supplied Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A7NW (SE)	5	2	389351 410061
10	Detailed River Network Lines River Type: Lake/Reservoir River Name: Not Supplied Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A7NW (S)	6	2	389215 410119
11	Detailed River Network Lines River Type: Lake/Reservoir River Name: Not Supplied Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A7NW (S)	7	2	389246 410114
12	Detailed River Network Lines River Type: Extended Culvert (greater than 50m) River Name: Not Supplied Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Below Surface Drain Feature: Not a Drain Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A7NW (SE)	10	2	389523 410086
13	Detailed River Network Lines River Type: Lake/Reservoir River Name: Not Supplied Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A6NE (S)	12	2	389193 410044

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
14	Detailed River Network Lines River Type: Lake/Reservoir River Name: Not Supplied Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A6NE (S)	17	2	389182 410003
15	Detailed River Network Lines River Type: Lake/Reservoir River Name: Not Supplied Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A6NE (SW)	32	2	389017 410028
16	Detailed River Network Lines River Type: Secondary River River Name: Not Supplied Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A6NE (S)	51	2	389156 410024
17	Detailed River Network Lines River Type: Secondary River River Name: Trub Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A6NW (SW)	55	2	388858 410060
18	Detailed River Network Lines River Type: Secondary River River Name: Not Supplied Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A6NE (S)	63	2	389150 410006
19	Detailed River Network Lines River Type: Secondary River River Name: Not Supplied Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A6NE (S)	73	2	389141 410003

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
20	Detailed River Network Lines River Type: Extended Culvert (greater than 50m) River Name: Not Supplied Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Below Surface Drain Feature: Not a Drain Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A6NE (S)	84	2	389129 410003
21	Detailed River Network Lines River Type: Extended Culvert (greater than 50m) River Name: Not Supplied Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Below Surface Drain Feature: Not a Drain Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A6SE (S)	218	2	389088 409840
22	Detailed River Network Lines River Type: Tertiary River River Name: Not Supplied Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A6SE (SW)	224	2	388885 409887
23	Detailed River Network Lines River Type: Tertiary River River Name: Not Supplied Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A7NE (E)	228	2	389782 410168
24	Detailed River Network Lines River Type: Extended Culvert (greater than 50m) River Name: Not Supplied Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Below Surface Drain Feature: Not a Drain Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A7NE (E)	228	2	389782 410168
25	Detailed River Network Lines River Type: Secondary River River Name: Drain Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Drain (ditch, Reen, Rhyne, Drain) Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A6SE (S)	235	2	389073 409844

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
26	Detailed River Network Lines River Type: Tertiary River River Name: Not Supplied Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A6SE (SW)	259	2	388945 409848
27	Detailed River Network Lines River Type: Tertiary River River Name: Not Supplied Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A6SW (SW)	291	2	388856 409787
28	Detailed River Network Lines River Type: Tertiary River River Name: Not Supplied Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A6SW (SW)	291	2	388706 409874
29	Detailed River Network Lines River Type: Extended Culvert (greater than 50m) River Name: Not Supplied Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Below Surface Drain Feature: Not a Drain Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A6SW (SW)	292	2	388675 409896
30	Detailed River Network Lines River Type: Tertiary River River Name: Not Supplied Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A7NE (E)	297	2	389850 410084
31	Detailed River Network Lines River Type: Tertiary River River Name: Not Supplied Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A6SW (SW)	327	2	388865 409785

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
32	Detailed River Network Lines River Type: Secondary River River Name: Not Supplied Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A6NW (SW)	343	2	388550 409978
33	Detailed River Network Lines River Type: Tertiary River River Name: Not Supplied Hydrographic Area: D011 River Flow Type: Primary Flow Path River Surface Level: Surface Drain Feature: Not a Drain Flood Risk: Other Rivers Management Status: Water Course: Not Supplied Name: Water Course: Not Supplied Reference:	A7SE (SE)	457	2	389703 409675
	Detailed River Network Offline Drainage None				

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Local Authority Landfill Coverage Name: Rochdale Metropolitan Borough Council - Has no landfill data to supply		0	3	389200 410258

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS 1:625,000 Solid Geology Description: Pennine Lower Coal Measures Formation And South Wales Lower Coal Measures Formation (Undifferentiated)	A6NE (N)	0	4	389200 410258
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic: 15 - 25 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A6NE (W)	0	4	389000 410258
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic: 15 - 25 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A6NE (N)	0	4	389200 410258
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic: 15 - 25 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A6NE (S)	19	4	389200 410000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic: 15 - 25 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: 150 - 300 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A6NE (SW)	22	4	389000 410080
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic: 15 - 25 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: 150 - 300 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A6NE (SW)	43	4	389094 410045
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic: 15 - 25 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: 150 - 300 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A6NE (S)	60	4	389158 410000

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic: 15 - 25 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A6NE (SW)	109	4	388922 410000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic: 25 - 35 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A6NE (SW)	112	4	389000 409957
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic: 15 - 25 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: 150 - 300 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A6NE (SW)	112	4	389000 410000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic: 15 - 25 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: 150 - 300 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A6NE (SW)	113	4	388897 410000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic: 15 - 25 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: 150 - 300 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A10SW (NW)	191	4	388788 410502
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic: 15 - 25 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A11SE (NE)	246	4	389612 410567

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic 15 - 25 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: 150 - 300 mg/kg Nickel 15 - 30 mg/kg Concentration:	A11NW (N)	361	4	389203 410886
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic 15 - 25 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A8NW (E)	444	4	390000 410258
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic 15 - 25 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A8NW (E)	456	4	390000 410025
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic 15 - 25 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A15SW (N)	457	4	389260 411000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic 25 - 35 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A8NW (E)	461	4	390000 410000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic 15 - 25 mg/kg Concentration: Cadmium <1.8 mg/kg Concentration: Chromium 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel 15 - 30 mg/kg Concentration:	A15SW (N)	462	4	389208 411000

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic: 15 - 25 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A14SE (N)	472	4	389200 411000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: RuSoilExAs Arsenic: 25 - 35 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A8NW (E)	478	4	390017 410000
	BGS Estimated Soil Chemistry Source: British Geological Survey, National Geoscience Information Service Soil Sample Type: Sediment Arsenic: 15 - 25 mg/kg Concentration: Cadmium: <1.8 mg/kg Concentration: Chromium: 60 - 90 mg/kg Concentration: Lead Concentration: <150 mg/kg Nickel: 15 - 30 mg/kg Concentration:	A14SE (N)	490	4	389146 411000
34	BGS Recorded Mineral Sites Site Name: Windy Bank Sand Pit Location: , Castleton, Rochdale, Lancashire Source: British Geological Survey, National Geoscience Information Service Reference: 96584 Type: Opencast Status: Ceased Operator: Unknown Operator Operator Location: Unknown Operator Periodic Type: Quaternary Geology: Glaciofluvial Deposits, Devensian Commodity: Sand Positional Accuracy: Located by supplier to within 10m	A10SE (NW)	99	4	388893 410507
35	BGS Recorded Mineral Sites Site Name: Windy Bank Sand Pit Location: , Castleton, Rochdale, Lancashire Source: British Geological Survey, National Geoscience Information Service Reference: 96583 Type: Opencast Status: Ceased Operator: Unknown Operator Operator Location: Unknown Operator Periodic Type: Quaternary Geology: Glaciofluvial Deposits, Devensian Commodity: Sand Positional Accuracy: Located by supplier to within 10m	A10SW (W)	107	4	388811 410387
36	BGS Recorded Mineral Sites Site Name: Castleton Location: , Castleton, Rochdale, Lancashire Source: British Geological Survey, National Geoscience Information Service Reference: 15322 Type: Opencast Status: Ceased Operator: Unknown Operator Operator Location: Unknown Operator Periodic Type: Quaternary Geology: Glaciofluvial Deposits, Devensian Commodity: Sand Positional Accuracy: Located by supplier to within 10m	A7SW (S)	199	4	389265 409820

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
37	BGS Recorded Mineral Sites Site Name: Castleton Location: , Castleton, Rochdale, Lancashire Source: British Geological Survey, National Geoscience Information Service Reference: 15321 Type: Opencast Status: Ceased Operator: Unknown Operator Operator Location: Unknown Operator Periodic Type: Quaternary Geology: Glaciofluvial Deposits, Devensian Commodity: Sand Positional Accuracy: Located by supplier to within 10m	A6SW (SW)	300	4	388760 409835
	BGS Measured Urban Soil Chemistry No data available				
	BGS Urban Soil Chemistry Averages No data available				
	Coal Mining Affected Areas Description: In an area which may be affected by coal mining activity. It is recommended that a coal mining report is obtained from the Coal Authority. Contact details are included in the Useful Contacts section of this report.	A6NE (N)	0	5	389200 410258
	Mining Instability Mining Evidence: Inconclusive Coal Mining Source: Ove Arup & Partners Boundary Quality: As Supplied	A6NE (N)	0	-	389200 410258
	Non Coal Mining Areas of Great Britain No Hazard				
	Potential for Collapsible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A6NE (N)	0	4	389200 410258
	Potential for Collapsible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A6NE (S)	19	4	389200 410000
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A6NE (N)	0	4	389200 410258
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A6NE (S)	19	4	389200 410000
	Potential for Compressible Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A6SE (S)	192	4	389200 409830
	Potential for Ground Dissolution Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A6NE (N)	0	4	389200 410258
	Potential for Ground Dissolution Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A6NE (S)	19	4	389200 410000
	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A6NE (N)	0	4	389200 410258
	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A6NE (S)	19	4	389200 410000
	Potential for Running Sand Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A6NE (N)	0	4	389200 410258
	Potential for Running Sand Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A6NE (S)	19	4	389200 410000
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A6NE (W)	0	4	388874 410127

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A6NE (SW)	0	4	389101 410041
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A6NE (N)	0	4	389200 410258
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A6NE (S)	19	4	389200 410000
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A6NE (S)	48	4	389172 410000
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A6NE (S)	50	4	389172 410000
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A7NE (SE)	62	4	389578 410036
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A7NE (SE)	108	4	389575 410000
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A10SW (NW)	187	4	388809 410537
	Radon Potential - Radon Protection Measures Protection Measure: No radon protective measures are necessary in the construction of new dwellings or extensions Source: British Geological Survey, National Geoscience Information Service	A6NE (N)	0	4	389200 410258
	Radon Potential - Radon Affected Areas Affected Area: The property is in a lower probability radon area, as less than 1% of homes are above the action level Source: British Geological Survey, National Geoscience Information Service	A6NE (N)	0	4	389200 410258

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
38	Contemporary Trade Directory Entries Name: Castleton Motor Bodies Location: Grange Mill, Trows Lane, Rochdale, Lancashire, OL11 2UF Classification: Car Body Repairs Status: Inactive Positional Accuracy: Manually positioned within the geographical locality	A6NE (SW)	12	-	389016 410134
38	Contemporary Trade Directory Entries Name: L J Autos Location: Unit 1 Grange Works, Trows Lane, Rochdale, Lancashire, OL11 2UF Classification: Garage Services Status: Inactive Positional Accuracy: Manually positioned within the geographical locality	A6NE (SW)	12	-	389016 410134
38	Contemporary Trade Directory Entries Name: Discount Cars Of Rochdale Location: 1 Trows La, Rochdale, Lancashire, OL11 2UF Classification: Car Dealers - Used Status: Active Positional Accuracy: Manually positioned within the geographical locality	A6NE (SW)	12	-	389016 410134
39	Contemporary Trade Directory Entries Name: Brushstrokes Location: The Grange, Trows Lane, Rochdale, Lancashire, OL11 2UE Classification: Floor Cleaning & Polishing Equipment - Manufacturers & Distributors Status: Inactive Positional Accuracy: Automatically positioned to the address	A6NE (SW)	28	-	389119 410116

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
40	Areas of Adopted Green Belt Authority: Rochdale Metropolitan Borough Council Plan Name: Rochdale Unitary Development Plan Status: Adopted Plan Date: 30th June 2006	A7SW (S)	99	6	389245 409918
41	Nitrate Vulnerable Zones Name: Not Supplied Description: Surface Water Source: Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)	A6NE (N)	0	9	389200 410258

Agency & Hydrological	Version	Update Cycle
Contaminated Land Register Entries and Notices Rochdale Metropolitan Borough Council - Environmental Health Department Oldham Metropolitan Borough Council - Environmental Health Department	March 2015 September 2013	Annually Annual Rolling Update
Discharge Consents Environment Agency - North West Region	November 2015	Quarterly
Enforcement and Prohibition Notices Environment Agency - North West Region	March 2013	As notified
Integrated Pollution Controls Environment Agency - North West Region	October 2008	Not Applicable
Integrated Pollution Prevention And Control Environment Agency - North West Region	October 2015	Quarterly
Local Authority Integrated Pollution Prevention And Control Rochdale Metropolitan Borough Council - Environmental Health Department Oldham Metropolitan Borough Council - Environmental Health Department	July 2014 March 2015	Annual Rolling Update Annual Rolling Update
Local Authority Pollution Prevention and Controls Rochdale Metropolitan Borough Council - Environmental Health Department Oldham Metropolitan Borough Council - Environmental Health Department	July 2014 March 2015	Annual Rolling Update Annual Rolling Update
Local Authority Pollution Prevention and Control Enforcements Rochdale Metropolitan Borough Council - Environmental Health Department Oldham Metropolitan Borough Council - Environmental Health Department	July 2014 September 2013	Annual Rolling Update Annual Rolling Update
Nearest Surface Water Feature Ordnance Survey	July 2012	Quarterly
Pollution Incidents to Controlled Waters Environment Agency - North West Region	January 2000	Not Applicable
Prosecutions Relating to Authorised Processes Environment Agency - North West Region	March 2013	As notified
Prosecutions Relating to Controlled Waters Environment Agency - North West Region	March 2013	As notified
River Quality Environment Agency - Head Office	November 2001	Not Applicable
River Quality Biology Sampling Points Environment Agency - Head Office	July 2012	Annually
River Quality Chemistry Sampling Points Environment Agency - Head Office	July 2012	Annually
Substantiated Pollution Incident Register Environment Agency - North West Region - South Area	October 2015	Quarterly
Water Abstractions Environment Agency - North West Region	July 2015	Quarterly
Water Industry Act Referrals Environment Agency - North West Region	October 2015	Quarterly
Groundwater Vulnerability Environment Agency - Head Office	April 2015	Not Applicable
Drift Deposits Environment Agency - Head Office	January 1999	Not Applicable
Bedrock Aquifer Designations British Geological Survey - National Geoscience Information Service	October 2012	As notified
Superficial Aquifer Designations British Geological Survey - National Geoscience Information Service	January 2015	As notified
Source Protection Zones Environment Agency - Head Office	October 2015	Quarterly

Agency & Hydrological	Version	Update Cycle
Extreme Flooding from Rivers or Sea without Defences Environment Agency - Head Office	November 2015	Quarterly
Flooding from Rivers or Sea without Defences Environment Agency - Head Office	November 2015	Quarterly
Areas Benefiting from Flood Defences Environment Agency - Head Office	November 2015	Quarterly
Flood Water Storage Areas Environment Agency - Head Office	November 2015	Quarterly
Flood Defences Environment Agency - Head Office	November 2015	Quarterly
Detailed River Network Lines Environment Agency - Head Office	March 2012	Annually
Detailed River Network Offline Drainage Environment Agency - Head Office	March 2012	Annually
Surface Water 1 in 30 year Flood Extent Environment Agency - Head Office	October 2013	As notified
Surface Water 1 in 100 year Flood Extent Environment Agency - Head Office	October 2013	As notified
Surface Water 1 in 1000 year Flood Extent Environment Agency - Head Office	October 2013	As notified
Surface Water Suitability Environment Agency - Head Office	October 2013	As notified
Waste	Version	Update Cycle
BGS Recorded Landfill Sites British Geological Survey - National Geoscience Information Service	June 1996	Not Applicable
Integrated Pollution Control Registered Waste Sites Environment Agency - North West Region	October 2008	Not Applicable
Licensed Waste Management Facilities (Landfill Boundaries) Environment Agency - North West Region - South Area	August 2014	Quarterly
Licensed Waste Management Facilities (Locations) Environment Agency - North West Region - South Area	October 2015	Quarterly
Local Authority Landfill Coverage Oldham Metropolitan Borough Council Rochdale Metropolitan Borough Council - Environmental Health Department	May 2000 May 2000	Not Applicable Not Applicable
Local Authority Recorded Landfill Sites Oldham Metropolitan Borough Council Rochdale Metropolitan Borough Council - Environmental Health Department	May 2000 May 2000	Not Applicable Not Applicable
Registered Landfill Sites Environment Agency - North West Region - South Area	March 2003	Not Applicable
Registered Waste Transfer Sites Environment Agency - North West Region - South Area	March 2003	Not Applicable
Registered Waste Treatment or Disposal Sites Environment Agency - North West Region - South Area	March 2003	Not Applicable

Hazardous Substances	Version	Update Cycle
Control of Major Accident Hazards Sites (COMAH) Health and Safety Executive	June 2015	Bi-Annually
Explosive Sites Health and Safety Executive	June 2015	Bi-Annually
Notification of Installations Handling Hazardous Substances (NIHHS) Health and Safety Executive	November 2000	Not Applicable
Planning Hazardous Substance Enforcements Oldham Metropolitan Borough Council Rochdale Metropolitan Borough Council	January 2015 September 2014	Annual Rolling Update Annual Rolling Update
Planning Hazardous Substance Consents Oldham Metropolitan Borough Council Rochdale Metropolitan Borough Council	January 2015 September 2014	Annual Rolling Update Annual Rolling Update
Geological	Version	Update Cycle
BGS 1:625,000 Solid Geology British Geological Survey - National Geoscience Information Service	January 2009	Not Applicable
BGS Estimated Soil Chemistry British Geological Survey - National Geoscience Information Service	January 2010	Annually
BGS Recorded Mineral Sites British Geological Survey - National Geoscience Information Service	November 2015	Bi-Annually
Brine Compensation Area Cheshire Brine Subsidence Compensation Board	August 2011	Not Applicable
Coal Mining Affected Areas The Coal Authority - Mining Report Service	March 2014	As notified
Mining Instability Ove Arup & Partners	October 2000	Not Applicable
Non Coal Mining Areas of Great Britain British Geological Survey - National Geoscience Information Service	July 2014	Not Applicable
Potential for Collapsible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Compressible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Ground Dissolution Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Landslide Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Running Sand Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Shrinking or Swelling Clay Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Radon Potential - Radon Affected Areas British Geological Survey - National Geoscience Information Service	July 2011	As notified
Radon Potential - Radon Protection Measures British Geological Survey - National Geoscience Information Service	July 2011	As notified
Industrial Land Use	Version	Update Cycle
Contemporary Trade Directory Entries Thomson Directories	November 2015	Quarterly
Fuel Station Entries Catalist Ltd - Experian	August 2015	Quarterly

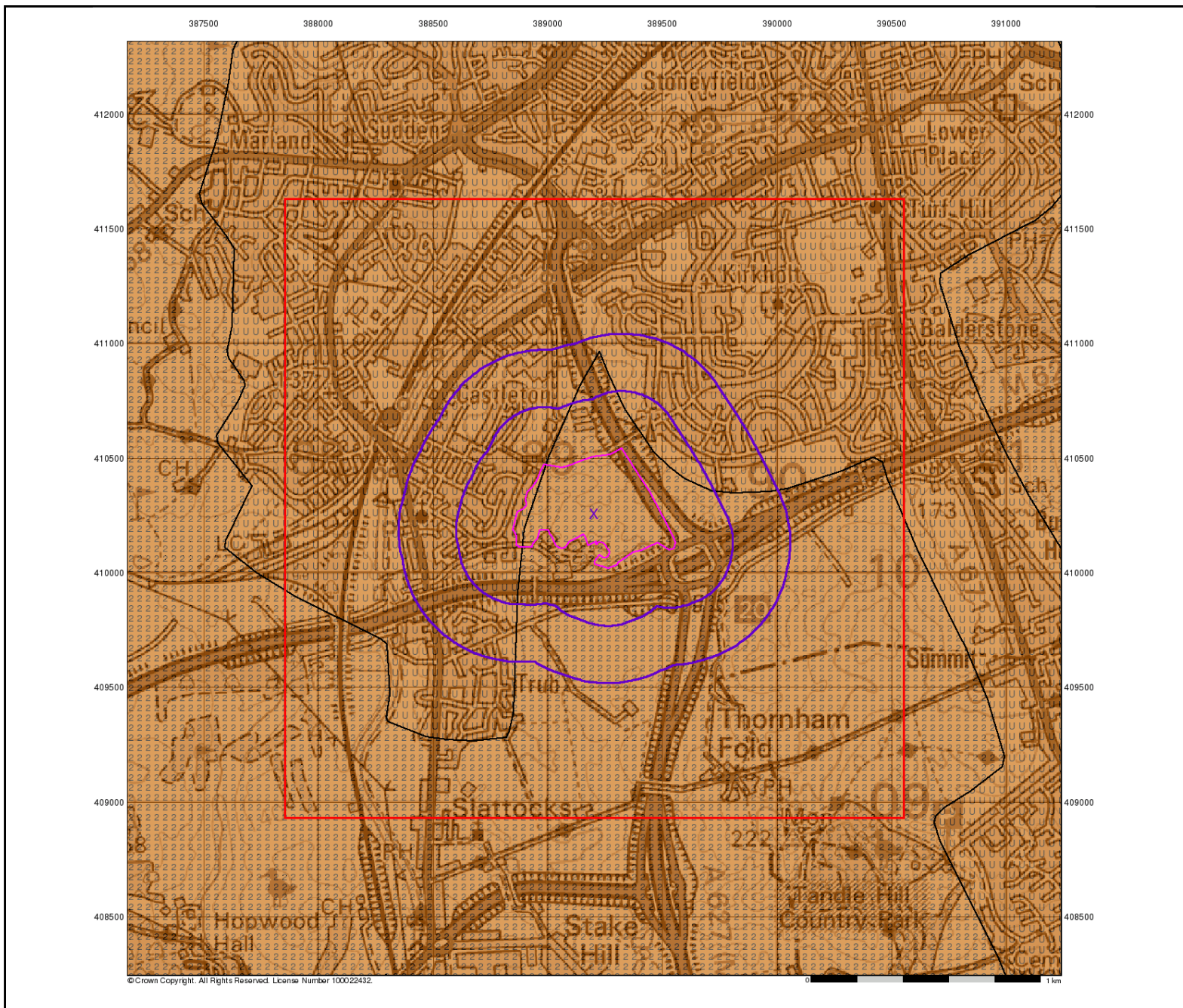
Sensitive Land Use	Version	Update Cycle
Areas of Adopted Green Belt Oldham Metropolitan Borough Council Rochdale Metropolitan Borough Council	November 201 November 201	As notified As notified
Areas of Unadopted Green Belt Oldham Metropolitan Borough Council Rochdale Metropolitan Borough Council	November 201 November 201	As notified As notified
Areas of Outstanding Natural Beauty Natural England	October 2015	Bi-Annually
Environmentally Sensitive Areas Natural England	October 2015	Annually
Forest Parks Forestry Commission	April 1997	Not Applicable
Local Nature Reserves Natural England	October 2015	Bi-Annually
Marine Nature Reserves Natural England	October 2015	Bi-Annually
National Nature Reserves Natural England	October 2015	Bi-Annually
National Parks Natural England	August 2015	Bi-Annually
Nitrate Sensitive Areas Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)	October 2015	Not Applicable
Nitrate Vulnerable Zones Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA)	October 2015	Annually
Ramsar Sites Natural England	October 2015	Bi-Annually
Sites of Special Scientific Interest Natural England	October 2015	Bi-Annually
Special Areas of Conservation Natural England	October 2015	Bi-Annually
Special Protection Areas Natural England	October 2015	Bi-Annually

A selection of organisations who provide data within this report

Data Supplier	Data Supplier Logo
Ordnance Survey	
Environment Agency	
Scottish Environment Protection Agency	
The Coal Authority	
British Geological Survey	
Centre for Ecology and Hydrology	
Natural Resources Wales	
Scottish Natural Heritage	
Natural England	
Public Health England	
Ove Arup	
Peter Brett Associates	

Contact	Name and Address	Contact Details
2	Environment Agency - National Customer Contact Centre (NCCC) PO Box 544, Templeborough, Rotherham, S60 1BY	Telephone: 03708 506 506 Email: enquiries@environment-agency.gov.uk
3	Rochdale Metropolitan Borough Council - Environmental Health Department P O Box 32, Telegraph House, Ballie Street, Rochdale, Greater Manchester, OL16 1JH	Telephone: 01706 864139 Fax: 01706 864185 Website: www.rochdale.gov.uk
4	British Geological Survey - Enquiry Service British Geological Survey, Kingsley Dunham Centre, Keyworth, Nottingham, Nottinghamshire, NG12 5GG	Telephone: 0115 936 3143 Fax: 0115 936 3276 Email: enquiries@bgs.ac.uk Website: www.bgs.ac.uk
5	The Coal Authority - Mining Report Service 200 Lichfield Lane, Mansfield, Nottinghamshire, NG18 4RG	Telephone: 0845 7626848 Email: thecoalauthority@coal.gov.uk
6	Rochdale Metropolitan Borough Council PO Box 15, Town Hall, Rochdale, Greater Manchester, OL16 1AB	Telephone: 01706 647474 Fax: 01706 59475 Website: www.rochdale.gov.uk
7	Oldham Metropolitan Borough Council Civic Centre, P O Box 55, West Street, Oldham, Lancashire, OL1 1XN	Telephone: 0161 911 3000 Fax: 0161 678 4550 Website: www.oldham.gov.uk
8	Natural England Suite D, Unex House, Bourges Boulevard, Peterborough, Cambridgeshire, PE1 1NG	Telephone: 0845 600 3078 Email: enquiries@naturalengland.org.uk Website: www.naturalengland.org.uk
9	Department for Environment, Food and Rural Affairs (DEFRA - formerly FRCA) Government Buildings, Otley Road, Lawnswood, Leeds, West Yorkshire, LS16 5QT	Telephone: 0113 2613333 Fax: 0113 230 0879
10	Environment Agency - Head Office Rio House, Waterside Drive, Aztec West, Almondsbury, Bristol, Avon, BS32 4UD	Telephone: 01454 624400 Fax: 01454 624409
-	Public Health England - Radon Survey, Centre for Radiation, Chemical and Environmental Hazards Chilton, Didcot, Oxfordshire, OX11 0RQ	Telephone: 01235 822622 Fax: 01235 833891 Email: radon@phe.gov.uk Website: www.ukradon.org
-	Landmark Information Group Limited Imperium, Imperial Way, Reading, Berkshire, RG2 0TD	Telephone: 0844 844 9952 Fax: 0844 844 9951 Email: customerservices@landmarkinfo.co.uk Website: www.landmarkinfo.co.uk

Please note that the Environment Agency / Natural Resources Wales / SEPA have a charging policy in place for enquiries.





Groundwater Vulnerability

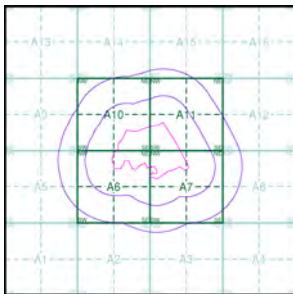
General

Specified Site Specified Buffer(s) Bearing Reference Point
Slice Map ID

Agency and Hydrological

Geological Classes	Soil Classes
Major Aquifer (Highly Permeable)	High (H) 1, 2, 3, U
	Intermediate (I) 1, 2
	Low
Minor Aquifer (Variably Permeable)	High (H) 1, 2, 3, U
	Intermediate (I) 1, 2
	Low
Non Aquifer (Negligibly Permeable)	
Water or Sea	
Drift Deposit	

Site Sensitivity Context Map - Slice A



Order Details

Order Number:	77317590_1_1
Customer Ref:	R2228
National Grid Reference:	389200, 410260
Slice:	A
Site Area (Ha):	21.43
Search Buffer (m):	500

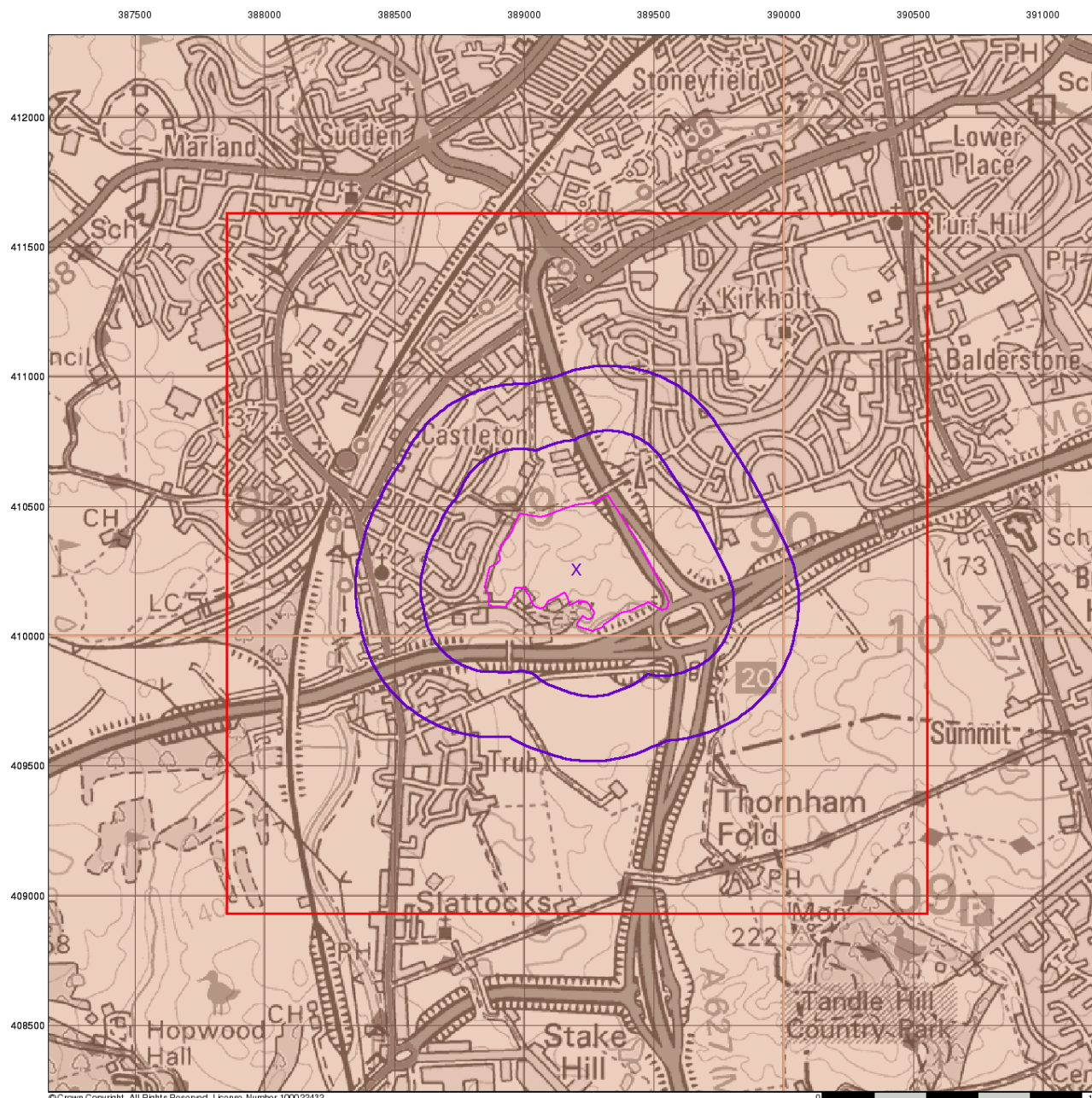
Site Details
Site at 389190, 410260



Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

A Landmark Information Group Service v15.0 22-Dec-2015

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0 1 km



Bedrock Aquifer Designation

General

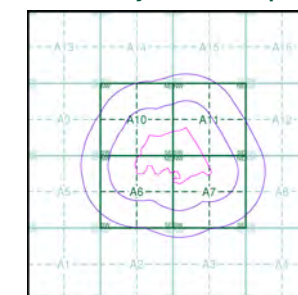
- Specified Site
- Specified Buffer(s)
- X Bearing Reference Point
- Slice
- B Map ID

