



Phase I & II Geo-Environmental Assessment

EG Manchester Road

Sudden

Rochdale

OL11 3PT

Prepared for:

Euro Garages Ltd

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LAND AT EG MANCHESTER ROAD, SUDDEN

NON-TECHNICAL CLIENT SUMMARY

This report presents the findings of a combined Phase I Desk Study and Phase II Intrusive Investigation undertaken to determine ground conditions, establish if there are any environmental risks associated with the site and its development and provide a geotechnical appraisal. Pertinent findings and conclusions may be summarised as follows:

- The site comprises an active petrol filling station (PFS) to the west and an area of woodlands to east. Within the PFS there exists a kiosk and a drive thru coffee shop. The proposed development consists of the demolition of the kiosk shop for construction of a larger shop and the creation of new car parking spaces to the west including electric charging bays.
- Historical mapping indicates the first development on site was in the late 1950's when an unnamed building was present. This is later assumed to be demolished and a garage is erected by 1975. Groundworks are also found on site at this time occurring along the southern border this is assumed to be development prior to the retaining wall found currently on site.
- Intrusive works involved the drilling of 11 boreholes to a maximum depth of 5.0m and ground conditions were found to be a notable thickness of Made Ground to a maximum depth of 2.8m overlying Glaciofluvial Deposits to beyond 5.0m. It should be noted that a thick layer of organic soil was found within one location and a number of obstructions were recorded in the made ground. Whilst, the site does not lie within a 'Development High Risk Area', a Preliminary Coal Mining Risk Assessment is recommended to confirm the risk level at the site.
- Soil samples were tested for the presence of potential contamination and no significant risk to users of the site have been established. Waste analysis has indicated that, on the basis of current data, Made Ground materials can be classified as **NON-HAZARDOUS** and that the Glaciofluvial Deposits can be classed as **INERT** for the purposes of off-site disposal.

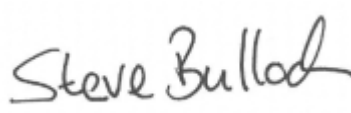
ENGINEERING SUMMARY

- The ground conditions are considered unsuitable for conventional spread foundations due to the thickness of the Made Ground and substantial drop in ground level at the location of the proposed kiosk shop. Therefore, alternate foundation solutions should be considered, such as piling.
- A design CBR value of 15% can be recommended for the areas where Glaciofluvial sands are present. However, in areas where Glaciofluvial clays and made ground are found at subgrade level, a CBR value of only 2% is recommended.
- Falling head infiltration testing found the Glaciofluvial Deposits unlikely to be suitable for infiltration drainage.
- A Design Sulphate Class (DS) of DS-1 with an aggressive chemical environment for concrete (ACEC) of AC-1s is considered suitable for shallow buried concrete.

The above points represent a simplified summary of the findings of this assessment and **must not** form the basis for key decisions for the proposed development. A thorough review of the details is contained within the following report, or alternatively get in touch and we'll talk you through it.



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Where ground investigations have been conducted, these have been limited to the level of detail required for the site in order to achieve the objectives of the investigation.

The report has been written, reviewed and authorised by the persons listed above. It has also undergone EPS' quality management inspection. Should you require any further assistance regarding the information provided within the report, please do not hesitate to contact us.

The National Planning Policy Framework 2019 requires a competent person to prepare site investigation information, which is defined as a person with a recognised relevant qualification, sufficient experience in dealing with the type(s) of pollution or land instability, and membership of a relevant professional organisation. EPS considers that it fulfils these criteria and would welcome any request for staff CVs or case studies to demonstrate it.

As stated within DEFRA's Contaminated Land Statutory Guidance (2012), with any complex risk assessment it is possible that different suitably qualified people may reach slightly different conclusions when interpreting the same information. EPS recognises this and considers the conclusions presented within this report to be robust and appropriate but input from the Local Authority and their judgement in line with this guidance would still be welcomed.

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1 INTRODUCTION

In April 2023, EPS (Leeds) Ltd was commissioned by Euro Garages to complete a Phase I and II Geo-Environmental Assessment Report at EG Manchester Road, Sudden, Rochdale, OL11 3PT ('the site'); see Figure 1.

The work was commissioned in order to fulfil pre-planning requirements and provide information to support the redevelopment of the petrol station with associated car parking including EV bays and the construction of a retaining wall.

This report presents the findings, conclusions, and recommendations of the Phase I Desk Study and subsequent Phase II Intrusive Investigation undertaken as instructed.

1.1 Objectives

The objectives of this investigation were as follows:

- a) Compile a Phase I Desk Study and Conceptual Site Model through a Preliminary Risk Assessment to evaluate the potential risks the site may pose to human and environmental receptors, both currently and in future.
- b) Investigate potential contaminant linkages identified in the CSM by means of investigating shallow soils and soil gases.
- c) Determine the potential risks posed by the site and make recommendations for further work that may be required, to ensure safe development in accordance the Environment Agency's *Land Contamination: Risk Management* guidance (LC:RM, 2020) and the *National Planning Policy Framework*.
- d) Collect information on ground conditions and strength in order to make appropriate recommendations for geotechnical design.
- e) Recover a number of samples for Waste Analysis, including Waste Acceptance Criteria (WAC) to support soil disposal.
- f) Conduct falling head infiltration testing to provide an initial assessment of the permeability of the shallow ground.

1.2 Scope of Work

To perform an exploratory assessment of the site in accordance with the principles and requirements of DEFRA's '*Contaminated Land Statutory Guidance*' (2012), BS10175 – '*Investigation of Potentially Contaminated Sites*', BS 5930:2015+A1:2020 '*Code of practice for ground investigations*' and BS EN 1997 '*Geotechnical Design*', the following tasks were undertaken:

Desk Study:

- Collection of site records.
- Study of existing geological, hydrogeological and historic maps of the area.
- Consultation of environmental databases, including records held by the local authority (where available).
- Review of proposed development plans.
- Development of a Conceptual Site Model (CSM) through a Preliminary Risk Assessment.

Intrusive Investigation:

- Site walkover, inspection of any visual evidence of contamination at the site, obtaining photographic records.
- Health and safety briefing / site supervision.
- Drilling of 11 window sample boreholes to a maximum depth of 5.0m below ground level (bgl) using a track-mounted percussive rig.
- Continual logging of ground conditions including inspection of samples for visual and olfactory contamination, and laboratory analysis of selected representative samples.
- Installation of gas and groundwater monitoring standpipes at selected locations.
- Infiltration testing.

Reporting:

- Data collection
- Interpretation of data including completion of Generic Quantitative Risk Assessment

The findings and conclusions of these investigations are presented in the following sections.

1.3 Limitations and Constraints

The purpose of this report is to present the findings of a soil sampling investigation conducted at the location(s) specified. When examining the data collected from the investigations made during the assessment, Environmental Protection Strategies Ltd (EPS) makes the following statements:

No investigation method is capable of completely identifying all ground conditions that might be present in the soil or groundwater under a site. Where outlined in our report, we have examined the ground beneath a site by constructing a number of boreholes and / or trial pits to recover soil and / or groundwater samples. The locations of these excavations and sampling points are considered to be representative of the condition of the whole site subsurface however, ground conditions are naturally variable and it may be possible that the conditions encountered may differ to those found during the investigation.

Visible evidence of Japanese Knotweed was identified during the site walkover located between the palisade fencing behind the kiosk and stairs leading to the residential area. Therefore, it is recommended that due to the presence of this Japanese Knotweed or if any other similarly invasive plants are present at the site, a specialist contractor should be commissioned to make a detailed assessment.

The investigation was carried out to assess the significance of contamination resulting from the use of the site as identified in this report. Unless EPS has otherwise indicated, no assessment of potential impact of any other previous uses has been made.

2 SITE CONTEXT

The following section provides a summary of the information collected in relation to the site location and history.

2.1 Site & Location Description

Detail	Description
Location	The site lies adjacent to Manchester Road (A58) and west of Cheltenham Street. It is located approximately 14.6km south west of Manchester.
National Grid Reference	388780, 411950
Topographic Elevation	Ground levels lie at approximately 140m Above Ordnance Datum (AOD) decreasing towards the south west to 135m AOD.
Description of Site	The site is made up of woodland area to the west and an active Petrol Filling Station (PFS) to the east. The PFS consists of eight pumps, a kiosk shop, and a drive thru coffee shop. The tank farm is located towards the eastern site boundary, near the vehicle entrance to the PFS. There is also associated parking with the drive thru coffee shop. A gabion retaining wall is observed south of the coffee shop and is approximately 2.0m to 3.0m in height. The woodland area to the west is made up of dense mature deciduous trees and low-lying shrubs. Fly tipping was observed, with building materials and rubble also found. A steep slope is present along the southern boundary, adjacent to the woodlands, it increases in height by approximately 5-6m away from the site boundary and towards the existing houses on Rufford Avenue. A stairway is present between the woodland and kiosk shop leading to the residential area. It should be noted that ground level within the woodlands is roughly 3m to 4m below ground level on the petrol station. Potential animal burrows/trench was observed on the soft landscaped footpath within the woodlands. Anecdotal evidence suggests that there are concrete pads in the Made Ground from the previous PFS onsite which subsided and was later constructed on to form the current ground level of the PFS.
Surrounding Land Use	The site lies within the town of Rochdale. The surrounding land use is predominantly residential with some commercial use to the south and west of the site.

A plan showing the site location is provided as Figure 1, the current site layout is detailed on Figure 2 and an aerial photograph is included as Figure 3. Selected site photographs are included as Appendix A, a proposed development plan is included as Appendix B and relevant extracts of a Landmark Envirocheck report are included as Appendices C - F.

2.2 Geo-Environmental Setting

Detail	Description		
Geology	Geological mapping shows the site is underlain by Glaciofluvial Deposits overlying Pennine Lower Coal Measures. A fault crosses the site to the east striking north west, south east. Information on the site’s geological context is included as Appendix D.		
British Geological Survey (BGS)	Historic borehole logs were reviewed for a location around 50m south west and on a similar elevation to the study area. These report a thin layer of topsoil overlying loose brown sand and gravel which extends to a depth of 0.6m. This is in turn underlain by a series of brown silty sand and grey silty clay to 12.2m, the full extent of the boreholes. Groundwater was encountered at a depth of approximately 2.6m. A copy of these historic borehole logs are included within Appendix D.		
Geological Hazards	Hazard	On Site Risk	
	Non-Coal Mining Activities	No Hazard	
	Collapsible Ground	Very Low	
	Compressible Ground	No Hazard	
	Ground Dissolution	No Hazard	
	Running Sand	Very Low	
	Landslide	Very Low	
	Shrinking / Swelling Clay	No Hazard	
	Coal Mining	Envirocheck indicates that the site is situated in an area that may be affected by coal mining activity.	
		Upon consulting the Coal Authority website, the site does lie within a coal mining ‘Reporting Area’ and two mine entrances are located approximately 230m north west of the site, although none appear to be on site.	
		However, the site does not lie within a ‘Development High Risk Area’ and therefore risks associated with ground stability issues arising from historic coal mining on the site are likely to be low. A Preliminary Coal Mining Risk Assessment would be recommended to confirm the risk level at the site.	
Radon	The Envirocheck Report indicates the site to lie in a location where the percentage of homes above the radon action level is less than 1%. It further reports that the site will not require radon protection measures in the construction of new buildings.		
Hydrogeology	Groundwater vulnerability maps for the area show that the underlying superficial and bedrock geology are classified as Secondary A Aquifers, and that the site does not lie within a Source Protection Zone (SPZ) for local groundwater abstraction.		
	The Envirocheck report doesn’t list any groundwater abstractions within 500m.		
	Groundwater vulnerability maps are included as Appendix E.		

