

4.5. Reservoir Flood Risk

The EA's 'Flood Risk Map from reservoirs', shown in Figure 7, does not identify the Site as an area at risk of flooding from reservoirs in either the dry-day or wet-day scenarios.

Reservoirs may flood in the event of a dam collapse, resulting in the release of a significantly large volume of water, however, reservoirs in the UK have an excellent safety record and the probability of such an event is considered extremely low.

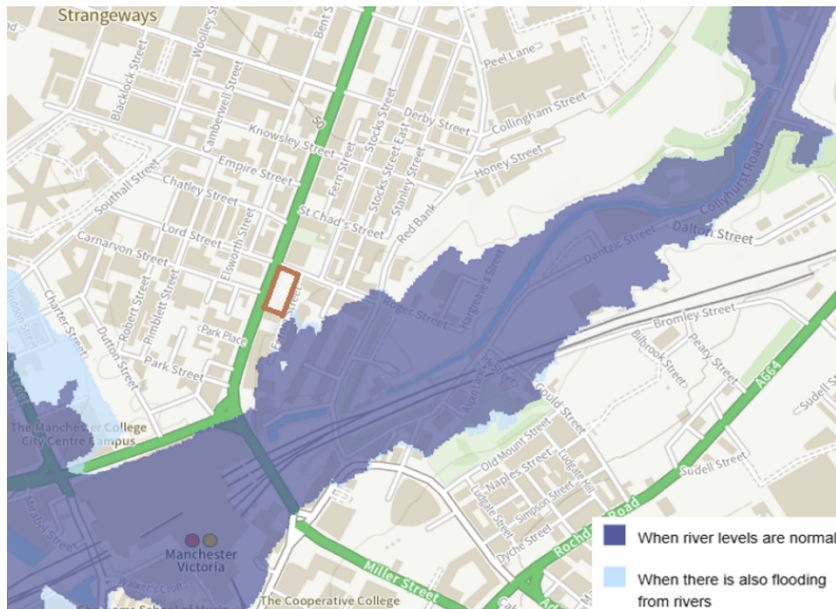


Figure 7: Flood Risk Map from reservoirs

4.6. Canals Flood Risk

In comparison to rivers, canals are generally less susceptible to significant changes in water level due to rainfall. The Rochdale Canal is located approximately 1.3km from the site and based on this distance, the risk of flooding from canals is considered to be extremely low.

4.7. Sewer Flood Risk

Sewers may also flood due to exceeded capacity or blockages outside of major storm events. No data on the site's existing flood risk from sewers, including any historic records of sewer flood events, have been found as part of this Flood Risk Assessment. Data will be required from United Utilities to confirm this risk.

The surrounding sewers are presumed to be adopted assets maintained by the statutory undertaker (United Utilities). No recorded incidents of flooding of these assets have been found. It is presumed that the risk of sewer flooding is very low provided United Utilities carry out their responsibilities to monitor and regularly maintain these assets.

4.8. Impacts of Climate Change

Climate change is anticipated to increase rainfall intensities, and the effects of urban creep may have impacts on how water flows throughout the catchment to which the development belongs. As such, the fluvial and surface water flood risk to the development can be expected to also rise throughout its lifetime.

Without further site-specific 2D hydraulic modelling, these effects cannot be fully assessed, however, given the existing very low risk of flooding, there are not anticipated to be significant impacts on the future flood risk to the development.

4.9. Summary of Flood Risk

From the evidence collated and subsequent negotiations, the flood risk for the proposed development can be summarised as follows:

- Tidal/Fluvial (Rivers and Sea) – Very low risk
- Pluvial (Surface Water) – Low risk
- Reservoir – Very low risk
- Canals – Extremely low risk
- Public Sewers – To be confirmed by UU, presumed low risk
- Groundwater - Low risk (to be confirmed by site investigation)

5. Drainage Strategy

5.1. Surface Water Management

5.1.1. Pre-Development Runoff

The Site currently consists of a mixture of positively drained hard standings, soft landscaping and made ground. The hard standings within the site are estimated to have an area of approximately 0.13ha, resulting in an existing run-off rate of approximately 18l/s (assuming a rainfall intensity of 50mm/hr). The extents of the hard standings which are positively drained to the local sewerage network could not be determined with the existing survey data

5.1.2. Post-Development Runoff and Attenuation

In accordance with the requirements of The Places for Everyone Joint Development Plan, it is proposed that the site will be restricted to the equivalent greenfield run-off rate, which is defined as the Qbar value for the development site by DEFRA publication National Standards for Sustainable Drainage Systems.

The equivalent greenfield run-off rate has been calculated to be 5.6l/s using the FEH Statistical Method. All surface water run-off from the development shall be restricted to the greenfield run-off rate with all excess rainwater being contained within the site demise for storm events up to the 1 in 100 year plus 45% allowance for climate change.

In restricting the flows from the development site, there will be a requirement to provide attenuation to accommodate flows up to the 1 in 100-year event with a climate change allowance of 45%. The purpose of the attenuation is to maintain operation on the system during the 1 in 1-year, 1 in 30-year and the 1 in 100-year (plus climate change) storm events.

The required volume of attenuation has been calculated to be approximately 110m³ using the quick storage estimate function in Flow software.

5.1.3. Drainage Hierarchy Points of Discharge

The NPPF Planning Practice Guidance Paragraph 080 states that:

“Generally, the aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable:

1. *into the ground (infiltration);*
2. *to a surface water body;*

3. *to a surface water sewer, highway drain, or another drainage system;*
4. *to a combined sewer.”*

Infiltration Potential of Sustainable Drainage Systems (SuDS)

Whilst the feasibility of infiltration as a means of discharge should be explored through infiltration testing to BRE Digest 365 and suitable risk assessments, the use of infiltration will require the agreement of the Local Highway Authority due to the proximity of the proposed SuDS components to the public highway.

It is noted that Building Regulations 2010 Approved Document H (Drainage and Waste Disposal) states in paragraph 3.25:

‘Infiltration drainage is not always possible. Infiltration devices should not be built:

- a. *within 5m of a building or road or in areas of unstable land’*

Acceptance of the use of infiltration by the Local Highway Authority is therefore deemed unlikely.

Additionally, the ground investigation carried out by Enzygo in March and April 2019 confirmed that the site is generally underlain by made ground overlying till deposits. The investigation found no evidence of ground contamination. However, due to the low infiltration capacity of till, infiltration has been ruled out as a viable method for surface water disposal.

Water Body

The nearest water body is the River Irk which is circa 300m away from the proposed development. Disposal of surface water via discharge to a water body is not deemed feasible due to the distance to the water body and the constraints imposed by crossing third-party land ownerships.

Surface Water Sewer

There are no known surface water sewers close to the development as per the existing drainage system discussed in Section 2.5. Disposal via surface water sewers is currently deemed to not be feasible pending confirmation via CCTV survey.

Combined Sewer

There are several combined water sewers surrounding the development and it is likely this will be the only feasible discharge option for the development based on the results of additional surveys.

The current strategy is designed on the basis that discharge will be to the

combined water sewer running along Fernie Street as a conservative scenario.

5.2. Surface Water Drainage Design

In order to restrict surface water run-off from the development site to the equivalent greenfield run-off rate, on-site storage will be required to accommodate excess run-off. Due to the dense development layout and levels constraints the use of open SUDS features such as swales and basins is not considered to be feasible.

Within the current design, it is anticipated that storage will be provided by an attenuation storage tank provided by proprietary geo-cellular systems) specified to attenuate stormwater runoff from storms with larger return periods prior to discharging into the existing combined sewer. The tanks will be located within the building footprint below the basement slab.