Agency and Hydrological

Geological Classes

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

Site Sensitivity Context Map - Slice A



Order Details

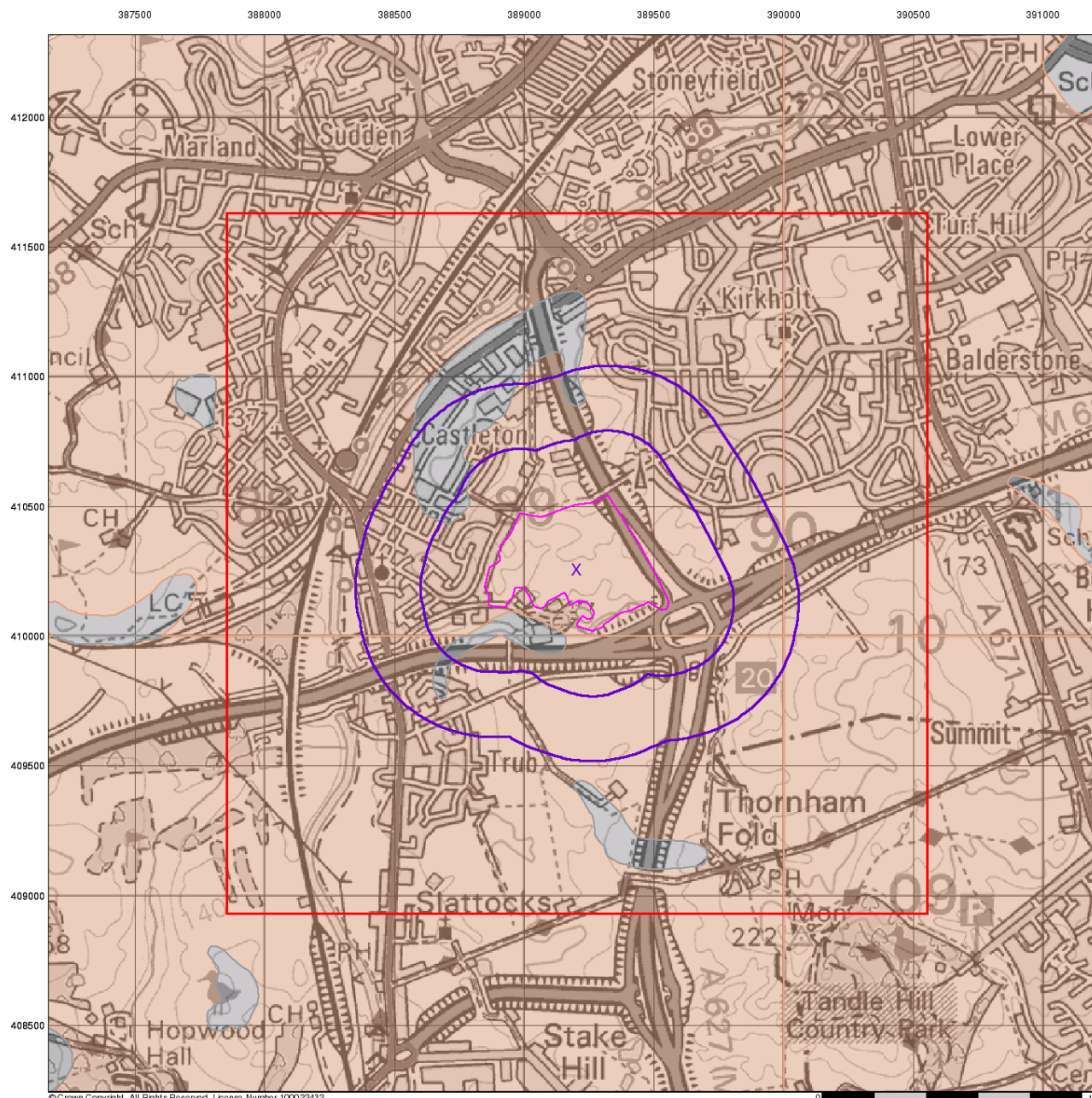
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 Customer Ref: R2228
 National Grid Reference: 389200, 410260
 Slice: A
 Site Area (Ha): 21.43
 Search Buffer (m): 500

Site Details

Site at 389190, 410260



Tel: 0844 844 9952
 Fax: 0844 844 9951
 Web: www.envirocheck.co.uk



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Superficial Aquifer Designation

General

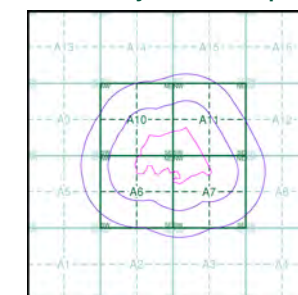
- Specified Site
- Specified Buffer(s)
- X Bearing Reference Point
- Slice
- Map ID

Agency and Hydrological

Geological Classes

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

Site Sensitivity Context Map - Slice A



Order Details

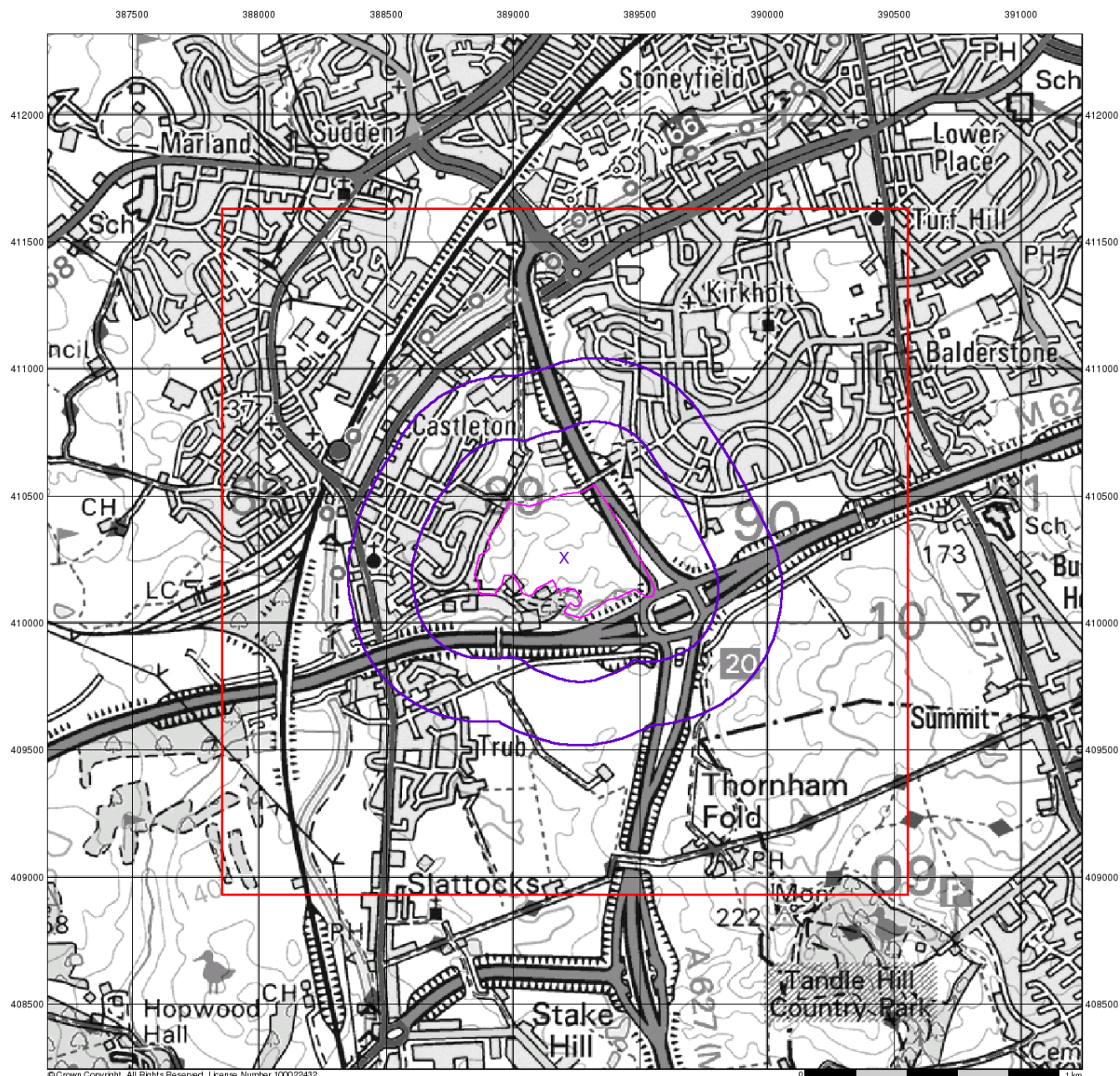
Order Number: 77317590_1_1
 Customer Ref: R2228
 National Grid Reference: 389200, 410260
 Slice: A
 Site Area (Ha): 21.43
 Search Buffer (m): 500

Site Details

Site at 389190, 410260



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Source Protection Zones

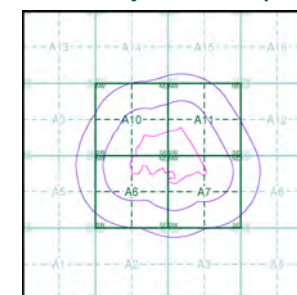
General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

Agency and Hydrological

- Inner zone (Zone 1)
- Inner zone - subsurface activity only (Zone 1c)
- Outer zone (Zone 2)
- Outer zone - subsurface activity only (Zone 2c)
- Total catchment (Zone 3)
- Total catchment - subsurface activity only (Zone 3c)
- Special interest (Zone 4)
- Source Protection Zone Borehole

Site Sensitivity Context Map - Slice A



Order Details

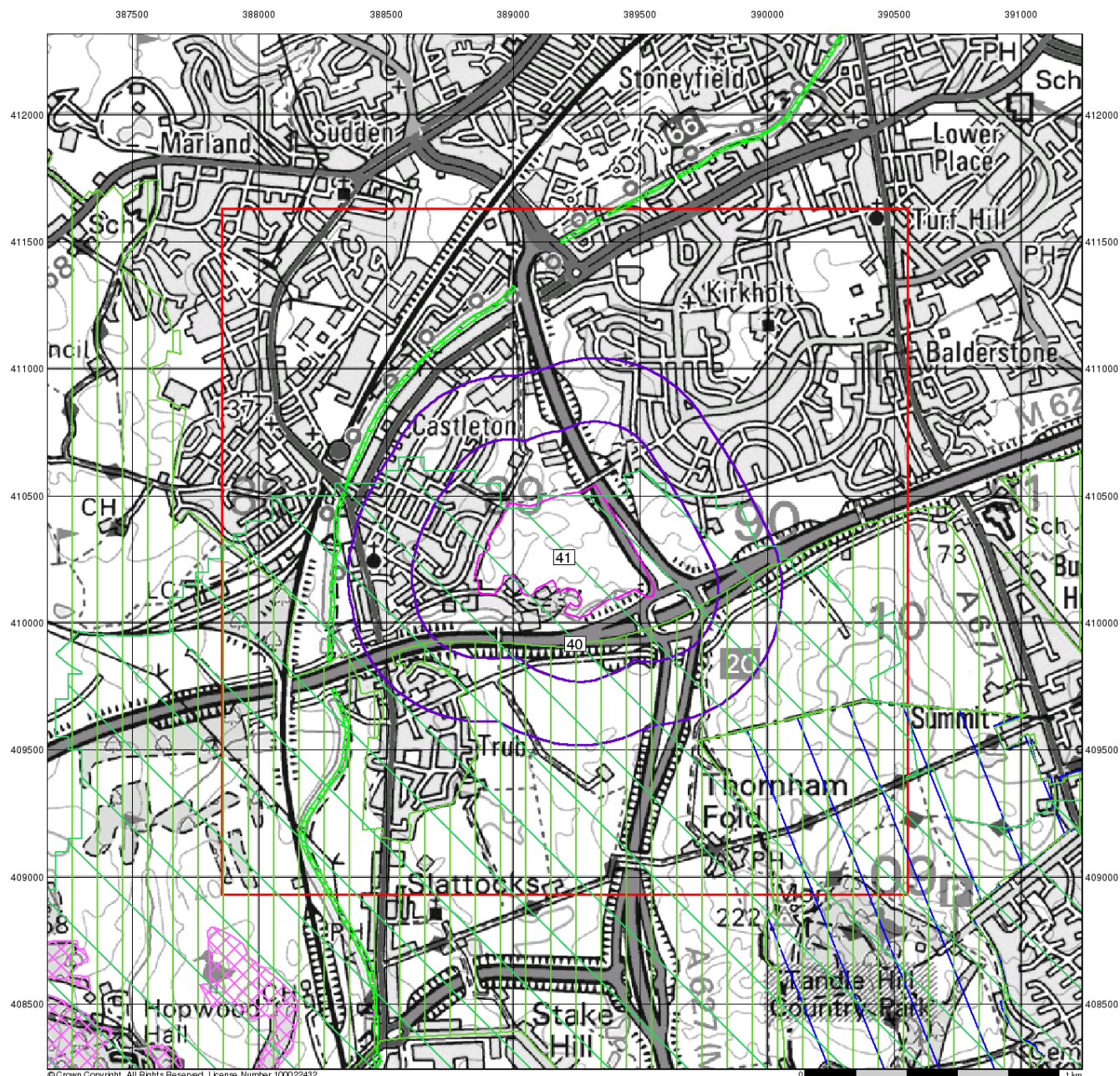
Order Number: 77317590_1_1
 Customer Ref: R2228
 National Grid Reference: 389200, 410260
 Slice: A
 Site Area (Ha): 21.43
 Search Buffer (m): 500

Site Details

Site at 389190, 410260



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Sensitive Land Uses

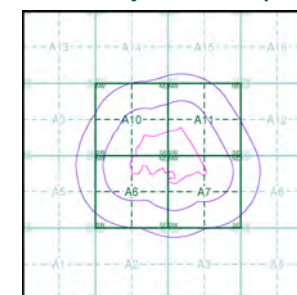
General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

Sensitive Land Uses

- Area of Adopted Green Belt
- Area of Unadopted Green Belt
- Area of Outstanding Natural Beauty
- Environmentally Sensitive Area
- Forest Park
- Local Nature Reserve
- Marine Nature Reserve
- National Nature Reserve
- National Park
- Nitrate Sensitive Area
- Nitrate Vulnerable Zone
- Ramsar Site
- Site of Special Scientific Interest
- Special Area of Conservation
- Special Protection Area

Site Sensitivity Context Map - Slice A



Order Details

Order Number: 77317590_1_1
 Customer Ref: R2228
 National Grid Reference: 389200, 410260
 Slice: A
 Site Area (Ha): 21.43
 Search Buffer (m): 500

Site Details

Site at 389190, 410260



Tel: 0844 844 9952
 Fax: 0844 844 9951
 Web: www.envirocheck.co.uk

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID
- Several of Type at Location

Agency and Hydrological

- Contaminated Land Register Entry or Notice (Location)
- Contaminated Land Register Entry or Notice
- Discharge Consent
- Enforcement or Prohibition Notice
- Integrated Pollution Control
- Integrated Pollution Prevention Control
- Local Authority Integrated Pollution Prevention and Control
- Local Authority Pollution Prevention and Control
- Local Authority Pollution Prevention and Control Enforcement
- Pollution Incident to Controlled Waters
- Prosecution Relating to Authorised Processes
- Prosecution Relating to Controlled Waters
- Registered Radioactive Substance
- River Network or Water Feature
- River Quality Sampling Point
- Substantiated Pollution Incident Register
- Water Abstraction
- Water Industry Act Referral
- BGS Recorded Mineral Site
- BGS Recorded Landfill Site (Location)
- BGS Recorded Landfill Site
- EA Historic Landfill (Buffered Point)
- EA Historic Landfill (Polygon)
- Integrated Pollution Control Registered Waste Site
- Licensed Waste Management Facility (Landfill Boundary)
- Licensed Waste Management Facility (Location)
- Local Authority Recorded Landfill Site (Location)
- Local Authority Recorded Landfill Site
- Registered Landfill Site
- Registered Landfill Site (Location)
- Registered Landfill Site (Point Buffered to 100m)
- Registered Landfill Site (Point Buffered to 250m)
- Registered Waste Transfer Site (Location)
- Registered Waste Transfer Site
- Registered Waste Treatment or Disposal Site (Location)
- Registered Waste Treatment or Disposal Site

Waste

Hazardous Substances

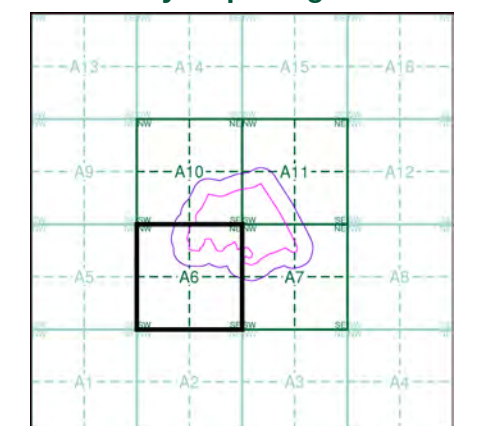
- COMAH Site
- Explosive Site
- NIHHS Site
- Planning Hazardous Substance Consent
- Planning Hazardous Substance Enforcement

Geological

Industrial Land Use

- Contemporary Trade Directory Entry
- Fuel Station Entry

Site Sensitivity Map - Segment A6

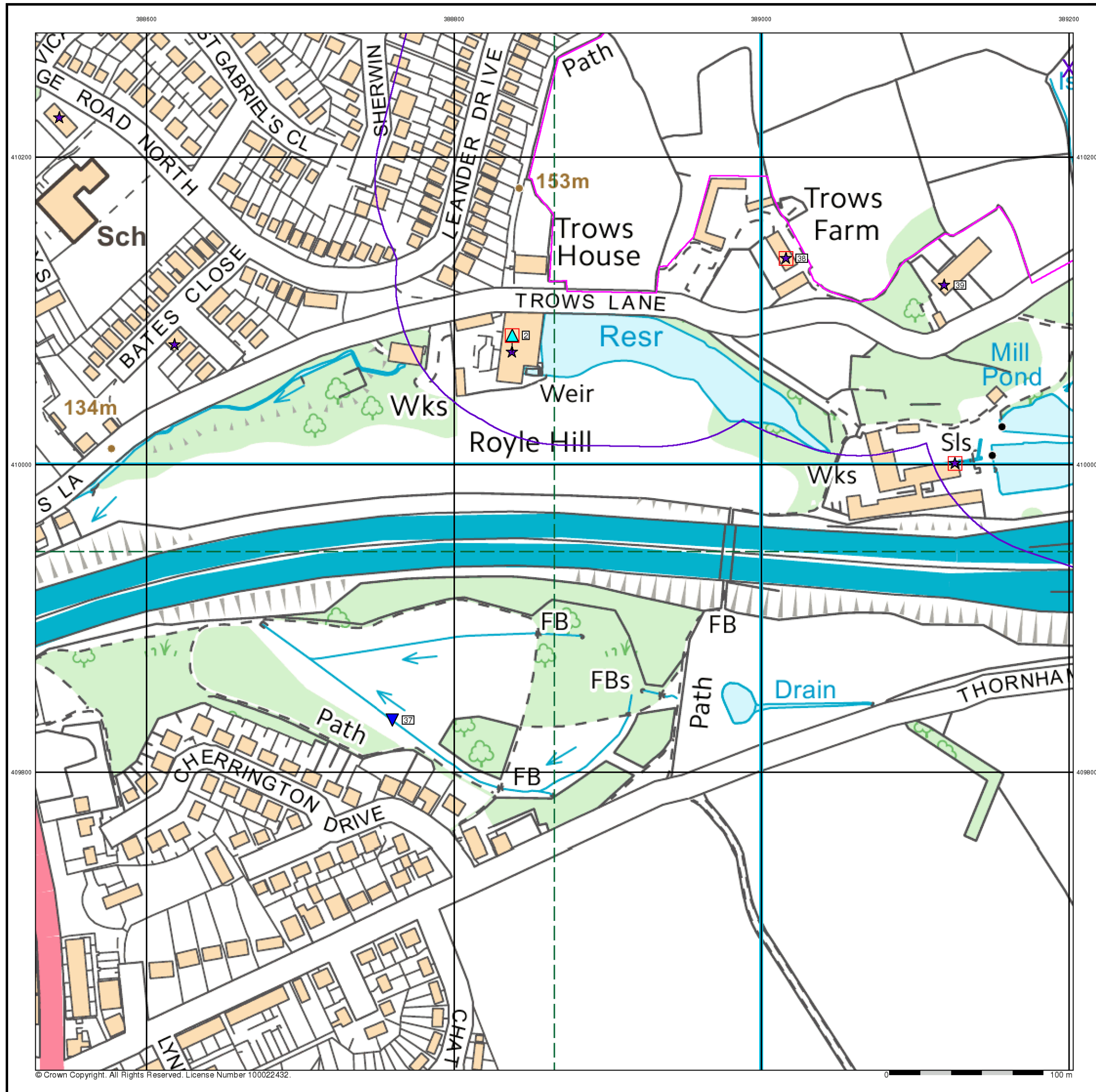


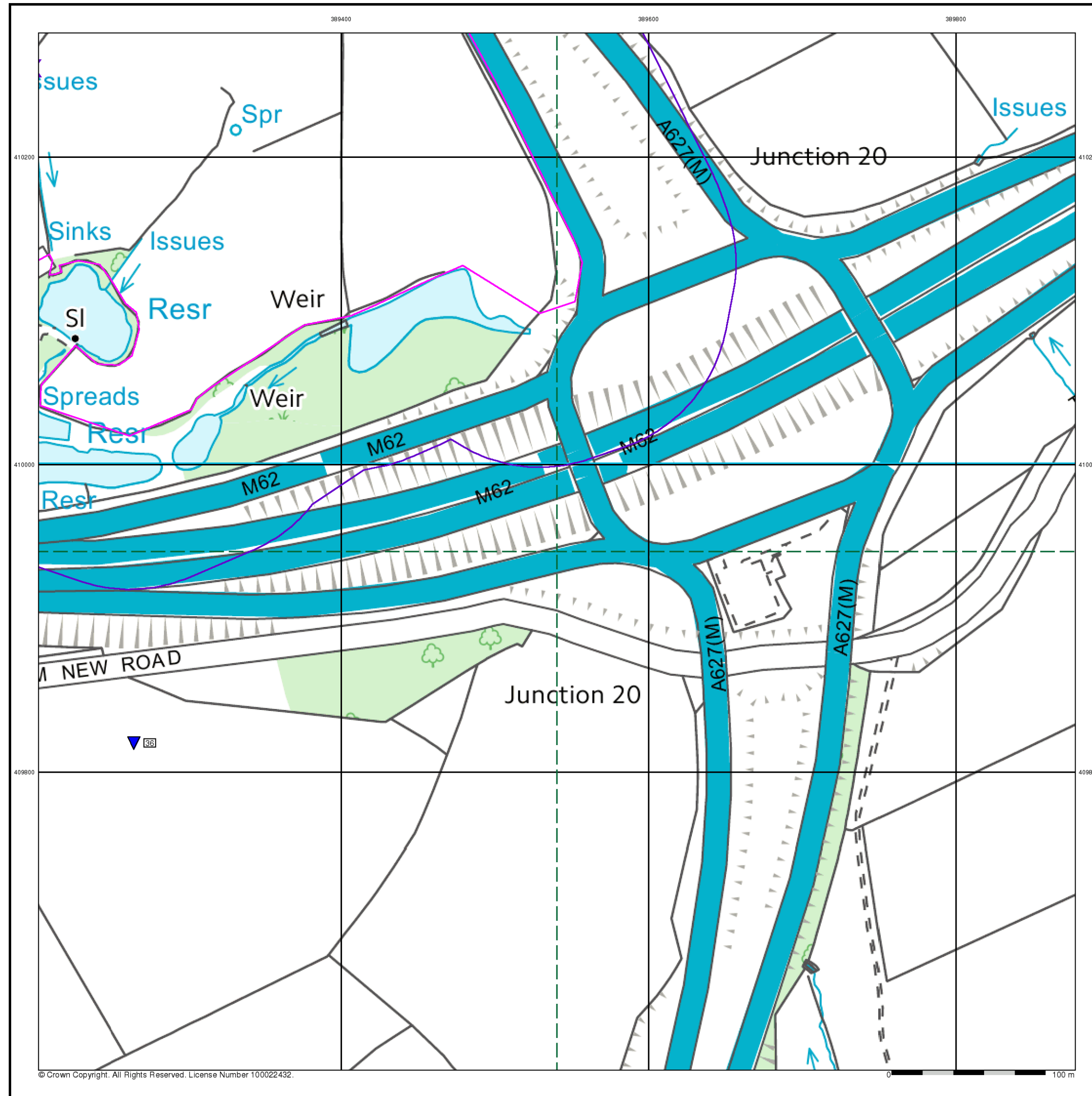
Order Details

Order Number: 77317590_1_1
 Customer Ref: R2228
 National Grid Reference: 389200, 410260
 Slice: A
 Site Area (Ha): 21.43

Site Details

Site at 389190, 410260





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- General**

 - Specified Site
 - Specified Buffer(s)
 - Bearing Reference Point
 - Map ID
 - Several of Type at Location
- Agency and Hydrological**

 - Contaminated Land Register Entry or Notice (Location)
 - Contaminated Land Register Entry or Notice
 - Discharge Consent
 - Enforcement or Prohibition Notice
 - Integrated Pollution Control
 - Integrated Pollution Prevention Control
 - Local Authority Integrated Pollution Prevention and Control
 - Local Authority Pollution Prevention and Control
 - Local Authority Pollution Prevention and Control Enforcement
 - Pollution Incident to Controlled Waters
 - Prosecution Relating to Authorised Processes
 - Prosecution Relating to Controlled Waters
 - Registered Radioactive Substance
 - River Network or Water Feature
 - River Quality Sampling Point
 - Substantiated Pollution Incident Register
 - Water Abstraction
 - Water Industry Act Referral
- Waste**

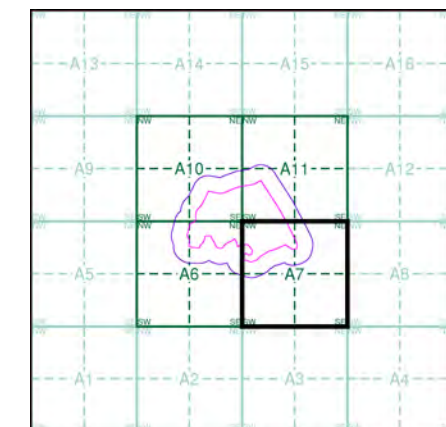
 - BGS Recorded Landfill Site (Location)
 - BGS Recorded Landfill Site
 - EA Historic Landfill (Buffered Point)
 - EA Historic Landfill (Polygon)
 - Integrated Pollution Control Registered Waste Site
 - Licensed Waste Management Facility (Landfill Boundary)
 - Licensed Waste Management Facility (Location)
 - Local Authority Recorded Landfill Site (Location)
 - Local Authority Recorded Landfill Site
 - Registered Landfill Site
 - Registered Landfill Site (Location)
 - Registered Landfill Site (Point Buffered to 100m)
 - Registered Landfill Site (Point Buffered to 250m)
 - Registered Waste Transfer Site (Location)
 - Registered Waste Transfer Site
 - Registered Waste Treatment or Disposal Site (Location)
 - Registered Waste Treatment or Disposal Site
- Hazardous Substances**

 - COMAH Site
 - Explosive Site
 - NIHHS Site
 - Planning Hazardous Substance Consent
 - Planning Hazardous Substance Enforcement
- Geological**

 - BGS Recorded Mineral Site
- Industrial Land Use**

 - Contemporary Trade Directory Entry
 - Fuel Station Entry

Site Sensitivity Map - Segment A7



Order Details
Order Number: 77317590_1_1
Customer Ref: R2228
National Grid Reference: 389200, 410260
Slice: A
Site Area (Ha): 21.43

Site Details
Site at 389190, 410260

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID
- Several of Type at Location

Agency and Hydrological

- Contaminated Land Register Entry or Notice (Location)
- Contaminated Land Register Entry or Notice
- Discharge Consent
- Enforcement or Prohibition Notice
- Integrated Pollution Control
- Integrated Pollution Prevention Control
- Local Authority Integrated Pollution Prevention and Control
- Local Authority Pollution Prevention and Control
- Local Authority Pollution Prevention and Control Enforcement
- Pollution Incident to Controlled Waters
- Prosecution Relating to Authorised Processes
- Prosecution Relating to Controlled Waters
- Registered Radioactive Substance
- River Network or Water Feature
- River Quality Sampling Point
- Substantiated Pollution Incident Register
- Water Abstraction
- Water Industry Act Referral

Waste

- BGS Recorded Landfill Site (Location)
- BGS Recorded Landfill Site
- EA Historic Landfill (Buffered Point)
- EA Historic Landfill (Polygon)
- Integrated Pollution Control Registered Waste Site
- Licensed Waste Management Facility (Landfill Boundary)
- Licensed Waste Management Facility (Location)
- Local Authority Recorded Landfill Site (Location)
- Local Authority Recorded Landfill Site
- Registered Landfill Site
- Registered Landfill Site (Location)
- Registered Landfill Site (Point Buffered to 100m)
- Registered Landfill Site (Point Buffered to 250m)
- Registered Waste Transfer Site (Location)
- Registered Waste Transfer Site
- Registered Waste Treatment or Disposal Site (Location)
- Registered Waste Treatment or Disposal Site

Hazardous Substances

- COMAH Site
- Explosive Site
- NIHHS Site
- Planning Hazardous Substance Consent
- Planning Hazardous Substance Enforcement

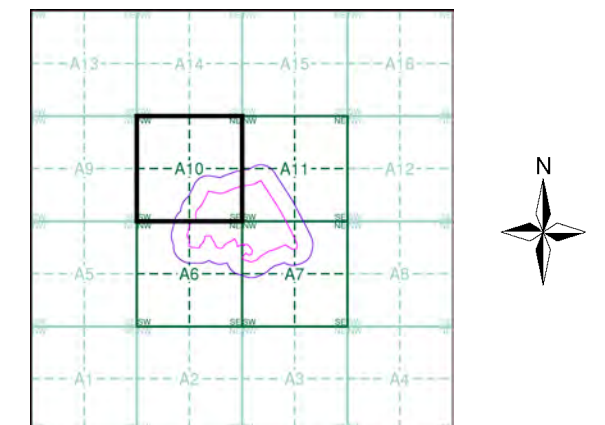
Geological

- BGS Recorded Mineral Site

Industrial Land Use

- Contemporary Trade Directory Entry
- Fuel Station Entry

Site Sensitivity Map - Segment A10

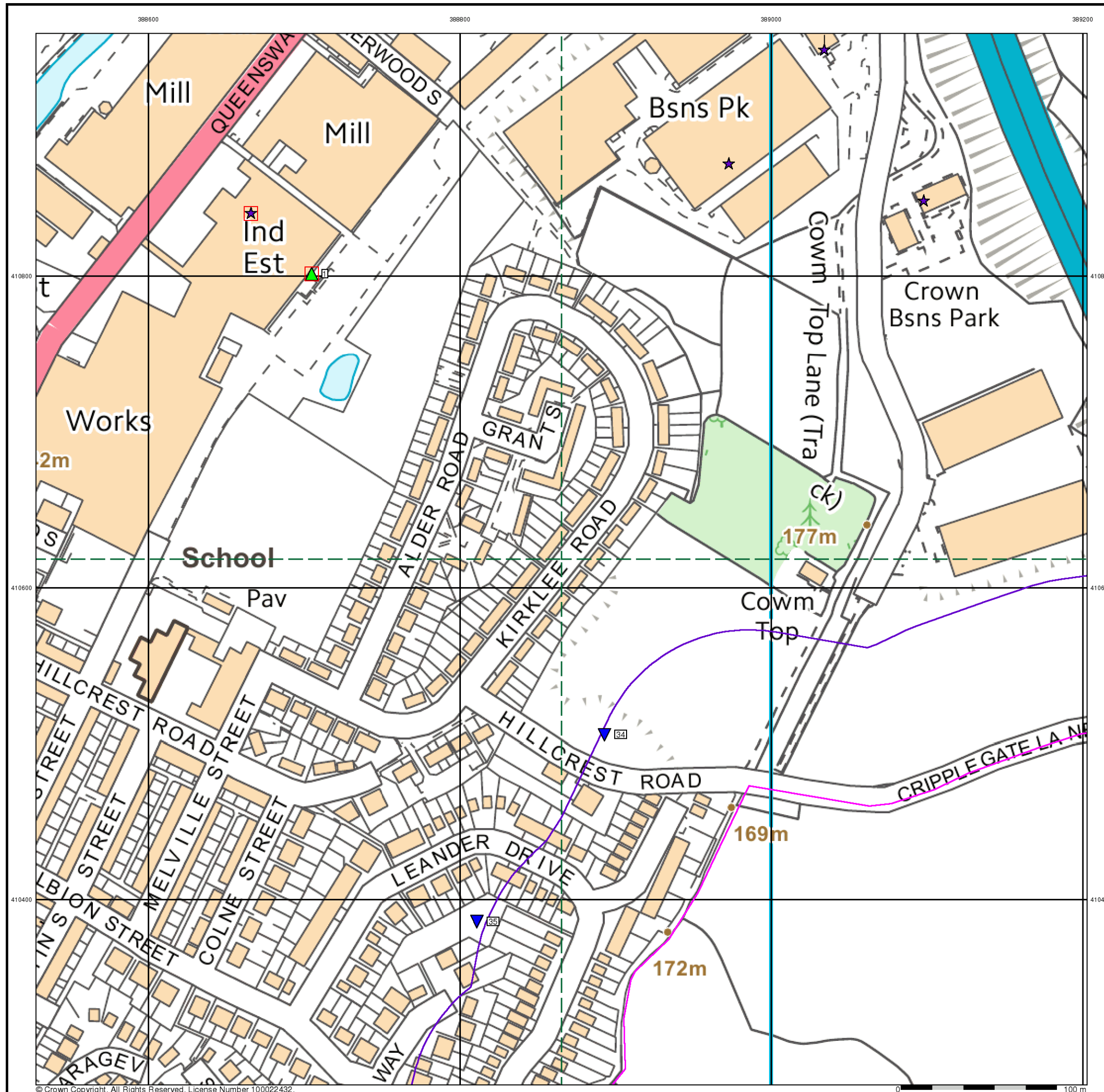


Order Details

Order Number: 77317590_1_1
 Customer Ref: R2228
 National Grid Reference: 389200, 410260
 Slice: A
 Site Area (Ha): 21.43