Detail	Description
Hydrology	The nearest surface water feature is Sudden Brook located approximately 150m south of the site. The brook flows north east, eventually feeding into the River Roch. The Envirocheck report lists one discharge consent located approximately 490m north west of the site which released treated effluent into a tributary of the Sudden Brook on July 1993. No records of surface water abstractions are found within a 500m radius. Review of the EA Flood Zone Map for the area indicates that the site lies within Flood Zone 1, which is defined as the area with a low potential risk of flooding from fluvial or tidal sources. It should be noted that the EA maps do not take into account flooding from poor drainage or groundwater. A copy of the flood map for the site and surrounding area is also included within Appendix E.
Known Site Drainage & Utilities	Given the nature of the site and following the walkover, the interceptor was found just north of the kiosk and utilities feeding into the kiosk from the north. Manhole covers were found in woodland areas assuming to be connecting to services found near the PFS. It should be noted that a site-specific utility survey was being carried out at the time of the works and is available upon request.
Landfill & Waste	The BGS, Local Authority, and historical records detail the presence of six historic landfills within 500m of the site. The nearest is located around 70m south, however is it unknown what waste was accepted at this site but first accepted waste in September 1972. Several areas of infilled land are recorded in the local area, the nearest of which is positioned roughly 215m north west.

2.3 Industrial Land Use & Pollution

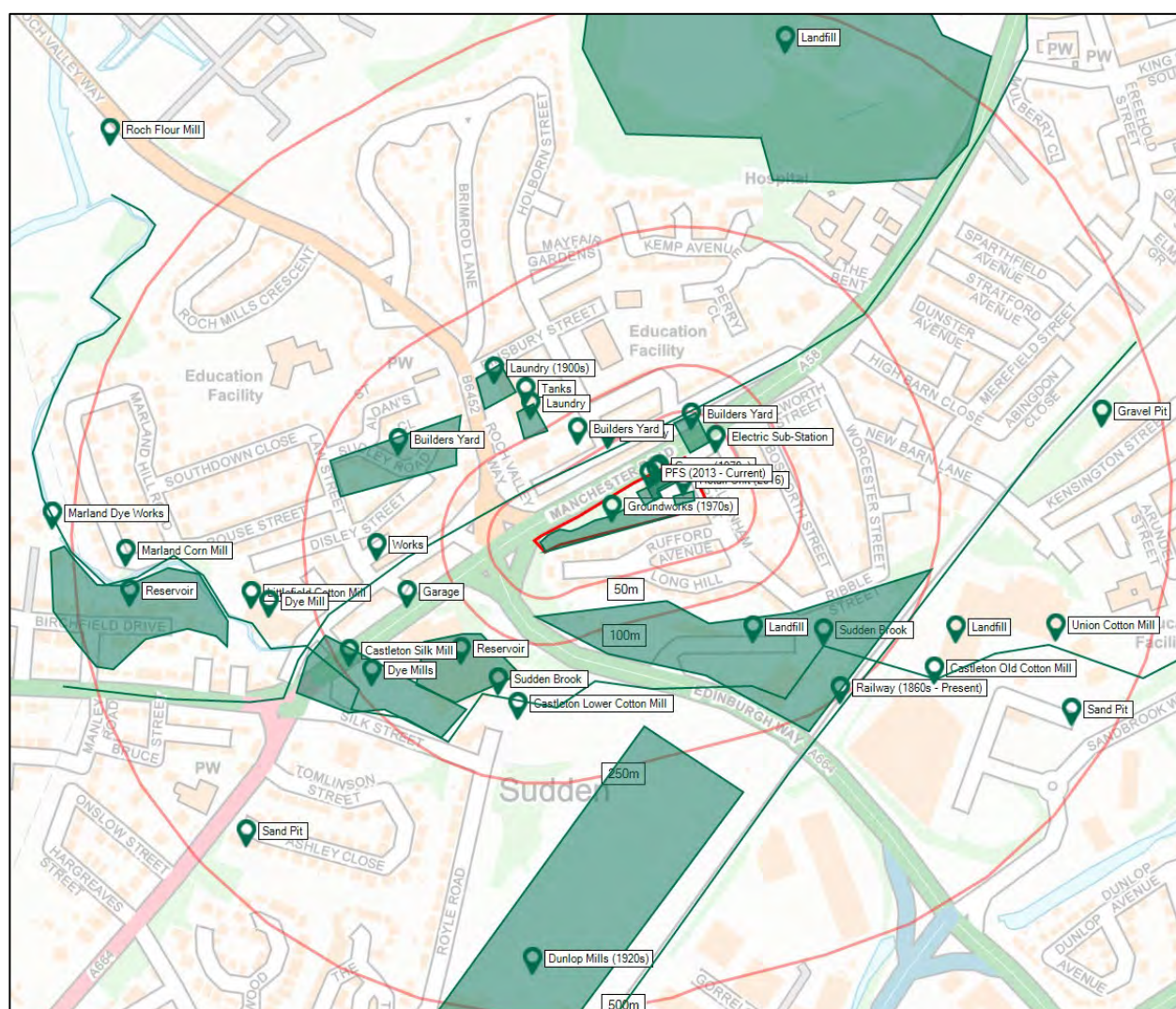
There are 11 sites licensed for industrial and commercial activity within the surrounding 500m, the details of the most pertinent are detailed below. It should be noted that there are four records for the petrol station on site.

Land Use	Approximate Distance (Direction)	Status
Euro Garages (Garage Services)	0m	Inactive
B P Service Station (Petrol Filling Station)	0m	Inactive
Esso (Petrol Filling Station)	0m	Active
Texaco (Petrol Filling Station)	0m	Inactive
Stainless Dry Cleaners (Dry Cleaners)	31m (NW)	Inactive
W Van Drom N L (Road Haulage Services)	80m (NE)	Inactive
R R G Toyota Rochdale (Car Dealers)	110m (S)	Active

2.4 Sensitive Land Use

2.5 Site History

A summary of historical map data from 1851 to 2023 is provided below and copies of relevant historic maps and any others examined during the investigation are included in this report as Appendix F. A map detailing historic features in the area surrounding the site is displayed below.



- Earliest maps from 1851 shows the site to be rural fields like much of the surrounding land, however there are multiple Mills (Cotton, Silk, Corn, Flour) with associated reservoirs, a Dye Works and a few Sand Pits noted. By the late 1890s development started to occur in the surrounding area in the form of housing, and by the 1900s – 1950s a tramway to the north had

been developed, as well as a Laundry The railway to the south east of the site has been present since the mid-1850s. Sudden Brook is approximately 150m south, flowing east to west.

- The first sign of development on site was in 1957 when an unnamed building is found on site. This is later assumed to be demolished and a garage is erected by 1975. Groundworks are also found on site at this time occurring along the southern border this is assumed to be development prior to the retaining wall found currently on site. Residential properties increase within the area, with the reservoirs being infilled and built upon. Another laundry is mapped to the north.
- By 1999 it seems from aerial photos that the first PFS has been erected on site and that the current site layout has been present since 2016.

3 PRELIMINARY RISK ASSESSMENT & CONCEPTUAL SITE MODEL

In accordance with the Environment Agency's Land Contamination: Risk Management, there are three stages to managing contaminated land (Risk Assessment/Remedial Options Appraisal/Remediation and Verification). This section outlines the first tier of Stage 1, the Preliminary Risk Assessment.

The following section provides a review of the contaminant linkages that may be active at the site, whereby EPS have examined the potential sources that may be present as a result of historic and / or current site activities and where potential interaction between these sources and the identified human / environmental receptors may occur.

3.1 Background

A Desk Study comprises the first stage of any geo-environmental assessment, the purpose of which is to determine what potentially contaminative activities may have occurred at the property or the surrounding area which may pose an environmental or geological risk to site users, the surrounding environment or proposed development, either at present or in the future.

The method used in this investigation to assess the environmental risk posed is based on the concept of 'contaminant linkage', which considers the following three factors:

Source	The location from which an environmentally hazardous / contaminative substance is, (or was,) derived.
Pathway	A route or mechanism via which a source could come into contact with a receptor to cause significant harm.
Receptor	An environmentally sensitive object or condition e.g. person, property, controlled water, or ecological system, which may be present now or in future.

If all three factors are identified, there is the potential for a 'contaminant linkage' to be active, which could result in significant harm being caused to the environment or human health.

3.2 Source Characterisation

The following potential contaminant sources have been identified at the site and in the surrounding area:

Potential Source	Source Description	Principal Contaminants of Concern
Current Site Use	Current use of the site as a Petrol Filling Station	TPH, BTEX, MTBE
	In-fill material of unknown origin (Made Ground) material anticipated beneath existing hardstanding.	PAH, Metals, ACM
Historic Site Use	Historic use of site as a garage	TPH, BTEX, MTBE

Potential Source	Source Description	Principal Contaminants of Concern
Current and Historic Surrounding Land Use	Historic Laundry approximately 150m north.	VOC (particularly chlorinated solvents)

Notes: PAH Polycyclic Aromatic Hydrocarbons ACM Asbestos Containing Material
 TPH Total Petroleum Hydrocarbons MTBE Methyl Tert Butyl Ether
 BTEX Benzene, Toluene, Ethylbenzene and Xylenes

3.3 Potential Receptors

A framework for the assessment of risks arising from the presence of contamination in soils has been produced by the Environment Agency and the Department for the Environment, Food and Rural Affairs (DEFRA) and is presented with the report: '*Using Science to Create A Better Place: Updated Technical Background to the CLEA Model – Science Report SC050021/SR3*'. This guidance document defines a series of standard land-uses which have been further developed into six generic land uses in the Category 4 Screening Levels project for Land Affected by Contamination (DEFRA/Contaminated Land: Applications in Real Environments (CL:AIRE) Project Report SP1010, 2014) which form a basis for the development of the Conceptual Site Model.

Risks posed to controlled waters have been considered in line with the Environment Agency's *approach to groundwater protection* (v1.2, 2018) and associated position statements.

The proposed development plan includes the demolition of the existing kiosk shop and the construction of a new larger shop in its place, new parking spaces including electric vehicle (EV) bays to the west and a retaining wall towards the southern boundary of the site. Therefore, the land use has been considered as 'Commercial'.

In view of the environmental setting, current and potential future land use of the site and surrounding sites, the potential receptors for any contaminant impact are discussed in the table below:

Receptor	Site Specific Description
Human	Future site users, site workers involved in the site redevelopment, and those working and living in the surrounding area have the potential to be at risk from exposure to potential contaminants of concern (CoCs).
Groundwater	The underlying geology comprises of Devensian Till overlying Pennine Lower Coal Measures, which are both classified as Secondary A Aquifers. The historic borehole logs suggests that groundwater is likely to be below 10m. Whilst the site does not lie within a SPZ for nearby groundwater abstraction, the underlying geology is a potentially important groundwater resource and therefore, groundwater should be considered as a potential receptor to site derived contaminants.
Surface Water	The nearest surface watercourse is Sudden Brook which comes within 150m of the boundary. The primary concern for this site should be considered as the groundwater. However, if significant impacts to groundwater were to be encountered, then further consideration should be given to the associated risk posed to nearby surface waters via lateral migration of contaminants in the subsurface.