Runoff will be restricted to a rate of 5.6L/s upstream of the outfall from site, which allows the system to surcharge and utilise the attenuation storage

5.3. Foul Water Drainage Strategy

The proposed foul water drainage network is to be a separate piped gravity network that conveys foul water flows from the proposed building within the development to the public combined sewer, and shall be designed in accordance with:

- BS EN 752:2008 (Drain and sewer systems outside buildings)
- Sewers for Adoption (7th Edition)
- Technical Guidance to the National Planning Policy Framework document (Department for Communities and Local Government, March 2012)
- BS EN 12056-2:2000 (Drainage systems inside buildings)
- Building Regulations Approved Document H, Drainage and waste disposal. (Office of the Deputy Prime Minister, December 2010)

No drainage pipes will be less than 100mm in diameter, and the design will ensure all velocities are over 0.75 m/s. Adequate access will be provided to ensure that maintenance activity can be carried out. Foul water drainage will be conveyed via a new below-ground pipe network and discharged from the site to the existing combined sewer located in the northeastern corner of the site.

It is proposed that the foul water from the development will discharge to the United Utilities combined water sewer in Fernie Street. There may be the option to re-use existing connections to the public combined sewer, subject to their condition,

location, and depth.

An assessment of the potential re-use of any existing sewers will require examinations of the outputs from a CCTV drainage survey

A Pre-Development enquiry has been issued to United Utilities to confirm in principle, accepting to discharge foul water from the site into the sewer at an unrestricted rate.

Any connection to the public sewer is subject to formal agreement with United Utilities under Section 106 of the Water Industry Act 1991.

The site drainage proposals are shown on the Drainage Strategy drawing in Appendix F.

6. Conclusion

This technical note has discussed drainage and flood risk information relating to proposed development of the existing site located at Lord Street, Manchester. Proposals include the erection of a residential multi-storey tower block.

In its present form, the site is deemed to lie in Flood Zone 1 and does not require a Flood Risk Assessment under current guidelines published in the National Planning Policy Framework 2024, Manchester Core Strategy 2012 and Addendum to Manchester Core Strategy 2024.

The existing flood risk to the Site is at very low risk from fluvial and tidal flooding. The large majority of the site is deemed to be at very low risk of flooding from pluvial (surface water) sources, with small sections of the surrounding streets at low risk. Groundwater flooding is deemed to be low risk as per the ground investigation report. All other sources of flooding, including reservoirs, are deemed very low risk. Climate change is anticipated to exacerbate occurrences of flooding and result in a heightened flood risk to the site in future, however, this is not deemed to be significantly different to the current flood risk.

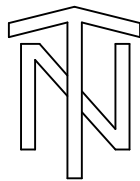
In the outline drainage strategy for the Site, SuDs components such as infiltration are not deemed to be feasible due to the proximity to the public highway. Attenuation for surface water run-off is to be provided via a geo-cellular attenuation tank. The proposed surface water outfall is the public combined sewer, as other discharge options are not deemed feasible at present due to the site's location and underlying ground conditions. The outfall to the public combined sewer will be subject to agreement with the Lead Local Flood Authority (LLFA) and United Utilities, the statutory undertaker for the sewer.

Foul water flows will be conveyed using a traditional piped gravity system, discharging to the public combined sewer. This connection is additionally subject to approval from United Utilities under S106 of the Water Industry Act 1991.

Overall, the site is deemed to have a low overall flood risk, which is to be mitigated as part of the proposed development. Furthermore, the development is not expected to have a detrimental impact on wider flood risk in the area and is anticipated to reduce flood risk within the immediate vicinity owing to the restriction of existing discharge rates to greenfield rates.

Appendix A: Proposed Development – Site Layout

Appendix B: Topographical Survey



Appendix C: Geo-Environmental Report



Geo-environmental Report

One Lord Street, Manchester

Beaumont Morgan Developments Ltd.

Report No. SHF.258.002.GE.R.01

Contact Details:

Enzygo Geo-environmental Ltd.
3 Hardman Square
Manchester
M3 3EB

tel: 01454 269237
email: david.frayne@enzygo.com
www: enzygo.com

Geo-environmental Report

Project:	SHF.258.002.GE.R.01
For:	Beaumont Morgan Developments Ltd.
Status:	Final
Date:	May 2019
Author:	Nick Brook- BSc (Hons) , FGS . Geo-Environmental Engineer
Reviewer:	David Oliver Frayne - BSc (hons.) , FGS , C.Geol , UKROGEP , Associate Director

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Enzygo Limited Registered in England No. 6525159 Registered Office Stag House Chipping Wotton-Under-Edge Gloucestershire GL12 7AD

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1.0 INTRODUCTION

1.1 Background

1.1.1 Enzygo Geoenvironmental Limited [Enzygo] has been commissioned by Beaumont Morgan Developments Ltd. [the Client] to prepare a Geo-environmental Report, for a proposed high-rise development located at 1 Lord Street, Manchester, M4 4EW.

1.2 Proposed Development

1.2.1 We understand that the site is proposed to be developed across the full plot with a single 192 residential unit building. The development contains an under-croft carpark. It is highlighted for the purposes of this report that this car park will form a continual reinforced concrete barrier across the entire footprint of the development plot and that there are no proposed 'soft landscaping' areas. The development is shown on the 'Proposed Development Layout' presented in the appendices to this report.

1.3 Objectives

1.3.1 The objectives of the study are to:

- Review any available ground investigation data;
- Undertake a targeted ground investigation;
- Provide a factual and interpretative report relating to the site investigation;
- Benchmark the contamination status of the site;
- Provide a conceptual model and recommendations on any potential development issues and mitigation/remedial measures, where appropriate;
- Provide geotechnical recommendations in relation to foundations and infrastructure.

1.4 Risk Classification

1.4.1 Enzygo has utilised the available information, together with our experience to assess the likely risks to development from land quality issues. Definitions of the risk terms used are provided on the following table.

Table 1.4.1 Risk Classification

Risk	Description
Negligible	No contamination risk has been identified which is likely to affect development.
Low	No significant contaminated land risks have been encountered affecting development and a low risk that remediation will be required.
Low-Moderate	There are unlikely to be significant contaminated land issue associated with the site which will adversely affect its re-development. However, minor or localised contamination may be present requiring remediation. Remediation should be possible under a discovery strategy and with a call out service.
Moderate	Some potential contaminated land risks have been encountered or identified which may affect re- development. The risks identified are unlikely to affect the entire site or preclude development. Remediation is considered feasible as part of the development process and no further investigation is considered necessary.
Moderate-High	Some potentially significant contaminated land risks have been identified at the property that requires remediation. It is recommended that a separate remedial methodology is prepared supported by a site-specific risk assessment
High	Significant potential contaminated land risks have been identified and remediation is required supported by further intrusive ground investigation, risk assessment and remedial design.

1.4.2 Where adverse risks from ground instability are identified these are discussed within the report.

2.0 SITE SETTING

Table 2.0 Site Description

Item	Description
Site Address	1 Lord Street, Manchester, M4 4EW
National Grid Reference	SJ 841, 994
Site Area	0.15 Ha

2.1 Current Site Description

- 2.1.1 The following description has been compiled from an inspection of the site undertaken in by an experienced Enzygo geo-environmental consultant.
- 2.1.2 At the time of the inspection, the site comprised of one existing warehouse building, which has access to both Cheetham Hill Road and Fernie Street, positioned within the south-eastern corner of the site. A much more dilapidated structure [skeletal frame] is also present in the north east corner of the site.
- 2.1.3 The site is currently used as a material storage area for another development site located along Fernie Street.
- 2.1.4 The main site access is through a gate located off Fernie Street. The site boundaries typically consist of fencing/hording, however; as Cheetham hill is positioned some 3m higher than Fernie Street this boundary is effectively a retaining structure.
- 2.1.5 The sites' topography is generally level, with a slight fall towards the south.
- 2.1.6 There were no fuel tanks, drums or fly-tipped waste observed on the site.

2.2 Surrounding Area

- 2.2.1 Land uses surrounding the site are summarised as follows:

Table 2.2.1 Land Use Surrounding the Area

Direction	Land Use
North	Commercial.
East	Residential property.
South	Residential property.
West	Residential property.