Site Details

Site at 389190, 410260



General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID
- Several of Type at Location

Agency and Hydrological

- Contaminated Land Register Entry or Notice (Location)
- Contaminated Land Register Entry or Notice
- Discharge Consent
- Enforcement or Prohibition Notice
- Integrated Pollution Control
- Integrated Pollution Prevention Control
- Local Authority Integrated Pollution Prevention and Control
- Local Authority Pollution Prevention and Control
- Local Authority Pollution Prevention and Control Enforcement
- Pollution Incident to Controlled Waters
- Prosecution Relating to Authorised Processes
- Prosecution Relating to Controlled Waters
- Registered Radioactive Substance
- River Network or Water Feature
- River Quality Sampling Point
- Substantiated Pollution Incident Register
- Water Abstraction
- Water Industry Act Referral

Waste

- BGS Recorded Landfill Site (Location)
- BGS Recorded Landfill Site
- EA Historic Landfill (Buffered Point)
- EA Historic Landfill (Polygon)
- Integrated Pollution Control Registered Waste Site
- Licensed Waste Management Facility (Landfill Boundary)
- Licensed Waste Management Facility (Location)
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- Local Authority Recorded Landfill Site
- Registered Landfill Site
- Registered Landfill Site (Location)
- Registered Landfill Site (Point Buffered to 100m)
- Registered Landfill Site (Point Buffered to 250m)
- Registered Waste Transfer Site (Location)
- Registered Waste Transfer Site
- Registered Waste Treatment or Disposal Site (Location)
- Registered Waste Treatment or Disposal Site

Hazardous Substances

- COMAH Site
- Explosive Site
- NIHHS Site
- Planning Hazardous Substance Consent
- Planning Hazardous Substance Enforcement

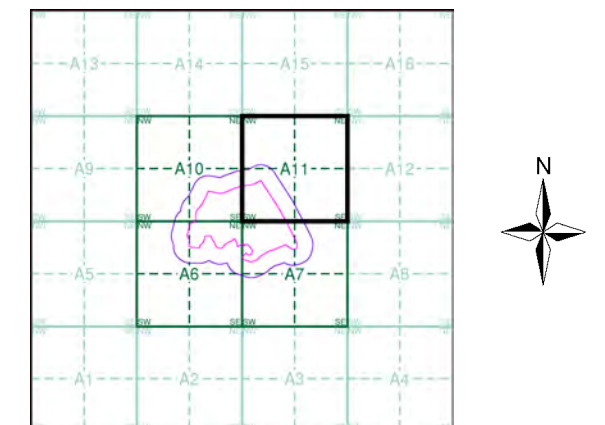
Geological

- BGS Recorded Mineral Site

Industrial Land Use

- Contemporary Trade Directory Entry
- Fuel Station Entry

Site Sensitivity Map - Segment A11

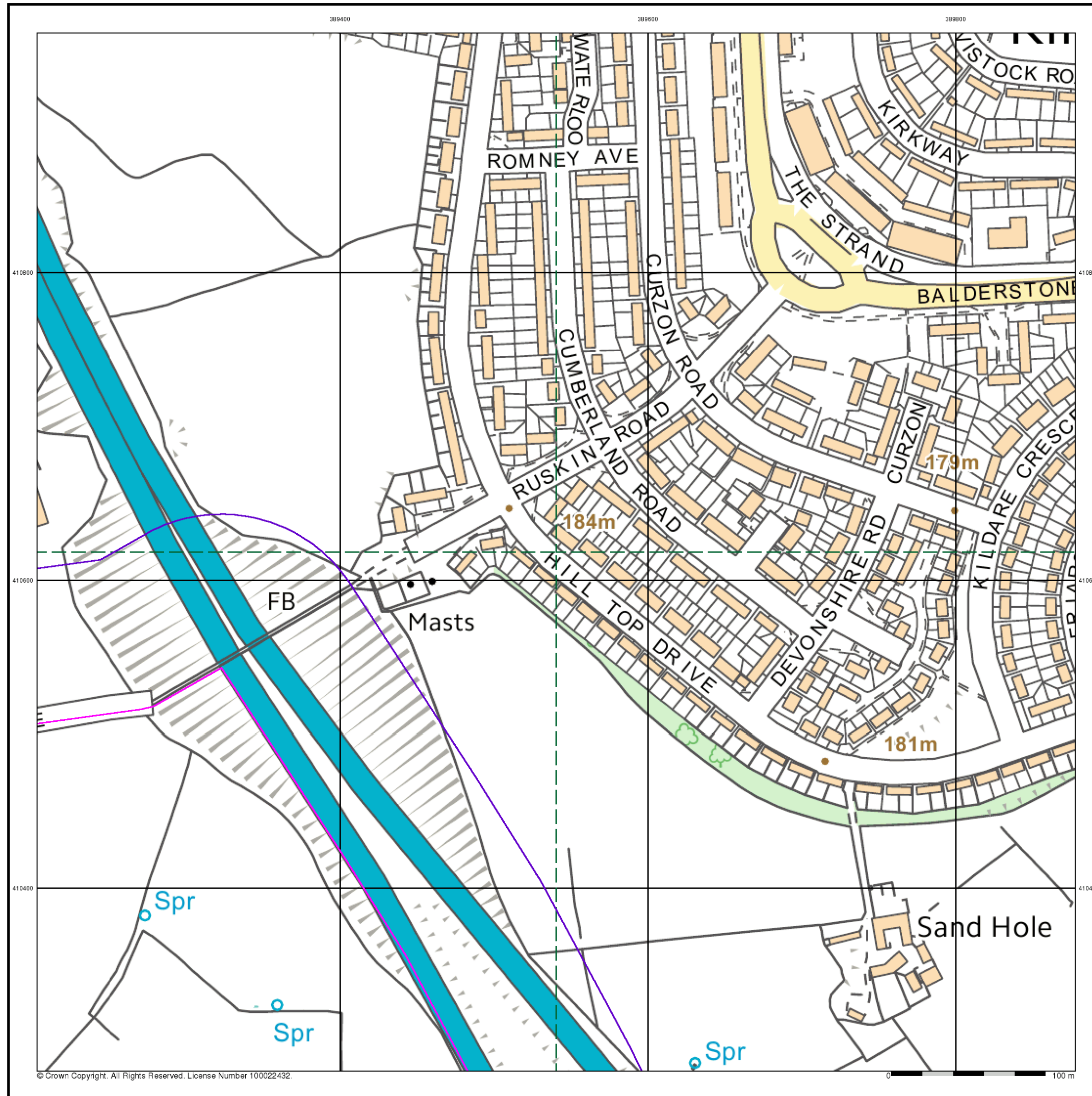


Order Details

Order Number: 77317590_1_1
 Customer Ref: R2228
 National Grid Reference: 389200, 410260
 Slice: A
 Site Area (Ha): 21.43

Site Details

Site at 389190, 410260



General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID
- Several of Type at Location

Agency and Hydrological

- Contaminated Land Register Entry or Notice (Location)
- Contaminated Land Register Entry or Notice
- Discharge Consent
- Enforcement or Prohibition Notice
- Integrated Pollution Control
- Integrated Pollution Prevention Control
- Local Authority Integrated Pollution Prevention and Control
- Local Authority Pollution Prevention and Control
- Local Authority Pollution Prevention and Control Enforcement
- Pollution Incident to Controlled Waters
- Prosecution Relating to Authorised Processes
- Prosecution Relating to Controlled Waters
- Registered Radioactive Substance
- River Network or Water Feature
- River Quality Sampling Point
- Substantiated Pollution Incident Register
- Water Abstraction
- Water Industry Act Referral

Waste

- BGS Recorded Landfill Site (Location)
- BGS Recorded Landfill Site
- EA Historic Landfill (Buffered Point)
- EA Historic Landfill (Polygon)
- Integrated Pollution Control Registered Waste Site
- Licensed Waste Management Facility (Landfill Boundary)
- Licensed Waste Management Facility (Location)
- Local Authority Recorded Landfill Site (Location)
- Local Authority Recorded Landfill Site
- Registered Landfill Site
- Registered Landfill Site (Location)
- Registered Landfill Site (Point Buffered to 100m)
- Registered Landfill Site (Point Buffered to 250m)
- Registered Waste Transfer Site (Location)
- Registered Waste Transfer Site
- Registered Waste Treatment or Disposal Site (Location)
- Registered Waste Treatment or Disposal Site

Hazardous Substances

- COMAH Site
- Explosive Site
- NIHHS Site
- Planning Hazardous Substance Consent
- Planning Hazardous Substance Enforcement

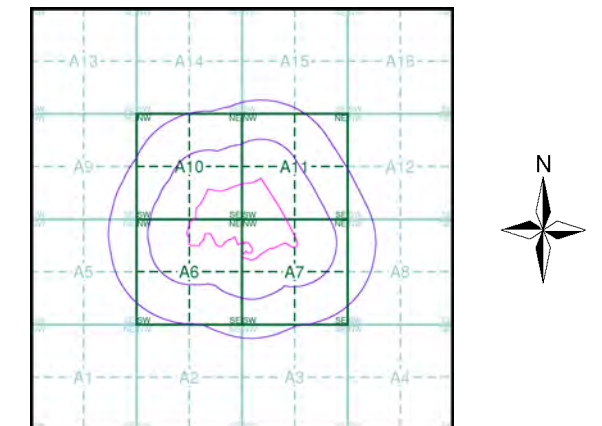
Geological

- BGS Recorded Mineral Site

Industrial Land Use

- Contemporary Trade Directory Entry
- Fuel Station Entry

Site Sensitivity Map - Slice A



Order Details

Order Number: 77317590_1_1
 Customer Ref: R2228
 National Grid Reference: 389200, 410260
 Slice: A
 Site Area (Ha): 21.43
 Search Buffer (m): 500

Site Details

Site at 389190, 410260



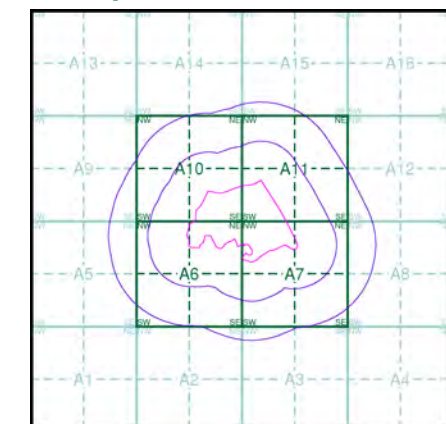
General

-  Specified Site
-  Specified Buffer(s)
-  Bearing Reference Point

Agency and Hydrological (Flood)

-  Extreme Flooding from Rivers or Sea without Defences (Zone 2)
-  Flooding from Rivers or Sea without Defences (Zone 3)
-  Area Benefiting from Flood Defence
-  Flood Water Storage Areas
-  Flood Defence

Flood Map - Slice A

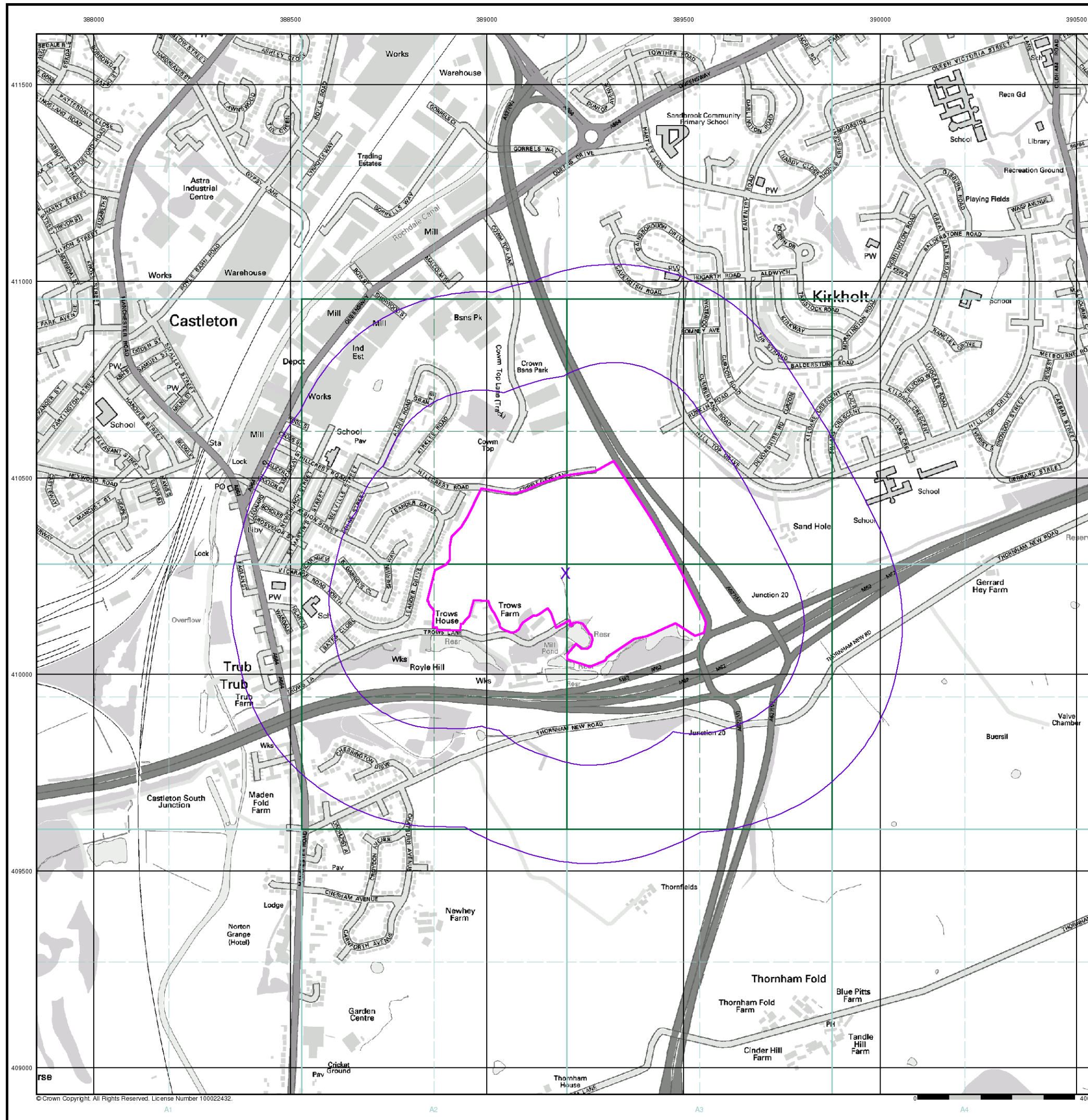


Order Details

Order Number: 77317590_1_1
 Customer Ref: R2228
 National Grid Reference: 389200, 410260
 Slice: A
 Site Area (Ha): 21.43
 Search Buffer (m): 500

Site Details

Site at 389190, 410260



General

-  Specified Site
-  Specified Buffer(s)
-  Bearing Reference Point
-  Map ID
-  Several of Type at Location

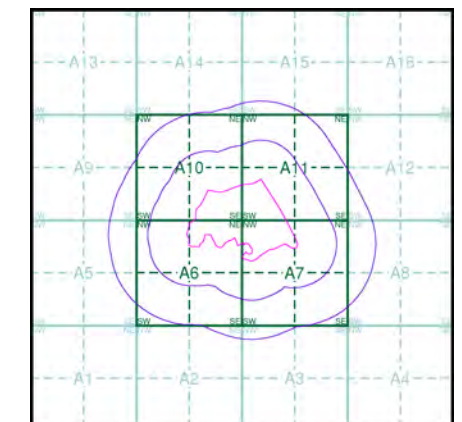
Agency and Hydrological (Boreholes)

-  BGS Borehole Depth 0 - 10m
-  BGS Borehole Depth 10 - 30m
-  BGS Borehole Depth 30m +
-  Confidential
-  Other

For Borehole information please refer to the Borehole datasheet which accompanied this slice.

A copy of the BGS Borehole Ordering Form is available to download from the Support section of www.envirocheck.co.uk.

Borehole Map - Slice A



Order Details

Order Number: 77317590_1_1
 Customer Ref: R2228
 National Grid Reference: 389200, 410260
 Slice: A
 Site Area (Ha): 21.43
 Search Buffer (m): 500

Site Details

Site at 389190, 410260



General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

Risk of Flooding from Surface Water

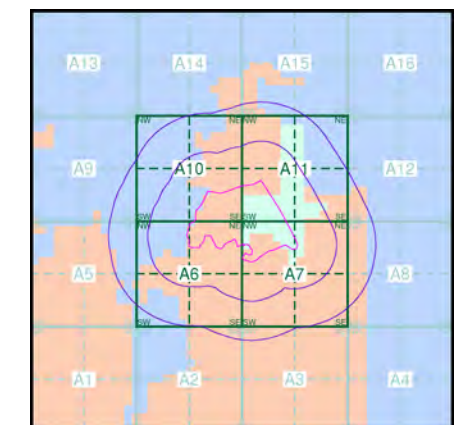
- High - 30 Year Return
- Medium - 100 Year Return
- Low - 1000 Year Return

Suitability

See the suitability map below

- National to county
- County to town
- Town to street
- Street to parcels of land
- Property

EA/NRW Suitability Map - Slice A

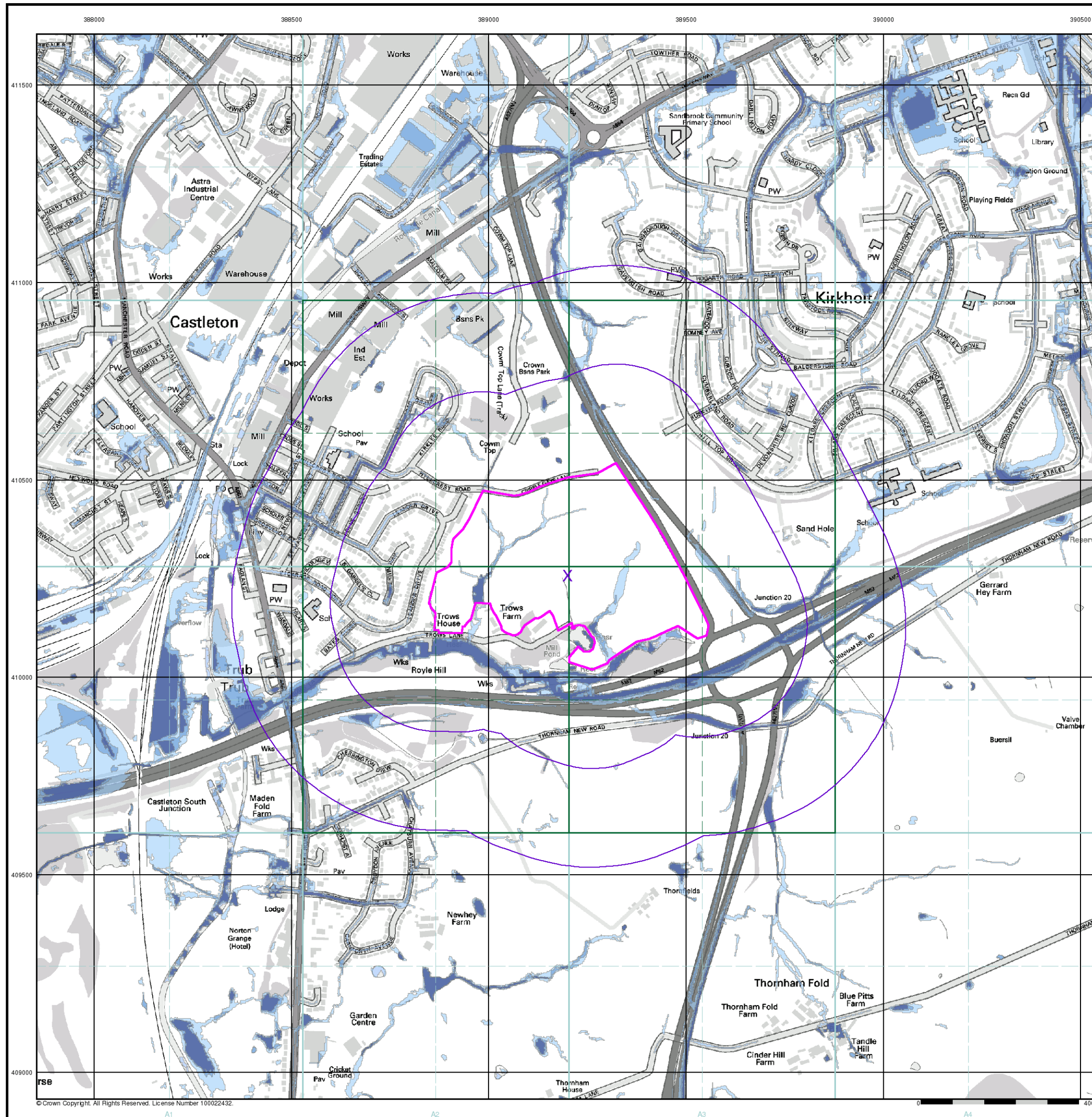


Order Details

Order Number: 77317590_1_1
 Customer Ref: R2228
 National Grid Reference: 389200, 410260
 Slice: A
 Site Area (Ha): 21.43
 Search Buffer (m): 500

Site Details

Site at 389190, 410260

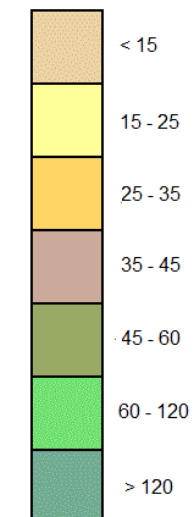


General

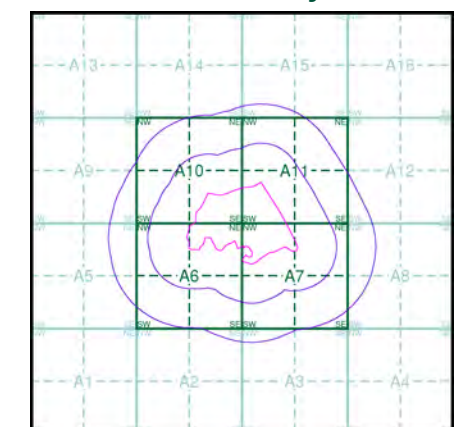
 Specified Site
  Specified Buffer(s)
  Bearing Reference Point

Estimated Soil Chemistry Arsenic

Arsenic Concentrations mg/kg



Estimated Soil Chemistry Arsenic - Slice A

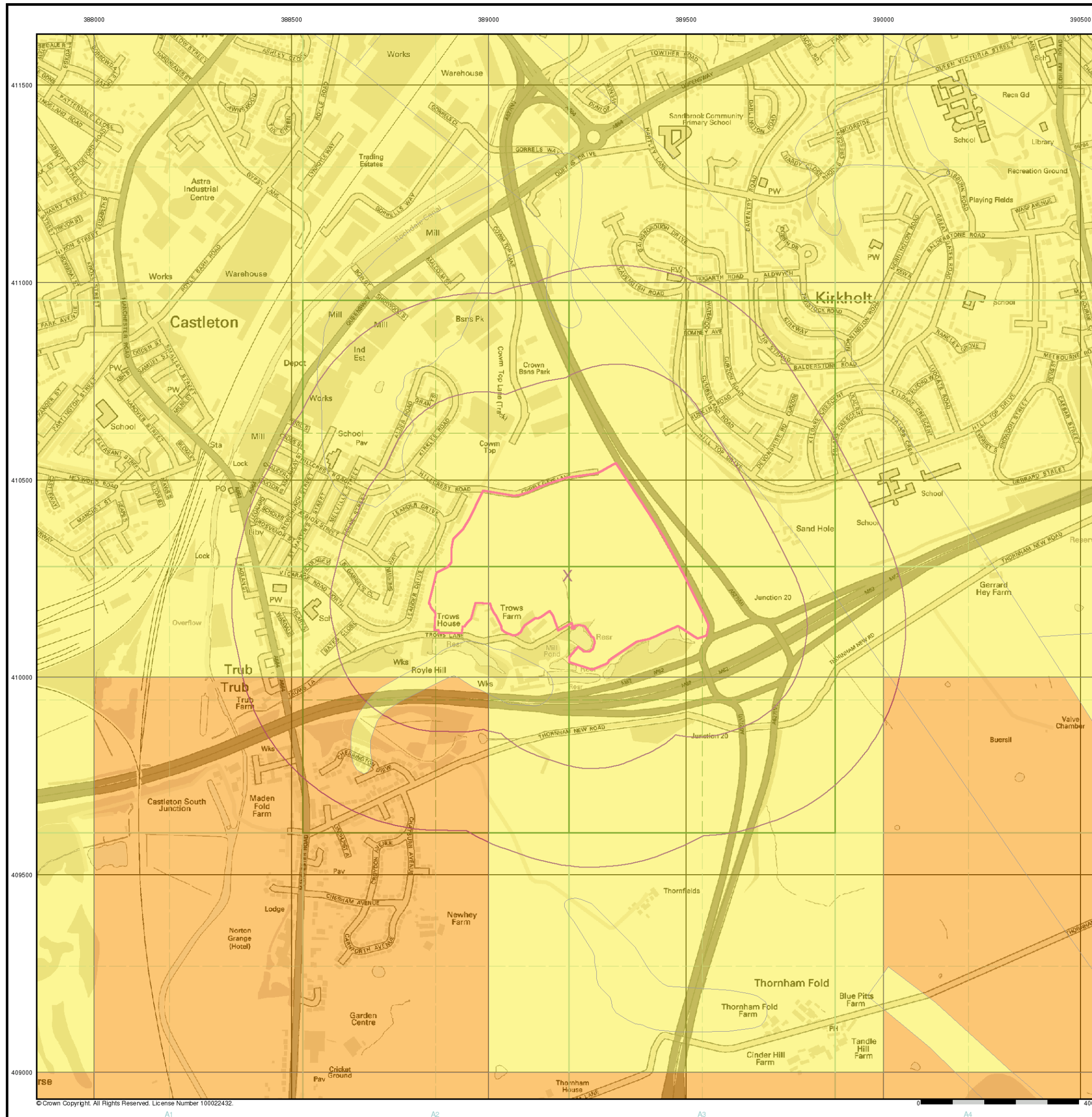


Order Details

Order Details: 77317590_1_1
 Customer Ref: R2228
 National Grid Reference: 389200, 410260
 Slice: A
 Site Area (Ha): 21.43
 Search Buffer (m): 500

Site Details

Site at 389190, 410260

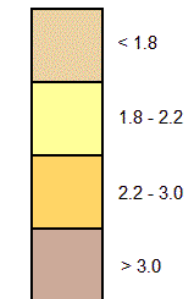


General

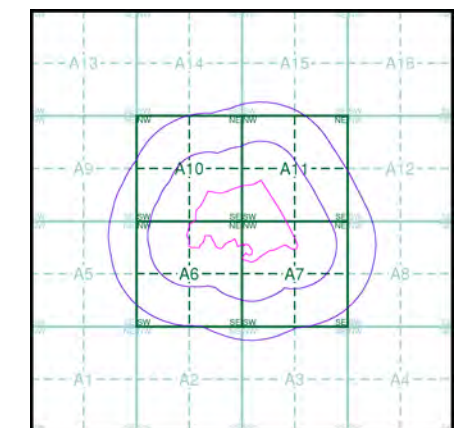
 Specified Site
  Specified Buffer(s)
  Bearing Reference Point

Estimated Soil Chemistry Cadmium

Cadmium Concentrations mg/kg



Estimated Soil Chemistry Cadmium - Slice A

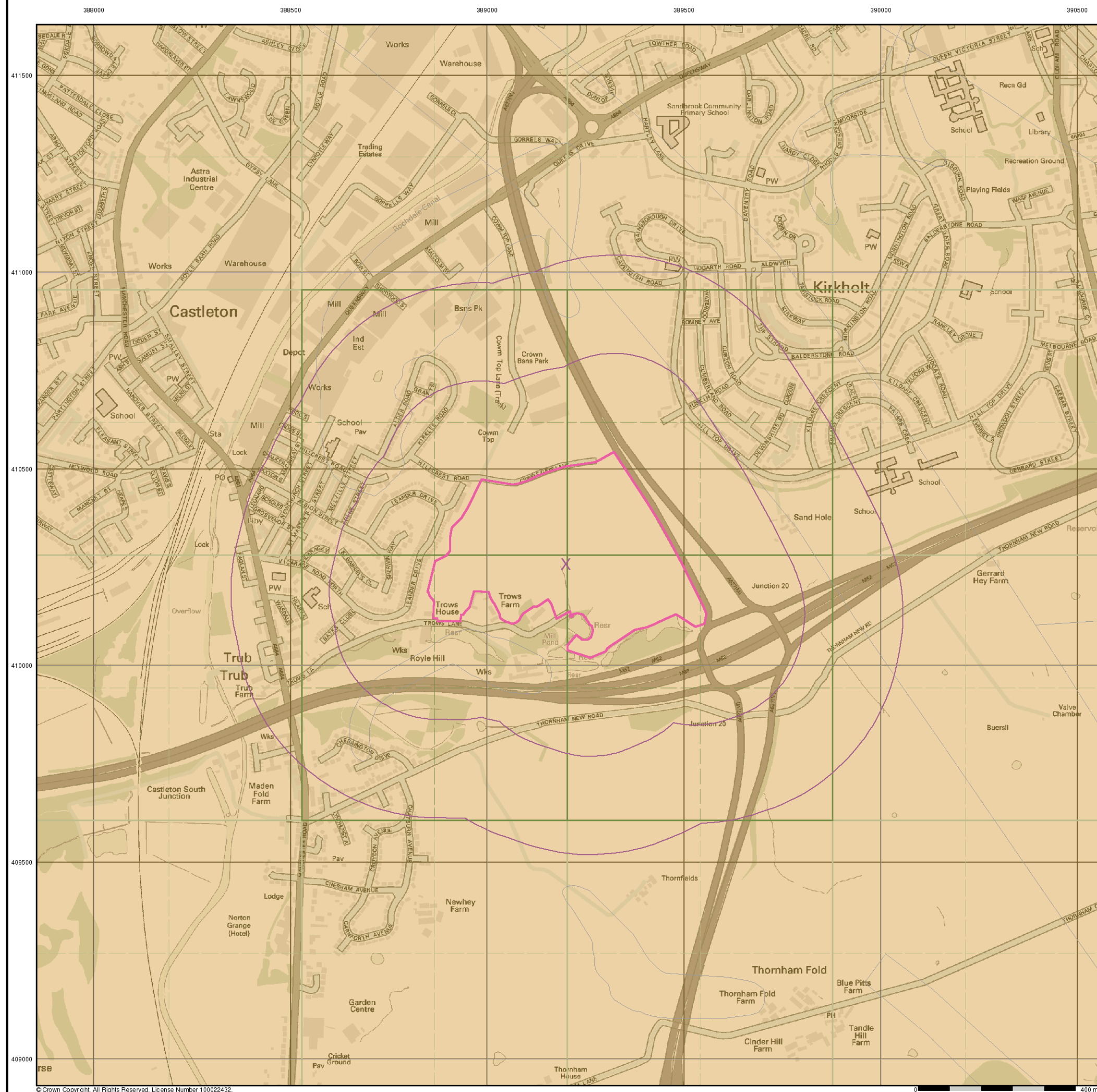


Order Details

Order Details: 77317590_1_1
 Customer Ref: R2228
 National Grid Reference: 389200, 410260
 Slice: A
 Site Area (Ha): 21.43
 Search Buffer (m): 500