Receptor	Site Specific Description
Flora and Fauna	The proposed development includes the provision of soft landscaping and some of the identified contaminants of concern are known to be phytotoxic and as such, the potential for this impact should be considered.
Buildings & Infrastructure	Subsurface structures are likely to be present at the site which may be adversely affected by the potential presence of the identified contaminants of concern. These include concrete used in building foundations, buried potable water supply pipes and other service lines and pipes.
Adjacent Land	Adjacent properties including private residential dwellings could also be at risk from potential contaminants found at the site.

3.4 Potential Pathways

Where contaminants may be present in soil, there are a number of potential pathways that enable human receptors to come into contact with or be exposed to them. The most direct pathways, considered under current UK legislation, can be summarised as follows:

- Direct ingestion of contaminated soil
- Ingestion of household dust
- Ingestion of contaminated vegetables
- Ingestion of soil attached to vegetables
- Dermal contact with contaminated soil
- Dermal contact with household dust
- Inhalation of fugitive soil dust
- Inhalation of fugitive household dust
- Inhalation of vapours outside
- Inhalation of vapours inside

Clearly, not all of these potential pathways apply for every standard land-use. For example, ingestion of contaminated vegetables will not apply to land uses other than residential with plant uptake and allotments.

However, in addition to direct exposure pathways, a number of physical transport mechanisms / pathways may also exist at a site that allow remote or less accessible contaminants in soil or groundwater to reach human or environmental receptors both at a site and beyond the site boundary. These include the transport mechanisms listed below.

- Downward and lateral movement of contaminants in soil either by gravity or through being 'leached' by percolating rainwater
- Lateral migration of contaminants dissolved in groundwater.
- Direct seepage or leaching of contaminants from soil into subsurface drains or supply pipework.
- Volatilisation of contaminants from groundwater or unsaturated soils into buildings or outdoor air.

Through examination of the standard land use and environmental setting at each site, the presence of pathways and transport mechanisms described above must be considered when assessing whether a contaminant linkage may plausibly be active, and therefore be included in the conceptual site model.

3.5 Summary of Contaminant Linkages

Considering the site use and environmental setting, and proposed land use, the following plausible contaminant linkages have been identified through this phase I assessment and require further investigation.

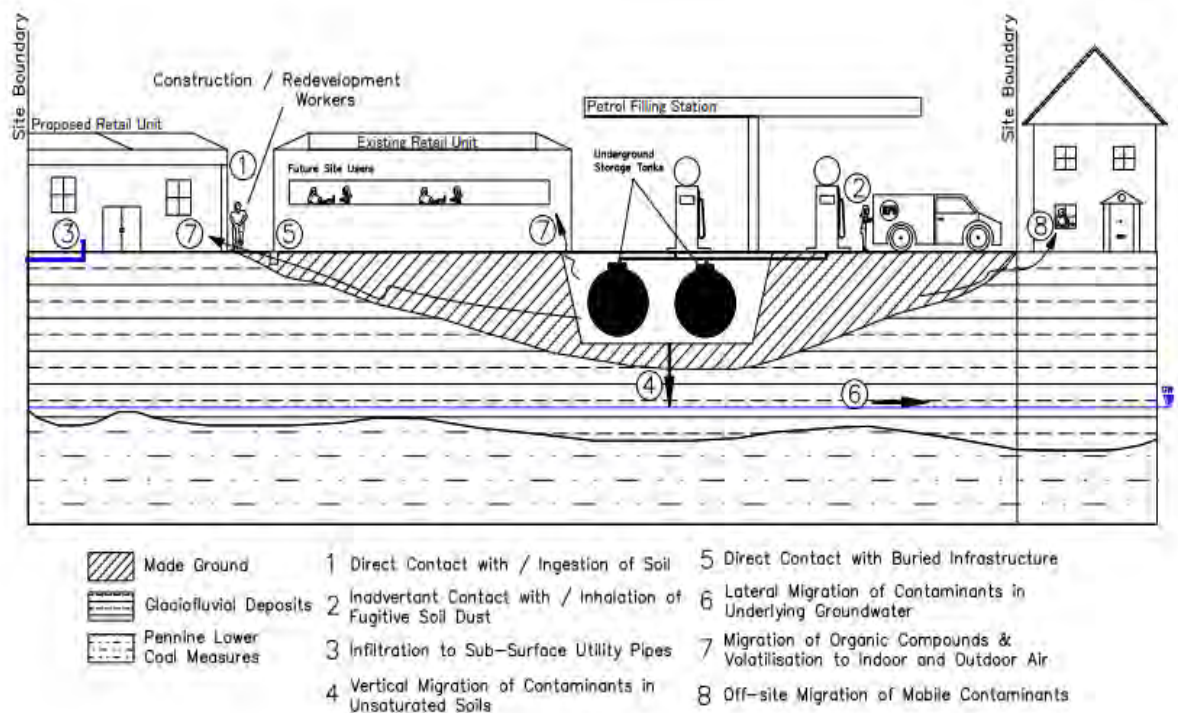
Source	Pathway	Receptor
Contaminated soil	Direct contact and inadvertent ingestion by eating or smoking with dirty hands	Construction workers during redevelopment & site users
	Inhalation of fugitive dusts	
Fuel Storage & Distribution Systems	Leakage from Primary and Secondary Fuel Containment	Soil & Groundwater
Contaminated soil and/or groundwater	Ingress / diffusion through permeable potable water supply pipes	Site users
	Direct contact	Buried infrastructure
	Off-site migration of mobile contaminants	Adjacent Site Users

The following comments are made with respect to contaminant linkages which have been considered through development of the conceptual model, but have not been concluded as 'plausible' – i.e. through which a significant possibility of significant harm could occur to an identified receptor:

- PAHs and metals have been identified as contaminants of concern associated with the historic on-site infill, however these contaminants are considered to be relatively immobile in the environment by virtue of their very low solubility and volatility. On this basis, plausible pathways by which these potential contaminants could pose a significant risk to the underlying groundwater (or nearby surface watercourses) are not considered to be active.
- A laundry is located roughly 150m north of the site. Although several contaminants of concern have been identified associated with this land use, due to the distance and the fact that the proposed redevelopment site is located upgradient from the former laundry, it is not anticipated that there are any risks regarding the onsite migration of vapours to indoor air and outdoor air from that former land-use.

The following diagram provides an illustration of the plausible contaminant linkages that may be active at the site and which may need further investigation or control to ensure safe development:

Illustrative Conceptual Site Model – Manchester Road, Sudden



4 SUMMARY OF INTRUSIVE INVESTIGATIONS

Intrusive ground investigations were undertaken on 25th and 26th April in accordance with EPS standard operating procedures, copies of which will be made available on request. A summary of all site activities is presented in the following sections.

4.1 Exploratory Hole Locations

Exploratory hole locations were selected through consideration of the potential contaminant linkages identified through the Phase I Desk Study, the proposed development layout, the location of below ground utilities as well as operational and health & safety considerations.

A total of 11 window sample boreholes (WS01 – WS11) were formed at the site to a maximum depth of 5.0m using a track-mounted percussive drilling rig. In addition to this, two locations underwent falling head testing.

The overall objective in terms of exploratory hole locations was to provide an appropriate lateral and vertical coverage of the soils underlying the site in order to offer information relating to their quality and nature as well as provide information for geotechnical design.

Standpipes were installed in within positions WS01, WS02, WS07 and WS10 on a precautionary basis. Groundwater sampling pipes were installed using 50mm diameter HDPE well casing and fitted with a gas tap. Slotted casing (1mm slot) was installed at each location from the base of the borehole to approximately 1.0m below the surface. The installations were completed to ground surface using plain casing. A filter pack of 2-3mm of washed gravel extended from the base of the boreholes to approximately 0.1m above the slotted section with a bentonite seal to surface. All installations were finished with flush-mounted, bolt-down headworks.

A Window Sample Borehole location plan is presented as Figure 4.

4.2 In-Situ Testing & Soil Sampling

Each borehole was logged for ground conditions encountered and inspected for any physical evidence of contamination, such as soil staining, odour and the presence of separate phase liquids on a precautionary basis. Window Sample Borehole logs are presented in Appendix G.

Standard or cone penetration tests (SPT / CPT) were carried out in all materials using an automatic trip hammer. The number of blows required to advance a standard split spoon, (or solid 60° nose cone for the CPT test) over the final 300mm of a 450mm total drive was recorded, and is shown on the borehole records at the penetration resistance (“N” value).

Where potentially volatile organic compounds are suspected, EPS carries a Photoionisation Detector (PID), which can be used to measure the relative concentrations of vapour associated with soil within borehole installation wells. As potentially volatile organic compounds, specifically including petroleum hydrocarbons, were identified in the conceptual site model, PID readings were collected during this intrusive investigation. These readings are included within borehole logs presented as Appendix G and the results are discussed further in later sections.

4.3 Laboratory Testing

Samples obtained for analysis of identified contaminants of concern were submitted to Derwentside Environmental Testing Services Ltd. (DETS), Durham, who hold appropriate UKAS / MCERT accreditation for the required testing. Samples were transported in laboratory supplied containers and delivered to the laboratory by approved courier.

Geotechnical testing was undertaken by The Testing Lab, Doncaster, a UKAS accredited laboratory.

Copies of chain of custody documentation are held by EPS and will be made available on request.

Laboratory testing schedules are included as Table 1 and Table 2.

5 FINDINGS OF THE INVESTIGATION

This section of the report provides a summary of the findings of the various aspects of the ground investigation.

5.1 Ground Conditions

A total of 11 window sampler boreholes were formed at the site and the ground conditions encountered, from surface level, were found to comprise:

- Topsoil
- Made Ground
- Glaciofluvial Deposits

Site specific borehole logs are included as Appendix G and give descriptions and depths of strata encountered. A summary of the general strata encountered across the site is provided in the table below, with more detailed description given in the following sub sections.

Geological Strata	Maximum Depth to Base of Strata (mbgl)	Strata Thickness (m)
Topsoil	0.38	0.20 - 0.38
Made Ground	2.80	0.20 - 2.65
Glaciofluvial Deposits	>5.00 (not proven)	>2.20 - >4.80 (not proven)

5.1.1 Topsoil

Topsoil was only found within the woodlands area where it was described as a dark brown slightly clayey sand with rootlets throughout to roughly 0.30m depth.

5.1.2 Made Ground

Underlying the Topsoil in the woodlands area and the concrete hardstanding within the areas of the PFS is the Made Ground. This is generally observed as a dark brown silty gravelly cobbly sand with fragments of brick, glass, metal and concrete down to 2.80m depth. Fragments of sandstone and red brick were observed within WS02. These large fragments of sandstone and concrete are assumed to be the cause of refusals within WS03, WS09 and WS11.

It should also be noted that within WS04 a slab of concrete approximately 0.30m thick was observed at 0.50m depth. This is possibly a part of the previous petrol station structure as noted in Section 2.1.

Within the woodlands area it was generally observed that the areas north of the existing footpath was of made ground to 1.50m depth (WS09) and potentially deeper. In contrast, within the areas south of the footpath, no made ground materials were found. Boreholes (WS07, WS08, WS10) in this area encountered natural soils below topsoil.

5.1.3 Glaciofluvial Deposits

Directly underlying the Topsoil/ Made Ground material interpreted as the Glaciofluvial Deposits was encountered. This was recovered as a loose to medium dense brown variably silty slightly gravelly sand. Within WS02 a layer of dark brownish black gravelly peat was observed between 2.80m and 4.50.