3.0 SITE SETTING

3.1 Historical Maps

3.1.1 A review of historical Ordnance Survey maps and information pertinent to the site and within a 250m radius is summarised below:

Table 3.1.1 Historical Maps

Potentially Contaminative Historical Land Use		
Map Edition	Site	Surrounding Area
1848 - 1850	Site marked as open ground / field.	Cheethan Hill Road [York Street], is present indicated in its' current day alignment, adjacent to the north and west of the site. Beyond this are terraced houses. Immediately east and north are open fields / land. A print works, brick field and tannery are all noted approximately within 250m [>200m from site] all located to the south and west.
1882 - 1893	Site indicated to be developed with unknown buildings [suspected terraced housing].	The surrounding area has seen significant development typically in residential properties and infrastructure. Lord street and Fernies street are now developed into current day alignments. Carriage works noted 250m south west of site. Church and burial grounds now noted approximately 200m north.
1894 - 1896	No significant changes.	No significant changes.
1908 - 1909	No significant changes.	School now marked 50m north. 'Spring and axel works' noted 250-300m south east of site.
1922 - 1938	No significant changes.	No significant changes.
1949 - 1952	Row of building adjoining Fernie Street are no longer present and a 'school' is now marked in their place. One of the buildings adjoining Cheetham Hill Road is now marked as an 'inn'.	Unknown 'tank' indicated 100m south east. 'Spring and axel works' extended now, 150m south east of site. Two other 'works' (oil and shoe repair) are marked approximately 200m east of the site.
1958 - 1963	Only three buildings [northern corner] and the school remain marked on mapping for the site.	Spring and Axel works now just marked 'works'.
1966	No significant changes.	Few additional 'works' and 'warehouses' now marked within 200-250m of site in all directions.
1972-1981	No significant changes.	No significant changes.
1980 - 1987	No significant changes.	No significant changes.
1986-1994	No significant changes.	No significant changes.

3.1.2 The majority of the significant historical land uses are likely to be positioned too far from the development site to pose a significant risk. Nevertheless, 'tanks', 'works' and 'warehouses' have been noted within 250m of the site. Therefore, historical land uses may pose a risk of contamination inc. asbestos and metals from construction materials on site.

3.1.3 There is a low risk for ground gas generation as no identifiable potential sources within 250m of site were noted.

3.1.4 No other significant risks are identified

4.0 ENVIRONMENTAL SETTING

4.1 Ground Conditions

4.1.1 The British Geological Survey (BGS) indicates that the site is underlain by the following geological sequence:

Table 4.1.1 Geological Sequence

Geological Unit	Type	Descriptions	Aquifer Classification
Drift	Glacial Till	Clay	Unproductive
Solid	Chester Bed Formation	Sandstone	Principal

4.1.2 No Made Ground is identified on or adjacent to the site by the BGS. However, given the historical development on site this is anticipated to be encountered.

4.1.3 There are a number of BGS borehole records available nearby; the closest is located approximately 25m north and east. These confirm the near surface anticipated geology beneath the site.

4.2 Coal Mining

4.2.1 The site is not within an area of potential coal mining.

4.3 Non-Coal Mining and Cavities

4.3.1 No significant risk from non-coal mining workings are identified.

4.3.2 No non-coal mining cavities are identified within 1000m of the site.

4.4 Hydrology

4.4.1 The nearest surface watercourses is the River Irk located 300m south east of the site.

4.4.2 The risk of flooding from rivers and the sea is described as 'Very Low'.

5.0 PRELIMINARY ASSESSMENT

5.1 General

5.1.1 The preliminary desk-based information is used together with professional judgement and experience to identify potential risks such that the ground investigation can be targeted following the principles of British Standard BS10175.

5.2 Industry Profiles

5.2.1 A number of Industry Profiles have been published by the Department of the Environment which gives information on the type of activities which can occur on these types of site. They are not intended as a check list against which to undertake an investigation but are a source of supplementary information only. The pre-ample to the industry profiles advises the reader that they must use professional judgement and assess sites specifically when considering the profiles., which Enzygo have employed when assessing this site.

5.3 Assessment

5.3.1 The risk source at the site from historical uses is predominantly associated with Made Ground from site re-development including asbestos fibres and metals.

5.3.2 It is possible that Made Ground may exist elsewhere across the site, which can include metals and Polycyclic Aromatic Hydrocarbons (PAH) associated with inclusions such as ash and clinker.

5.3.3 The risk identified above will be re-evaluated after the site investigation works in accordance with good practice.

5.4 Preliminary Conceptual Model

5.4.1 Based on the information obtained the following Preliminary Conceptual Model has been prepared:

Table 5.4.1 Preliminary Conceptual Model

Source	Location	Exposure Pathway	Potential Receptor	Probability of Exposure	Details
Human Health					
Asbestos, hydrocarbons and metals	On-site	Ingestion, dermal and inhalation	Construction Workers	Dismissed	Normal construction PPE will address risk under CDM.
			Site users	Negligible	No significant source identified.
Asbestos, hydrocarbons and metals	Unforeseen contamination	Ingestion, dermal and inhalation	Construction Workers	Dismissed	Normal construction PPE will address risk under CDM.
			Site users	Negligible	No significant source identified. However, petrol station within 100m of development.
Hydrocarbon and metals	Migration from off-site source	Ingestion, dermal and inhalation	Construction Workers	Dismissed	Normal construction PPE will address risk under CDM.
			Site users	Dismissed	No source identified.
Ground Gas		Inhalation & Explosive	Construction Workers	Negligible	Normal construction PPE will address risk under CDM.

	Migration from off-site source		Site users	Negligible	likely to be infilled land identified within 250m of the site, however; given distance and age the risk is negligible.
Groundwater					
Hydrocarbon and metals	Potential spillage on site	Vertical Migration	Groundwater	Negligible	Any fuel tanks used on site to be bunded and spill kits available, etc. Soils are of low permeability and superficial geology is of mixed permeability.
Surface Water					
Hydrocarbon and metals	Potential spillage on site	Horizontal Migration	River Network	Dismissed	No receptor identified.
Environmental Receptors					
On-site contaminants		Ingestion dermal and inhalation	Ecology	Dismissed	No sensitive ecology designation.
		Direct	Archaeology	Dismissed	None present.
		Direct	Geology	Dismissed	None present.
		Phytotoxic	Woodland	Dismissed	None present.
		Phytotoxic	Crops	Dismissed	None present.
		Ingestion dermal and inhalation	Livestock	Dismissed	None present.
Building Services					
On site contaminants		Direct	Historic Buildings	Dismissed	No receptors.
		Direct	Proposed Buildings	Dismissed	No sources identified.
		Permeate into pipework	Water Pipes	Dismissed	No sources identified.

5.4.2 Preliminary Conceptual Model has identified potential risks associated with unforeseen contamination, such as inclusions within potential Made Ground and historic residential usage. There is an existing petrol station within 100m of the proposed site.

5.4.3 There is a potential risk of ground gas; however, this risk is considered to be minimal as there is unlikely to be any significant putrescible material.

5.4.4 The ground investigation will include a standard suite of contamination tests and ground gas monitoring.

6.0 SITE INVESTIGATION

6.1 Investigation Rational

- 6.1.1 British Standards BS10175:2011 and A1:2013 provides guidance on the design of site investigations for potentially contaminated sites. The guidance is provided for a range of sites varying from relatively low risk brownfield schemes such as light industrial uses to high risk sites such as Manufactured Gas Works.
- 6.1.2 British Standards BS10175:2011 and A1:2013 advocates that the investigation works is undertaken in consecutive stages with an assessment of the data being undertaken at the end of each stage and prior to further works being designed and implemented. These stages are:
- 6.1.3 Preliminary investigation (Desk Study) to identify potential risks and receptors;
- 6.1.4 Main investigation to locate and investigate the areas of potential risk identified from the preliminary investigation. Typically, a sampling density of 20m to 25m is used and there is a recognition that this stage of investigation may be undertaken prior to demolition of the site thereby hampering the extent and location of exploratory holes;
- 6.1.5 The main investigation is then followed, where appropriate, by supplementary investigations to delineate contamination hotspots so that remediation can be designed to address only those areas where a risk is identified.
- 6.1.6 There is an expectation that the British Standard will apply professional judgement and will understand that the scope of investigation works is to achieve an objective relating to risk and the proposed development, with the development itself potentially providing elements of remediation.