Site Details

Site at 389190, 410260

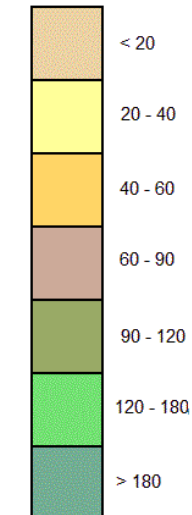


General

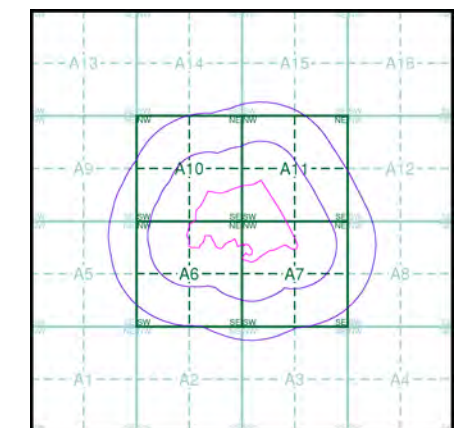
Specified Site Specified Buffer(s) Bearing Reference Point

Estimated Soil Chemistry Chromium

Chromium Concentrations mg/kg



Estimated Soil Chemistry Chromium - Slice A



Order Details

Order Details: 77317590_1_1
Customer Ref: R2228
National Grid Reference: 389200, 410260
Slice: A
Site Area (Ha): 21.43
Search Buffer (m): 500

Site Details

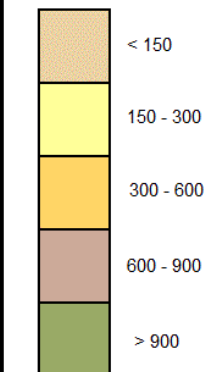
Site at 389190, 410260

General

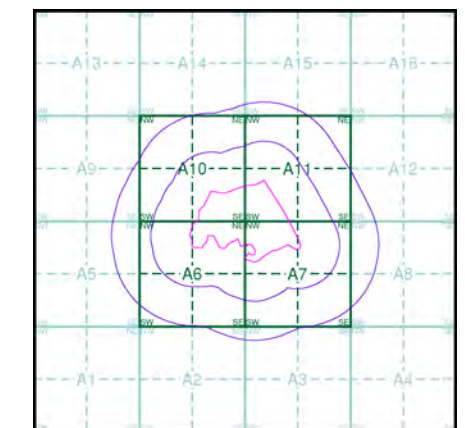
 Specified Site
  Specified Buffer(s)
  Bearing Reference Point

Estimated Soil Chemistry Lead

Lead Concentrations mg/kg



Estimated Soil Chemistry Lead - Slice A

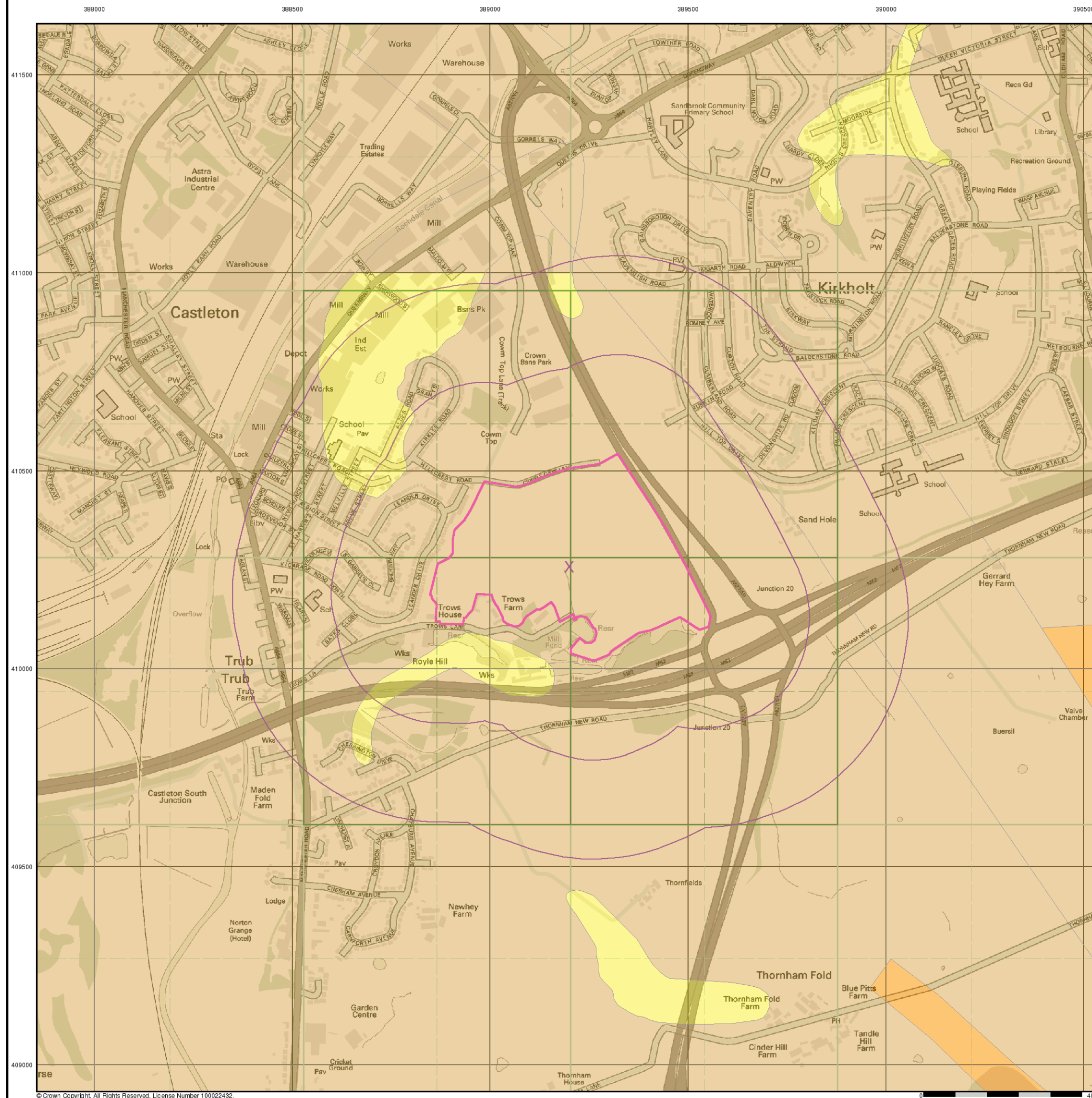


Order Details

Order Details: 77317590_1_1
 Customer Ref: R2228
 National Grid Reference: 389200, 410260
 Slice: A
 Site Area (Ha): 21.43
 Search Buffer (m): 500

Site Details

Site at 389190, 410260





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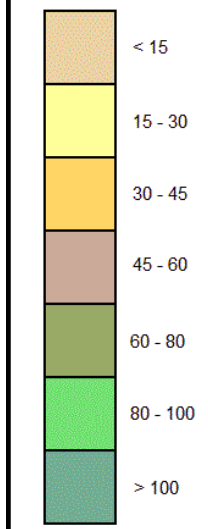


General

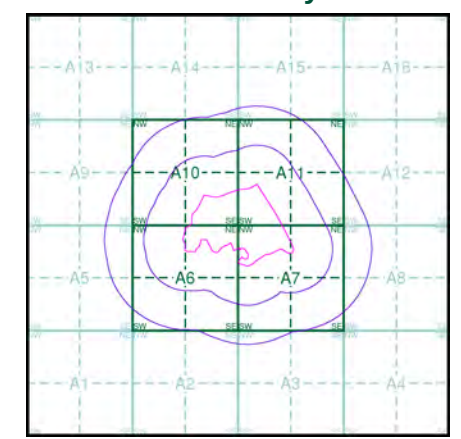
- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

Estimated Soil Chemistry Nickel

Nickel Concentrations mg/kg



Estimated Soil Chemistry Nickel - Slice A



Order Details

Order Details: 77317590_1_1
Customer Ref: R2228
National Grid Reference: 389200, 410260
Slice: A
Site Area (Ha): 21.43
Search Buffer (m): 500

Site Details

Site at 389190, 410260



Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

Envirocheck[®] Report:

BGS Boreholes Datasheet

Order Details:

Order Number:

77317590_1_1

Customer Reference:

R2228

National Grid Reference:

389200, 410260

Slice:

A

Site Area (Ha):

21.43

Borehole Search Buffer (m):

50

Site Details:

Site at 389190, 410260

Client Details:

Mr S Miller
Smith Grant Partnership
Station House
Station Road
Ruabon
Wrexham
LL14 6DL

Data Type	Page Number	On Site	0 to 50m
BGS Boreholes (50m)	pg 1	None	3

Introduction

The Environment Act 1995 has made site sensitivity a key issue, as the legislation pays as much attention to the pathways by which contamination could spread, and to the vulnerable targets of contamination, as it does the potential sources of contamination.

For this reason, Landmark's Site Sensitivity maps and Datasheet(s) place great emphasis on statutory data provided by the Environment Agency and the Scottish Environment Protection Agency; it also incorporates data from Natural England (and the Scottish and Welsh equivalents) and Local Authorities; and highlights hydrogeological features required by environmental and geotechnical consultants. It does not include any information concerning past uses of land. The datasheet is produced by querying the Landmark database to a distance defined by the client from a site boundary provided by the client.

In the attached datasheet the National Grid References (NGRs) are rounded to the nearest 10m in accordance with Landmark's agreements with a number of Data Suppliers.

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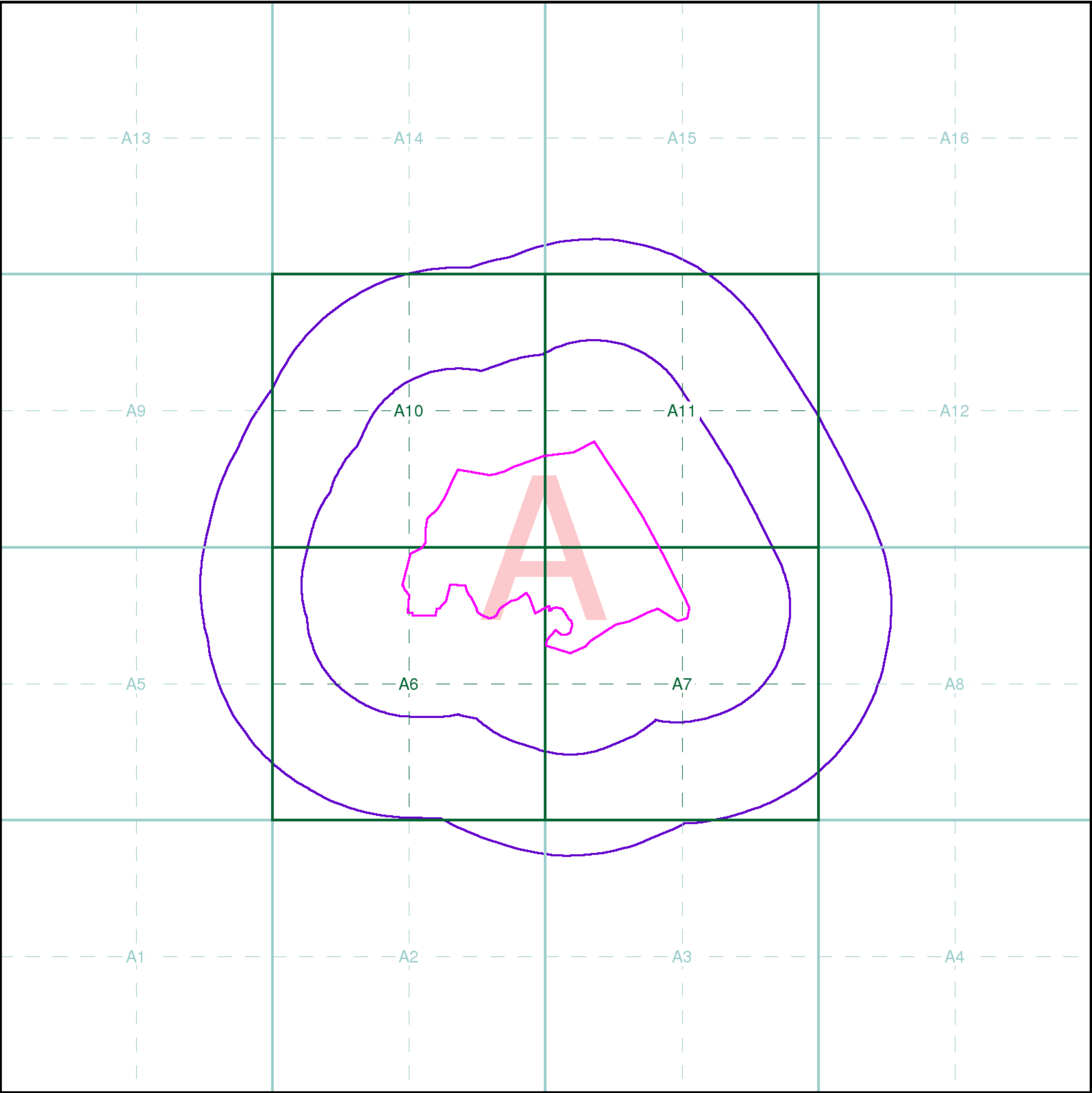
A copy of the BGS Borehole Ordering Form is available to download from the Support section of www.envirocheck.co.uk.

Report Version v50.0

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
42	BGS Boreholes BGS Reference: Sd81se421 Drilled Length (m): 8 Borehole Name: Junction 20 Project Rochdale 1 Link to Borehole Scan: http://scans.bgs.ac.uk/sobi_scans/boreholes/30147/	A10SE (NW)	20	4	389100 410490
43	BGS Boreholes BGS Reference: Sd81se423 Drilled Length (m): 12 Borehole Name: Junction 20 Project Rochdale 3 Link to Borehole Scan: http://scans.bgs.ac.uk/sobi_scans/boreholes/30149/	A11SW (N)	41	4	389220 410550
44	BGS Boreholes BGS Reference: Sd81se429 Drilled Length (m): 3.9 Borehole Name: Junction 20 Project Rochdale Tp1 Link to Borehole Scan: http://scans.bgs.ac.uk/sobi_scans/boreholes/30155/	A10SE (NW)	46	4	389040 410510

BGS Boreholes	Version	Update Cycle
BGS Boreholes British Geological Survey - National Geoscience Information Service	November 2015	Quarterly

Contact Details	Contact Logo
4 British Geological Survey - Enquiry Service British Geological Survey, Kingsley Dunham Centre, Keyworth, Nottingham, Nottinghamshire, NG12 5GG Telephone: 0115 936 3143 Fax: 0115 936 3276 Email: enquiries@bgs.ac.uk Website: www.bgs.ac.uk	 British Geological Survey NATURAL ENVIRONMENT RESEARCH COUNCIL
- Landmark Information Group Limited Imperium, Imperial Way, Reading, Berkshire, RG2 0TD Telephone: 0844 844 9952 Fax: 0844 844 9951 Email: customerservices@landmarkinfo.co.uk Website: www.landmarkinfo.co.uk	 LANDMARK[®] Information Group



Index Map

For ease of identification, your site and buffer have been split into Slices, Segments and Quadrants. These are illustrated on the Index Map opposite and explained further below.

Slice
Each slice represents a 1:10,000 plot area (2.7km x 2.7km) for your site and buffer. A large site and buffer may be made up of several slices (represented by a red outline), that are referenced by letters of the alphabet, starting from the bottom left corner of the slice "grid". This grid does not relate to National Grid lines but is designed to give best fit over the site and buffer.

Segment
A segment represents a 1:2,500 plot area. Segments that have plot files associated with them are shown in dark green, others in light blue. These are numbered from the bottom left hand corner within each slice.

Quadrant
A quadrant is a quarter of a segment. These are labelled as NW, NE, SW, SE and are referenced in the datasheet to allow features to be quickly located on plots. Therefore a feature that has a quadrant reference of A7NW will be in Slice A, Segment 7 and the NW Quadrant.

A selection of organisations who provide data within this report:



Envirocheck reports are compiled from 136 different sources of data.

Client Details
Mr S Miller, Smith Grant Partnership, Station House,
Station Road, Ruabon, Wrexham, LL14 6DL

Order Details
Order Number: 77317590_1_1
Customer Ref: R2228
National Grid Reference: 389200, 410280
Site Area (Ha): 21.43
Search Buffer (m): 500

Site Details
Site at 389190, 410260

Full Terms and Conditions can be found on the following link:
<http://www.landmarkinfo.co.uk/Terms/Show/515>



APPENDIX C

Ground Stability Report

Envirocheck® Report:

Mining and Ground Stability Datasheet

Order Details:

Order Number:

77317590_1_1

Customer Reference:

R2228

National Grid Reference:

389200, 410260

Slice:

A

Site Area (Ha):

21.43

Search Buffer (m):

500

Site Details:

Site at 389190, 410260

Client Details:

Mr S Miller
Smith Grant Partnership
Station House
Station Road
Ruabon
Wrexham
LL14 6DL

Report Section and Details	Page Number
Summary	-
The Summary section provides an overview of the data contained within the report, detailing the number of data set features or the existence of a data set in relation to the buffer selected. For ease of reference, the report is broken down into 4 sections of data; Mining and Natural Cavities Data, Historical Land Use Information (1:2,500), Historical Land Use Information (1:10,000) and Ground Stability Data (1:50,000).	
Mining and Natural Cavities Data	1
The Mining and Natural Cavities Data section features data sets related to the existence of mining areas and their potential hazards; and details of naturally formed cavities. Data sets within this section are not plotted, with the exception of BGS Recorded Mineral Sites and Potential Mining Areas which feature on the Historical Land Use Information (1:10,000) map.	
Historical Land Use Information (1:2,500)	2
The Historical Land Use Information (1:2,500) section contains data captured from analysis carried out by Landmark of 1:1,250 and 1:2,500 scale historical Ordnance Survey mapping, identifying areas where, historically, the land uses were potentially contaminative. For the purpose of this Envirocheck module, only historical data relating to mining and ground stability has been included and plotted on the corresponding Historical Land Use Information (1:2,500) map. This section also includes the Subterranean Features data set, which details various man-made and man-used underground spaces obtained from the Subterranea Britannica society.	
Historical Land Use Information (1:10,000)	6
The Historical Land Use (1:10,000) section covers data captured from the systematic analysis carried out by Landmark of 1:10, 560 and 1:10,000 scale historical Ordnance Survey mapping dating back to the mid-19th century, identifying potentially contaminative past industrial land uses. For the purpose of this Envirocheck module, only data relating to mining and ground stability has been included and plotted on the accompanying Historical Land Use Information (1:10,000) map.	
Ground Stability Data (1:50,000)	7
The Ground Stability (1:50,000) section includes the BGS Geosure data suite, reporting features to 250m and plotted onto 3 separate maps. Also reported is brine subsidence, brine mining and salt mining data sets, of which Brine Pumping and Salt Mining Related Features are plotted, and subsidence insurance claims and insurance investigations data, which is not plotted.	
Motion Map Data (1:2,500)	9
The Motion Map Data (1:2,500) section contains data which is plotted to indicate long-term stability trends from analysis of satellite radar data.	
Historical Map List	10
The Historical Map List section details the historical mapping that has been analysed for your site, in relation to the Historical Land Use Information sections.	
Data Currency	12
Data Suppliers	14
Useful Contacts	15

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The brine subsidence data relating to the Driotwich area as provided in this report is derived from JPB studies and physical monitoring undertaken annually over more than 35 years. For more detailed interpretation contact enquiries@jpb.co.uk. JPB retain the copyright and intellectual rights to this data and accept no liability for any loss or damage, including in direct or consequential loss, arising from the use of this data.

Data Type	Page Number	On Site	0 to 250m	251 to 500m
Mining and Natural Cavities Data				
BGS Recorded Mineral Sites	pg 1		3	1
Coal Mining Affected Areas	pg 1	Yes	n/a	n/a
Man Made Mining Cavities				
Mining Instability	pg 1	Yes	n/a	n/a
Natural Cavities				
Non Coal Mining Areas of Great Britain				n/a
Potential Mining Areas				
Historical Land Use Information (1:2,500)				
Extractive Industries or Potential Excavations from 1855-1909 (100m)	pg 2	1	4	n/a
Extractive Industries or Potential Excavations from 1893-1915 (100m)	pg 2	2	6	n/a
Extractive Industries or Potential Excavations from 1906-1937 (100m)	pg 3	1	7	n/a
Extractive Industries or Potential Excavations from 1924-1949 (100m)	pg 3	1	6	n/a
Extractive Industries or Potential Excavations from 1950-1980 (100m)	pg 4		7	n/a
Subterranean Features (100m)				n/a
Historical Land Use Information (1:10,000)				
Air Shafts				
Disturbed Ground				
General Quarrying				
Heap, unknown constituents				
Mineral Railway				
Mining & quarrying general				
Mining of coal & lignite				
Quarrying of sand & clay, operation of sand & gravel pits	pg 6		5	1
Former Marshes	pg 6		1	
Potentially Infilled Land (Non-Water)	pg 6		5	2
Potentially Infilled Land (Water)	pg 6		2	4

Data Type	Page Number	On Site	0 to 250m	251 to 500m
Ground Stability Data (1:50,000)				
Brine Compensation Area			n/a	n/a
Brine Pumping Related Features				
Brine Subsidence Solution Area				
Potential for Collapsible Ground Stability Hazards	pg 7	Yes	Yes	n/a
Potential for Compressible Ground Stability Hazards	pg 7	Yes	Yes	n/a
Potential for Ground Dissolution Stability Hazards	pg 7	Yes	Yes	n/a
Potential for Landslide Ground Stability Hazards	pg 7	Yes	Yes	n/a
Potential for Running Sand Ground Stability Hazards	pg 7	Yes	Yes	n/a
Potential for Shrinking or Swelling Clay Ground Stability Hazards	pg 7	Yes	Yes	n/a
Salt Mining Related Features				
Subsidence Insurance Claims				n/a
Subsidence Investigations	pg 8		1	n/a
Motion Map Data (1:2,500)				
Motion Map (100m)	pg 9		19	n/a

Report Version v50.0

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
1	BGS Recorded Mineral Sites Site Name: Windy Bank Sand Pit Location: , Castleton, Rochdale, Lancashire Source: British Geological Survey, National Geoscience Information Service Reference: 96584 Type: Opencast Status: Ceased Operator: Unknown Operator Operator Location: Unknown Operator Periodic Type: Quaternary Geology: Glaciofluvial Deposits, Devensian Commodity: Sand Positional Accuracy: Located by supplier to within 10m	A10SE (NW)	99	1	388893 410507
2	BGS Recorded Mineral Sites Site Name: Windy Bank Sand Pit Location: , Castleton, Rochdale, Lancashire Source: British Geological Survey, National Geoscience Information Service Reference: 96583 Type: Opencast Status: Ceased Operator: Unknown Operator Operator Location: Unknown Operator Periodic Type: Quaternary Geology: Glaciofluvial Deposits, Devensian Commodity: Sand Positional Accuracy: Located by supplier to within 10m	A10SW (W)	107	1	388811 410387
3	BGS Recorded Mineral Sites Site Name: Castleton Location: , Castleton, Rochdale, Lancashire Source: British Geological Survey, National Geoscience Information Service Reference: 15322 Type: Opencast Status: Ceased Operator: Unknown Operator Operator Location: Unknown Operator Periodic Type: Quaternary Geology: Glaciofluvial Deposits, Devensian Commodity: Sand Positional Accuracy: Located by supplier to within 10m	A7SW (S)	199	1	389265 409820
4	BGS Recorded Mineral Sites Site Name: Castleton Location: , Castleton, Rochdale, Lancashire Source: British Geological Survey, National Geoscience Information Service Reference: 15321 Type: Opencast Status: Ceased Operator: Unknown Operator Operator Location: Unknown Operator Periodic Type: Quaternary Geology: Glaciofluvial Deposits, Devensian Commodity: Sand Positional Accuracy: Located by supplier to within 10m	A6SW (SW)	300	1	388760 409835
	Coal Mining Affected Areas Description: In an area which may be affected by coal mining activity. It is recommended that a coal mining report is obtained from the Coal Authority. Contact details are included in the Useful Contacts section of this report.	A6NE (N)	0	2	389200 410258
	Mining Instability Mining Evidence: Inconclusive Coal Mining Source: Ove Arup & Partners Boundary Quality: As Supplied	A6NE (N)	0	3	389200 410258
	Non Coal Mining Areas of Great Britain No Hazard				

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
5	Extractive Industries or Potential Excavations from 1855-1909 Use: Mill Pond First Map Published 1893 Date: Last Map Published Not Applicable Date:	A7NW (S)	0	-	389209 410063
6	Extractive Industries or Potential Excavations from 1855-1909 Use: Reservoir First Map Published 1890 Date: Last Map Published Not Applicable Date:	A7NW (SE)	1	-	389408 410096
7	Extractive Industries or Potential Excavations from 1855-1909 Use: Reservoir First Map Published 1893 Date: Last Map Published Not Applicable Date:	A6NE (S)	11	-	389198 410012
8	Extractive Industries or Potential Excavations from 1855-1909 Use: Reservoir First Map Published 1893 Date: Last Map Published Not Applicable Date:	A6NE (SW)	11	-	389053 410025
9	Extractive Industries or Potential Excavations from 1855-1909 Use: Old Gravel Pit First Map Published 1893 Date: Last Map Published Not Applicable Date:	A10SE (NW)	51	-	388934 410484
10	Extractive Industries or Potential Excavations from 1893-1915 Use: Mill Pond First Map Published 1910 Date: Last Map Published Not Applicable Date:	A7NW (S)	0	-	389212 410062
11	Extractive Industries or Potential Excavations from 1893-1915 Use: Reservoir First Map Published 1910 Date: Last Map Published Not Applicable Date:	A7NW (S)	0	-	389230 410126
12	Extractive Industries or Potential Excavations from 1893-1915 Use: Reservoir First Map Published 1910 Date: Last Map Published Not Applicable Date:	A7NW (SE)	1	-	389407 410096
13	Extractive Industries or Potential Excavations from 1893-1915 Use: Reservoir First Map Published 1910 Date: Last Map Published Not Applicable Date:	A6NE (SW)	12	-	389053 410026
14	Extractive Industries or Potential Excavations from 1893-1915 Use: Reservoir First Map Published 1910 Date: Last Map Published Not Applicable Date:	A6NE (S)	14	-	389195 410010
15	Extractive Industries or Potential Excavations from 1893-1915 Use: Old Sand Pit First Map Published 1910 Date: Last Map Published Not Applicable Date:	A10SE (NW)	50	-	388937 410486

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
16	Extractive Industries or Potential Excavations from 1893-1915 Use: Unspecified Pit First Map Published 1910 Date: Last Map Published Not Applicable Date:	A6NW (W)	60	-	388799 410233
17	Extractive Industries or Potential Excavations from 1893-1915 Use: Old Sand Pits First Map Published 1910 Date: Last Map Published Not Applicable Date:	A10SW (W)	80	-	388834 410373
18	Extractive Industries or Potential Excavations from 1906-1937 Use: Reservoir First Map Published 1929 Date: Last Map Published Not Applicable Date:	A7NW (S)	0	-	389230 410127
19	Extractive Industries or Potential Excavations from 1906-1937 Use: Reservoir First Map Published 1930 Date: Last Map Published Not Applicable Date:	A7NW (SE)	1	-	389404 410096
20	Extractive Industries or Potential Excavations from 1906-1937 Use: Mill Pond First Map Published 1929 Date: Last Map Published Not Applicable Date:	A6NE (S)	3	-	389191 410046
21	Extractive Industries or Potential Excavations from 1906-1937 Use: Reservoir First Map Published 1929 Date: Last Map Published Not Applicable Date:	A6NE (SW)	11	-	389018 410050
22	Extractive Industries or Potential Excavations from 1906-1937 Use: Reservoir First Map Published 1929 Date: Last Map Published Not Applicable Date:	A6NE (S)	12	-	389195 410011
23	Extractive Industries or Potential Excavations from 1906-1937 Use: Unspecified Deposited Material First Map Published 1929 Date: Last Map Published Not Applicable Date:	A10SE (NW)	51	-	388934 410484
24	Extractive Industries or Potential Excavations from 1906-1937 Use: Unspecified Pit First Map Published 1929 Date: Last Map Published Not Applicable Date:	A10SW (W)	80	-	388833 410371
25	Extractive Industries or Potential Excavations from 1906-1937 Use: Unspecified Pit First Map Published 1929 Date: Last Map Published Not Applicable Date:	A6NE (SW)	87	-	389053 410020
26	Extractive Industries or Potential Excavations from 1924-1949 Use: Reservoir First Map Published 1937 Date: Last Map Published Not Applicable Date:	A7NW (S)	0	-	389227 410127

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
27	Extractive Industries or Potential Excavations from 1924-1949 Use: Reservoir First Map Published 1937 Date: Last Map Published Not Applicable Date:	A7NW (SE)	2	-	389407 410096
28	Extractive Industries or Potential Excavations from 1924-1949 Use: Mill Pond First Map Published 1937 Date: Last Map Published Not Applicable Date:	A6NE (S)	4	-	389188 410047
29	Extractive Industries or Potential Excavations from 1924-1949 Use: Reservoir First Map Published 1937 Date: Last Map Published Not Applicable Date:	A6NE (S)	11	-	389197 410012
30	Extractive Industries or Potential Excavations from 1924-1949 Use: Reservoir First Map Published 1937 Date: Last Map Published Not Applicable Date:	A6NE (SW)	11	-	389043 410032
31	Extractive Industries or Potential Excavations from 1924-1949 Use: Unspecified Pit First Map Published 1937 Date: Last Map Published Not Applicable Date:	A6NW (SW)	79	-	388821 410052
32	Extractive Industries or Potential Excavations from 1924-1949 Use: Unspecified Pit First Map Published 1937 Date: Last Map Published Not Applicable Date:	A10SW (W)	82	-	388832 410375
33	Extractive Industries or Potential Excavations from 1950-1980 Use: Reservoir First Map Published 1956 Date: Last Map Published 1956 Date:	A7NW (S)	1	-	389228 410127
34	Extractive Industries or Potential Excavations from 1950-1980 Use: Reservoir First Map Published 1956 Date: Last Map Published 1956 Date:	A7NW (SE)	3	-	389404 410093
35	Extractive Industries or Potential Excavations from 1950-1980 Use: Mill Pond First Map Published 1956 Date: Last Map Published 1956 Date:	A6NE (S)	5	-	389189 410045
36	Extractive Industries or Potential Excavations from 1950-1980 Use: Reservoir First Map Published 1956 Date: Last Map Published 1956 Date:	A7NW (S)	12	-	389206 410014
37	Extractive Industries or Potential Excavations from 1950-1980 Use: Reservoir First Map Published 1956 Date: Last Map Published 1956 Date:	A6NE (SW)	14	-	389013 410044

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
38	Extractive Industries or Potential Excavations from 1950-1980 Use: Pond First Map Published 1956 Date: Last Map Published 1956 Date:	A7NW (SE)	67	-	389441 410040
39	Extractive Industries or Potential Excavations from 1950-1980 Use: Unspecified Pit First Map Published 1956 Date: Last Map Published 1956 Date:	A10SW (W)	84	-	388831 410374