It should be noted that Glaciofluvial Deposits in WS07 was recovered as a firm grey mottled orange very silt sandy clay to 3.0m depth with interbeds of small sand lenses overlying the sands observed within other borehole locations.

5.2 Groundwater

Groundwater was encountered at 3.47m within WS01. All other locations were dry. However, it should be noted that the sand in WS07 and WS10 at 4.0m and 3.0m depth, respectively were observed wet.

5.3 Physical Evidence of Contamination

With the exception of PID readings within wells WS01 and WS02, which were measured after the intrusive investigation, recording 6.3ppmV and 4.0ppmV respectively, there was no palpable evidence of contamination, waste or putrefiable material encountered in any of the sampling locations, including any visual or olfactory evidence of hydrocarbon staining.

5.4 Laboratory Analysis – Soil

A laboratory analysis testing schedule is presented as Table 1 and all environmental sample results obtained from the laboratory are included as Appendix H. The key results of laboratory testing on environmental soil samples are summarised below.

Contaminant	No. of Samples	No of Detections	Range of Detections (mg/kg)		Highest Location & Depth (m bgl)
			Min	Max	
Arsenic	6	6	0.9	6.7	WS07 (1.5-1.8)
Cadmium	6	2	0.1	0.2	WS02 (3.5-3.8)
Chromium	6	6	4.5	18	WS07 (1.5-1.8)
Copper	6	6	3.5	44	WS02 (3.5-3.8)
Lead	6	6	3.4	68	WS02 (3.5-3.8)
Mercury	6	2	0.25	0.47	WS08 (0.4-0.8)
Nickel	6	6	4.2	30	WS07 (1.5-1.8)
Selenium	6	1	0.5		WS02 (3.5-3.8)
Zinc	6	6	16	170	WS02 (3.5-3.8)
Naphthalene	6	0	-		-
Benzo[a]pyrene	6	0	-		-
Dibenz(ah)anthracene	6	0	-		-
Phenols	3	1	0.4		WS02 (3.5-3.8)
BTEX	6	0	-		-
TPH CWG	9	0	-		-
Asbestos (%)	6	0	-		-

Notes:	-	Contaminant not found above laboratory detection limits	PAH	Polycyclic Aromatic Hydrocarbons
	BTEX	Benzene, Toluene, Ethylbenzene, Xylenes		
	TPH CWG	Total Petroleum Hydrocarbons (Criteria Working Group)		

5.5 Waste Analysis

Waste classification (i.e. hazardous or non-hazardous) was undertaken on samples of both Made Ground and natural soils, which included total concentrations of metals and hydrocarbons, using computer software provided by HazWaste Online™. The results of the WAC analysis are included within Appendix H and the outputs from the software are included in a Waste Classification Report in Appendix I.

Waste Acceptance Criteria was subsequently undertaken on one sample of Topsoil/ Made Ground and two samples of natural superficial deposits. These results, together with those of the waste classification above are summarised in the following table:

Strata	Typical Depth (m bgl) and Description	Is it Hazardous? (number of hazardous samples)	Waste Acceptance Criteria	Appropriate Landfill
Made Ground	0.0 - 1.0- Brown silty sand with brick, glass and sandstone fragments.	No (0 of 4)	Passes criteria for inert landfill*	NON-HAZARDOUS*
Glaciofluvial Deposits	0.3 - >5.0 - brown variably silty gravelly sand and silty sandy clay.	No (0 of 4)	Passes criteria for inert landfill	INERT

Based on the above the Made Ground can be classified as **NON-HAZARDOUS**, under the waste code **17 05 04** and the Glaciofluvial Deposits are classified as **INERT** for the purposes of off-site disposal, under the waste code **17 05 04**.

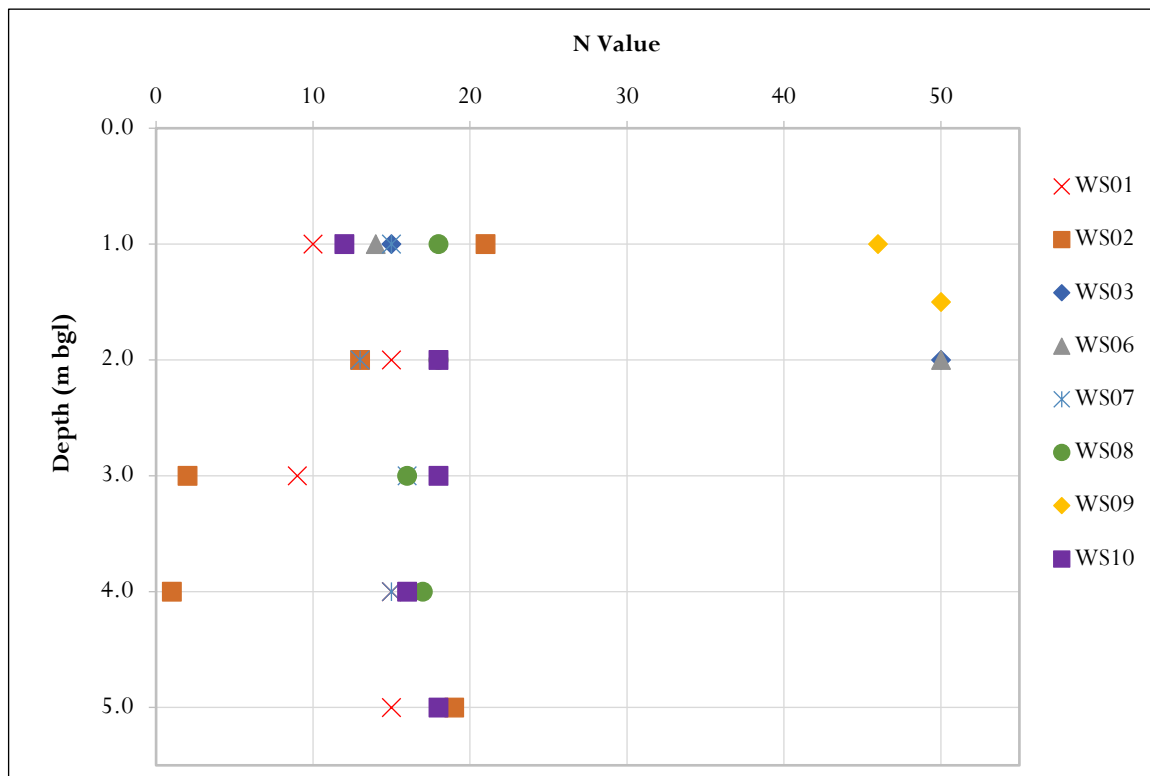
*It should be noted that the sample of Made Ground passed inert WAC criteria. However, as these are not naturally occurring soils, they may not be suitable for disposal at an inert waste facility. The final decision on the classification of soils should be subject to agreement with the waste haulier or landfill/waste disposal facility. Further assessment to refine the classification of soils is always recommended once the potential waste streams are confirmed.

For Made Ground present, although the soil sampling process did not identify potentially hazardous concentrations of Asbestos Containing Material (ACM) within the soil, it must be acknowledged that the material may exist within areas which were not sampled or accessible during the investigation. Any visually identifiable fragments of ACM can invalidate any non-hazardous waste classification, as such, the above waste classifications are made on the proviso that any visually identifiable fragments of ACM are removed from the material prior to its disposal off-site. The subsequent ACM must then be disposed of in accordance with the Control of Asbestos Regulations 2012.

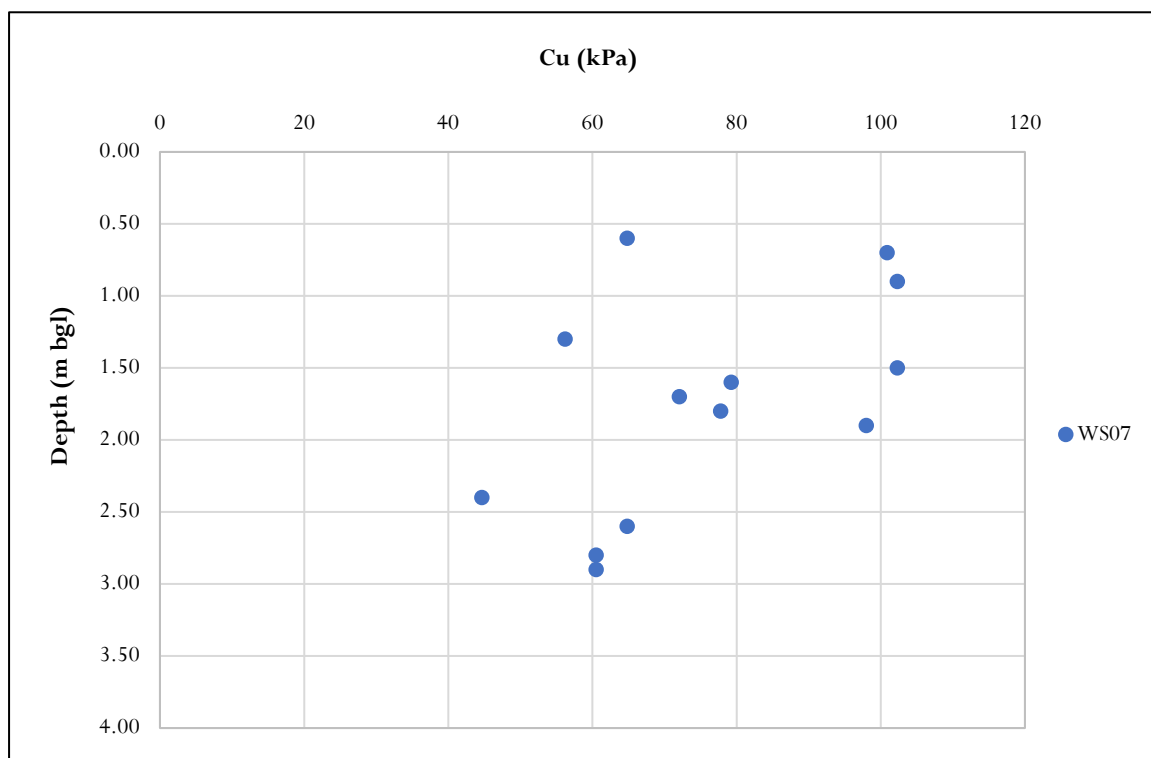
5.6 Geotechnical Testing

5.6.1 In-Situ Geotechnical Testing

The results of in-situ geotechnical testing are summarised in the graph below.



The Glaciofluvial Deposits are consistent in strength throughout all locations except for WS02 where N-values are very low between 3.0m and 4.0m reflecting the peat encountered.



5.6.2 Laboratory Geotechnical Testing

The results of geotechnical laboratory testing are summarised in the table below and all geotechnical sample results obtained from the laboratory are included as Appendix J. The key results of laboratory testing on geotechnical soil samples are summarised below.

Strata	Range of Parameters									
	Moisture Content (%)		Plasticity Index (%)		Particle Size Distribution (%)					
					Fines		Sand		Gravel	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Glaciofluvial Deposits	9.7	22	4 (4)	20 (20)	7	84	16	93	1	4

Note: (-) Modified plasticity index

Moisture contents and Atterberg Limit was established for three samples of Glaciofluvial Deposits in accordance with BS1377.

The particle size distribution was established for six samples of the Glaciofluvial Deposits in accordance with BS1377: Part 2:1990, clause 9.2.

Sulphate contents and pH values determinations were carried out by the analytical laboratory, the results of which are included in Appendix H and summarised in section 6.7.