6.2 General

- 6.2.1 Two phases of ground investigation was undertaken by Enzygo on the 29th March 2019 and 9th – 15th April 2019, which comprised of six dynamic [windowless] sampling holes, three cable percussive with rotary follow on exploratory holes. The locations of exploratory holes are presented on Drawing Ref: SHF.258.002.GE.DR.001. The exploratory holes were all positioned within the footprint of the proposed development. The position and number are considered to satisfy current UK guidance requirements as outlined above, as any further positions cannot be accommodated under the existing site constraints.

6.3 Site Works

- 6.3.1 Typically, exploratory holes were advanced within the footprint of the proposed development. Exploratory holes were located within areas where access could be gained safely. However, three of the proposed dynamic sampling holes (WS2, WS3 and WS5) could not be completed due to access constraints. WS2 the current ceiling height is too low, and WS3 and WS4 could not penetrate the existing ground slab. It should be noted that exploratory holes BH02 and BH03 could not be advanced through the very dense layer of sandstone cobbles encountered into competent bedrock. A change in casing to ODEX was attempted, and are BH02 was re-drilled, however, this ultimately proved unsuccessful.
- 6.3.2 Strength of soils were assessed using Standard Penetration Tests (SPT). The results of which are included on the exploratory hole logs presented in Appendix 3.

6.3.3 Representative soil samples were collected for chemical and geotechnical testing. Soil samples destined for chemical analysis were collected in appropriate containers provided by the analytical laboratory. Samples were stored in cool boxes prior to dispatch to the laboratory for analysis. All samples were collected using appropriate sampling equipment that was cleaned at each sampling location.

6.3.4 Generally, samples were collected from Made Ground, which may contain potential inclusions of contaminating materials and also materials displaying evidence of potential contamination.

6.3.5 In the absence of any evidence of contamination samples were collected near surface as this material is more likely to be contaminated by surface spillages and also will potentially be in contact with future residents, in accordance with BS10175.

6.4 Laboratory Testing

6.4.1 Samples for geotechnical testing were sent to the laboratories of PSL Ltd, which is UKAS accredited, for the following analysis:

- Classification Testing [soil];
- Moisture Content, and;
- Soluble sulphate and pH.

6.4.2 Samples for chemical analysis were sent to the same Envirolab laboratories who are NAMAS and MCERTS accredited. Samples were tested for the CLEA metal suite, pH, sulphate, cyanide, phenols, speciated Polycyclic Aromatic Hydrocarbons (PAH), organic carbon, banded Total Petroleum Hydrocarbon (TPH-CWG), VOC suite and asbestos screen.

6.4.3 Sample analysis was based on historical uses of the site and also visual and olfactory evidence of contamination in accordance with BS10175.

7.0 GROUND AND GROUNDWATER CONDITIONS

7.1 Summary of Ground and Groundwater Conditions

7.1.1 Ground and groundwater conditions have been assessed by Enzygo using the available data and are summarised with the following table:

Table 7.1.1: Ground and groundwater conditions

Strata	Summary Description	Thickness (m)
Made Ground	Concrete (WS01, WS04 & WS06)	0.20
	Tarmac (BH02 & BH03)	0.15
	Black, red, brown Sand. Inclusions of brick and ash noted	0.1 – 2.3
	Firm/Stiff brown Clay (BH02 & BH03: perhaps reworked natural)	0.6 - 1.95
Glacial Till	Firm to Stiff brown slightly sandy gravelly Clay. Gravel generally described as angular to sub-rounded fine to coarse quartz and sandstone. Sand noted as fine to coarse. Horizons of medium dense to dense Silt/Sand were encountered up to 6.7m in thickness.	18.2 [max.]
Completely weathered Rock [Chester Bed Formation]	Very Dense reddish-brown Cobble of Sandstone and quartzite and / or a gravelly coarse Sand. Gravel of angular sandstone and quartz.	7.9 [max.]
Rockhead [Chester Bed Formation]	Reddish brown, moderately strong Sandstone	7.1m [max. BH01 ONLY]
Groundwater.	Encountered in BH01 and WS1	19.5m begl [BH01], and 4.5m begl and 6.1m begl [WS01].

7.1.2 Details of the ground and groundwater conditions encountered are given on the exploratory hole records included in Appendix 3 and are summarised in further detail in the sections below:

7.2 Made Ground

7.2.1 Made Ground was encountered in all exploratory holes and typically comprised concrete or tarmac surfacing over red, brown, black sand within inclusion of part and whole brick. Firm to stiff Clay was encountered in BH02 and BH03, but this is anticipated to be re-worked natural materials [Glacial Till].

7.2.2 This is typical, associated with the sites historical development.

7.3 Glacial Till

7.3.1 Generally, this was encountered as a firm to very stiff slightly sandy gravelly Clay, however; horizons of medium dense to very dense Sand/Silt were encountered up to 7.9m in thickness.

7.3.2 These natural materials were encountered as anticipated, indicated on the available BGS mapping.

7.4 Chester Bed Formation

7.4.1 A 'completely weathered horizon' was encountered above competent rockhead described as either dense to very dense horizon of sandstone / quartz cobbles or a dense to very dense gravelly Sand proven up to 7.9m in thickness.

7.4.2 Moderately strong reddish-brown medium grained Sandstone was encountered below this proven to a maximum depth of 31.2m begl in BH01.

7.5 Visual and Olfactory Evidence of Contamination

7.5.1 No visual or olfactory evidence of contamination was encountered during the Ground Investigation works.

7.6 Soil Strength

7.6.1 Within the soils SPT N-values ranged between 17 and >50 and show an increase with depth. These results confirm the materials' engineering description.

7.7 Groundwater

7.7.1 Groundwater was encountered during the site works at varying levels and may be assumed to potentially be perched waters. Subsequent groundwater monitoring results are presented within the appendices and summarised within the table below.

Table 7.7.1: Groundwater Monitoring

Exploratory Hole	Depth m(begl)					
	25/4	10/5	16/5	23/5	6/6	10/6
WS3	3.26	3.3	3.1	3.3	3.1	3.01
BH01	13.18	13.16	13.15	13.18	3.18	3.28

7.8 Ground Gas

7.8.1 Results of the ground gas monitoring visits are presented within the appendices to this report and are summarised and presented within the below.

Table 7.8.1: Gas Monitoring Results

Exploratory Hole	Atmos. pressure (Mb)	Flow (l/hr)	CH ₄		CO ₂		O ₂
			Concentration (%)	GSV (l/hr)	Concentration (%)	GSV (l/hr)	Concentration (%)
10.06.19							
WS1	1019	0.0	0.0	0.0	0.1	0.0	20.7
BH1	1019	0.0	0.1	0.0	2.0	0.0	17.9
06.06.19							
WS1	1008	0.0	0.1	0.0	0.4	0.0	16.1
BH1	1008	0.0	0.1	0.0	3.3	0.0	16.1
23.05.19							
WS1	1017	0.0	0.0	0.0	0.3	0.0	20.9
BH1	1017	0.0	0.0	0.0	0.0	0.0	20.7
16.05.19							
WS1	1028	0.0	0.1	0.0	0.4	0.0	20.9
BH1	1028	0.0	0.0	0.0	2.0	0.0	16.0

10.05.19							
WS1	1009	0.0	0.0	0.0	0.0	0.0	20.6
BH1	1009	0.0	0.0	0.0	0.0	0.0	20.7
25.04.19							
WS1	996	0.0	0.0	0.0	0.1	0.0	20.6
BH1	996	0.0	0.0	0.0	0.3	0.0	20.7

7.8.2 Where gas concentrations exceed 1% by volume methane or 5% by volume carbon dioxide the concentrations are coloured yellow. If concentrations are lower the values are coloured green. Where gas flux meets characteristic situation 1 the GSV is coloured green. The GSV is coloured yellow for Characteristic Situation 2 and red for Characteristic Situation 3 and above.