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
40	Quarrying of sand & clay, operation of sand & gravel pits Use: Not Supplied Date of Mapping: 1910	A10SE (NW)	44	-	388942 410481
41	Quarrying of sand & clay, operation of sand & gravel pits Use: Not Supplied Date of Mapping: 1910	A10SW (W)	95	-	388822 410383
41	Quarrying of sand & clay, operation of sand & gravel pits Use: Not Supplied Date of Mapping: 1910	A10SW (W)	136	-	388776 410367
42	Quarrying of sand & clay, operation of sand & gravel pits Use: Not Supplied Date of Mapping: 1956	A6NW (SW)	182	-	388722 410004
43	Quarrying of sand & clay, operation of sand & gravel pits Use: Not Supplied Date of Mapping: 1932 - 1956	A7SW (S)	191	-	389284 409830
44	Quarrying of sand & clay, operation of sand & gravel pits Use: Not Supplied Date of Mapping: 1894 - 1910	A6SW (SW)	474	-	388725 409663
45	Former Marshes Use: Former Marsh Date of Mapping: 1851	A10NE (NW)	175	-	388945 410643
46	Potentially Infilled Land (Non-Water) Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1993	A10SE (NW)	44	-	388942 410481
47	Potentially Infilled Land (Non-Water) Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1993	A10SW (W)	95	-	388822 410383
48	Potentially Infilled Land (Non-Water) Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1993	A10SW (W)	136	-	388776 410367
49	Potentially Infilled Land (Non-Water) Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1984	A6NW (SW)	182	-	388722 410004
50	Potentially Infilled Land (Non-Water) Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1984	A7SW (S)	191	-	389284 409830
51	Potentially Infilled Land (Non-Water) Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1993	A10NW (NW)	449	-	388743 410850
52	Potentially Infilled Land (Non-Water) Use: Unknown Filled Ground (Pit, quarry etc) Date of Mapping: 1984	A6SW (SW)	474	-	388725 409663
53	Potentially Infilled Land (Water) Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A7NW (SE)	85	-	389459 410027
54	Potentially Infilled Land (Water) Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A7NE (E)	181	-	389688 410278
55	Potentially Infilled Land (Water) Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	A7SW (SE)	274	-	389518 409825
56	Potentially Infilled Land (Water) Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1931	A11SE (E)	409	-	389830 410499
57	Potentially Infilled Land (Water) Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1910	A10NW (NW)	422	-	388758 410828
58	Potentially Infilled Land (Water) Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1851	A10NW (NW)	500	-	388759 410918

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Brine Compensation Area The site does not fall within the brine compensation area.				
	Brine Subsidence Solution Area The site does not fall within the brine subsidence solution area.				
59	Potential for Collapsible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A6NE (N)	0	1	389200 410258
60	Potential for Collapsible Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A6NE (S)	19	1	389200 410000
61	Potential for Compressible Ground Stability Hazards Hazard Potential: Moderate Source: British Geological Survey, National Geoscience Information Service	A6SE (S)	192	1	389200 409830
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A6NE (N)	0	1	389200 410258
	Potential for Compressible Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A6NE (S)	19	1	389200 410000
	Potential for Ground Dissolution Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A6NE (N)	0	1	389200 410258
	Potential for Ground Dissolution Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A6NE (S)	19	1	389200 410000
62	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A6NE (N)	0	1	389200 410258
63	Potential for Landslide Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A6NE (S)	19	1	389200 410000
64	Potential for Running Sand Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A6NE (N)	0	1	389200 410258
65	Potential for Running Sand Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A6NE (S)	19	1	389200 410000
66	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A6NE (SW)	0	1	389101 410041
67	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A6NE (N)	0	1	389200 410258
68	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Low Source: British Geological Survey, National Geoscience Information Service	A6NE (S)	19	1	389200 410000
69	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A6NE (S)	50	1	389172 410000
70	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A7NE (SE)	62	1	389578 410036
71	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A7NE (SE)	108	1	389575 410000
72	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: Very Low Source: British Geological Survey, National Geoscience Information Service	A10SW (NW)	187	1	388809 410537
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A6NE (W)	0	1	388874 410127

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
	Potential for Shrinking or Swelling Clay Ground Stability Hazards Hazard Potential: No Hazard Source: British Geological Survey, National Geoscience Information Service	A6NE (S)	48	1	389172 410000
	Subsidence Investigations Site Investigation Date: 5th November 2010 Root Survey: No CCTV Drain Survey: No Depth of Foundation: Not Supplied Footing: Soil Classification: Not Supplied			-	

Map ID	Details	Quadrant Reference (Compass Direction)	Estimated Distance From Site	Contact	NGR
73	Motion Map Average Velocity -0.1 Gradient (mmyear):	A11SW (N)	2	-	389287 410525
73	Motion Map Average Velocity 0.2 Gradient (mmyear):	A11SW (N)	3	-	389291 410528
73	Motion Map Average Velocity -0.1 Gradient (mmyear):	A11SW (N)	4	-	389290 410529
73	Motion Map Average Velocity 0.2 Gradient (mmyear):	A11SW (N)	5	-	389293 410532
74	Motion Map Average Velocity -0.4 Gradient (mmyear):	A11SW (NE)	21	-	389340 410554
74	Motion Map Average Velocity -0.4 Gradient (mmyear):	A11SW (NE)	25	-	389343 410557
75	Motion Map Average Velocity 0.1 Gradient (mmyear):	A11SW (NE)	47	-	389361 410570
75	Motion Map Average Velocity -0.1 Gradient (mmyear):	A11SW (NE)	48	-	389363 410569
75	Motion Map Average Velocity 0.1 Gradient (mmyear):	A11SW (NE)	53	-	389366 410572
76	Motion Map Average Velocity 0.2 Gradient (mmyear):	A6NW (W)	50	-	388813 410110
76	Motion Map Average Velocity 0.0 Gradient (mmyear):	A6NW (W)	50	-	388815 410105
77	Motion Map Average Velocity -2.0 Gradient (mmyear):	A10SW (W)	59	-	388819 410296
78	Motion Map Average Velocity -0.7 Gradient (mmyear):	A11SW (N)	67	-	389328 410609
78	Motion Map Average Velocity -0.6 Gradient (mmyear):	A11SW (N)	67	-	389326 410610
79	Motion Map Average Velocity -0.1 Gradient (mmyear):	A11SW (NE)	68	-	389379 410581
79	Motion Map Average Velocity 0.7 Gradient (mmyear):	A11SW (NE)	69	-	389383 410576
79	Motion Map Average Velocity -0.3 Gradient (mmyear):	A11SW (NE)	73	-	389384 410580
79	Motion Map Average Velocity -0.1 Gradient (mmyear):	A11SW (NE)	76	-	389386 410584
80	Motion Map Average Velocity 0.1 Gradient (mmyear):	A7SW (S)	86	-	389255 409934

The following mapping has been analysed for Historical Land Use Information (1:2,500):

1:2,500	Mapsheet	Published Date
Lancashire And Furness	089_09	1890
Lancashire And Furness	089_09	1890
Lancashire And Furness	088_12	1893
Lancashire And Furness	088_12	1893
Lancashire And Furness	088_12	1893
Lancashire And Furness	088_12	1893
Lancashire And Furness	088_12	1910
Lancashire And Furness	088_12	1910
Lancashire And Furness	088_12	1910
Lancashire And Furness	088_12	1910
Lancashire And Furness	089_09	1910
Lancashire And Furness	089_09	1910
Lancashire And Furness	088_12	1929
Lancashire And Furness	088_12	1929
Lancashire And Furness	088_12	1929
Lancashire And Furness	088_12	1929
Lancashire And Furness	089_09	1930
Lancashire And Furness	089_09	1930
Lancashire And Furness	088_12	1937
Lancashire And Furness	088_12	1937
Lancashire And Furness	088_12	1937
Lancashire And Furness	088_12	1937
Lancashire And Furness	089_09	1937
Lancashire And Furness	089_09	1937
Ordnance Survey Plan	SD8809	1956
Ordnance Survey Plan	SD8810	1956
Ordnance Survey Plan	SD8810	1956
Ordnance Survey Plan	SD8909	1956
Ordnance Survey Plan	SD8909	1956
Ordnance Survey Plan	SD8910	1956
Ordnance Survey Plan	SD8910	1956
Ordnance Survey Plan	SD8910	1956
Ordnance Survey Plan	SD8910	1956

The following mapping has been analysed for Historical Land Use Information (1:10,000):

1:10,560	Mapsheet	Published Date
Lancashire And Furness	088_00	1851
Lancashire And Furness	089_00	1851
Yorkshire	258_00	1854
Lancashire And Furness	088_NE	1894
Lancashire And Furness	088_SE	1894
Lancashire And Furness	089_NW	1894
Lancashire And Furness	089_SW	1894
Lancashire And Furness	088_SE	1910
Lancashire And Furness	089_NW	1910
Lancashire And Furness	089_SW	1910
Lancashire And Furness	088_NE	1911
Lancashire And Furness	089_NW	1931
Lancashire And Furness	089_SW	1931
Lancashire And Furness	088_NE	1932
Lancashire And Furness	088_SE	1932
Ordnance Survey Plan	SD80NE	1956
Ordnance Survey Plan	SD81SE	1956
Ordnance Survey Plan	SD90NW	1956
Ordnance Survey Plan	SD91SW	1956
1:10,000	Mapsheet	Published Date
Ordnance Survey Plan	SD80NE	1984
Ordnance Survey Plan	SD91SW	1989
Ordnance Survey Plan	SD90NW	1990
Ordnance Survey Plan	SD81SE	1993

Mining and Cavities Data	Version	Update Cycle
BGS Recorded Mineral Sites British Geological Survey - National Geoscience Information Service	November 2015	Bi-Annually
Coal Mining Affected Areas The Coal Authority - Mining Report Service	March 2014	As notified
Man Made Mining Cavities Peter Brett Associates	October 2015	Bi-Annually
Mining Instability Ove Arup & Partners	October 2000	Not Applicable
Natural Cavities Peter Brett Associates	October 2015	Bi-Annually
Non Coal Mining Areas of Great Britain British Geological Survey - National Geoscience Information Service	July 2014	Not Applicable
Historical Land Use Information (1:2,500)	Version	Update Cycle
Subterranean Features Landmark Information Group Limited	August 2015	Bi-Annually
Ground Stability Data (1:50,000)	Version	Update Cycle
Brine Compensation Area Cheshire Brine Subsidence Compensation Board	August 2011	Not Applicable
Potential for Collapsible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Compressible Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Ground Dissolution Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Landslide Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Running Sand Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Potential for Shrinking or Swelling Clay Ground Stability Hazards British Geological Survey - National Geoscience Information Service	June 2015	Annually
Subsidence Insurance Claims SP Property Services	November 2015	Quarterly
Subsidence Investigations CET Structures Ltd	November 2015	Quarterly

Motion Map Data (1:2,500)	Version	Update Cycle
Motion Map		
Nigel Press Associates - Hampshire	February 2011	As notified
Nigel Press Associates - Cambridge	January 2011	As notified
Nigel Press Associates - Ipswich	January 2011	As notified
Nigel Press Associates - Norwich	January 2011	As notified
Nigel Press Associates - Peterborough	January 2011	As notified
Nigel Press Associates - Barnstaple	July 2010	As notified
Nigel Press Associates - Derbyshire	July 2010	As notified
Nigel Press Associates - Humberside	July 2010	As notified
Nigel Press Associates - Kent	July 2010	As notified
Nigel Press Associates - Lincolnshire	July 2010	As notified
Nigel Press Associates - Nottinghamshire	July 2010	As notified
Nigel Press Associates - Birmingham	May 2009	As notified
Nigel Press Associates - Bournemouth	May 2009	As notified
Nigel Press Associates - Brighton	May 2009	As notified
Nigel Press Associates - Bristol	May 2009	As notified
Nigel Press Associates - Cardiff	May 2009	As notified
Nigel Press Associates - Central London	May 2009	As notified
Nigel Press Associates - Cheltenham	May 2009	As notified
Nigel Press Associates - Coventry	May 2009	As notified
Nigel Press Associates - Crawley	May 2009	As notified
Nigel Press Associates - Edinburgh	May 2009	As notified
Nigel Press Associates - Exeter	May 2009	As notified
Nigel Press Associates - Glasgow	May 2009	As notified
Nigel Press Associates - Isle of Wight	May 2009	As notified
Nigel Press Associates - Leeds	May 2009	As notified
Nigel Press Associates - Leicester	May 2009	As notified
Nigel Press Associates - Liverpool	May 2009	As notified
Nigel Press Associates - Manchester	May 2009	As notified
Nigel Press Associates - Milton Keynes	May 2009	As notified
Nigel Press Associates - Newcastle	May 2009	As notified
Nigel Press Associates - Northwich	May 2009	As notified
Nigel Press Associates - Nottingham	May 2009	As notified
Nigel Press Associates - Oxford	May 2009	As notified
Nigel Press Associates - Plymouth	May 2009	As notified
Nigel Press Associates - Portsmouth	May 2009	As notified
Nigel Press Associates - Preston	May 2009	As notified
Nigel Press Associates - Reading	May 2009	As notified
Nigel Press Associates - Sheffield	May 2009	As notified
Nigel Press Associates - Stoke	May 2009	As notified
Nigel Press Associates - Swindon	May 2009	As notified
Nigel Press Associates - Tonbridge	May 2009	As notified
Nigel Press Associates - North London	November 2008	As notified
Nigel Press Associates - Head Office	September 2008	As notified

A selection of organisations who provide data within this report

Data Supplier	Data Supplier Logo
Ordnance Survey	
British Geological Survey	
The Coal Authority	
Ove Arup	
Peter Brett Associates	
Wardell Armstrong	
Johnson Poole & Bloomer	

Contact	Name and Address	Contact Details
1	British Geological Survey - Enquiry Service British Geological Survey, Kingsley Dunham Centre, Keyworth, Nottingham, Nottinghamshire, NG12 5GG	Telephone: 0115 936 3143 Fax: 0115 936 3276 Email: enquiries@bgs.ac.uk Website: www.bgs.ac.uk
2	The Coal Authority - Mining Report Service 200 Lichfield Lane, Mansfield, Nottinghamshire, NG18 4RG	Telephone: 0845 7626848 Email: thecoalauthority@coal.gov.uk
3	Ove Arup & Partners Central Square, Forth Street, Newcastle upon Tyne, Tyne and Wear, NE1 3PL	Telephone: 0191 261 6080 Fax: 0191 261 7879
-	Landmark Information Group Limited Imperium, Imperial Way, Reading, Berkshire, RG2 0TD	Telephone: 0844 844 9952 Fax: 0844 844 9951 Email: customerservices@landmarkinfo.co.uk Website: www.landmarkinfo.co.uk

Historical Land Use Information (1:2,500)

General

- Specified Site Specified Buffer(s) Bearing Reference Point Map ID
Several of Type at Location

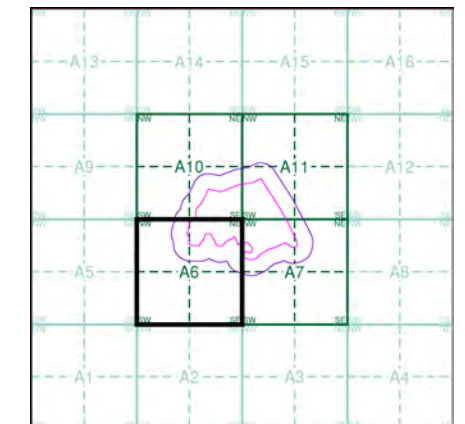
Potentially Contaminative Industrial Uses (Extractive Industries Activity)

	Point	Line	Polygon
Extractive Industries Activity from 1855 - 1909	▲	—	■
Extractive Industries Activity from 1893 - 1915	▲	—	■
Extractive Industries Activity from 1906 - 1937	▲	—	■
Extractive Industries Activity from 1924 - 1949	▲	—	■
Extractive Industries Activity from 1950 - 1980	▲	—	■

Subterranean Features

	Point	Line	Polygon
Subterranean Features	▼	---	■

Mining and Ground Stability - Segment A6

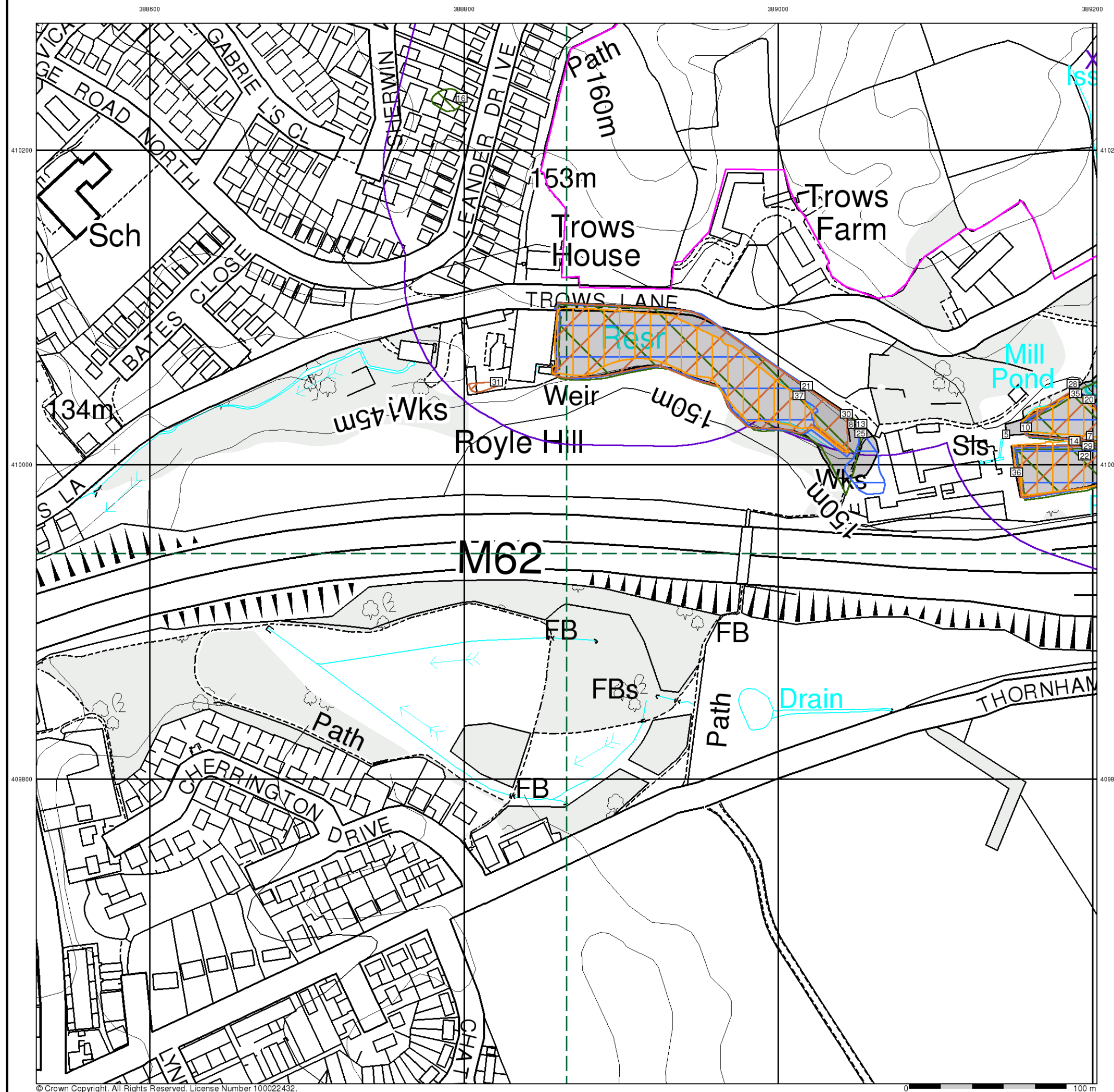


Order Details

Order Number: 77317590_1_1
Customer Ref: R2228
National Grid Reference: 389200, 410260
Slice: A
Site Area (Ha): 21.43
Plot Buffer (m): 100

Site Details

Site at 389190, 410260



Historical Land Use Information (1:2,500)

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID
- Several of Type at Location

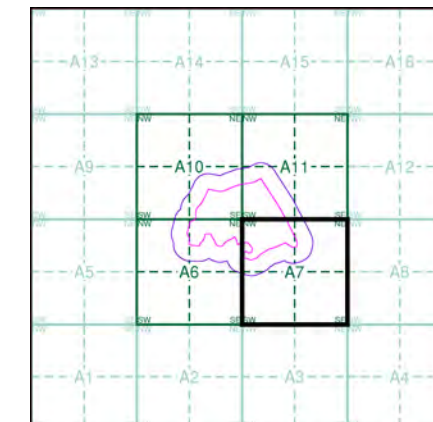
Potentially Contaminative Industrial Uses (Extractive Industries Activity)

	Point	Line	Polygon
Extractive Industries Activity from 1855 - 1909	▲	—	■
Extractive Industries Activity from 1893 - 1915	▲	—	■
Extractive Industries Activity from 1906 - 1937	▲	—	■
Extractive Industries Activity from 1924 - 1949	▲	—	■
Extractive Industries Activity from 1950 - 1980	▲	—	■

Subterranean Features

	Point	Line	Polygon
Subterranean Features	▼	---	■

Mining and Ground Stability - Segment A7

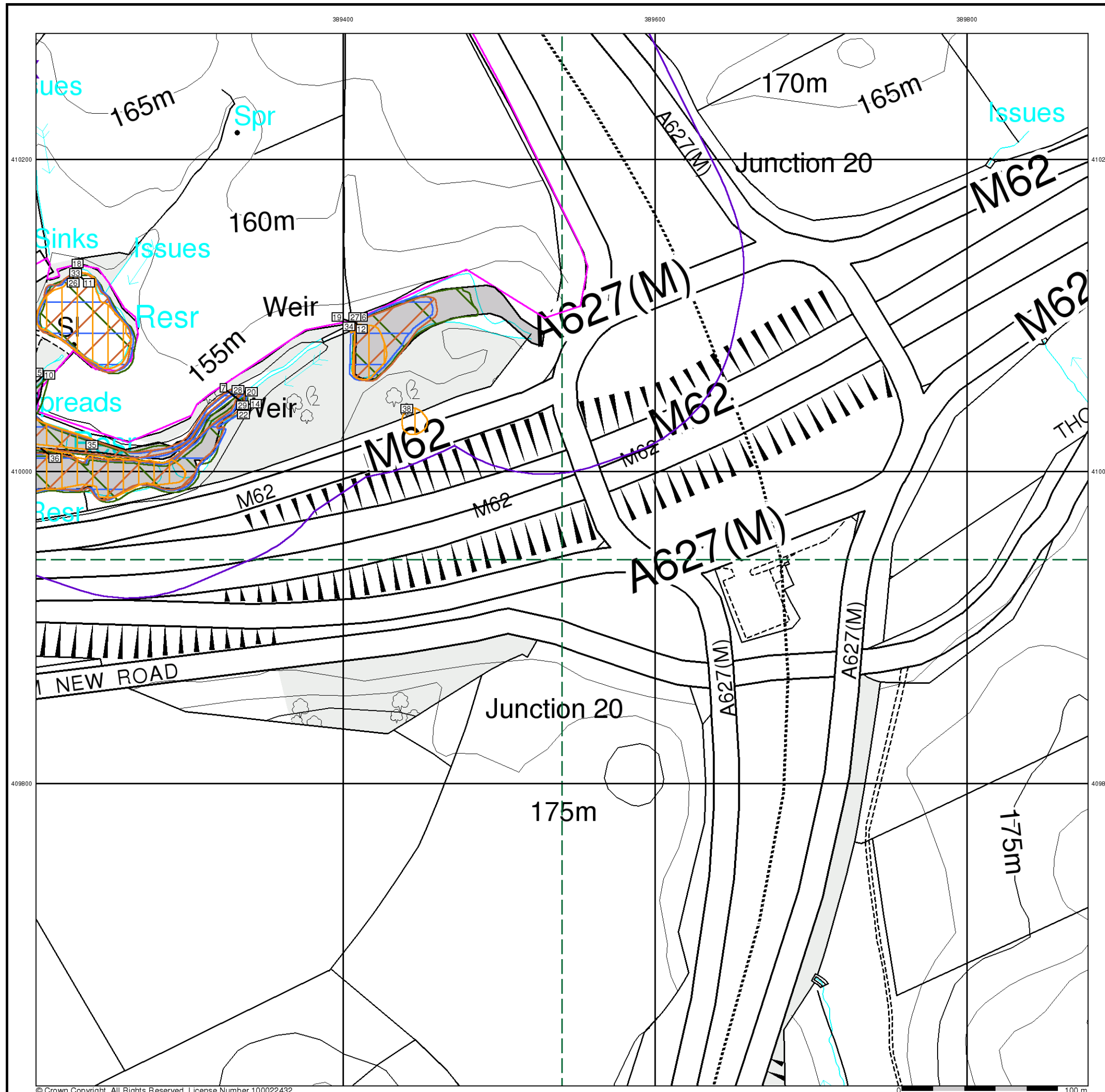


Order Details

Order Number: 77317590_1_1
 Customer Ref: R2228
 National Grid Reference: 389200, 410260
 Slice: A
 Site Area (Ha): 21.43
 Plot Buffer (m): 100

Site Details

Site at 389190, 410260



Historical Land Use Information (1:2,500)

General

- Specified Site Specified Buffer(s) Bearing Reference Point Map ID
Several of Type at Location

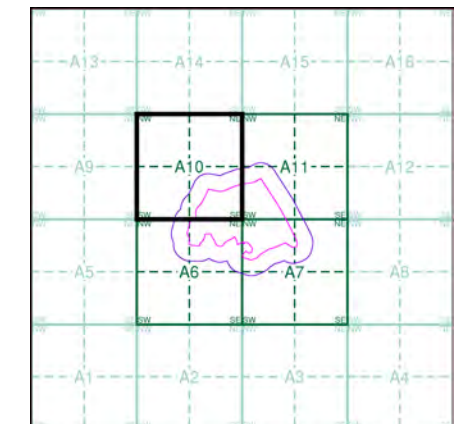
Potentially Contaminative Industrial Uses (Extractive Industries Activity)

	Point	Line	Polygon
Extractive Industries Activity from 1855 - 1909	▲	—	■
Extractive Industries Activity from 1893 - 1915	▲	—	■
Extractive Industries Activity from 1906 - 1937	▲	—	■
Extractive Industries Activity from 1924 - 1949	▲	—	■
Extractive Industries Activity from 1950 - 1980	▲	—	■

Subterranean Features

	Point	Line	Polygon
Subterranean Features	▼	---	■

Mining and Ground Stability - Segment A10

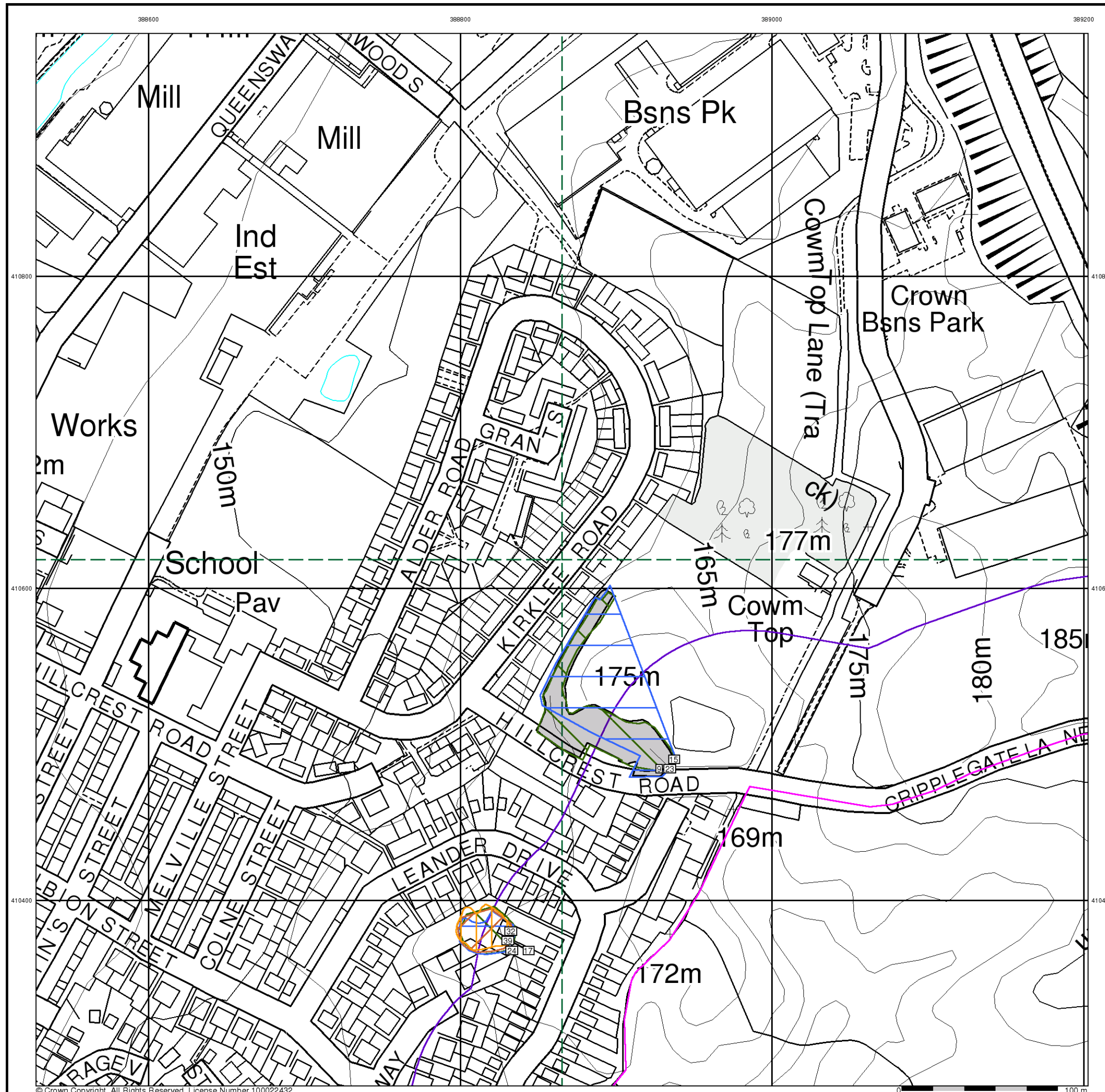


Order Details

Order Number: 77317590_1_1
Customer Ref: R2228
National Grid Reference: 389200, 410260
Slice: A
Site Area (Ha): 21.43
Plot Buffer (m): 100

Site Details

Site at 389190, 410260



Historical Land Use Information (1:2,500)

General

- Specified Site Specified Buffer(s) Bearing Reference Point Map ID
Several of Type at Location

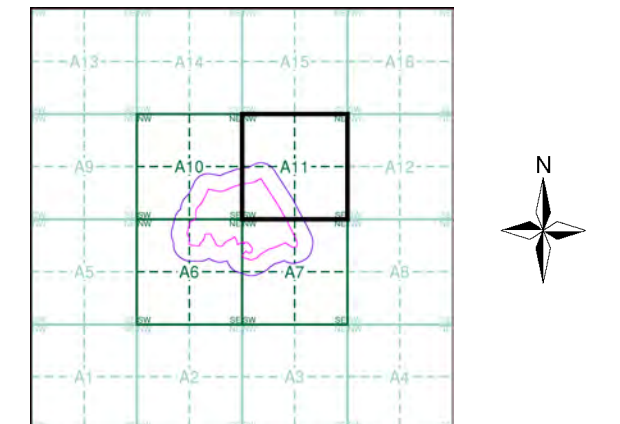
Potentially Contaminative Industrial Uses (Extractive Industries Activity)

	Point	Line	Polygon
Extractive Industries Activity from 1855 - 1909	▲	—	■
Extractive Industries Activity from 1893 - 1915	▲	—	■
Extractive Industries Activity from 1906 - 1937	▲	—	■
Extractive Industries Activity from 1924 - 1949	▲	—	■
Extractive Industries Activity from 1950 - 1980	▲	—	■