A laboratory analysis testing schedule is presented as Table 1.

6 GEOTECHNICAL APPRAISAL

The ground conditions have been found to be quite variable, comprising a notable thickness of Made Ground typically underlain by superficial Glaciofluvial Deposits, although organic soils were recorded in one borehole to the east of the site. The development is understood to comprise of the demolition and reconstruction of the kiosk shop, areas of car parking and retaining walls.

6.1 Geotechnical Category

Geotechnical Category (BS EN 1997-1:2004)	Definition
GC1	Geotechnical Category 1 (GC1) should only include small and relatively simple structures for which it is possible to ensure that the fundamental requirements will be satisfied on the basis of experience and qualitative geotechnical investigations with negligible risk in terms of overall stability or ground movements and in ground conditions which are known.
GC2	Geotechnical Category 2 (GC2) should include conventional types of structure and foundation with no exceptional risk or difficult or loading conditions. Designs for structures in Geotechnical Category 2 should normally include quantitative geotechnical data and analysis.
GC3	Geotechnical Category 3 (GC3) should include structures or parts of structures, which fall outside the limits of Geotechnical Categories 1 and 2. This may include very large or unusual structures, structures involving abnormal risks, or unusual or exceptionally difficult ground or loading conditions, or structures in areas of probable site instability or persistent ground movements that require separate investigation or special measures.

The proposed development comprises the redevelopment of the petrol station with associated car parking and the construction of a retaining wall, and therefore the below assessment has been undertaken in accordance with Geotechnical Category 2 (GC2), including conventional types of structure and foundation with no exceptional risk or difficult ground or loading conditions, as defined by BS EN 1997-1:2004.

6.2 Structural Foundations

As detailed above, the development is understood to comprise the demolition and reconstruction of the kiosk shop with associated car park to the west and retaining wall. The ground conditions are not likely suitable for conventional spread foundations due to the thickness (2.8m) and variable strength of the made ground.

Furthermore, a part of the proposed kiosk shop is located in an area where there is a fall in ground level (approximately 3.0m-4.0m), it is assumed this will be infilled before the construction phase. Taking this into account, it is considered unlikely that spread foundations will be appropriate and an alternative solution, such as piles is recommended.

6.2.1 Piles

As discussed above, a piled foundation solution might prove a more suitable alternative to shallow foundation for the proposed kiosk shop.

Piles will and carry their loads in a combination of end bearing and skin friction. It would be unwise to assume any positive contribution to skin friction within the Made Ground.

In view of the wide variety of piles sizes available, and the range of installation plant and techniques, the design of the piles should be carried out by and remain the responsibility of the specialist piling contractor, who will reflect their own methods, experience, and design procedures within their proposals. Importantly, the presence of in-ground obstructions in many of the boreholes must also be taken in to account and pre-probing of pile locations may well be required.

A deep borehole is likely to be required for pile design and given the presence of Made Ground, with limited contamination, a piling works risk assessment may also be required. It should be noted that the thickness of the superficial Glaciofluvial Deposits is currently unproven and the depth to the underlying bedrock (Pennine Middle Coal Measures) has not been established and this will be an important consideration in pile design.

6.3 Retaining Structures

The development proposals are understood to include the construction of a new retaining wall on the southern boundary.

Suggested design parameters for retaining structures are provided in the table below.

Strata	Bulk Density (kN/m ³)	Angle of Shearing Resistance (°)	Cohesion (c' kPa)
Made Ground	17	22	0
Glaciofluvial Deposits	18	30	0

6.4 Ground Floor Construction

Given that Made Ground is present across the site to depths of greater than 2.0m and the near surface soils having low to high volume change potential, suspended ground floor slabs are recommended for the site, incorporating a sub-floor void suitable for a medium volume change potential soil.

6.5 Pavement Design

In total, three laboratory CBR testing was undertaken, two on the sands and one of the clays from the Glaciofluvial Deposits. The CBR values of the sands range from 16% - 26% and the clays at 1.6% - 1.8%.

Therefore, is it considered that in areas where the Glaciofluvial sands are likely to form the subgrade a design CBR value of 15% is considered suitable. However, in areas where the Glaciofluvial clays are likely to form the subgrade a design CBR value of only 2% can be recommended. In addition,

much of the subgrade may well comprise made ground, for which a CBR value of 2% would again be appropriate.

Given the variability of the recommended CBR values, additional in-situ CBR testing could be undertaken if required to further refine areas where the various recommended values might be appropriate.

Once the formation level for the new pavement has been achieved, proof rolling should be carried out using a heavy roller, and any soft or loose areas revealed should be excavated and a greater depth of sub-base provided.

Exposed subgrades will likely deteriorate rapidly on exposure to wet weather and should be shaped to shed water. Subbase should be placed as soon as possible to minimise the exposure of the subgrade to adverse weather conditions.

6.6 Drainage

Falling head infiltration testing was undertaken twice in WS01 and once in WS07. These tests were undertaken to give an indication of the infiltration potential of the underlying soils.

Borehole	Indicative Infiltration Rate(m/s)		Depth of Test (mbgl)	Strata
WS01	Test 1	1.37×10^{-7}	4.17	Glaciofluvial Deposits
	Test 2	2.12×10^{-7}		
WS07	Test 1	1.39×10^{-8}	2.36	Glaciofluvial Deposits

Based on the above results, both WS01 and WS07 exhibited poor infiltration rates, therefore infiltration drainage is not considered suitable. It should also be noted that soakaways on a Petrol Filling Station are not recommended as it promotes the migration of contaminants in the subsurface.

6.7 Groundworks

Given the nature of the ground conditions encountered, the unsupported stability of all but the shallowest of excavations must not be relied upon.

Heavy plant and stockpiles of materials should not be permitted close to the edges of unsupported excavations. Further reference may be made to CIRIA Report No. 97 '*Trenching Practice*' 1992.

On the basis of the findings of the ground investigation, significant quantities of groundwater are unlikely to be encountered within shallow excavations for foundations or drainage. The tank farm excavation is likely to be deeper and in WS01 wet soils were noted during drilling, as a result, some groundwater may be encountered in deeper tank farm excavations.

6.8 Concrete Grade

Sulphate contents and pH values determinations were carried out for the natural material by the analytical laboratory, the results of which are also included within Appendix H. Results for concrete grade are summarised within the following table:

Strata	Water Soluble Sulphate (mg/l SO ₄)		pH	
	Min	Max	Min	Max
Made Ground	63		5.7	10.9
Glaciofluvial Deposits	43	75	6.2	8.1

In accordance with Part 1 of the BRE Special Digest 1 '*Concrete in Aggressive Ground*' 2005, the mean of the highest two water soluble sulphate values has been used. This gives a Design Sulphate Class (DS) of DS-1 with an aggressive chemical environment for concrete (ACEC) of AC-1.

7 ENVIRONMENTAL APPRAISAL

The following section outlines the approach applied to assessing the risks posed to human health and controlled waters, then identifies any sample results found by this investigation which warrant further consideration. In accordance with the Environment Agency's Land Contamination: Risk Management, this section represents the second tier of Stage 1, the Generic Quantitative Risk Assessment.

7.1 Human Health

7.1.1 Land Use Setting

It is understood that development proposals for the site includes redevelopment of the petrol station with associated car parking including EV bays and the construction of a retaining wall, the existing areas of soft landscaping will be maintained or reduced as a result. In order to screen laboratory data for concentrations of contaminants in soil with potential to cause harm to human health in these soft landscaped areas, relevant generic screening values most applicable to this land use have been utilised. A land use setting of Commercial, has been adopted as it is considered the most representative.

The technical framework used to derive DEFRA's Category 4 Screening Levels (Policy Companion Document '*SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination*') outlines the relevant factors for determining land use selection in the application of the screening levels and the following key considerations have been taken into account.

7.1.2 Generic Screening – Soils

The technical framework used to derive the assessment criteria and the documents in which they are published are summarised as follows:

- *EA Science Reports* (SC050021/SR2, SC050021/SR3, and SC050021/SR7)
- *EA Soil Guideline Value Science Reports*
- *Suitable For Use Levels (S4ULs) for Human Health Risk Assessment* – LQM and CIEH (2015)
- *Soil Generic Assessment Criteria for Human Health Risk Assessment* - EIC/AGS/CL:AIRE (2010)

Category 4 Screening Levels (C4SLs) provide generic suitable for use screening values for common contaminants in a variety of land uses and are also utilised as appropriate generic screening criteria.

Where assessment of the risk to human health from asbestos in soil is concerned there is no nationally recognised suitable for use /generic screening value commonly referred to through the planning system. Due to this, it is necessary to take a more qualitative approach to the risks posed to future site users from asbestos on a site-specific basis.

A summary of the screening criteria and the methodology used to derive them is included in Appendix K.

7.1.3 Assessment of Results- Human Health

The results of the screening process for on-site human receptors showed that generic screening criteria representative of risks to future site users were not exceeded for any contaminant at any location.

7.2 Controlled Waters

7.2.1 Generic Screening

In addition to screening the recorded concentrations of contaminants to pose risks to human health, EPS has also screened the results of soil analysis for potential to cause harm to water resources.

The criteria used for this process were derived by EPS using the following technical guidance

- *Environment Agency Remedial Targets Methodology: Hydrogeological Risk Assessment for Land Contamination.*

Primary Receptor Associated with Site	Basis of Tier 1 Criteria
Groundwater	UK Drinking Water Standards (UKDWS)
Surface Water	UK Environmental Quality Standards (EQS)

The site is underlain by Secondary A Aquifer. In the absence of surface water in close proximity of the site the primary receptor associated with the site is groundwater. As such, groundwater screening criteria have been selected in the assessment of risks to water resource receptors.

7.2.2 Generic Screening – Groundwater

The technical framework used to derive the assessment criteria and the documents in which they are published are summarised as follows:

- *EA Science Reports* (SC050021/SR2, SC050021/SR3, and SC050021/SR7)
- *EA Soil Guideline Value Science Reports*
- *Suitable For Use Levels (S4ULs) for Human Health Risk Assessment* – LQM and CIEH (2015)
- *Soil Generic Assessment Criteria for Human Health Risk Assessment* - EIC/AGS/CL:AIRE (2010)
- *The VOCs Handbook. Investigating, assessing and managing risks from inhalation of VOCs at land affected by contamination (C682), CIRIA, London 2009*
- *Society of Brownfield Risk Assessment (SoBRA) 'Development of Generic Assessment Criteria for Assessing Vapour Risks to Human Health from Volatile Contaminants in Groundwater' - Version 1.0, February 2017*

SoBRA groundwater vapour GAC were derived for two types of land uses, namely generic residential and generic commercial land use. They are intended as a conservative screening tool in the assessment for long-term (chronic) risks to human health from inhalation of vapours arising from

groundwater. For other land uses (public open space, and allotment), these typically do not include building and as such pathway of vapour intrusion is generally not recognised.

7.2.3 Assessment of Results - Controlled Waters

The screening process has shown that screening criteria representative of suitability of soil concentrations as applicable to controlled waters have not been exceeded.

7.3 Conclusions and Recommendations

This investigation comprised the drilling of 11 window sampler boreholes to a maximum depth of 5.00m, which has recorded Made Ground across the property to a maximum depth of 2.80m. The underlying natural geology has been recorded as Glaciofluvial Deposits which are variable in nature, although a significant thickness of made ground has been recorded in some areas and organic soils have also been encountered.