8.0 CONTAMINATION ASSESSMENT

8.1 General

8.1.1 A Tier I risk assessment has been undertaken using available and current screening values for human health and where appropriate controlled waters. The risk assessment is undertaken based on the findings of the preliminary conceptual model presented in Section 6. Based on the contamination testing and Tier I assessment a revised Conceptual Model has been prepared, which is presented later in this section.

8.1.2 Where significant risks are identified remedial measures are recommended.

8.2 Human Health

8.2.1 Assessment of the risks to human health has been undertaken by comparing the soil quality data with reference values obtained from the Contaminated Land Exposure Assessment (CLEA), Soil Guideline Values (SGV) and General Acceptance Criteria (GAC) published by LQM/CIEH. The LQM/CIEH S4ULs values are used and summary tables of the reference values are included in Appendix 6.

8.2.2 Where an exceedance is identified the risk is assessed by considering the sensitivity of the proposed development and the potential pathway. The proposed development is for residential therefore the GAC values for residential use without plant up-take are considered suitable.

8.2.3 Results of the chemical testing from the investigations are included in Appendix 5.

8.3 Assessment

8.3.1 No exceedances of the GAC values [Residential without plant uptake] were recorded for the testing undertaken, except for one soil sample taken from WS4 at a depth of 0.5m begl., for the following determinants and concentrations;

- WS04 @ 0.5m begl: Lead recorded at 553 mg/kg

8.3.2 However, this identified exceedance does not pose a residual risk to site end uses. This is because the proposed development includes a reinforced concrete [ground floor] slab across the entire development footprint [at car park level]. Therefore, no complete S-P-R linkages can be identified because potential pathways from the identified contaminant above to the end-user are broken. Therefore, in accordance with current published guidance there are no remaining residual contamination risks. It should also be noted that proposed development ground level is approximately 500mm lower than current levels on Fernie Street, this combined with the usual a site strip is anticipated to remove approximately 800-1000mm of material across the entire site regardless.

8.3.3 No asbestos was detected.

8.4 Ground Gas

8.4.1 Following the guidance provided in CIRIA C665 an initial assessment is undertaken to determine if there are any significant sources of potential ground gas. Such sources include landfills, organic clays and made ground incorporating putrescible materials such as rags, paper and wood. Where no significant source is identified no further assessment is necessary.

- 8.4.2 Where significant potential risk from ground gas has been identified from the Initial Conceptual Model and the intrusive ground investigation works ground gas monitoring is undertaken and the results of the monitoring are compared against the Gas Screening Values given in CIRIA Report 665. From this the Characteristic Situation is identified, and remedial measures proposed.
- 8.4.3 When assessing the risk and type of remedial measures appropriate consideration is given to the likely construction of the development, the nature of the gas posing a risk and the nature of the likely source. The use of engineering judgement when determining risk from ground gas is consistent with the recommendations given in CIRIA C665. No significant sources of ground gas were noted from the desk study. Made Ground was encountered on site, but this did not include significant putrescible materials.
- 8.4.4 Gas monitoring was undertaken during return visits to monitor groundwater levels. Ground gas has recorded slightly elevated concentrations of Methane and Carbon Dioxide and no detectable gas flow rates have been measured.
- 8.4.5 Based upon the data collected the site would be classified as Characteristic Situation 1 in accordance with CIRIA R665. This is because no flow has been recorded during the monitoring visits. However, given the slightly elevated gas concentrations recorded, we advise that the site is classified as Characteristic Situation 2.
- 8.4.6 Required remedial measures, assuming a “Type B” building residential managed Multi occupancy (BS8485 page 21) would expect to have a points score of 3.5, these can be achieved via the following;
- Slab 1 point minimum assuming the slab is cast in situ monolithic well reinforced (confirmation should be sought);
 - Membrane 2 points (assuming well installed and independently validated);
 - Pressure relief pathway provided 0.5 points (again clarification should be sought, or a specific design produced.).

8.5 Conceptual Model

8.5.1 The Revised Conceptual Model is presented below.

Table 8.5.1 Conceptual Model

Source	Location	Exposure Pathway	Potential Receptor	Probability of Exposure	Details
Human Health					
Asbestos, PAH, and Lead.	Made Ground.	Ingestion dermal and inhalation.	Construction Workers.	Dismissed.	Normal construction PPE will address risk under CDM.
			Site users.	Dismissed.	No Source.
Asbestos, metals and hydrocarbons.	Unforeseen Contamination.	Ingestion dermal and inhalation.	Construction Workers.	Dismissed.	Normal construction PPE will address risk under CDM.
			Site users.	Negligible.	No significant contamination identified or likely.
Hydrocarbon and metals.	Migration from off-site sources.	Ingestion dermal and inhalation.	Construction Workers.	Dismissed.	No Source.
			Site users.		
Ground Gas.	Made Ground.	Inhalation & Explosive.	Construction Workers.	Negligible.	No significant concentrations or flow identified, however; using an appropriately cautious approach CS2 designation has been recommended.
			Site users.		
	Landfill	Inhalation & Explosive.	Construction Workers.		
			Site users.		
Groundwater					
Hydrocarbon and metals.	Potential spillage on site.	Vertical Migration.	Groundwater.	Dismissed.	No mobile receptor.
Surface Water					
Hydrocarbon and metals.	Potential spillage on site.	Horizontal Migration.	River Network.	Dismissed.	No receptor.
Environmental Receptors					
On site contaminants.		Ingestion dermal and inhalation.	Ecology.	Dismissed.	No sensitive ecology designation.
		Direct.	Archaeology.	Dismissed.	None present.
		Direct.	Geology.	Dismissed.	None present.
		Phytotoxic.	Woodland.	Dismissed.	None present.
		Phytotoxic.	Crops.	Dismissed.	None present.
		Ingestion dermal and inhalation.	Livestock.	Dismissed.	None present.
Building Services					
On site contaminants.		Direct.	Historic Buildings.	Dismissed.	No receptors.
		Direct.	Proposed Buildings.	Dismissed.	No sources identified.
		Permeate into pipework.	Water Pipes.	Dismissed.	No sources identified.

8.6 Remediation and Verification Strategy

- 8.6.1 Based upon the assessment above, no remediation works are considered necessary for the proposed development.
- 8.6.2 However, there are negligible residual risks associated with the presence of Made Ground and encountering unforeseen contamination, such as; inclusions of foreign material within soils and these affecting the end user. This risk will be managed through a discovery strategy, as outlined below.

Unforeseen Contamination

- 8.6.3 Regardless of any ground investigation works undertaken there is a residual risk that unforeseen contamination may be encountered at the site during the preparation and construction works. As such a discovery strategy is proposed.
- 8.6.4 If unforeseen contamination is encountered during construction works such as a localised spillage outside the areas investigated an Enzygo environmental consultant will be available on a 'call out' basis to undertake an assessment of risk. If 'unforeseen contamination' is encountered the discovery strategy will be to remove the source as it is likely to be very limited in extent and the Local Planning Authority advised. The following recommendations are advised to be adopted during site works
- Site Staff should wear suitable PPE i.e. gloves, boots and overalls and wash their hands before eating, drinking and smoking. Excessive dust generation is not anticipated, but clearly this should be avoided or controlled.
 - Although asbestos was not detected on site during the investigation, vigilance should be adhered to and any suspected asbestos containing material, work should cease in this region, and the appropriate person notified.

Supplementary Investigation

- 8.6.5 Further ground investigation [for contamination purposes] is not considered necessary at the site.

9.0 GEOTECHNICAL ASSESSMENT

9.1 Proposed Development

9.1.1 The proposed development will comprise a multi-storey residential tower block. At the time of writing no loading were available.

9.1.2 It is considered that the scheme meets the criteria of Geotechnical Category 1 of Eurocode 7.

9.2 Ground Conditions

9.2.1 Ground conditions generally comprise up to 2m of Made Ground, overlying Glacial Till. Rockhead was encountered at an approximate depth of 17.5m begl, however; intact rockhead was only encountered in BH01 at a depth of 24.1m proven to a final depth of 31.2m begl.