Subterranean Features

	Point	Line	Polygon
Subterranean Features	▼	---	■

Mining and Ground Stability - Segment A11

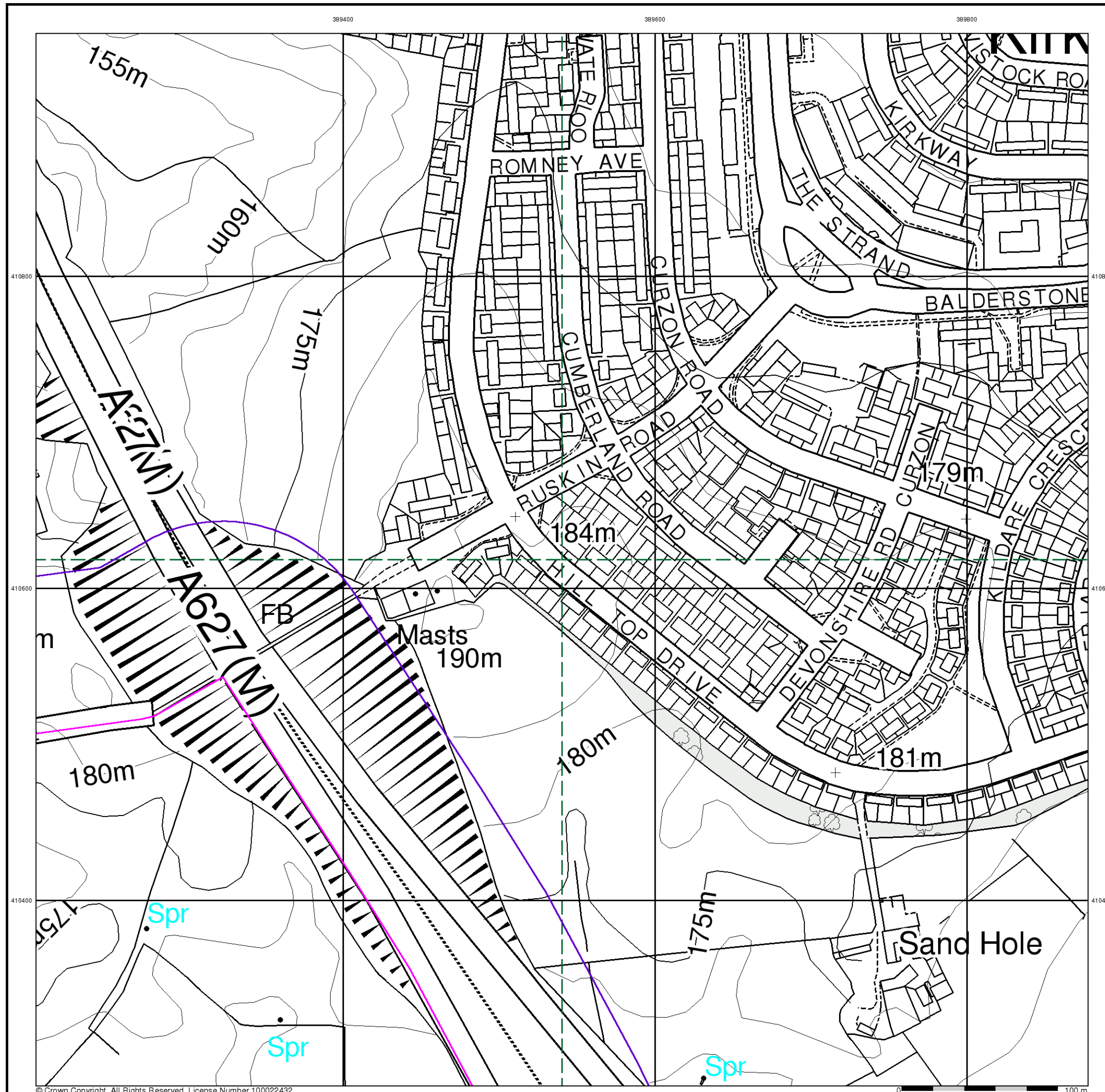


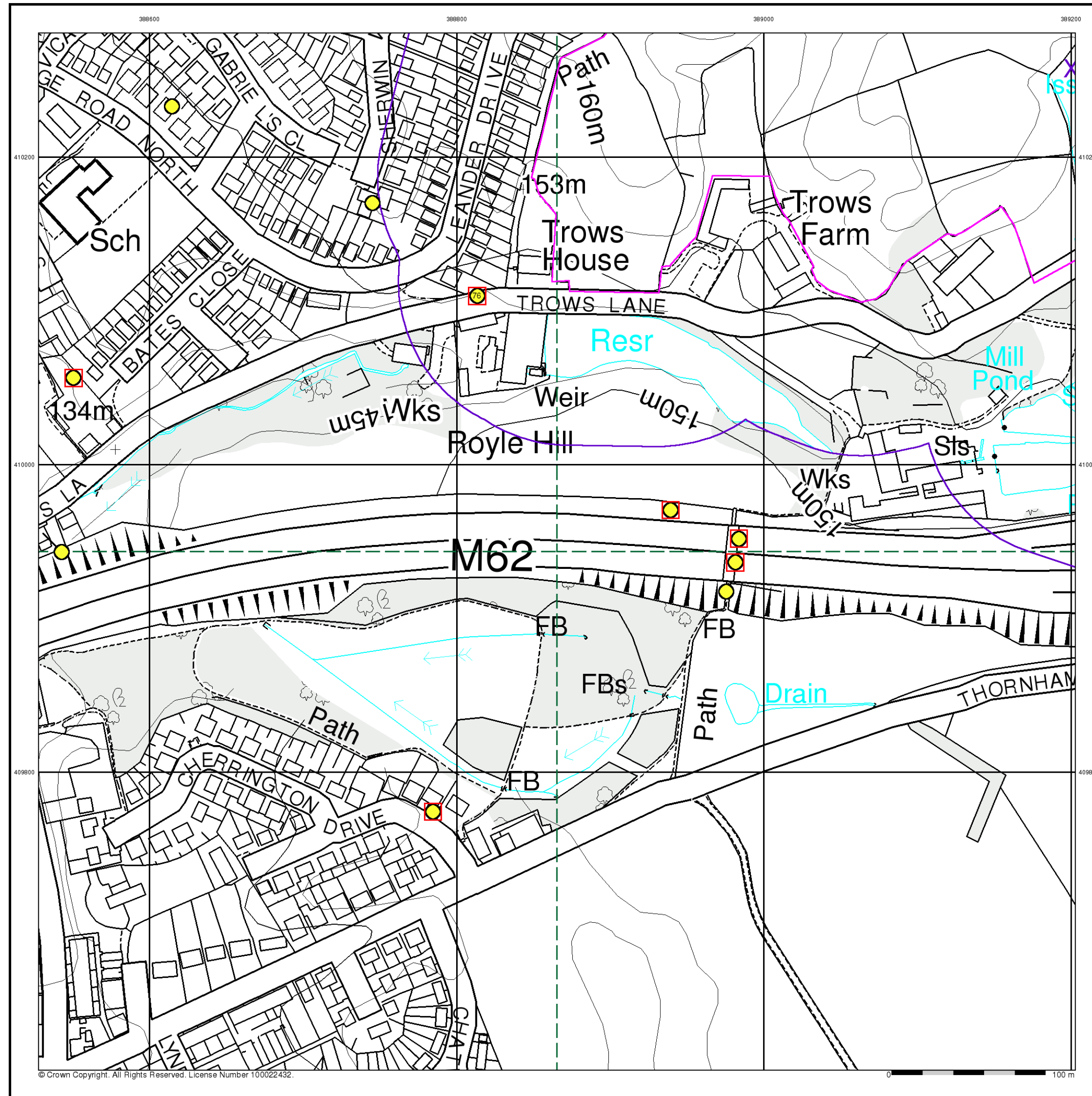
Order Details

Order Number: 77317590_1_1
Customer Ref: R2228
National Grid Reference: 389200, 410260
Slice: A
Site Area (Ha): 21.43
Plot Buffer (m): 100

Site Details

Site at 389190, 410260





Motion Map Data (1:2,500)

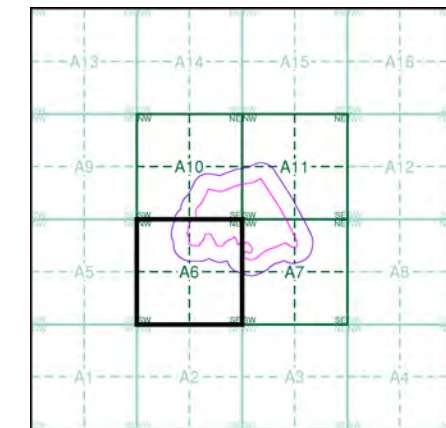
General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID
- Several of Type at Location

Average Velocity Gradient

- Upward Movement > 3.5mm per year
- Upward Movement 1.5mm to 3.5mm per year
- Stable 1.5mm to -1.5mm per year
- Downward Movement -1.5mm to -3.5mm per year
- Downward Movement > -3.5mm per year

Mining and Ground Stability - Segment A6



Order Details

Order Number: 77317590_1_1
Customer Ref: R2228
National Grid Reference: 389200, 410260
Slice: A
Site Area (Ha): 21.43
Plot Buffer (m): 100

Site Details

Site at 389190, 410260

Motion Map Data (1:2,500)

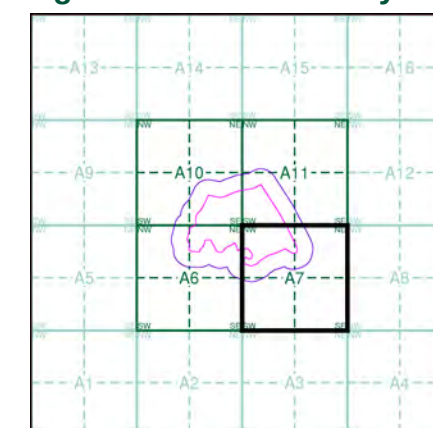
General

- Specified Site □ Specified Buffer(s) X Bearing Reference Point 8 Map ID
- Several of Type at Location

Average Velocity Gradient

- Upward Movement > 3.5mm per year ●
- Upward Movement 1.5mm to 3.5mm per year ●
- Stable 1.5mm to -1.5mm per year ●
- Downward Movement -1.5mm to -3.5mm per year ●
- Downward Movement > -3.5mm per year ●

Mining and Ground Stability - Segment A7

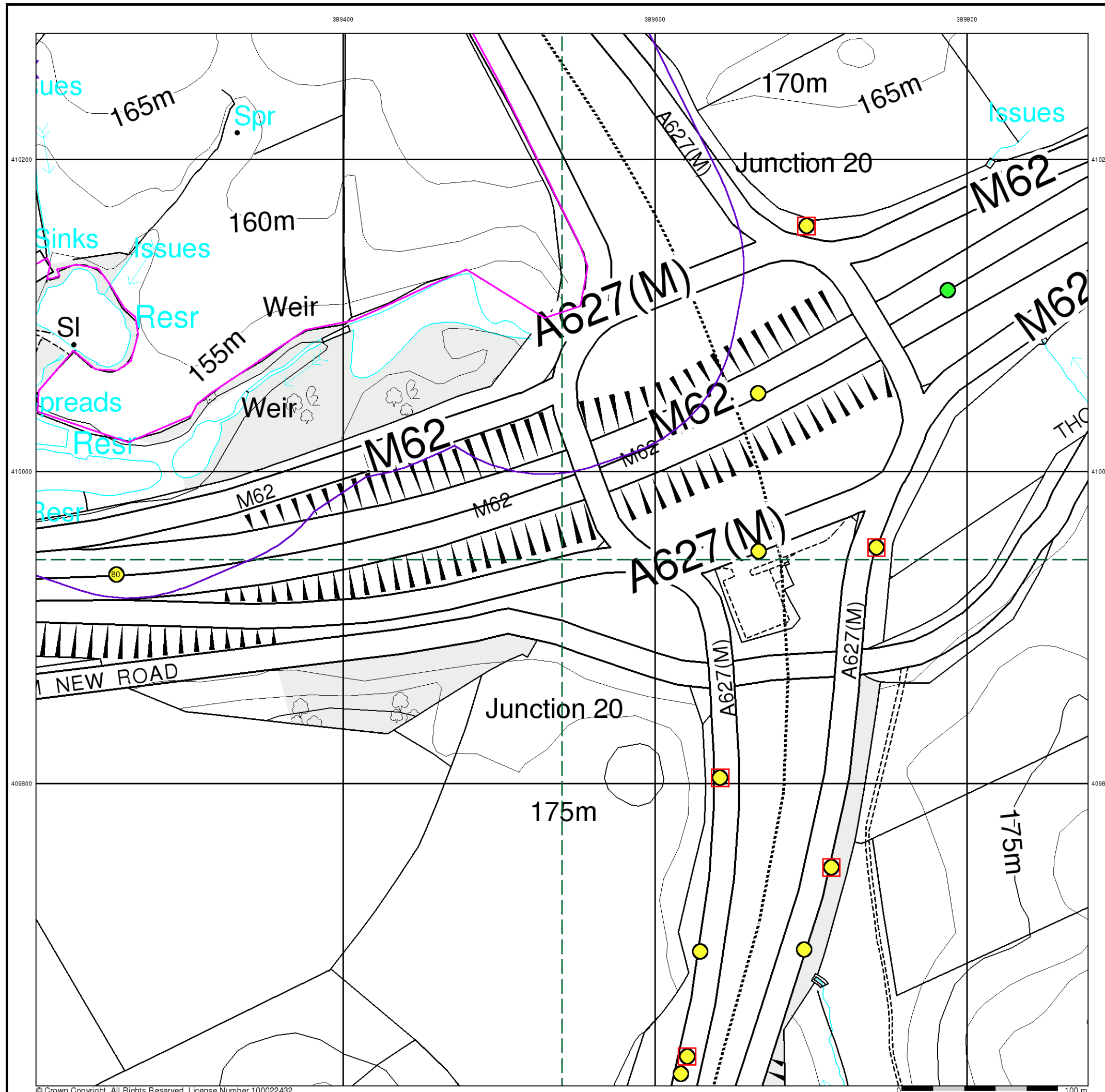


Order Details

Order Number: 77317590_1_1
 Customer Ref: R2228
 National Grid Reference: 389200, 410260
 Slice: A
 Site Area (Ha): 21.43
 Plot Buffer (m): 100

Site Details

Site at 389190, 410260



Motion Map Data (1:2,500)

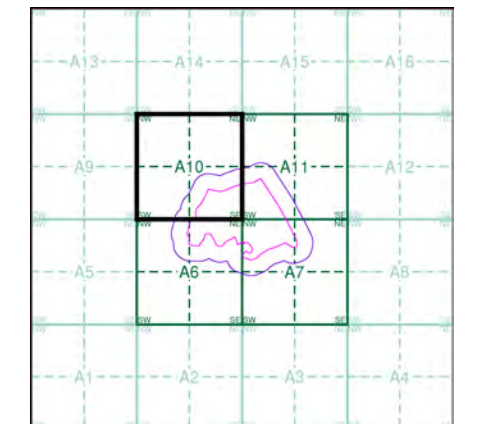
General

- Specified Site □ Specified Buffer(s) X Bearing Reference Point Map ID
- Several of Type at Location

Average Velocity Gradient

- Upward Movement > 3.5mm per year ●
- Upward Movement 1.5mm to 3.5mm per year ●
- Stable 1.5mm to -1.5mm per year ●
- Downward Movement -1.5mm to -3.5mm per year ●
- Downward Movement > -3.5mm per year ●

Mining and Ground Stability - Segment A10

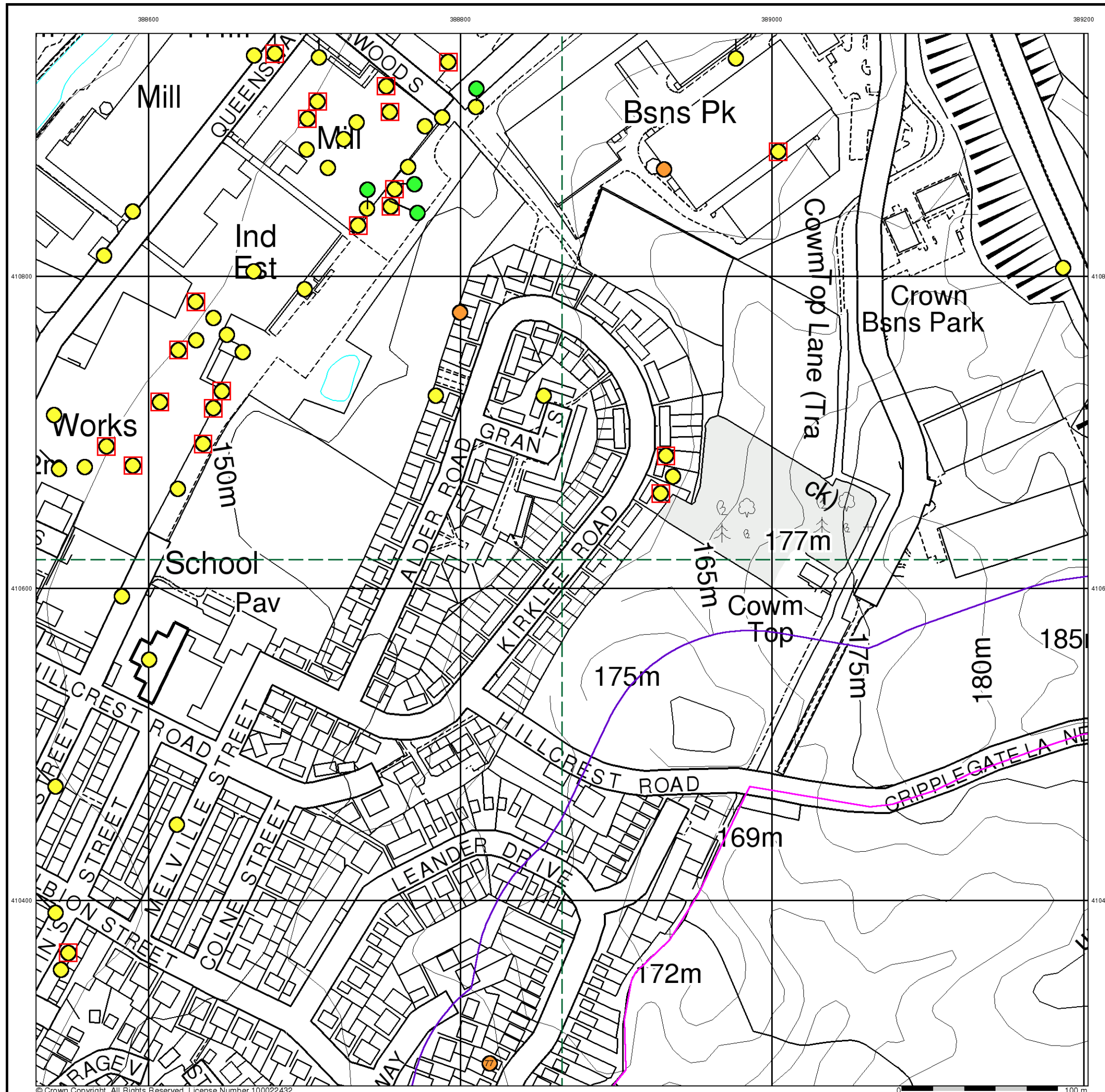


Order Details

Order Number: 77317590_1_1
 Customer Ref: R2228
 National Grid Reference: 389200, 410260
 Slice: A
 Site Area (Ha): 21.43
 Plot Buffer (m): 100

Site Details

Site at 389190, 410260



Motion Map Data (1:2,500)

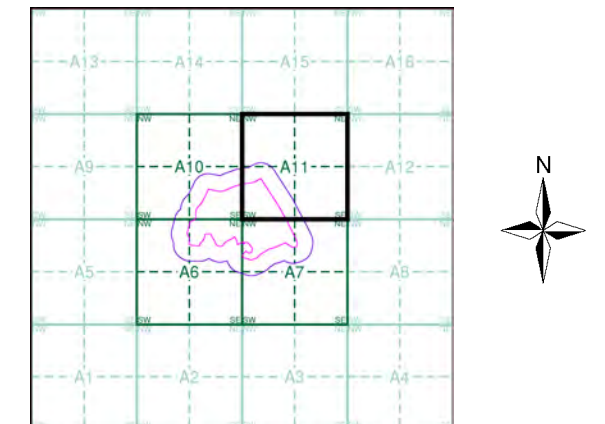
General

- Specified Site ■ Specified Buffer(s) X Bearing Reference Point Map ID
- Several of Type at Location

Average Velocity Gradient

- Upward Movement > 3.5mm per year ●
- Upward Movement 1.5mm to 3.5mm per year ●
- Stable 1.5mm to -1.5mm per year ●
- Downward Movement -1.5mm to -3.5mm per year ●
- Downward Movement > -3.5mm per year ●

Mining and Ground Stability - Segment A11

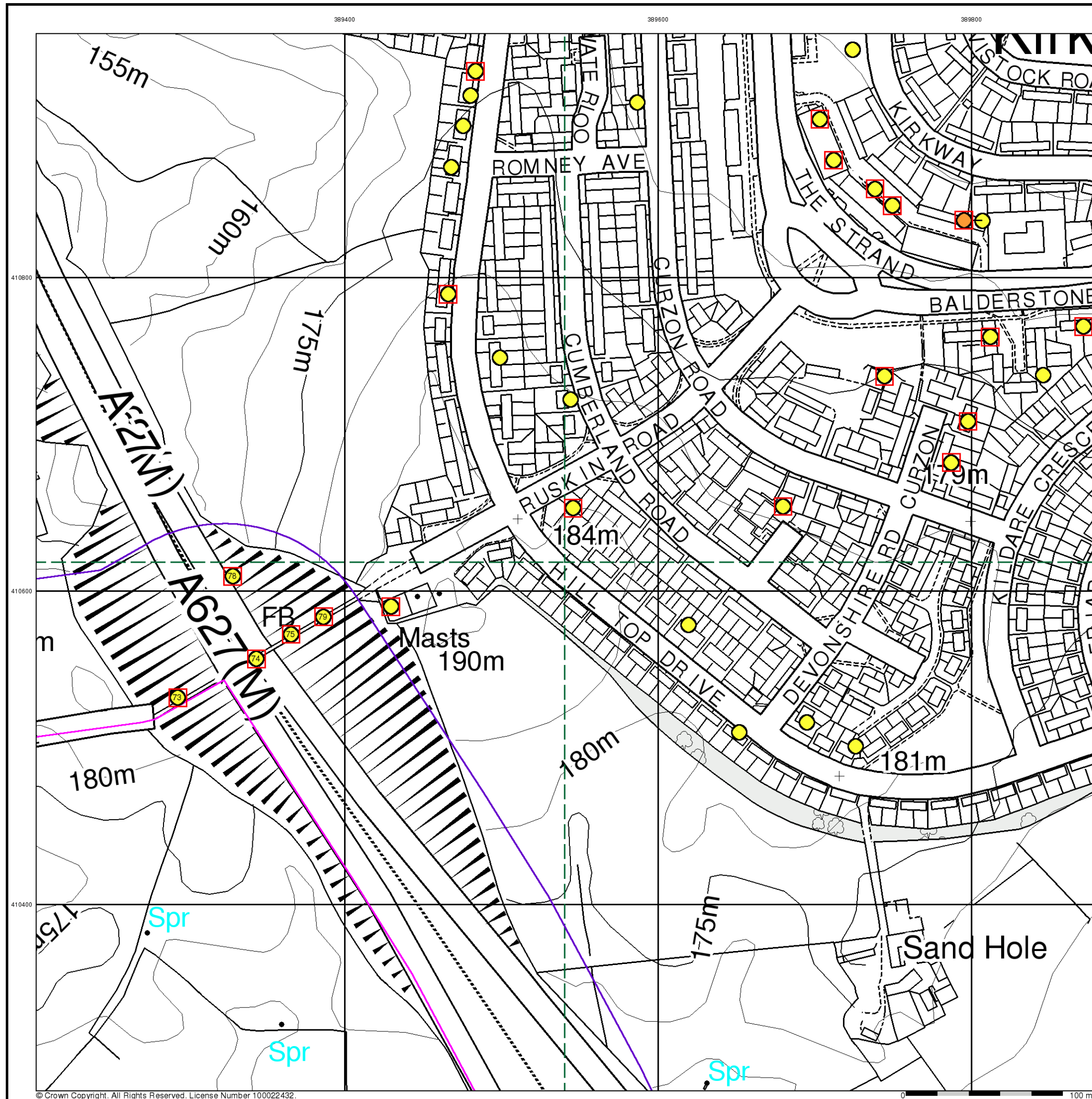


Order Details

Order Number: 77317590_1_1
 Customer Ref: R2228
 National Grid Reference: 389200, 410260
 Slice: A
 Site Area (Ha): 21.43
 Plot Buffer (m): 100

Site Details

Site at 389190, 410260





Historical Land Use Information (1:10,000)

General

- Specified Site Specified Buffer(s) Bearing Reference Point Map ID
Several of Type at Location

Potentially Contaminative Industrial Uses (Past Land Uses - Mining)

	Point	Line	Polygon
Air Shafts			
Disturbed Ground			
General Quarrying			
Heap, unknown constituents			
Mineral Railway			
Mining and Quarrying General			
Mining of Coal & Lignite			
Quarrying of Sand and Clay, Operation of Sand and Gravel Pits			

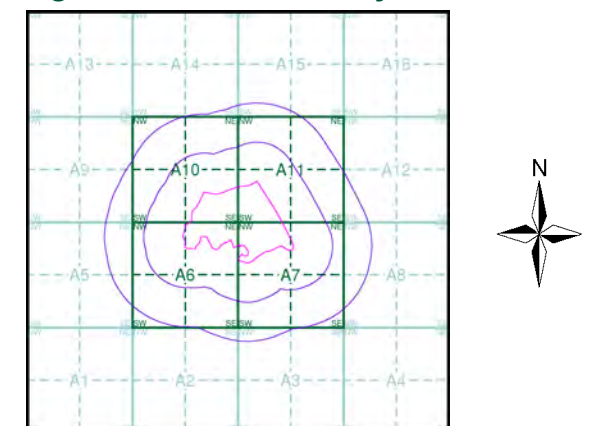
Historical Land Use

	Point	Line	Polygon
Potentially Infilled Land (Non-Water)			
Potentially Infilled Land (Water)			
Former Marsh			

Mining Data

- Potential Mining Area
BGS Recorded Mineral Site

Mining and Ground Stability - Slice A



Order Details

Order Number: 77317590_1_1
Customer Ref: R2228
National Grid Reference: 389200, 410260
Slice: A
Site Area (Ha): 21.43
Search Buffer (m): 500

Site Details

Site at 389190, 410260



Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



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Ground Stability Data (1:50,000)

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

Potential for Compressible Ground Stability Hazards

- High
- Moderate
- Low
- Very Low

Potential for Collapsible Ground Stability Hazards

- High
- Moderate
- Low
- Very Low

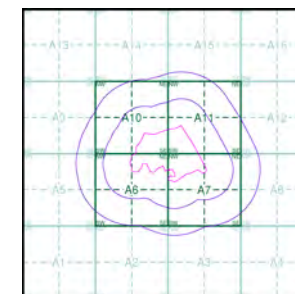
Brine Pumping and Salt Mining

Brine Pumping Related Feature

Salt Mining Related Feature

- | Point | Polygon |
|-------|---------|
| | |
| | |

Mining and Ground Stability - Slice A



Order Details

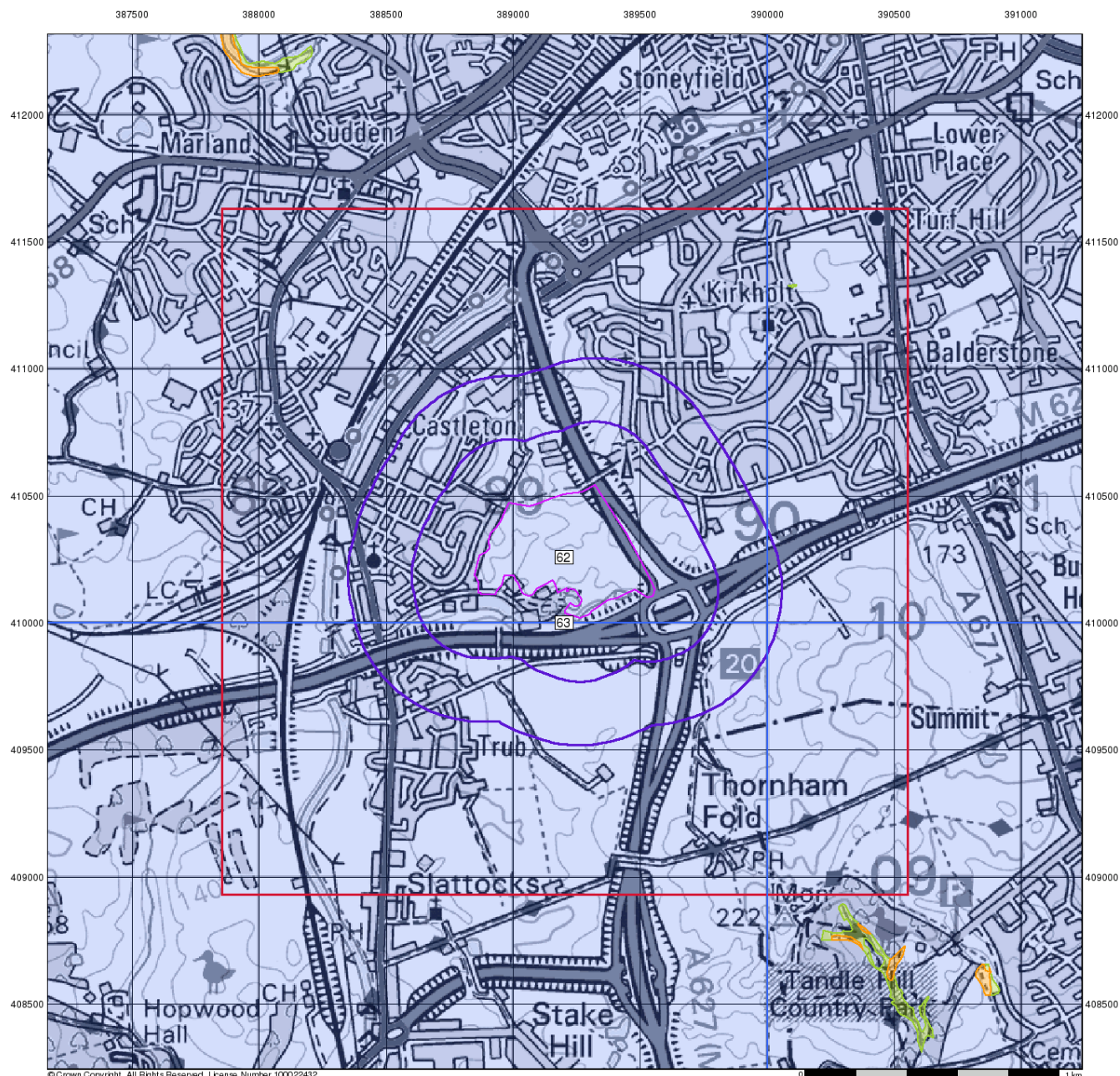
Order Number: 77317590_1_1
 Customer Ref: R2228
 National Grid Reference: 389200, 410260
 Slice: A
 Site Area (Ha): 21.43
 Search Buffer (m): 500

Site Details

Site at 389190, 410260



Tel: 0844 844 9952
 Fax: 0844 844 9951
 Web: www.envirocheck.co.uk



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Ground Stability Data (1:50,000)

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

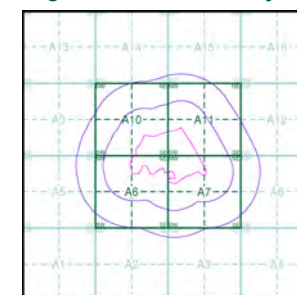
Potential for Landslide Ground Stability Hazards