Laboratory analysis of shallow soils sampled from across the site has identified that the adopted screening criteria protective of future site users have not been exceeded by any contaminants of concern.

Whilst the soils were noted to be wet from around 3m to 4m in a number of the boreholes, no evidence of hydrocarbon impacts was identified within the field or laboratory analysis. Given the absence of any evidence of contamination and the nature of the ground conditions encountered during the investigation it is not considered plausible that the site or proposed development poses any appreciable risk to controlled waters.

In the context of potentially unacceptable or acceptable risks as outlined within the Environment Agency's *Land Contamination: Risk Management* guidance (LC:RM, 2020), the risks identified by this work can be addressed through implementation of the following recommendations.

Overall, the site is considered to at low risk in relation to contaminated land, with no further works or remedial measures recommended. A number of precautionary measures have been recommended to ensure safe development, as follows:

Precautionary measures are also recommended to ensure safe development, as follows:

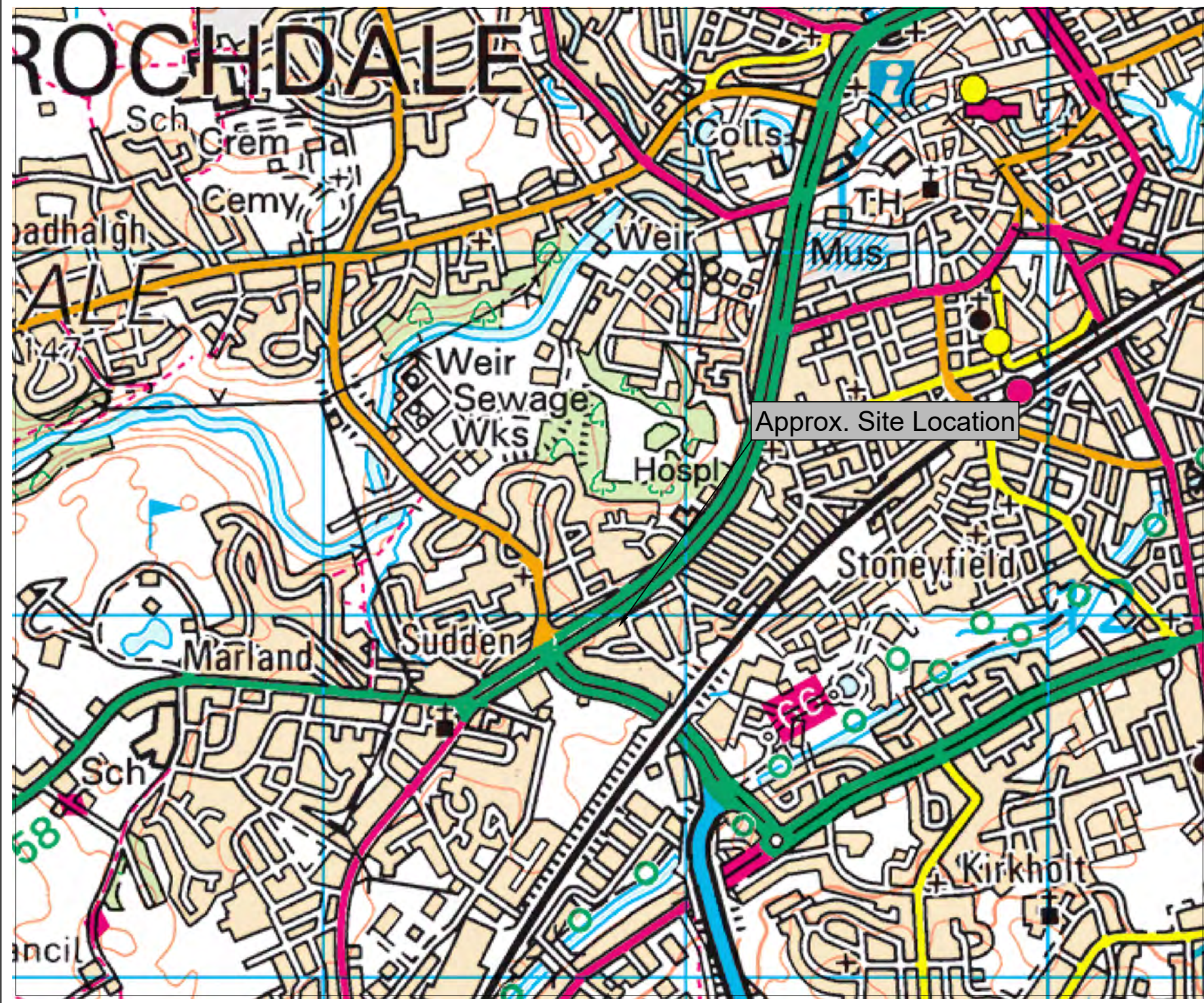
- a) All construction workers operating at the site should be advised of the potential for contact with Made Ground material within shallow soils, particularly beneath the existing buildings and hardstanding. Appropriate health and safety precautions should be adopted during any excavation works to avoid exposure to infilled soils. Reference should be made to relevant health & safety guidance including the following CIRIA document: *R132 Guide to Safe Working on Contaminated Sites*.
- b) Although the findings of the investigation would suggest that significant quantities of asbestos are unlikely to be encountered, the possibility of discrete pockets of this material existing within the Made Ground remains. If any evidence of visually identifiable ACM is suspected and is to be disturbed during the site development it is recommended that all works are postponed until suitable assessment and control measures (including a Working Method Statement (WMS)) are

created. This WMS should be in accordance with guidance from CIRIA as well as the CL:AIRE /Joint Industry Working Group industry guidance on Interpretation for Managing and Working with Asbestos in Soil and Construction and Demolition Materials (2016).

- c) Should any palpable evidence of unexpected contamination be encountered during the redevelopment work, it should be reported to EPS so that an inspection can be made and appropriate sampling and assessment work carried out, a method statement for this is provided as Appendix L.

It is recommended that a copy of this report be provided to the Environmental Health Department of Rochdale Borough Council so that the information may be incorporated into their land quality records and used to support the current planning application. This report should satisfy the pre-commencement requirements of the planning process relating to contamination.

FIGURES



Approx. Site Location

Rev	Date	Drawn	Description	CHK'd



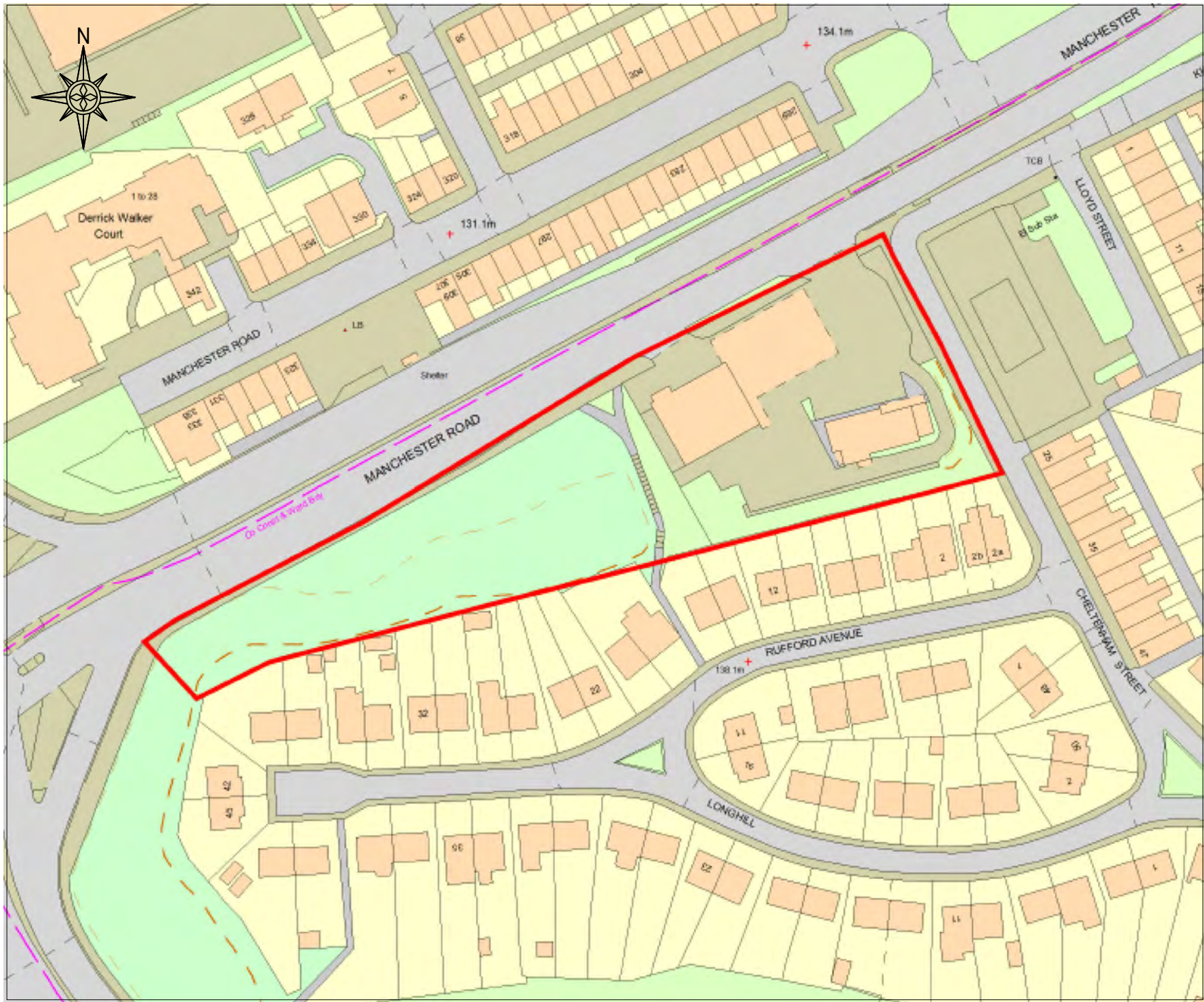
The Geotechnical and Environmental Engineers
www.epstrategies.co.uk

Site
Manchester Road, Sudden,
Rochdale

Client
Euro Garages

Title
Figure 1 - Site Location Plan

Surveyed by	JP	Drawn by	JP
Checked by	LA	Date	04/04/23
Scale	(M4 Sheet) Drawing Reference		
NTS	UK23.6426_001		
Job No	UK23.6426		Rev 0



KEY:

— SITE BOUNDARY

Rev	Date	Drawn	Description	CHK'd



The Geotechnical and Environmental Engineers
www.epstrategies.co.uk

Site

Manchester Road, Sudden, Rochdale

Client

Euro Garages

Title

Figure 2 - Current Site Layout

Surveyed:	N/A	Drawn by:	JP
Checked by:	LA	Date:	04/04/23
Scale:	(A4 Sheet)	Drawing Reference:	
NTS	UK23.6426_002		
Job No	UK23.6426	Rev	0



KEY:
 SITE BOUNDARY

Rev	Date	Drawn	Description	CHK'd



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www.epstrategies.co.uk

Site
 Manchester Road, Sudden,
 Rochdale

Client
 Euro Garages

Title
 Figure 3 - Aerial Photograph

Surveyed:	N/A	Drawn by:	JP
Checked by:	LA	Date:	04/04/23

Scale	(A4 Sheet)	Drawing Reference
NTS		UK23.6426_003

Job No	Rev
UK23.6426	0



KEY:

— SITE BOUNDARY



EPS WINDOW SAMPLE BOREHOLE

Rev	Date	Drawn	Description	Chk'd



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Site

Manchester Road, Sudden,
Rochdale

Client

Euro Garages

Title	Figure 4 - Borehole Location Plan
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Surveyed by:	JP	Drawn by:	JP
Checked by:	LA	Date:	04/05/23

Scale	[A4 Sheet]	Drawing Reference
NTS		UK23.6426_004

Job No	UK23.6426	Rev	0
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TABLES

Table 1 – Laboratory Testing Schedule (Environmental)

Sample ID	Sample Depth (mbgl)	EPS Waste Suite	EPS TPH Suite	DETS Spectrum	pH and Water Soluble Sulphate
WS01 ES1	1.4-1.6	-	-	X	-
WS01 ES2	1.9-2.3	-	-	-	-
WS02 ES1	0.8-1.0	X	X	-	-
WS02 ES2	3.5-3.8	-	-	X	-
WS04 ES1	0.2-0.4	-	-	X	-
WS05 ES1	0.5-0.8	-	X	-	X
WS06 ES1	1.2-1.5	-	X	-	X
WS07 ES1	3.7-4.0	-	-	-	X
WS07 ES2	1.5-1.8	X	-	-	-
WS08 ES1	0.4-0.8	X	-	-	X

Notes:

mbgl

X

-

DETS Spectrum

EPS TPH Suite

EPS Waste Suite

meters below ground level

Sample Taken

Sample Not Analysed

Metals, PAHs, TPH, BTEX

Total Petroleum Hydrocarbons, MTBE

Waste Characterisation Suite, Inert WAC, Metals, PAHs, TPH, BTEX, MTBE, Asbestos

Table 2 – Laboratory Testing Schedule (Geotechnical)

Sample ID	Sample Depth (mbgl)	Moisture Content	Liquid / Plastic Limits	Particle Size Distribution (PSD)	California Bearing Ratio (CBR)
WS07 B1	0.3-1.3	-	-	-	X
WS07 D1	1.8-2.0	X	X	X	-
WS07 D2	2.0-2.3	-	-	-	-
WS07 D3	3.5-3.7	X	X	X	-
WS07 D4	2.5-2.8	-	-	X	-
WS08 D1	0.8-1.0	X	X	-	-
WS08 B1	1.1-2.1	-	-	-	X
WS08 D2	2.8-3.0	-	-	X	-
WS10 B1	0.2-1.2	-	-	-	X
WS10 D1	1.8-2.1	X	X	-	-

Notes:

mbgl

X

-

meters below ground level

Sample Taken

Sample Not Analysed

APPENDICES

APPENDIX A

Selected Site Photographs

Photo 1: Photograph of material recovered from WS01.



Photo 2: Photograph of peat recovered from WS03.



Photo 3: Photograph of concrete found at the base of borehole within WS03.



Photo 4: Photograph of Made Ground materials within WS06.



Photo 5: Photograph of clay soils recovered from WS07.



Photo 6: Photograph of passageway into woodlands from the most western side.

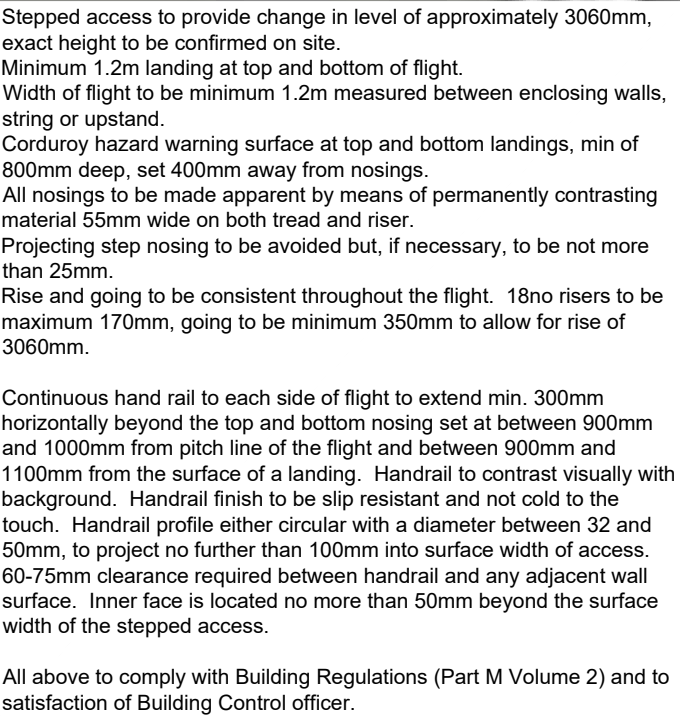


APPENDIX B

Proposed Development Plan



100



B	21.03.23 EY ARRANGEMENT UPDATED
A	20.03.23 EY NUMBER AND LOCATION UPDATED BUILDING SQUARED OFF FOLLOWING CLIENT COMMENTS
REVISIONS A	
CLIENT	EURO GARAGES LTD
PROJECT	MANCHESTER ROAD ROCHDALE OL11 3PT
TITLE	FEASIBILITY
DATE	05.03.22
SCALE	1:250 @ A1
JOB ID	1809
DWG	8b

APPENDIX C

Surrounding Land Use



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- ### General

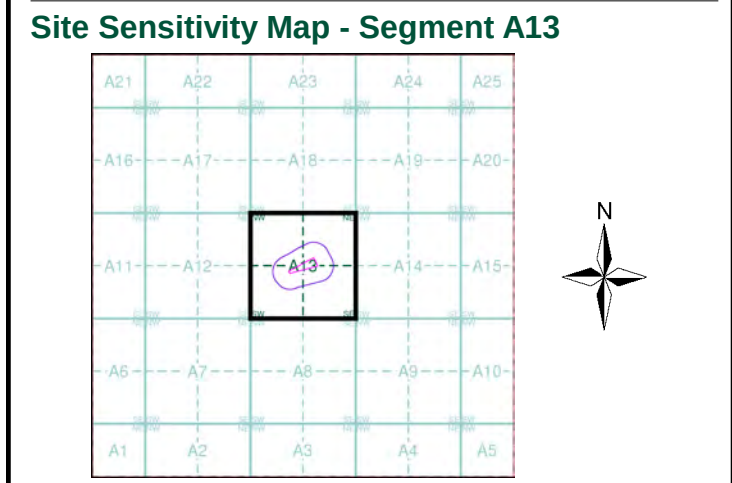
 - Specified Site
 - Specified Buffer(s)
 - Bearing Reference Point
 - Map ID
 - Several of Type at Location
 - Pylon
 - Overhead Transmission Line
- ### Agency and Hydrological

 - 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 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
 - Potentially Infilled Land (Non-water)
 - Potentially Infilled Land (Non-water)
 - Potentially Infilled Land (Non-water)
 - Potentially Infilled Land (Water)
 - Potentially Infilled Land (Water)
 - Potentially Infilled Land (Water)
 - 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

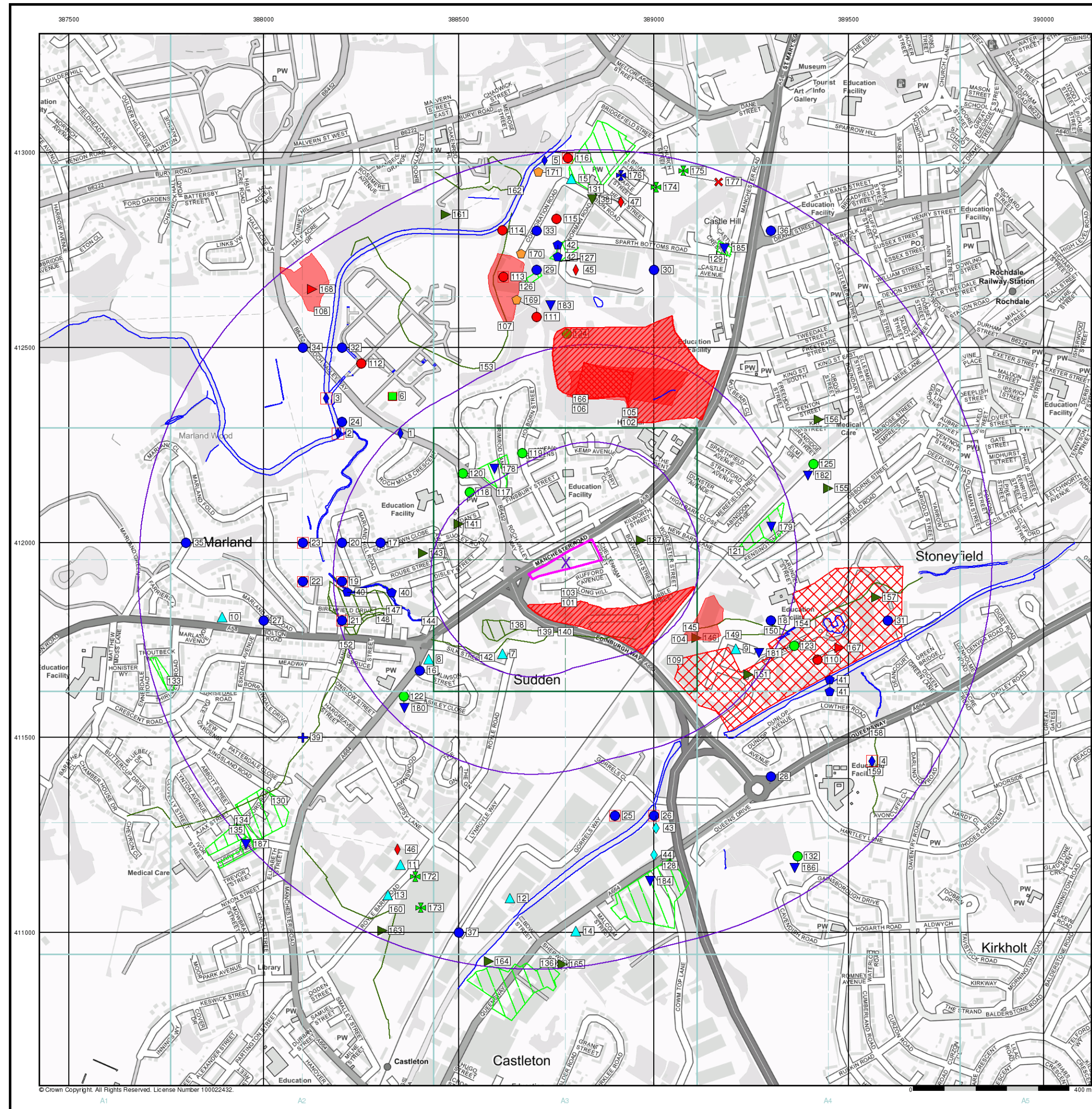


Order Details

Order Number: 309538152_1_1
Customer Ref: UK23.6426
National Grid Reference: 388780, 411950
Slice: A
Site Area (Ha): 0.68
Plot Buffer (m): 100