9.2.2 Groundwater was encountered at varying levels [across the investigation positions] typically located within more granular horizons, indicating this might be localised perched waters.

9.3 Site Preparation

9.3.1 The site should be cleared and any vegetation below areas of proposed development stripped in accordance with Series 200 of the Specification for Highway Works (SHW). This should include:

- Any redundant services should be sealed off and grubbed out and replaced with suitable compacted engineered fill;
- All buried structures and old foundations should be excavated from below the proposed structures with the resulting void backfilled; and
- Loose or soft areas of formation should be removed to their full depth and replaced with suitable material in accordance with SHW.

9.4 Foundations

9.4.1 Given the encountered ground conditions and likely column loadings it is initially recommended that piled foundations are used. A local piling contractor with appropriate experience should be employed to undertake pile design.

9.5 Ground Floor Slab

9.5.1 Ground bearing floor slabs may be used. However, plate bearing tests are recommended to be undertaken to provide suitable modulus of subgrade reaction to allow detailed design. Alternatively, suspended floor slabs should be used e.g. either in-situ RC slabs or block & beam flooring is recommended as per NHBC guidance.

9.6 Materials Re-use

9.6.1 Based upon the material descriptions and classification testing is anticipated that the near surface materials if excavated are likely to be re-useable as Class 1 for Class 2 fills in accordance with SHW.

9.7 Pavement Construction

9.7.1 An assessment of the likely California Bearing Ratio (CBR) has been assessed from the following sources:

- Description of the materials; and
- Guidance given in HD25/94 and 73/06.

9.7.2 Based on this it is recommended that a preliminary design CBR of some 3% is used for all natural cohesive soils encountered near surface. However, the formation should be proof rolled and any areas of soft or loose material excavated and removed.

9.8 Buried Concrete

9.8.1 Sulfate testing has recorded sulfate values between 31mg/l and 360 mg/l and pH values in the range of 8.0 to 8.7. The mean of the highest two results (240mg/l and 360 mg/l) gives a Characteristic Site Value of 300mg/l, which corresponds to DS-1 ACEC class AC-1 assuming mobile groundwater.

9.9 Excavations

9.9.1 Localised shallow battered excavations are likely to be suitable near surface, however; suitable assessment should be made to reduce potential risks as much as practicable once details are known. Deeper excavations should be assessed on a specific case by case basis.

9.9.2 Excavations where access is required must be supported in accordance with CIRIA RR97.



Key

Site Boundary

Existing Structures on Site

Dynamic Sampling Location (WS)
(WS1, WS4, WS6)

Rotary Exploratory Boreholes (CP)
(CP/R1 - CP/R3)

Dynamic Sampling Location (WS)
Unable to complete (see Notes)

- Notes
1.

WS2, Shutter door could not be accessed.
2.

WS3, Ceiling was too low to operate rig and shutter door could not be accessed.
3.

WS4, Hand pit only as ceiling too low to operate rig.
4.

WS5, Concrete was encountered below subfloor void.

Samuel House, 5 Fox Valley Way, Stocksbridge, Sheffield, S36 2AA

CLIENT:

Beaumont Morgan Developments Ltd

SCALE:

Not to Scale

PROJECT REF:

SHF.258.002

DRAWN:

NB

CHECKED:

DF

DATE:

May 2019

PROJECT:

One Lord Street, Manchester

TITLE:

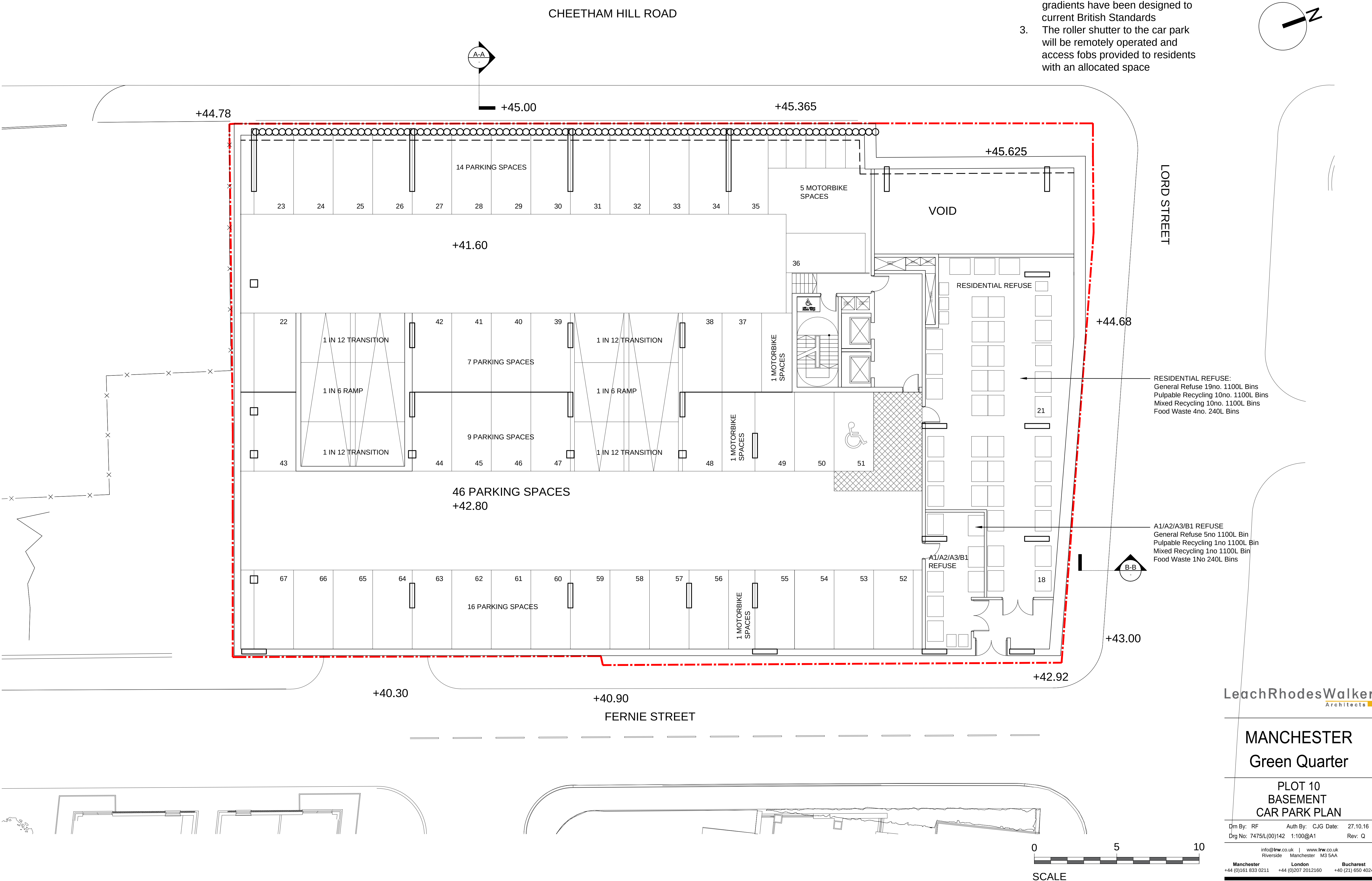
Exploratory Hole Location Plan

FIGURE NO:

SHF.258.002.GE.D.001

Gross Internal Area = 1532sqm

- Note:
- 1. All entrances to the building will be access controlled
 - 2. All Access ramp width and gradients have been designed to current British Standards
 - 3. The roller shutter to the car park will be remotely operated and access fobs provided to residents with an allocated space