- High
- Low
- Moderate
- Very Low

Potential for Ground Dissolution Stability Hazards

- High
- Low
- Moderate
- Very Low

Mining and Ground Stability - Slice A



Order Details

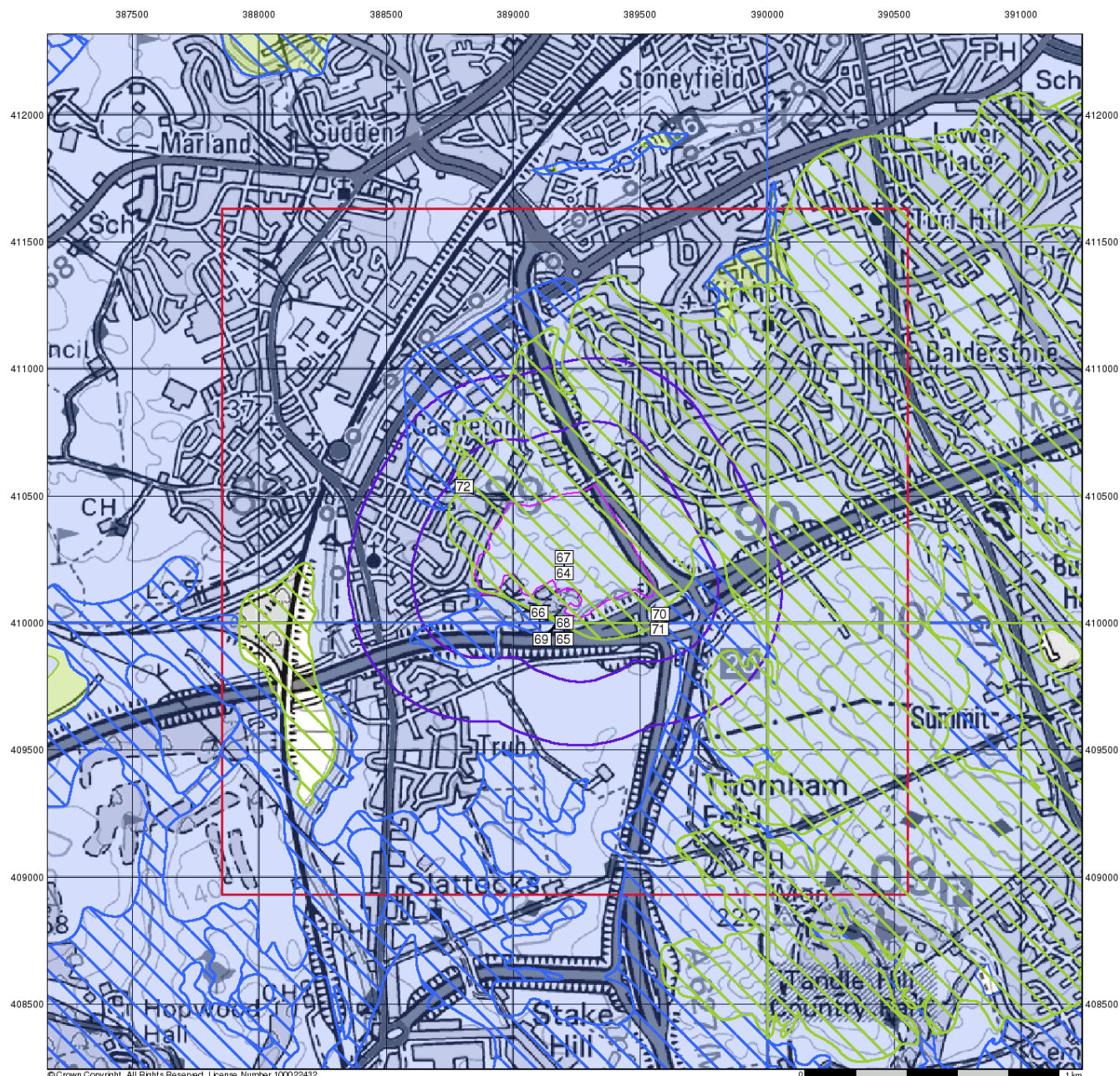
Order Number: 77317590_1_1
 Customer Ref: R2228
 National Grid Reference: 389200, 410260
 Slice: A
 Site Area (Ha): 21.43
 Search Buffer (m): 500

Site Details

Site at 389190, 410260



Tel: 0844 844 9952
 Fax: 0844 844 9951
 Web: www.envirocheck.co.uk



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Ground Stability Data (1:50,000)

General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

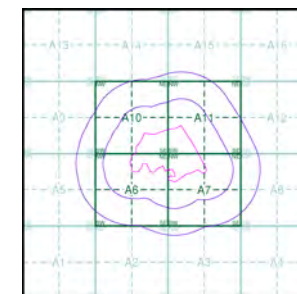
Potential for Running Sand Ground Stability Hazards

- High
- Low
- Moderate
- Very Low

Potential for Shrinking or Swelling Clay Ground Stability Hazards

- High
- Low
- Moderate
- Very Low

Mining and Ground Stability - Slice A



Order Details

Order Number: 77317590_1_1
 Customer Ref: R2228
 National Grid Reference: 389200, 410260
 Slice: A
 Site Area (Ha): 21.43
 Search Buffer (m): 500

Site Details

Site at 389190, 410260



Tel: 0844 844 9952
 Fax: 0844 844 9951
 Web: www.envirocheck.co.uk

APPENDIX D

Coal Authority Report

Issued by:

The Coal Authority, Property Search Services, 200 Lichfield Lane, Berry Hill, Mansfield, Nottinghamshire, NG18 4RG
Website: www.groundstability.com Phone: 0345 762 6848 DX 716176 MANSFIELD 5

**LANDMARK INFORMATION GROUP
LIMITED
SOWTON INDUSTRIAL ESTATE
ABBAY COURT
UNIT 5/7 EAGLE WAY
EXETER
DEVON
EX2 7HY**

Our reference: **51001057857001**
Your reference: **77317590_2|**
Date of your enquiry: **22 December 2015**
Date we received your enquiry: **22 December 2015**
Date of issue: **22 December 2015**

This report is for the property described in the address below and the attached plan.

Non-Residential Coal Authority Mining Report

SITE AT 389190, 410260, GREATER MANCHESTER,

This report is based on and limited to the records held by, the Coal Authority, and the Cheshire Brine Subsidence Compensation Board's records, at the time we answer the search.

Coal mining	See comments below
Brine Compensation District	No

Information from the Coal Authority

Underground coal mining

Past

According to the records in our possession, the property is not within the zone of likely physical influence on the surface from past underground workings.

Present

The property is not in the likely zone of influence of any present underground coal workings.

Future

The property is not in an area for which the Coal Authority is determining whether to grant a licence to remove coal using underground methods.

The property is not in an area for which a licence has been granted to remove or otherwise work coal using underground methods.

The property is not in an area that is likely to be affected at the surface from any planned future workings.

However, reserves of coal exist in the local area which could be worked at some time in the future.

No notice of the risk of the land being affected by subsidence has been given under section 46 of the Coal Mining Subsidence Act 1991.

Mine entries

There are no known coal mine entries within, or within 20 metres of, the boundary of the property.

Coal mining geology

The Authority is not aware of any evidence of damage arising due to geological faults or other lines of weakness that have been affected by coal mining.

Opencast coal mining

Past

The property is not within the boundary of an opencast site from which coal has been removed by opencast methods.

Present

The property does not lie within 200 metres of the boundary of an opencast site from which coal is being removed by opencast methods.

Future

The property is not within 800 metres of the boundary of an opencast site for which the Coal Authority is determining whether to grant a licence to remove coal by opencast methods.

The property is not within 800 metres of the boundary of an opencast site for which a licence to remove coal by opencast methods has been granted.

Coal mining subsidence

The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres, since 31st October 1994.

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

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

Mine gas

There is no record of a mine gas emission requiring action by the Coal Authority within the boundary of the property.

Hazards related to coal mining

The property has not been subject to remedial works, by or on behalf of the Authority, under its Emergency Surface Hazard Call Out procedures.

Withdrawal of support

The property is not in an area for which a notice of entitlement to withdraw support has been published.

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

Working facilities orders

The property is not in an area for which an Order has been made under the provisions of the Mines (Working Facilities and Support) Acts 1923 and 1966 or any statutory modification or amendment thereof.

Payments to owners of former copyhold land

The property is not in an area for which a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

Comments on Coal Authority information

In view of the mining circumstances a prudent developer would seek appropriate technical advice before any works are undertaken.

Therefore if development proposals are being considered, technical advice relating to both the investigation of coal and former coal mines and their treatment should be obtained before beginning work on site. All proposals should apply good engineering practice developed for mining areas. No development should be undertaken that intersects, disturbs or interferes with any coal or mines of coal without the permission of the Coal Authority. Developers should be aware that the investigation of coal seams/former mines of coal may have the potential to generate and/or displace underground gases and these risks both under and adjacent to the development should be fully considered in developing any proposals. The need for effective measures to prevent gases entering into public properties either during investigation or after development also needs to be assessed and properly addressed. This is necessary due to the public safety implications of any development in these circumstances.

Information from the Cheshire Brine Subsidence Compensation Board

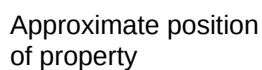
The property lies outside the Cheshire Brine Compensation District.

Additional Remarks

Information provided by the Coal Authority in this report is compiled in response to the Law Society's Con29M Coal Mining and Brine Subsidence Claim enquiries. The said enquiries are protected by copyright owned by the Law Society of 113 Chancery Lane, London WC2A 1PL. Please note that Brine Subsidence Claim enquiries are only relevant for England and Wales. This report is prepared in accordance with the Law Society's Guidance Notes 2006, the User Guide 2006 and the Coal Authority and Cheshire Brine Board's Terms and Conditions applicable at the time the report was produced.

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Location map

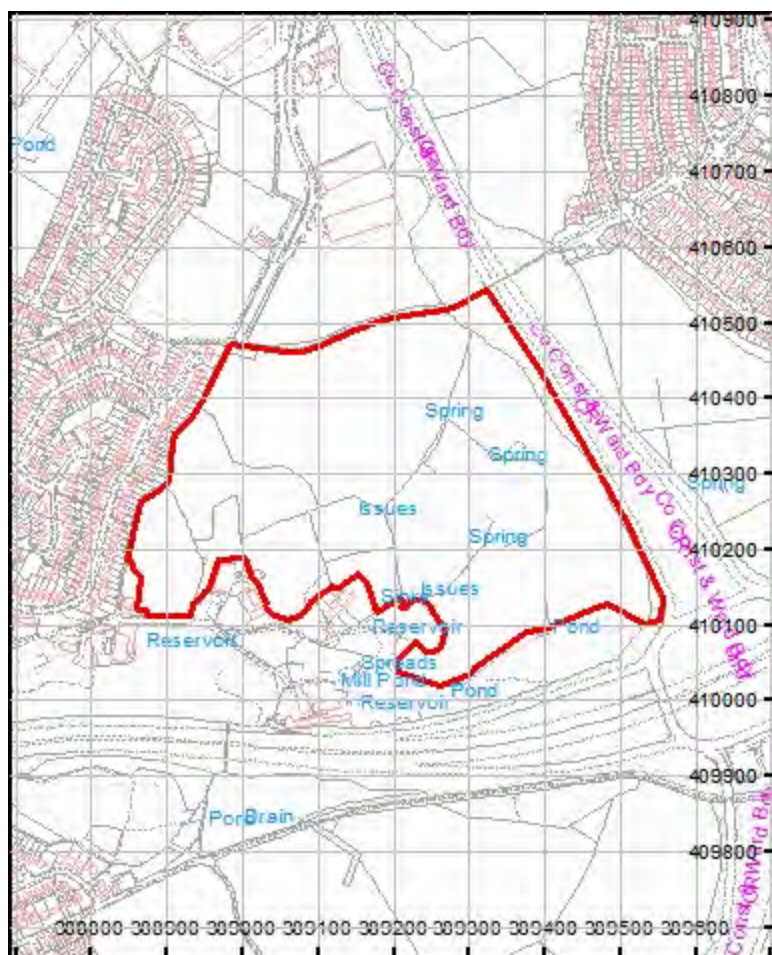


Enquiry boundary

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Key

Approximate position of enquiry boundary shown



APPENDIX E

Environmental Laboratory Testing Results



Jones Environmental Laboratory

Registered Address : Unit 3 Deeside Point, Zone 3, Deeside Industrial Park, Deeside, CH5 2UA. UK

Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

Smith Grant LLP
Station House
Station Road
Ruabon
Wrexham
LL14 6DL

Tel: +44 (0) 1244 833780

Fax: +44 (0) 1244 833781



Attention : Ben Thomas
Date : 15th July, 2016
Your reference : R2228
Our reference : Test Report 16/11018 Batch 1
Location : Throws Farm Rochdale
Date samples received : 30th June, 2016
Status : Final report
Issue : 1

Twenty one samples were received for analysis on 30th June, 2016 of which twenty one were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied. All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Compiled By:

Phil Sommerton BSc
Project Manager

Jones Environmental Laboratory

Client Name: Smith Grant LLP
Reference: R2228
Location: Throws Farm Rochdale
Contact: Ben Thomas
JE Job No.: 16/11018

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	1-2	3-4	5	6	7-8	9	10-11	12-13	14	15-16	Please see attached notes for all abbreviations and acronyms		
Sample ID	TP02J1	TP03J1	TP03D	TP05D	TP06J1	TP07D	TP07J1	TP08J1	TP08D	TP11J1			
Depth	0.20	0.30	1.30	0.60	0.10	0.60	0.10	0.20	0.70	0.10			
COC No / misc													
Containers	V J	V J	T	T	V J	T	V J	V J	T	V J			
Sample Date	28/06/2016	28/06/2016	28/06/2016	28/06/2016	28/06/2016	28/06/2016	28/06/2016	28/06/2016	28/06/2016	29/06/2016			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	30/06/2016	30/06/2016	30/06/2016	30/06/2016	30/06/2016	30/06/2016	30/06/2016	30/06/2016	30/06/2016	30/06/2016	LOD/LOR	Units	Method No.
Arsenic ^{#M}	21.7	21.1	-	-	22.2	-	27.0	98.9	-	30.9	<0.5	mg/kg	TM30/PM15
Cadmium ^{#M}	5.3	<0.1	-	-	0.4	-	0.1	2.0	-	0.5	<0.1	mg/kg	TM30/PM15
Chromium ^{#M}	98.8	53.9	-	-	109.9	-	113.9	529.4 ^{AB}	-	119.1	<0.5	mg/kg	TM30/PM15
Copper ^{#M}	92	492 ^{AA}	-	-	107	-	48	1011 ^{AB}	-	93	<1	mg/kg	TM30/PM15
Lead ^{#M}	145	672	-	-	284	-	122	887	-	200	<5	mg/kg	TM30/PM15
Mercury ^{#M}	0.4	<0.1	-	-	<0.1	-	0.2	0.4	-	0.5	<0.1	mg/kg	TM30/PM15
Nickel ^{#M}	21.1	61.1	-	-	16.1	-	22.1	168.1	-	19.6	<0.7	mg/kg	TM30/PM15
Selenium ^{#M}	1	<1	-	-	2	-	2	3	-	2	<1	mg/kg	TM30/PM15
Zinc ^{#M}	539	124	-	-	86	-	92	872	-	104	<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene ^{#M}	<0.04	<0.04	-	-	<0.04	-	<0.04	<0.20 ^{AA}	-	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	-	-	<0.03	-	<0.03	<0.15 ^{AA}	-	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene ^{#M}	<0.05	<0.05	-	-	<0.05	-	<0.05	<0.25 ^{AA}	-	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene ^{#M}	<0.04	<0.04	-	-	<0.04	-	<0.04	<0.20 ^{AA}	-	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene ^{#M}	0.32	<0.03	-	-	0.14	-	0.13	0.38 ^{AA}	-	0.20	<0.03	mg/kg	TM4/PM8
Anthracene [#]	0.07	<0.04	-	-	<0.04	-	<0.04	<0.20 ^{AA}	-	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene ^{#M}	0.58	<0.03	-	-	0.29	-	0.28	0.40 ^{AA}	-	0.49	<0.03	mg/kg	TM4/PM8
Pyrene [#]	0.52	<0.03	-	-	0.26	-	0.27	0.69 ^{AA}	-	0.46	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene [#]	0.35	<0.06	-	-	0.14	-	0.22	<0.30 ^{AA}	-	0.33	<0.06	mg/kg	TM4/PM8
Chrysene ^{#M}	0.29	<0.02	-	-	0.17	-	0.16	0.59 ^{AA}	-	0.29	<0.02	mg/kg	TM4/PM8
Benzo(b)fluoranthene ^{#M}	0.48	<0.07	-	-	0.28	-	0.28	0.77 ^{AA}	-	0.51	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene [#]	0.28	<0.04	-	-	0.16	-	0.16	0.46 ^{AA}	-	0.28	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene ^{#M}	0.19	<0.04	-	-	0.10	-	0.12	0.51 ^{AA}	-	0.20	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene [#]	0.05	<0.04	-	-	<0.04	-	<0.04	<0.20 ^{AA}	-	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene [#]	0.19	<0.04	-	-	0.10	-	0.10	0.49 ^{AA}	-	0.18	<0.04	mg/kg	TM4/PM8
PAH 16 Total	3.3	<0.6	-	-	1.6	-	1.7	4.3 ^{AA}	-	2.9	<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.35	<0.05	-	-	0.20	-	0.20	0.55 ^{AA}	-	0.37	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.13	<0.02	-	-	0.08	-	0.08	0.22 ^{AA}	-	0.14	<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	104	100	-	-	102	-	110	98 ^{AA}	-	106	<0	%	TM4/PM8
TPH CWG													
Aliphatics													
>C5-C6 ^{#M}	<0.1	<0.1 ^{SV}	-	-	<0.1 ^{SV}	-	<0.1 ^{SV}	<0.1 ^{SV}	-	<0.1 ^{SV}	<0.1	mg/kg	TM36/PM12
>C6-C8 ^{#M}	<0.1	<0.1 ^{SV}	-	-	<0.1 ^{SV}	-	<0.1 ^{SV}	<0.1 ^{SV}	-	<0.1 ^{SV}	<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1	<0.1 ^{SV}	-	-	<0.1 ^{SV}	-	<0.1 ^{SV}	<0.1 ^{SV}	-	<0.1 ^{SV}	<0.1	mg/kg	TM36/PM12
>C10-C12 ^{#M}	<0.2	<0.2	-	-	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	mg/kg	TM5/PM16
>C12-C16 ^{#M}	<4	<4	-	-	<4	-	<4	<4	-	<4	<4	mg/kg	TM5/PM16
>C16-C21 ^{#M}	<7	<7	-	-	<7	-	<7	155	-	<7	<7	mg/kg	TM5/PM16
>C21-C35 ^{#M}	<7	<7	-	-	<7	-	<7	1504	-	<7	<7	mg/kg	TM5/PM16
Total aliphatics C5-35	<19	<19	-	-	<19	-	<19	1659	-	<19	<19	mg/kg	TM5/PM16;TM2/PM15

Please see attached notes for all abbreviations and acronyms

Jones Environmental Laboratory

Client Name: Smith Grant LLP
Reference: R2228
Location: Throws Farm Rochdale
Contact: Ben Thomas
JE Job No.: 16/11018

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	17	18	19-20	21	22-23	24	25-26	27	28	29	Please see attached notes for all abbreviations and acronyms		
Sample ID	TP11D	TP12D	TP13J1	TP13D	TP15J1	TP15D	TP17J1	TP17D	TP20D	TP21D			
Depth	1.60	0.90	0.30	3.00	0.30	1.30	0.10	1.10	1.00	1.50			
COC No / misc													
Containers	T	T	V J	T	V J	T	V J	T	T	T			
Sample Date	29/06/2016	29/06/2016	29/06/2016	29/06/2016	29/06/2016	29/06/2016	29/06/2016	29/06/2016	30/06/2016	30/06/2016			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	30/06/2016	30/06/2016	30/06/2016	30/06/2016	30/06/2016	30/06/2016	30/06/2016	30/06/2016	30/06/2016	30/06/2016	LOD/LOR	Units	Method No.
Arsenic ^{#M}	-	-	5.1	-	41.2	-	20.4	-	-	-	<0.5	mg/kg	TM30/PM15
Cadmium ^{#M}	-	-	<0.1	-	<0.1	-	0.6	-	-	-	<0.1	mg/kg	TM30/PM15
Chromium ^{#M}	-	-	62.3	-	91.6	-	138.0	-	-	-	<0.5	mg/kg	TM30/PM15
Copper ^{#M}	-	-	17	-	53	-	90	-	-	-	<1	mg/kg	TM30/PM15
Lead ^{#M}	-	-	21	-	116	-	118	-	-	-	<5	mg/kg	TM30/PM15
Mercury ^{#M}	-	-	<0.1	-	0.2	-	0.2	-	-	-	<0.1	mg/kg	TM30/PM15
Nickel ^{#M}	-	-	27.1	-	18.9	-	21.1	-	-	-	<0.7	mg/kg	TM30/PM15
Selenium ^{#M}	-	-	<1	-	2	-	2	-	-	-	<1	mg/kg	TM30/PM15
Zinc ^{#M}	-	-	64	-	46	-	124	-	-	-	<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene ^{#M}	-	-	<0.04	-	<0.04	-	<0.04	-	-	-	<0.04	mg/kg	TM4/PM8
Acenaphthylene	-	-	<0.03	-	<0.03	-	<0.03	-	-	-	<0.03	mg/kg	TM4/PM8
Acenaphthene ^{#M}	-	-	<0.05	-	<0.05	-	<0.05	-	-	-	<0.05	mg/kg	TM4/PM8
Fluorene ^{#M}	-	-	<0.04	-	<0.04	-	<0.04	-	-	-	<0.04	mg/kg	TM4/PM8
Phenanthrene ^{#M}	-	-	0.03	-	0.12	-	1.02	-	-	-	<0.03	mg/kg	TM4/PM8
Anthracene [#]	-	-	<0.04	-	<0.04	-	0.20	-	-	-	<0.04	mg/kg	TM4/PM8
Fluoranthene ^{#M}	-	-	0.03	-	0.28	-	1.91	-	-	-	<0.03	mg/kg	TM4/PM8
Pyrene [#]	-	-	0.03	-	0.26	-	1.58	-	-	-	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene [#]	-	-	<0.06	-	0.21	-	0.91	-	-	-	<0.06	mg/kg	TM4/PM8
Chrysene ^{#M}	-	-	0.02	-	0.17	-	0.96	-	-	-	<0.02	mg/kg	TM4/PM8
Benzo(b)fluoranthene ^{#M}	-	-	<0.07	-	0.30	-	1.33	-	-	-	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene [#]	-	-	<0.04	-	0.16	-	0.75	-	-	-	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene ^{#M}	-	-	<0.04	-	0.10	-	0.44	-	-	-	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene [#]	-	-	<0.04	-	<0.04	-	0.11	-	-	-	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene [#]	-	-	<0.04	-	0.10	-	0.47	-	-	-	<0.04	mg/kg	TM4/PM8
PAH 16 Total	-	-	<0.6	-	1.7	-	9.7	-	-	-	<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	-	-	<0.05	-	0.22	-	0.96	-	-	-	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	-	-	<0.02	-	0.08	-	0.37	-	-	-	<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	-	-	106	-	104	-	105	-	-	-	<0	%	TM4/PM8
TPH CWG													
Aliphatics													
>C5-C6 ^{#M}	-	-	<0.1 ^{SV}	-	<0.1 ^{SV}	-	<0.1	-	-	-	<0.1	mg/kg	TM36/PM12
>C6-C8 ^{#M}	-	-	<0.1 ^{SV}	-	<0.1 ^{SV}	-	<0.1	-	-	-	<0.1	mg/kg	TM36/PM12
>C8-C10	-	-	<0.1 ^{SV}	-	<0.1 ^{SV}	-	<0.1	-	-	-	<0.1	mg/kg	TM36/PM12
>C10-C12 ^{#M}	-	-	<0.2	-	<0.2	-	<0.2	-	-	-	<0.2	mg/kg	TM5/PM16
>C12-C16 ^{#M}	-	-	<4	-	<4	-	<4	-	-	-	<4	mg/kg	TM5/PM16
>C16-C21 ^{#M}	-	-	<7	-	<7	-	<7	-	-	-	<7	mg/kg	TM5/PM16
>C21-C35 ^{#M}	-	-	<7	-	<7	-	<7	-	-	-	<7	mg/kg	TM5/PM16
Total aliphatics C5-35	-	-	<19	-	<19	-	<19	-	-	-	<19	mg/kg	TM5/PM16

Please see attached notes for all abbreviations and acronyms

Client Name: Smith Grant LLP
Reference: R2228
Location: Throws Farm Rochdale
Contact: Ben Thomas
JE Job No.: 16/11018

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

J E Sample No.	30-31										Please see attached notes for all abbreviations and acronyms		
Sample ID	TP18J1												
Depth	0.10												
COC No / misc													
Containers	V J												
Sample Date	29/06/2016												
Sample Type	Soil												
Batch Number	1												
Date of Receipt	30/06/2016										LOD/LOR	Units	Method No.
Arsenic ^{#M}	19.8										<0.5	mg/kg	TM30/PM15
Cadmium ^{#M}	0.2										<0.1	mg/kg	TM30/PM15
Chromium ^{#M}	115.5										<0.5	mg/kg	TM30/PM15
Copper ^{#M}	45										<1	mg/kg	TM30/PM15
Lead ^{#M}	109										<5	mg/kg	TM30/PM15
Mercury ^{#M}	0.3										<0.1	mg/kg	TM30/PM15
Nickel ^{#M}	20.0										<0.7	mg/kg	TM30/PM15
Selenium ^{#M}	2										<1	mg/kg	TM30/PM15
Zinc ^{#M}	117										<5	mg/kg	TM30/PM15
PAH MS													
Naphthalene ^{#M}	<0.04										<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03										<0.03	mg/kg	TM4/PM8
Acenaphthene ^{#M}	<0.05										<0.05	mg/kg	TM4/PM8
Fluorene ^{#M}	<0.04										<0.04	mg/kg	TM4/PM8
Phenanthrene ^{#M}	0.10										<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04										<0.04	mg/kg	TM4/PM8
Fluoranthene ^{#M}	0.23										<0.03	mg/kg	TM4/PM8
Pyrene #	0.23										<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	0.19										<0.06	mg/kg	TM4/PM8
Chrysene ^{#M}	0.16										<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene ^{#M}	0.29										<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	0.16										<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene ^{#M}	0.13										<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04										<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	0.12										<0.04	mg/kg	TM4/PM8
PAH 16 Total	1.6										<0.6	mg/kg	TM4/PM8
Benzo(b)fluoranthene	0.21										<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	0.08										<0.02	mg/kg	TM4/PM8
PAH Surrogate % Recovery	99										<0	%	TM4/PM8
TPH CWG													
Aliphatics													
>C5-C6 ^{#M}	<0.1 ^{SV}										<0.1	mg/kg	TM36/PM12
>C6-C8 ^{#M}	<0.1 ^{SV}										<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1 ^{SV}										<0.1	mg/kg	TM36/PM12
>C10-C12 ^{#M}	<0.2										<0.2	mg/kg	TM5/PM16
>C12-C16 ^{#M}	<4										<4	mg/kg	TM5/PM16
>C16-C21 ^{#M}	<7										<7	mg/kg	TM5/PM16
>C21-C35 ^{#M}	<7										<7	mg/kg	TM5/PM16
Total aliphatics C5-35	<19										<19	mg/kg	TM5/PM16/PM12/PM15

Please see attached notes for all abbreviations and acronyms

Client Name: Smith Grant LLP
Reference: R2228
Location: Throws Farm Rochdale
Contact: Ben Thomas

Note:

Analysis was carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Jones Environmental Laboratory consultant, Jones Environmental Laboratory cannot be responsible for inaccurate or unrepresentative sampling.

Signed on behalf of Jones Environmental Laboratory:



Ryan Butterworth
 Asbestos Team Leader

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
16/11018	1	TP02J1	0.20	2	05/07/2016	General Description (Bulk Analysis)	soil/stones
					05/07/2016	Asbestos Fibres	NAD
					05/07/2016	Asbestos Fibres (2)	NAD
					05/07/2016	Asbestos ACM	NAD
					05/07/2016	Asbestos ACM (2)	NAD
					05/07/2016	Asbestos Type	NAD
					05/07/2016	Asbestos Type (2)	NAD
					05/07/2016	Asbestos Level Screen	NAD
16/11018	1	TP03J1	0.30	4	05/07/2016	General Description (Bulk Analysis)	soil/stones
					05/07/2016	Asbestos Fibres	NAD
					05/07/2016	Asbestos Fibres (2)	NAD
					05/07/2016	Asbestos ACM	NAD
					05/07/2016	Asbestos ACM (2)	NAD
					05/07/2016	Asbestos Type	NAD
					05/07/2016	Asbestos Type (2)	NAD
					05/07/2016	Asbestos Level Screen	NAD
16/11018	1	TP06J1	0.10	8	06/07/2016	General Description (Bulk Analysis)	soil-stones
					06/07/2016	Asbestos Fibres	NAD
					06/07/2016	Asbestos Fibres (2)	NAD
					06/07/2016	Asbestos ACM	NAD
					06/07/2016	Asbestos ACM (2)	NAD
					06/07/2016	Asbestos Type	NAD
					06/07/2016	Asbestos Type (2)	NAD
					06/07/2016	Asbestos Level Screen	NAD
16/11018	1	TP07J1	0.10	11	06/07/2016	General Description (Bulk Analysis)	soil-stones
					06/07/2016	Asbestos Fibres	NAD
					06/07/2016	Asbestos Fibres (2)	NAD
					06/07/2016	Asbestos ACM	NAD
					06/07/2016	Asbestos ACM (2)	NAD
					06/07/2016	Asbestos Type	NAD
					06/07/2016	Asbestos Type (2)	NAD
					06/07/2016	Asbestos Level Screen	NAD
16/11018	1	TP08J1	0.20	13	06/07/2016	General Description (Bulk Analysis)	soil-stones-vegetation
					06/07/2016	Asbestos Fibres	NAD
					06/07/2016	Asbestos Fibres (2)	NAD

Client Name: Smith Grant LLP
Reference: R2228
Location: Throws Farm Rochdale
Contact: Ben Thomas

J E Job No.	Batch	Sample ID	Depth	J E Sample No.	Date Of Analysis	Analysis	Result
16/11018	1	TP08J1	0.20	13	06/07/2016	Asbestos ACM	NAD
					06/07/2016	Asbestos ACM (2)	NAD
					06/07/2016	Asbestos Type	NAD
					06/07/2016	Asbestos Type (2)	NAD
					06/07/2016	Asbestos Level Screen	NAD
16/11018	1	TP11J1	0.10	16	06/07/2016	General Description (Bulk Analysis)	soil-stones-vegetation
					06/07/2016	Asbestos Fibres	NAD
					06/07/2016	Asbestos Fibres (2)	NAD
					06/07/2016	Asbestos ACM	NAD
					06/07/2016	Asbestos ACM (2)	NAD
					06/07/2016	Asbestos Type	NAD
					06/07/2016	Asbestos Type (2)	NAD
					06/07/2016	Asbestos Level Screen	NAD
16/11018	1	TP13J1	0.30	20	05/07/2016	General Description (Bulk Analysis)	Soil/Stone
					05/07/2016	Asbestos Fibres	NAD
					05/07/2016	Asbestos Fibres (2)	NAD
					05/07/2016	Asbestos ACM	NAD
					05/07/2016	Asbestos ACM (2)	NAD
					05/07/2016	Asbestos Type	NAD
					05/07/2016	Asbestos Type (2)	NAD
					05/07/2016	Asbestos Level Screen	NAD
16/11018	1	TP15J1	0.30	23	06/07/2016	General Description (Bulk Analysis)	Soil/Stones
					06/07/2016	Asbestos Fibres	NAD
					06/07/2016	Asbestos Fibres (2)	NAD
					06/07/2016	Asbestos ACM	NAD
					06/07/2016	Asbestos ACM (2)	NAD
					06/07/2016	Asbestos Type	NAD
					06/07/2016	Asbestos Type (2)	NAD
					06/07/2016	Asbestos Level Screen	NAD
16/11018	1	TP17J1	0.10	26	06/07/2016	General Description (Bulk Analysis)	Soil/Stones
					06/07/2016	Asbestos Fibres	NAD
					06/07/2016	Asbestos Fibres (2)	NAD
					06/07/2016	Asbestos ACM	NAD
					06/07/2016	Asbestos ACM (2)	NAD
					06/07/2016	Asbestos Type	NAD
					06/07/2016	Asbestos Type (2)	NAD
					06/07/2016	Asbestos Level Screen	NAD
16/11018	1	TP18J1	0.10	31	06/07/2016	General Description (Bulk Analysis)	Soil/Stones
					06/07/2016	Asbestos Fibres	NAD
					06/07/2016	Asbestos Fibres (2)	NAD
					06/07/2016	Asbestos ACM	NAD
					06/07/2016	Asbestos ACM (2)	NAD
					06/07/2016	Asbestos Type	NAD
					06/07/2016	Asbestos Type (2)	NAD
					06/07/2016	Asbestos Level Screen	NAD

Matrix : Solid

[illegible]

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NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 16/11018

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 (UKAS) accreditation applies to surface water and groundwater and one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

Please include all sections of this report if it is reproduced

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS) accredited - UK.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x5 Dilution
AB	x10 Dilution

JE Job No: 16/11018

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.				
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes	Yes	AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes	Yes	AR	Yes
TM5/TM36	TM005: Modified USEPA 8015B. Determination of solvent Extractable Petroleum Hydrocarbons (EPH) including column fractionation in the carbon range of C10-35 into aliphatic and aromatic fractions by GC-FID. TM036: Modified USEPA 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C5-10 by headspace GC-FID. Including determination of	PM12/PM16	CWG GC-FID			AR	Yes
PM13	A visual examination of the solid sample is carried out to ascertain sample make up, colour and any other inclusions. This is not a geotechnical description.	PM0	No preparation is required.			AR	
TM21	Modified USEPA 415.1. Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7 and 6010B	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes	Yes	AD	Yes

JE Job No: 16/11018

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM31	Modified USEPA 8015B. Determination of Methyltertbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM31	Modified USEPA 8015B. Determination of Methyltertbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes	Yes	AR	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground samples with deionised water in a 2:1 water to solid ratio for anions. Extraction of as received samples with deionised water in a 2:1 water to solid ratio for ammoniacal nitrogen. Samples are extracted using an orbital shaker.	Yes	Yes	AD	Yes
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM20	Extraction of dried and ground samples with deionised water in a 2:1 water to solid ratio for anions. Extraction of as received samples with deionised water in a 2:1 water to solid ratio for ammoniacal nitrogen. Samples are extracted using an orbital shaker.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.			AR	
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 and 9045D. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes	Yes	AR	No
NONE	No Method Code	NONE	No Method Code			AR	Yes



Jones Environmental Laboratory

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Attention :	Ben Thomas
Date :	13th July, 2016
Your reference :	R2228
Our reference :	Test Report 16/10975 Batch 1
Location :	Trows Farm
Date samples received :	30th June, 2016
Status :	Final report
Issue :	1

Three samples were received for analysis on 30th June, 2016 of which three were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.