Site Details

EG Manchester Road, Sudden, Rochdale, OL11 3PT



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- ### General

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

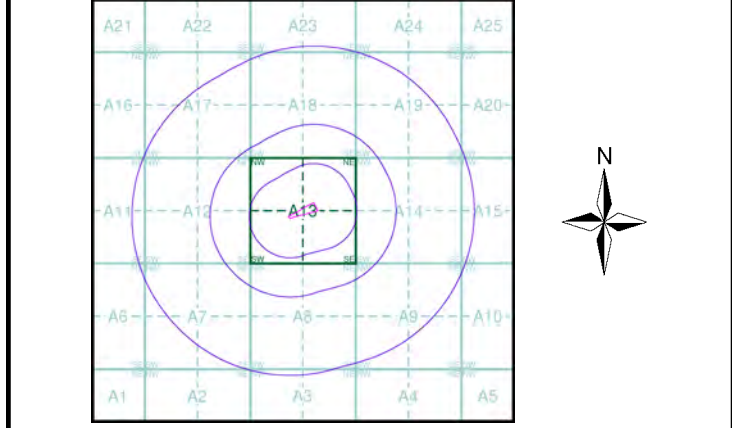
 - Contaminated Land Register Entry or Notice (Location)
 - Contaminated Land Register Entry or Notice
 - Discharge Consent
 - Enforcement or Prohibition Notice
 - Integrated Pollution Control
 - Integrated Pollution Prevention Control
 - Local Authority Integrated Pollution Prevention and Control
 - Local Authority Pollution Prevention and Control Enforcement
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- ### Waste

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 - EA Historic Landfill (Polygon)
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 - Potentially Infilled Land (Non-water)
 - Potentially Infilled Land (Water)
 - Potentially Infilled Land (Water)
 - Potentially Infilled Land (Water)
 - 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
 - BGS Recorded Mineral Site
- ### Geological

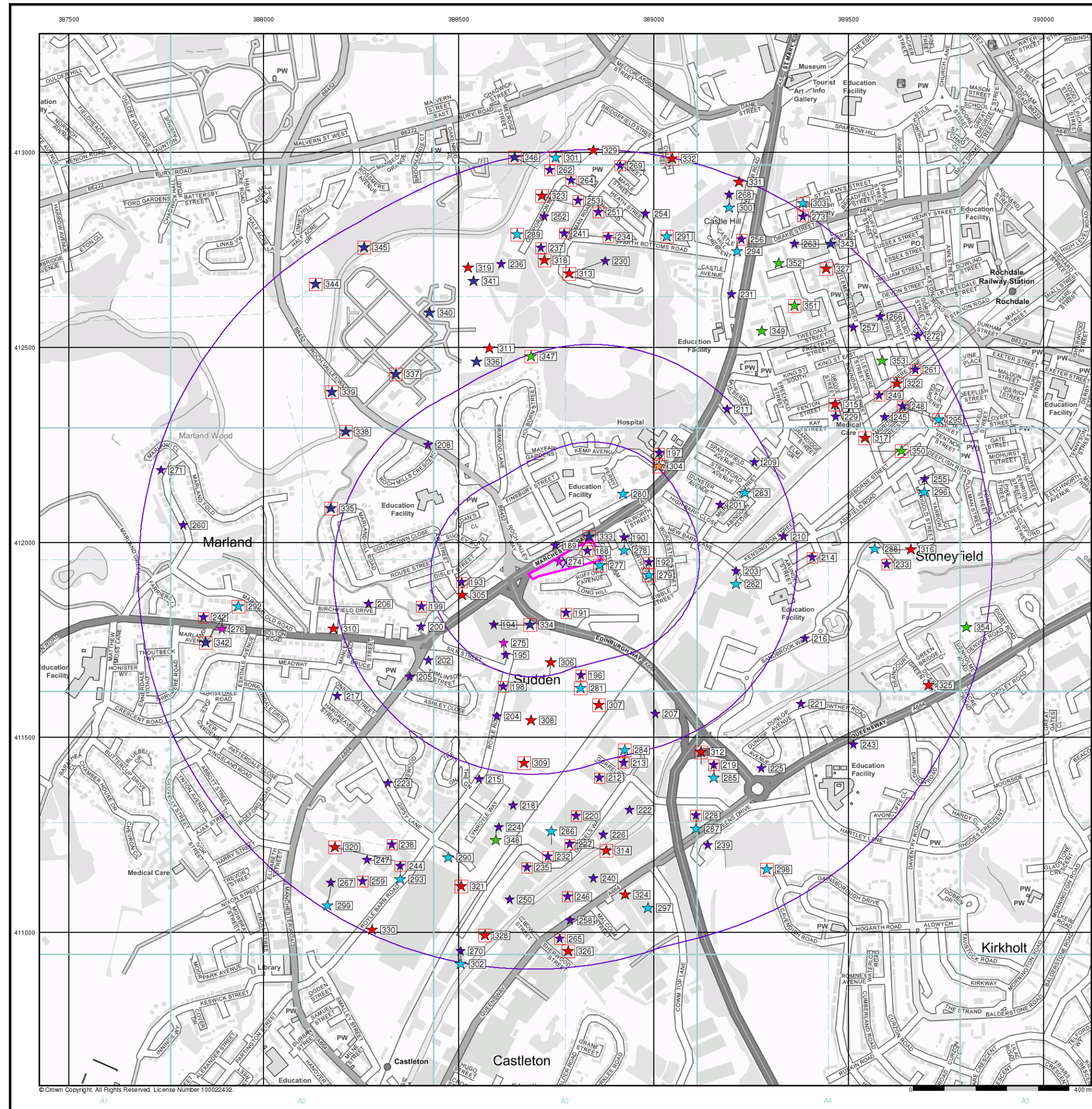
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Site Sensitivity Map - Slice A



Order Details
Order Number: 309538152_1_1
Customer Ref: UK23.6426
National Grid Reference: 388780, 411950
Slice: A
Site Area (Ha): 0.68
Search Buffer (m): 1000

Site Details
EG Manchester Road, Sudden, Rochdale, OL11 3PT



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Industrial Land Use Map

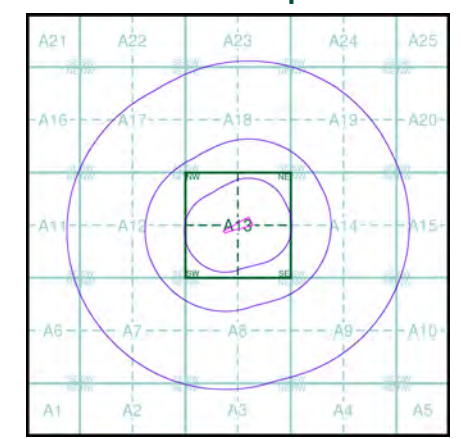
General

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

Industrial Land Use

- Contemporary Trade Directory Entry
- Fuel Station Entry
- Gas Pipeline
- Points of Interest - Commercial Services
- Points of Interest - Education and Health
- Points of Interest - Manufacturing and Production
- Points of Interest - Public Infrastructure
- Points of Interest - Recreational and Environmental
- Underground Electrical Cables

Industrial Land Use Map - Slice A



Order Details

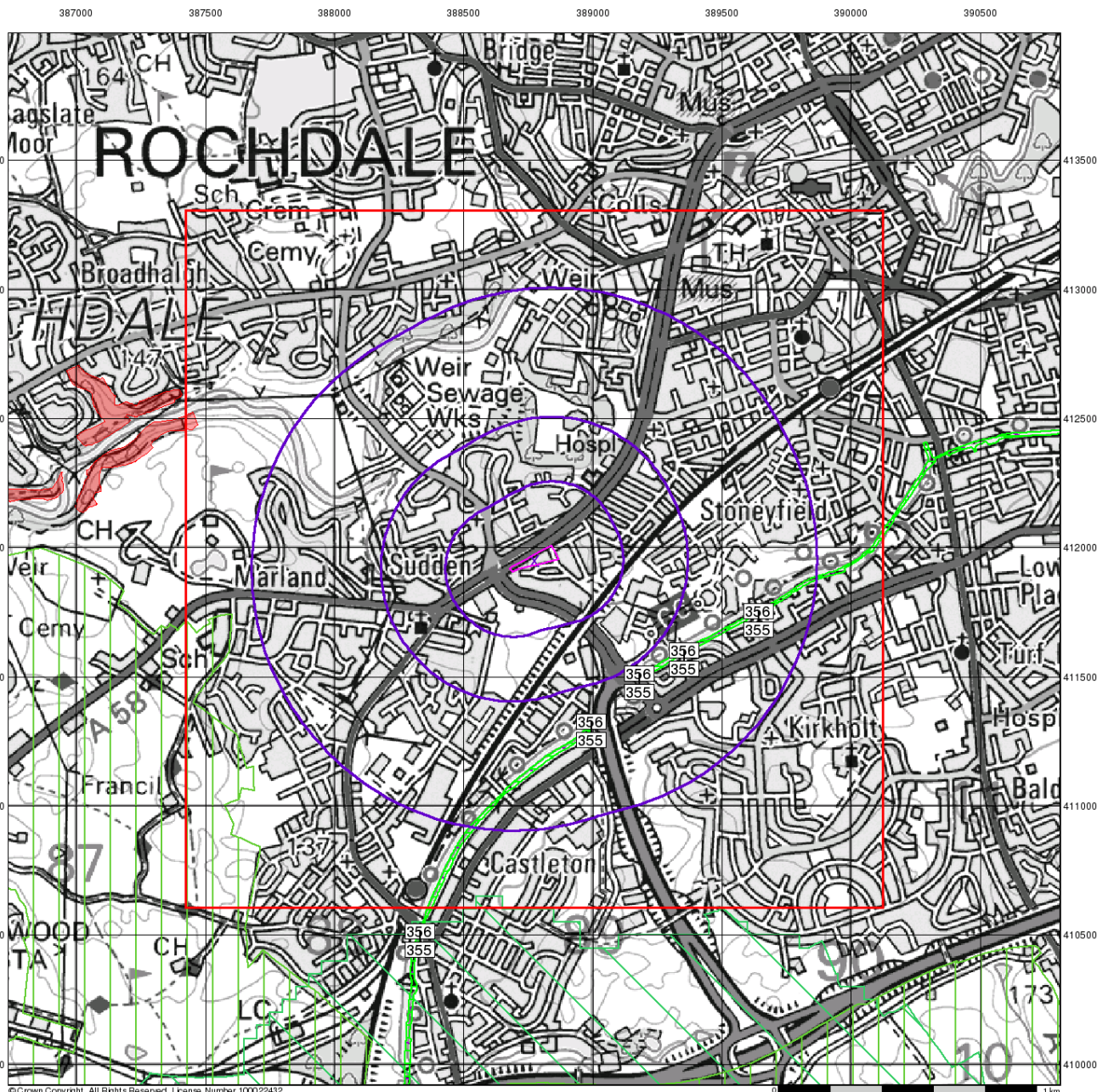
Order Number: 309538152_1_1
Customer Ref: UK23.6426
National Grid Reference: 388780, 411950
Slice: A
Site Area (Ha): 0.68
Search Buffer (m): 1000

Site Details

EG Manchester Road, Sudden, Rochdale, OL11 3PT

Landmark
INFORMATION GROUP

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



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Sensitive Land Uses

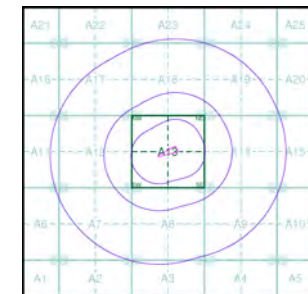
General

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

Sensitive Land Uses

- Ancient Woodland
- 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
- World Heritage Sites

Site Sensitivity Context Map - Slice A



Order Details

Order Number: 309538152_1_1
 Customer Ref: UK23.6426
 National Grid Reference: 388780, 411950
 Slice: A
 Site Area (Ha): 0.68
 Search Buffer (m): 1000

Site Details

EG Manchester Road, Sudden, Rochdale, OL11 3PT