LeachRhodesWalker
Architects

MANCHESTER
Green Quarter

PLOT 10
BASEMENT
CAR PARK PLAN

Drn By: RF Auth By: C/JG Date: 27.10.16
Org No: 7475/L(00)142 1:100@A1 Rev: Q

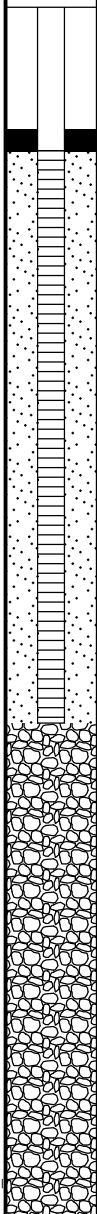
info@lrw.co.uk | www.lrw.co.uk
Riverside Manchester M3 5AA
Manchester London Bucharest
+44 (0)161 833 0211 +44 (0)207 2012160 +40 (21) 650 4024

File loc: L:\7475 Cheetham Hill Road\Drawings\Public\7475-7475-1001-02-Basement Parking Plot10.dwg Plotter: g: Road Master-Dragon

Appendix 2 – Exploratory Hole Logs

Site One Lord Street, Manchester				WS01
Job No SHF.258.002	Dates Start 29-03-19 Finish 29-03-19	Ground Level (m)	Co-Ordinates	

Client Beaumont Morgan Developments Limited	Sheet 1 of 1
--	-----------------

Well	Water Levels	Samples & In Situ Testing			Depth (m)	Level (mAD)	Legend	Stratum Description	
		Depth (m)	No/Type	Results					
					0.20			MADE GROUND: Grey reinforced concrete. Sub-floor VOID.	0
		0.90 1.05 1.20 - 1.65 1.20	1ES 2ES C 3ES	N 9	0.85 1.00 1.10			MADE GROUND: Grey green brown slightly silty fine to coarse sand.	1
		2.00 - 2.45 2.00	C 4ES	N 15	1.60			MADE GROUND: Firm consistency brown mottled grey slightly gravelly clay. Gravel is subangular to subrounded fine to coarse of coal and quartz (Possible Reworked).	2
		3.00 - 3.45 3.00	C 5D	N 17	3.20			Firm to stiff consistency brown mottled grey slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse of coal and quartz.	3
		4.00 - 4.45 4.00	C 6D	N 21	4.50			Firm to stiff consistency orange brown mottled grey slightly gravelly sandy CLAY. Gravel is subangular to subrounded fine to coarse of various lithologies including sandstone, coal and quartz. Sand is fine.	4
		4.80 5.00 - 5.45	7D C	N 26	5.30			4.50 - 5.00 Locally very wet. Red brown laminated clayey silty fine SAND.	5
		6.00 - 6.45 6.00	C 8D	N 20				Firm to stiff consistency brown slightly sandy gravelly CLAY. Gravel is subangular to subrounded fine to coarse of various lithologies including sandstone, coal and quartz.	6
		7.00 - 7.45 7.00	C 9D	N 33				6.20 - 6.40 Band of wet silty sand.	7
		8.00 - 8.45	C 10D	N 50					8
					8.45 {8.45}			Borehole completed at 8.45m.	

General Remarks

1. Hand excavated inspection pit to 1.20m begl followed by dynamic sampling using a tracked percussive sampling rig to 8.45m begl due to refusal.
2. Groundwater was encountered at 4.50m and 6.20m begl.
3. Log completed in accordance with BS5930:2015.
4. Borehole was installed with 1.00m plain pipe and 4.00m of slotted pipe.
5. Coordinates and levels were not recorded.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
29/03/19	4.50		
29/03/19	6.20		

All dimensions in metres
Scale 1:52.8125

Logged By
NB



Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site One Lord Street, Manchester				WS04
Job No SHF.258.002	Dates Start 29-03-19 Finish 29-03-19	Ground Level (m)	Co-Ordinates	

Client Beaumont Morgan Developments Limited	Sheet 1 of 1
--	-----------------

Well	Water Levels	Samples & In Situ Testing			Depth (m)	Level (mAD)	Legend	Stratum Description	
		Depth (m)	No/Type	Results					
		0.50	1ES		0.20			MADE GROUND: Grey reinforced concrete.	0
					0.60			0.20 Blue membrane. MADE GROUND: Black brown slightly clayey gravelly fine to coarse sand of ash with a low cobble content of subangular brick. Gravel is subangular to subrounded fine to coarse of various lithologies including slag, brick and concrete.	1
								Borehole completed at 0.60m.	
									2
									3
									4
									5
									6
									7
									8
					{8.45}				

General Remarks

1. Hand excavated inspection pit to 0.60m begl due to refusal on obstruction.
2. Groundwater was not encountered.
3. Log completed in accordance with BS5930:2015.
4. Borehole was backfilled with arisings.
5. Coordinates and levels were not recorded.

Groundwater

Date

Strike Depth
(m)

Casing Depth
(m)

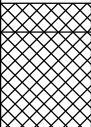
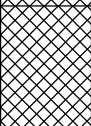
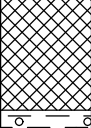
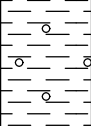
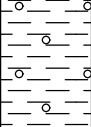
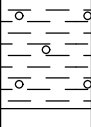
Depth After
Observation
(m)

All dimensions in metres
Scale 1:52.8125

Logged By
NB

Site One Lord Street, Manchester				WS06
Job No SHF.258.002	Dates Start 29-03-19 Finish 29-03-19	Ground Level (m)	Co-Ordinates	

Client Beaumont Morgan Developments Limited	Sheet 1 of 1
--	-----------------

Well	Water Levels	Samples & In Situ Testing			Depth (m)	Level (mAD)	Legend	Stratum Description	
		Depth (m)	No/Type	Results					
					0.20			MADE GROUND: Grey reinforced concrete.	0
					0.90			MADE GROUND: Red brown sandy gravelly cobbles of subangular brick. Gravel is subangular to subrounded fine to coarse of brick. Sand is fine to coarse.	
		1.00 1.20 - 1.65	1ES C	N 12				MADE GROUND: Red brown slightly clayey gravelly fine to coarse sand with a medium cobble content of subangular brick. Gravel is subangular to subrounded fine to coarse of various lithologies including brick, slag and concrete.	1
		2.00 - 2.45 2.00	C 2ES	N 15					2
		3.00 - 3.45 3.00	C 3ES	N 10				Firm to stiff consistency brown mottled grey slightly sandy gravelly CLAY. Gravel is subangular to subrounded fine to coarse of coal and quartz. Sand is fine.	3
		4.00 - 4.45 4.00	C 4D	N 23					4
		4.80 - 5.13 4.80	C 5D	N 50	5.13			Borehole completed at 5.13m.	5
					{8.45}				6
									7
									8

General Remarks

1. Hand excavated inspection pit to 1.20m begl followed by dynamic sampling using a tracked percussive sampling rig to 5.13m begl due to refusal.
2. Groundwater was not encountered.
3. Log completed in accordance with BS5930:2015.
4. Borehole was backfilled with arisings.
5. Coordinates and levels were not recorded.

Groundwater	Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
All dimensions in metres Scale 1:52.8125				
				Logged By NB



Location Lord Street, Manchester				BOREHOLE No BH01 RC
Job No RT/19/63292	Date 09-04-19 11-04-19	Ground Level (m)	Co-ordinates ()	
Client Enzygo Ltd				Sheet 2 of 7

Drilling Progress	Casing depth/size	Water level/ time/ date	Flush Return %	CORE RECOVERY & TESTS							STRATA				
				Depth (m) AL/ from to	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Depth	Fracture Index	Tests	Legend	Reduced Level	Depth (Thickness) (m)	Description	Instrument/ Backfill
											5.00	Stiff dark brown slightly sandy gravelly CLAY. Gravel is of angular to rounded fine to coarse quartz and sandstone. <i>(continued)</i>			
											5.40	Very dense grey/slightly reddish brown silty medium SAND.			
											(4.90)				

REMARKS

Borehole terminated at 31.2m.
Cable percussion 0.0-19.1m.
Rotary open hole 19.1-25.2m.
Rotary core 25.2-31.2m.