All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Compiled By:

Phil Sommerton BSc
Project Manager

Client Name: Smith Grant LLP
Reference: R2228
Location: Trows Farm
Contact: Ben Thomas
JE Job No.: 16/10975

SVOC Report : Liquid

J E Sample No.	1-3	4-6	7-9									
Sample ID	SPRING 1	SPRING 2	SUPPLY									
Depth												
COC No / misc												
Containers	V G	V G	V G									
Sample Date	28/06/2016	28/06/2016	28/06/2016									
Sample Type	Ground Water	Ground Water	Ground Water									
Batch Number	1	1	1									
Date of Receipt	30/06/2016	30/06/2016	30/06/2016									
	LOD/LOR	Units	Method No.									
SVOC MS												
Phenols												
2-Chlorophenol #	<1	<1	<1							<1	ug/l	TM16/PM30
2-Methylphenol #	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
2-Nitrophenol	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
2,4-Dichlorophenol #	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
2,4-Dimethylphenol	<1	<1	<1							<1	ug/l	TM16/PM30
2,4,5-Trichlorophenol #	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
2,4,6-Trichlorophenol	<1	<1	<1							<1	ug/l	TM16/PM30
4-Chloro-3-methylphenol #	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
4-Methylphenol	<1	<1	<1							<1	ug/l	TM16/PM30
4-Nitrophenol	<10	<10	<10							<10	ug/l	TM16/PM30
Pentachlorophenol	<1	<1	<1							<1	ug/l	TM16/PM30
Phenol	<1	<1	<1							<1	ug/l	TM16/PM30
PAHs												
2-Chloronaphthalene #	<1	<1	<1							<1	ug/l	TM16/PM30
2-Methylnaphthalene #	<1	<1	<1							<1	ug/l	TM16/PM30
Naphthalene #	<1	<1	<1							<1	ug/l	TM16/PM30
Acenaphthylene #	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
Acenaphthene #	<1	<1	<1							<1	ug/l	TM16/PM30
Fluorene #	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
Phenanthrene #	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
Anthracene #	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
Fluoranthene #	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
Pyrene #	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
Benzo(a)anthracene #	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
Chrysene #	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
Benzo(bk)fluoranthene #	<1	<1	<1							<1	ug/l	TM16/PM30
Benzo(a)pyrene	<1	<1	<1							<1	ug/l	TM16/PM30
Indeno(123cd)pyrene	<1	<1	<1							<1	ug/l	TM16/PM30
Dibenzo(ah)anthracene #	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
Benzo(ghi)perylene #	<0.5	<0.5	<0.5							<0.5	ug/l	TM16/PM30
Phthalates												
Bis(2-ethylhexyl) phthalate	<5	<5	<5							<5	ug/l	TM16/PM30
Butylbenzyl phthalate	<1	<1	<1							<1	ug/l	TM16/PM30
Di-n-butyl phthalate #	<1.5	<1.5	<1.5							<1.5	ug/l	TM16/PM30
Di-n-Octyl phthalate	<1	<1	<1							<1	ug/l	TM16/PM30
Diethyl phthalate #	<1	<1	<1							<1	ug/l	TM16/PM30
Dimethyl phthalate	<1	<1	<1							<1	ug/l	TM16/PM30

Please see attached notes for all abbreviations and acronyms

[illegible]

Client Name: Smith Grant LLP
Reference: R2228
Location: Trows Farm
Contact: Ben Thomas
JE Job No.: 16/10975

VOC Report : Liquid

J E Sample No.	1-3	4-6	7-9									
Sample ID	SPRING 1	SPRING 2	SUPPLY									
Depth												
COC No / misc												
Containers	V G	V G	V G									
Sample Date	28/06/2016	28/06/2016	28/06/2016									
Sample Type	Ground Water	Ground Water	Ground Water									
Batch Number	1	1	1									
Date of Receipt	30/06/2016	30/06/2016	30/06/2016									
										LOD/LOR	Units	Method No.
VOC MS												
Dichlorodifluoromethane	<2	<2	<2							<2	ug/l	TM15/PM10
Methyl Tertiary Butyl Ether #	<0.1	<0.1	<0.1							<0.1	ug/l	TM15/PM10
Chloromethane #	<3	<3	<3							<3	ug/l	TM15/PM10
Vinyl Chloride #	<0.1	<0.1	<0.1							<0.1	ug/l	TM15/PM10
Bromomethane	<1	<1	<1							<1	ug/l	TM15/PM10
Chloroethane #	<3	<3	<3							<3	ug/l	TM15/PM10
Trichlorofluoromethane #	<3	<3	<3							<3	ug/l	TM15/PM10
1,1-Dichloroethene (1,1 DCE) #	<3	<3	<3							<3	ug/l	TM15/PM10
Dichloromethane (DCM) #	<3	<3	<3							<3	ug/l	TM15/PM10
trans-1,2-Dichloroethene #	<3	<3	<3							<3	ug/l	TM15/PM10
1,1-Dichloroethane #	<3	<3	<3							<3	ug/l	TM15/PM10
cis-1,2-Dichloroethene #	<3	<3	<3							<3	ug/l	TM15/PM10
2,2-Dichloropropane	<1	<1	<1							<1	ug/l	TM15/PM10
Bromochloromethane #	<2	<2	<2							<2	ug/l	TM15/PM10
Chloroform #	<2	<2	<2							<2	ug/l	TM15/PM10
1,1,1-Trichloroethane #	<2	<2	<2							<2	ug/l	TM15/PM10
1,1,1-Dichloropropene #	<3	<3	<3							<3	ug/l	TM15/PM10
Carbon tetrachloride #	<2	<2	<2							<2	ug/l	TM15/PM10
1,2-Dichloroethane #	<2	<2	<2							<2	ug/l	TM15/PM10
Benzene #	<0.5	<0.5	<0.5							<0.5	ug/l	TM15/PM10
Trichloroethene (TCE) #	<3	<3	<3							<3	ug/l	TM15/PM10
1,2-Dichloropropane #	<2	<2	<2							<2	ug/l	TM15/PM10
Dibromomethane #	<3	<3	<3							<3	ug/l	TM15/PM10
Bromodichloromethane #	<2	<2	<2							<2	ug/l	TM15/PM10
cis-1,3-Dichloropropene	<2	<2	<2							<2	ug/l	TM15/PM10
Toluene #	<5	<5	<5							<5	ug/l	TM15/PM10
trans-1,3-Dichloropropene	<2	<2	<2							<2	ug/l	TM15/PM10
1,1,2-Trichloroethane #	<2	<2	<2							<2	ug/l	TM15/PM10
Tetrachloroethene (PCE) #	<3	<3	<3							<3	ug/l	TM15/PM10
1,3-Dichloropropane #	<2	<2	<2							<2	ug/l	TM15/PM10
Dibromochloromethane #	<2	<2	<2							<2	ug/l	TM15/PM10
1,2-Dibromoethane #	<2	<2	<2							<2	ug/l	TM15/PM10
Chlorobenzene #	<2	<2	<2							<2	ug/l	TM15/PM10
1,1,1,2-Tetrachloroethane #	<2	<2	<2							<2	ug/l	TM15/PM10
Ethylbenzene #	<0.5	<0.5	<0.5							<0.5	ug/l	TM15/PM10
p/m-Xylene #	<1	<1	<1							<1	ug/l	TM15/PM10
o-Xylene #	<0.5	<0.5	<0.5							<0.5	ug/l	TM15/PM10
Styrene	<2	<2	<2							<2	ug/l	TM15/PM10
Bromoform #	<2	<2	<2							<2	ug/l	TM15/PM10
Isopropylbenzene #	<3	<3	<3							<3	ug/l	TM15/PM10
1,1,2,2-Tetrachloroethane	<4	<4	<4							<4	ug/l	TM15/PM10
Bromobenzene #	<2	<2	<2							<2	ug/l	TM15/PM10
1,2,3-Trichloropropane #	<3	<3	<3							<3	ug/l	TM15/PM10
Propylbenzene #	<3	<3	<3							<3	ug/l	TM15/PM10
2-Chlorotoluene #	<3	<3	<3							<3	ug/l	TM15/PM10
1,3,5-Trimethylbenzene #	<3	<3	<3							<3	ug/l	TM15/PM10
4-Chlorotoluene #	<3	<3	<3							<3	ug/l	TM15/PM10
tert-Butylbenzene #	<3	<3	<3							<3	ug/l	TM15/PM10
1,2,4-Trimethylbenzene #	<3	<3	<3							<3	ug/l	TM15/PM10
sec-Butylbenzene #	<3	<3	<3							<3	ug/l	TM15/PM10
4-Isopropyltoluene #	<3	<3	<3							<3	ug/l	TM15/PM10
1,3-Dichlorobenzene #	<3	<3	<3							<3	ug/l	TM15/PM10
1,4-Dichlorobenzene #	<3	<3	<3							<3	ug/l	TM15/PM10
n-Butylbenzene #	<3	<3	<3							<3	ug/l	TM15/PM10
1,2-Dichlorobenzene #	<3	<3	<3							<3	ug/l	TM15/PM10
1,2-Dibromo-3-chloropropane	<2	<2	<2							<2	ug/l	TM15/PM10
1,2,4-Trichlorobenzene	<3	<3	<3							<3	ug/l	TM15/PM10
Hexachlorobutadiene	<3	<3	<3							<3	ug/l	TM15/PM10
Naphthalene	<2	<2	<2							<2	ug/l	TM15/PM10
1,2,3-Trichlorobenzene	<3	<3	<3							<3	ug/l	TM15/PM10
Surrogate Recovery Toluene D8	91	95	98							<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	98	100	101							<0	%	TM15/PM10

Please see attached notes for all abbreviations and acronyms

Client Name: Smith Grant LLP **Matrix : Liquid**

Reference: R2228

Location: Trows Farm

Contact: Ben Thomas

Matrix : Liquid

[illegible]

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.

Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 16/10975

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 (UKAS) accreditation applies to surface water and groundwater and one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS) accredited - UK.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

JE Job No: 16/10975

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM15	Modified USEPA 8260. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.				
TM15	Modified USEPA 8260. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM16	Modified USEPA 8270. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM16	Modified USEPA 8270. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7 and 6010B	PM14	Analysis of waters and leachates for metals by ICP OES. Samples are filtered for dissolved metals and acidified if required.				
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7 and 6010B	PM14	Analysis of waters and leachates for metals by ICP OES. Samples are filtered for dissolved metals and acidified if required.	Yes			
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM0	No preparation is required.	Yes			
TM73	Modified US EPA methods 150.1 and 9045D. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			
NONE	No Method Code	NONE	No Method Code				

Scientific Analysis Laboratories Ltd

Certificate of Analysis

Report Number: 586203-1

Date of Report: 28-Jul-2016

Customer: Smith Grant LLP
Station House
Station Road
Ruabon
Wrexham
LL14 6DL

Customer Contact: Mr Ben Thomas

Customer Job Reference: R2228

Customer Site Reference: Trows FM

Date Job Received at SAL: 19-Jul-2016

Date Analysis Started: 20-Jul-2016

Date Analysis Completed: 28-Jul-2016

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.

This report should not be reproduced except in full without the written approval of the laboratory

Tests covered by this certificate were conducted in accordance with SAL SOPs

All results have been reviewed in accordance with Section 25 of the SAL Quality Manual

Report checked
and authorised by :
Muhammad Waqas
Project Manager

Issued by :
Muhammad Waqas
Project Manager



SAL Reference: 586203 Project Site: Trows FM Customer Reference: R2228 Bulk Product Analysed as Bulk Product Asbestos Bulk ID					
SAL Reference				586203 001	
Customer Sample Reference				TIPS ACM	
Date Sampled				28-JUN-2016	
Determinand	Method	Test Sample	LOD	Units	
Asbestos	T27	AR			Chrysotile Detected
					Asbestos Cement

Index to symbols used in 586203-1

Value	Description
AR	As Received
S	Analysis was subcontracted
U	Analysis is UKAS accredited

Notes

Asbestos was subcontracted to REC Asbestos.

Method Index

Value	Description
T27	PLM

Accreditation Summary

Determinand	Method	Test Sample	LOD	Units	Symbol	SAL References
Asbestos	T27	AR			SU	001

APPENDIX F

Geotechnical Laboratory Testing Results

**TESTCONSULT LIMITED**

Ruby House, 40A Hardwick Grange, Warrington WA1 4RF
Tel (01925) 286880 Fax (01925) 286881

**LABORATORY TEST REPORT****PARTICLE SIZE DISTRIBUTION - BS 1377: Part 2: 1990 - WET SIEVING**

Project:	Trows Lane Farm , Rochdale	Lab Ref No.:	SA25377
Client:	Smith Grant	Date Received:	30/06/2016
		Date Tested:	07/08/2016
		Date Reported:	18/07/2016
		Material:	Wet Sand
Originator:	Ben Thomas	Specification:	

Client Sample Ref :

TP 10 @ 1.3m

Supplier: Not Stated

Location: Trows Lane Farm, Rochdale

Ticket No.: Not Stated

Date Sampled : Not Stated

Sample Type: Bulk

Sampled By: Client

Sampling Cert.: Yes

Sample Preparation Method: Oven dried

Specification:

SIEVE ANALYSIS		
Sieve size	% Passing	Specification
125mm	100	
90mm	100	
75mm	100	
37.5mm	94	
28mm	91	
20mm	90	
14mm	89	
10mm	89	
6.3mm	88	
5.0mm	87	
3.35mm	85	
2.0mm	85	
1.18mm	84	
600micron	83	
425micron	80	
300micron	70	
150micron	29	
63micron	10.7	

Particle Size Distribution tested in accordance with BS1377: Part 2: 1990

Approved Signature**TESTCONSULT LIMITED**

■ Mark Dawkins, Operations Manager

**TESTCONSULT LIMITED**

Ruby House, 40A Hardwick Grange, Warrington WA1 4RF
Tel (01925) 286880 Fax (01925) 286881

**LABORATORY TEST REPORT****PARTICLE SIZE DISTRIBUTION - BS 1377: Part 2: 1990 - WET SIEVING**

Project:	Trows Lane Farm , Rochdale	Lab Ref No.:	SA25377
Client:	Smith Grant	Date Received:	30/06/2016
		Date Tested:	07/08/2016
		Date Reported:	18/07/2016
		Material:	Sand
Originator:	Ben Thomas	Specification:	

Client Sample Ref :

TP 19 @ 1.4m

Supplier: Not Stated

Location: Trows Lane Farm, Rochdale

Ticket No.: Not Stated

Date Sampled : Not Stated

Sample Type: Bulk

Sampled By: Client

Sampling Cert.: Yes

Sample Preparation Method: Oven dried

Specification:

SIEVE ANALYSIS		
Sieve size	% Passing	Specification
125mm	100	
90mm	100	
75mm	92	
37.5mm	88	
28mm	87	
20mm	82	
14mm	80	
10mm	78	
6.3mm	74	
5.0mm	72	
3.35mm	70	
2.0mm	68	
1.18mm	67	
600micron	65	
425micron	62	
300micron	49	
150micron	15	
63micron	4.8	

Particle Size Distribution tested in accordance with BS1377: Part 2: 1990

Approved Signature**TESTCONSULT LIMITED**

■ Mark Dawkins, Operations Manager



TESTCONSULT LIMITED
Ruby House, 40A Hardwick Grange, Warrington WA1 4RF
Tel (01925) 286880 Fax (01925) 286881



LABORATORY TEST REPORT
PARTICLE SIZE DISTRIBUTION - BS 1377: Part 2: 1990 - WET SIEVING

Project:	Trows Lane Farm , Rochdale	Lab Ref No.:	SA25377
Client:	Smith Grant	Date Received:	30/06/2016
		Date Tested:	07/08/2016
		Date Reported:	18/07/2016
		Material:	Sand
Originator:	Ben Thomas	Specification:	

Client Sample Ref :

TP 04 @ 0.8m

Supplier: Not Stated
Location: Trows Lane Farm, Rochdale
Ticket No.: Not Stated
Date Sampled : Not Stated
Sample Type: Bulk
Sampled By: Client
Sampling Cert.: Yes
Sample Preparation Method: Oven dried
Specification:

SIEVE ANALYSIS		
Sieve size	% Passing	Specification
125mm	100	
90mm	100	
75mm	100	
37.5mm	100	
28mm	100	
20mm	100	
14mm	100	
10mm	100	
6.3mm	100	
5.0mm	100	
3.35mm	99	
2.0mm	99	
1.18mm	99	
600micron	99	
425micron	98	
300micron	96	
150micron	84	
63micron	28.4	

Particle Size Distribution tested in accordance with BS1377: Part 2: 1990

Approved Signature
TESTCONSULT LIMITED
■ Mark Dawkins, Operations Manager

**TESTCONSULT LIMITED**

Ruby House, 40A Hardwick Grange, Warrington WA1 4RF

Tel (01925) 286880 Fax (01925) 286881

**LABORATORY TEST REPORT****PARTICLE SIZE DISTRIBUTION - BS 1377: Part 2: 1990 - WET SIEVING**

Project:	Trows Lane Farm , Rochdale	Lab Ref No.:	SA25377
Client:	Smith Grant	Date Received:	30/06/2016
		Date Tested:	07/08/2016
		Date Reported:	18/07/2016
		Material:	Sand
Originator:	Ben Thomas	Specification:	

Client Sample Ref :

TP 18 @ 1.0m

Supplier: Not Stated**Location:** Trows Lane Farm, Rochdale**Ticket No.:** Not Stated**Date Sampled :** Not Stated**Sample Type:** Bulk**Sampled By:** Client**Sampling Cert.:** Yes**Sample Preparation Method:** Oven dried**Specification:**

SIEVE ANALYSIS		
Sieve size	% Passing	Specification
125mm	100	
90mm	100	
75mm	100	
37.5mm	93	
28mm	89	
20mm	86	
14mm	84	
10mm	83	
6.3mm	82	
5.0mm	81	
3.35mm	80	
2.0mm	79	
1.18mm	78	
600micron	76	
425micron	75	
300micron	71	
150micron	58	
63micron	39.0	

Particle Size Distribution tested in accordance with BS1377: Part 2: 1990

Approved Signature**TESTCONSULT LIMITED**

■ Mark Dawkins, Operations Manager

**TESTCONSULT LIMITED**

Ruby House, 40A Hardwick Grange, Warrington WA1 4RF
Tel (01925) 286880 Fax (01925) 286881

**LABORATORY TEST REPORT****PARTICLE SIZE DISTRIBUTION - BS 1377: Part 2: 1990 - WET SIEVING**

Project:	Trows Lane Farm , Rochdale	Lab Ref No.:	SA25377
Client:	Smith Grant	Date Received:	30/06/2016
		Date Tested:	07/08/2016
		Date Reported:	18/07/2016
		Material:	Sand
Originator:	Ben Thomas	Specification:	

Client Sample Ref :

TP 14 @ 1.5m

Supplier: Not Stated

Location: Trows Lane Farm, Rochdale

Ticket No.: Not Stated

Date Sampled : Not Stated

Sample Type: Bulk

Sampled By: Client

Sampling Cert.: Yes

Sample Preparation Method: Oven dried

Specification:

SIEVE ANALYSIS		
Sieve size	% Passing	Specification
125mm	100	
90mm	100	
75mm	100	
37.5mm	100	
28mm	100	
20mm	100	
14mm	99	
10mm	99	
6.3mm	99	
5.0mm	99	
3.35mm	99	
2.0mm	99	
1.18mm	99	
600micron	98	
425micron	96	
300micron	88	
150micron	48	
63micron	18.8	

Particle Size Distribution tested in accordance with BS1377: Part 2: 1990

Approved Signature**TESTCONSULT LIMITED**

■ Mark Dawkins, Operations Manager

**TESTCONSULT LIMITED**

Ruby House, 40A Hardwick Grange, Warrington WA1 4RF
Tel (01925) 286880 Fax (01925) 286881

**LABORATORY TEST REPORT****PARTICLE SIZE DISTRIBUTION - BS 1377: Part 2: 1990 - WET SIEVING**

Project:	Trows Lane Farm , Rochdale	Lab Ref No.:	SA25377
Client:	Smith Grant	Date Received:	30/06/2016
		Date Tested:	07/08/2016
		Date Reported:	18/07/2016
		Material:	Sand
Originator:	Ben Thomas	Specification:	

Client Sample Ref :

TP 09 @ 0.9m

Supplier: Not Stated

Location: Trows Lane Farm, Rochdale

Ticket No.: Not Stated

Date Sampled : Not Stated

Sample Type: Bulk

Sampled By: Client

Sampling Cert.: Yes

Sample Preparation Method: Oven dried

Specification:

SIEVE ANALYSIS		
Sieve size	% Passing	Specification
125mm	100	
90mm	100	
75mm	100	
37.5mm	92	
28mm	91	
20mm	90	
14mm	87	
10mm	86	
6.3mm	83	
5.0mm	82	
3.35mm	81	
2.0mm	80	
1.18mm	79	
600micron	78	
425micron	75	
300micron	66	
150micron	28	
63micron	10.7	

Particle Size Distribution tested in accordance with BS1377: Part 2: 1990

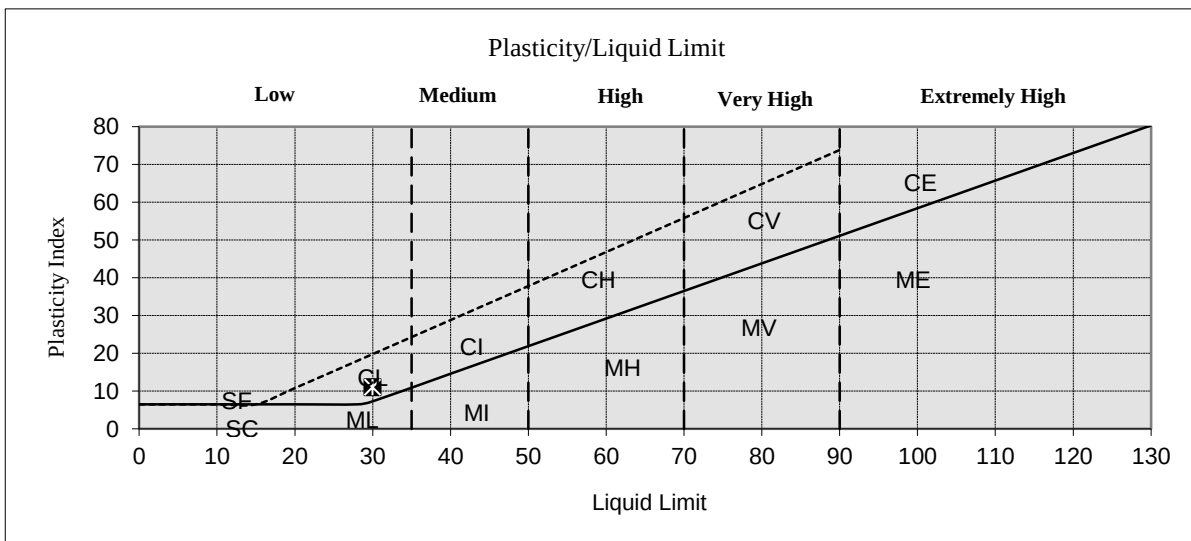
Approved Signature**TESTCONSULT LIMITED**

■ Mark Dawkins, Operations Manager

LABORATORY TEST REPORT
LIQUID & PLASTIC LIMIT TESTS BS 1377: Part 2: 1990 Cl 4.4,5.3

Site Ref.:	Trows Lane Farm, Rochdale	Job No.:	23179
Client:	Smith Grant	Lab Ref No.:	SA25377/01
		Sample Ref.:	TP 16 @ 1.0m
		Date Received:	30/06/2016
		Date Tested:	07/08/2016
Originator:	Ben Thomas	Date Reported:	08/08/2016

Sampling Certificate	Yes
Sampled By	Client
Sample Type	Bulk
Sample Preparation Method	As Received
MATERIAL	Brown Clay
Retained 425 micron (%)	0
Natural Moisture Content (%)	23
Liquid Limit (single point)(%)	30
Plastic Limit (%)	19
Plasticity Index	11

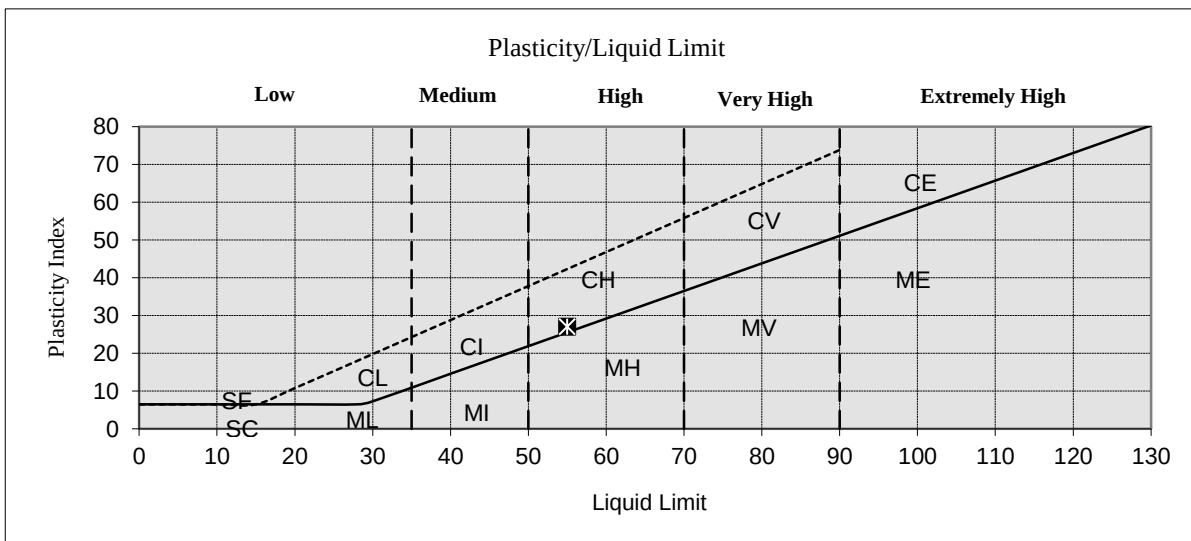



Approved Signature
TESTCONSULT LIMITED
■ Mark Dawkins, Operations Manager

LABORATORY TEST REPORT
LIQUID & PLASTIC LIMIT TESTS BS 1377: Part 2: 1990 Cl 4.4,5.3

Site Ref.:	Trows Lane Farm, Rochdale	Job No.:	23179
Client:	Smith Grant	Lab Ref No.:	SA25377/01
		Sample Ref.:	TP 18 @ 2.5m
		Date Received:	30/06/2016
		Date Tested:	07/08/2016
Originator:	Ben Thomas	Date Reported:	08/08/2016

Sampling Certificate	Yes
Sampled By	Client
Sample Type	Bulk
Sample Preparation Method	As Received
MATERIAL	Brown Clay
Retained 425 micron (%)	0
Natural Moisture Content (%)	35
Liquid Limit (single point)(%)	55
Plastic Limit (%)	28
Plasticity Index	27

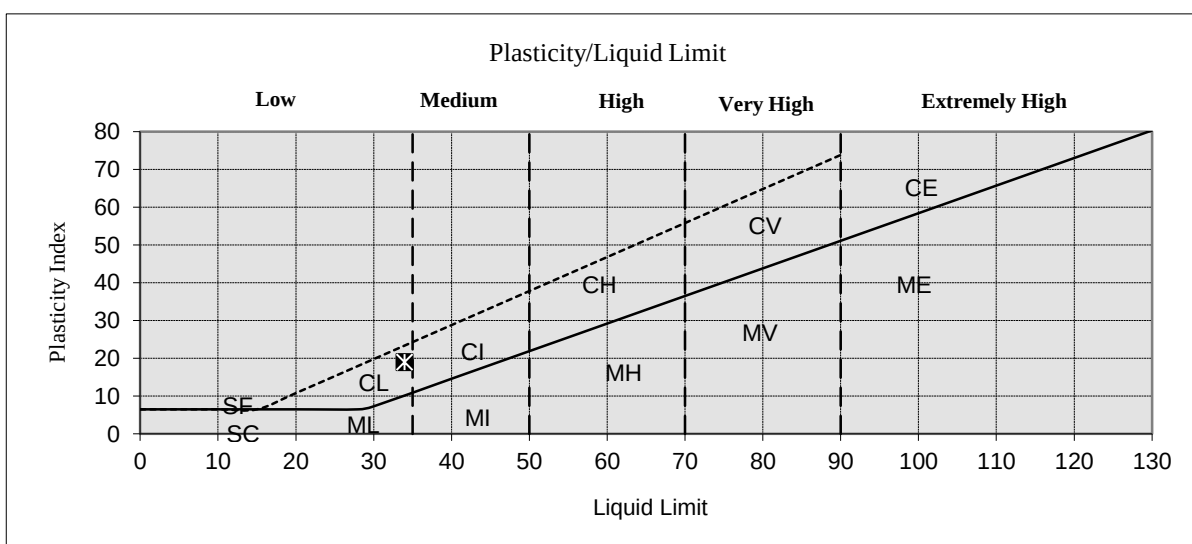



Approved Signature
TESTCONSULT LIMITED
■ Mark Dawkins, Operations Manager

LABORATORY TEST REPORT
LIQUID & PLASTIC LIMIT TESTS BS 1377: Part 2: 1990 Cl 4.4,5.3

Site Ref.:	Trows Lane Farm, Rochdale	Job No.:	23179
Client:	Smith Grant	Lab Ref No.:	SA25377/01
		Sample Ref.:	TP 06 @ 1.1m
		Date Received:	30/06/2016
		Date Tested:	07/08/2016
Originator:	Ben Thomas	Date Reported:	08/08/2016

Sampling Certificate	Yes
Sampled By	Client
Sample Type	Bulk
Sample Preparation Method	As Received
MATERIAL	Clay
Retained 425 micron (%)	0
Natural Moisture Content (%)	16
Liquid Limit (single point)(%)	34
Plastic Limit (%)	15
Plasticity Index	19




Approved Signature
TESTCONSULT LIMITED
■ Mark Dawkins, Operations Manager