All dimensions in metres Scale 1:32.3	Client D Frayne	Equipment Dando 2000/Comacchio 205	Logged By E Lodge
--	--------------------	---------------------------------------	----------------------



Location Lord Street, Manchester				BOREHOLE No BH01 RC
Job No RT/19/63292	Date 09-04-19 11-04-19	Ground Level (m)	Co-ordinates ()	
Client Enzygo Ltd				Sheet 3 of 7

Drilling Progress	Casing depth/size	Water level/ time/ date	Flush Return %	CORE RECOVERY & TESTS										STRATA		
				Depth (m) AL/ from to	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Depth	Fracture Index	Tests	Legend	Reduced Level	Depth (Thickness) (m)	Description	Instrument/ Backfill	
											x		10.00	Very dense grey/slightly reddish brown silty medium SAND. (continued)		
											x		10.30	Medium dense grey/slightly reddish brown silty medium SAND.		
											x		(1.60)			
											x		11.90			
											o		(1.90)	Stiff dark brown slightly sandy gravelly CLAY. Gravel is of angular fine to coarse sandstone.		
											o		13.80			
											x		(0.35)	Stiff laminated grey slightly silty slightly sandy CLAY with occasional brown silty sand partings.		
											x		14.15			
											x		(0.55)	Dense light brown slightly silty fine SAND.		
											x		14.70			
											o			Very dense reddish brown slightly gravelly medium to coarse SAND. Gravel is of rounded fine quartz.		

REMARKS

Borehole terminated at 31.2m.
Cable percussion 0.0-19.1m.
Rotary open hole 19.1-25.2m.
Rotary core 25.2-31.2m.

All dimensions in metres Scale 1:32.3	Client D Frayne	Equipment Dando 2000/Comacchio 205	Logged By E Lodge
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Location Lord Street, Manchester				BOREHOLE No BH01 D
Job No RT/19/63292	Date 09-04-19 11-04-19	Ground Level (m)	Co-Ordinates ()	
Client Enzygo Ltd				Sheet 1 of 4

SAMPLES & TESTS			Water	STRATA			Instrument/ Backfill	
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)		DESCRIPTION
0.05	ES1	N25 (3, 4, 4, 6, 8, 7)				0.10	MADE GROUND. Dark brown/dark grey slightly organic, slightly gravelly very clayey medium SAND with occasional cobbles. Gravel is of a fine to coarse brick, sandstone and mudstone. Cobbles are of angular brick. Stiff brown slightly gravelly CLAY with some disturbed laminations. Gravel is of angular to rounded fine to medium quartz, sandstone and coal.	
0.50	B1							
0.50	D2							
0.75	ES2					(1.95)		
1.20	SPT							
1.50	D4							
								
2.00	U100	113 Blows				2.05		
2.00-2.45	B5					(0.75)		
2.50	D6					2.80		
								
3.00-3.45	SPT	N22 (3, 5, 5, 5, 6, 6)				(0.70)		
						3.50		
3.50	D8							
						3.95		
4.00	U9	124 Blows						
4.00-4.45	D10					(1.45)		
								
5.00-5.45	SPT	17,16,18,32/50mm				5.40		
								
6.00-6.45	SPT	15,10,34,16/11mm						
								
7.00	B13	15,10,40,10/11mm						
								
7.50	S14				(4.90)			
								
8.00	D15							
								
9.00	S16	13,12,15,28,22/35mm						
								
9.50	D17							

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											Borehole terminated at 31.2m. Cable percussion 0.0-19.1m. Rotary open hole 19.1-25.2m. Rotary core 25.2-31.2m.
All dimensions in metres Scale 1:62.5			Client Engineer D Frayne			Method/ Plant Used Dando 2000/Comacchio 205			Logged By E Lodge		



Location Lord Street, Manchester				BOREHOLE No BH01 D
Job No RT/19/63292	Date 09-04-19 11-04-19	Ground Level (m)	Co-Ordinates ()	
Client Enzygo Ltd				Sheet 2 of 4

SAMPLES & TESTS			Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
10.50	S18	12,13,21,29/10mm			x x x x	10.30	Very dense grey/slightly reddish brown silty medium SAND. (continued)	
11.00	D19				x x x x	(1.60)	Medium dense grey/slightly reddish brown silty medium SAND.	
12.00	B20				x x x x	11.90		
12.00	D21				x x x x	(1.90)	Stiff dark brown slightly sandy gravelly CLAY. Gravel is of angular fine to coarse sandstone.	
13.00-13.45	U22	119 Blows			x x x x	13.80		
13.50	D23				x x x x	14.15	Stiff laminated grey slightly silty slightly sandy CLAY with occasional brown silty sand partings.	
13.80	B24				x x x x	(0.55)	Dense light brown slightly silty fine SAND.	
14.50-14.95	S26	15/10,20,30/8mm			x x x x	14.70		
15.00	D27				x x x x	(2.70)	Very dense reddish brown slightly gravelly medium to coarse SAND. Gravel is of rounded fine quartz.	
15.00	B28				x x x x	17.40		
16.00-16.45	S29	6,9,12,19,9/20mm			x x x x	(2.30)	Dense reddish brown sandy GRAVEL with some cobbles. Gravel is of rounded fine to coarse quartz and sandstone. Cobbles are of rounded quartz and sandstone.	
17.00	D30				x x x x	19.70		
17.50-17.95	S31	5,9,11,12,27			x x x x			
18.00	D32				x x x x			
19.00	D33				x x x x			

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
10-04-19	00.00	19.10	12.00	150							Borehole terminated at 31.2m. Cable percussion 0.0-19.1m. Rotary open hole 19.1-25.2m. Rotary core 25.2-31.2m.
All dimensions in metres Scale 1:62.5		Client Engineer D Frayne				Method/ Plant Used		Dando 2000/Comacchio 205		Logged By E Lodge	



Location Lord Street, Manchester				BOREHOLE No BH01 D
Job No RT/19/63292	Date 09-04-19 11-04-19	Ground Level (m)	Co-Ordinates ()	
Client Enzygo Ltd				Sheet 3 of 4

SAMPLES & TESTS			Water	STRATA			Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	
19.90-20.35	SPT	5,13,46,4/5mm				(0.60) 20.30	
22.00-22.45	SPT	10,50+/70mm				(3.80) 24.10	
						(1.10) 25.20	
						(6.00)	

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											Borehole terminated at 31.2m. Cable percussion 0.0-19.1m. Rotary open hole 19.1-25.2m. Rotary core 25.2-31.2m.
All dimensions in metres Scale 1:62.5			Client Engineer D Frayne			Method/ Plant Used Dando 2000/Comacchio 205			Logged By E Lodge		

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Location Lord Street, Manchester				BOREHOLE No BH01 RC
Job No RT/19/63292	Date 09-04-19 11-04-19	Ground Level (m)	Co-ordinates ()	
Client Enzygo Ltd				Sheet 4 of 7

Drilling Progress	Casing depth/size	Water level/ time/ date	Flush Return %	CORE RECOVERY & TESTS								STRATA			
				Depth (m) AL/ from to	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Depth	Fracture Index	Tests	Legend	Reduced Level	Depth (Thickness) (m)	Description	Instrument/ Backfill
												15.00	Very dense reddish brown slightly gravelly medium to coarse SAND. Gravel is of rounded fine quartz. <i>(continued)</i>		
												(2.70)			
												17.40	Dense reddish brown sandy GRAVEL with some cobbles. Gravel is of rounded fine to coarse quartz and sandstone. Cobbles are of rounded quartz and sandstone.		
												(2.30)			
												19.70	Dense reddish brown slightly silty slightly gravelly coarse SAND. Gravel is of sub rounded to rounded fine to coarse sandstone and quartz.		

REMARKS

Borehole terminated at 31.2m.
Cable percussion 0.0-19.1m.
Rotary open hole 19.1-25.2m.
Rotary core 25.2-31.2m.

All dimensions in metres Scale 1:32.3	Client D Frayne	Equipment Dando 2000/Comacchio 205	Logged By E Lodge
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Location Lord Street, Manchester				BOREHOLE No BH01 RC
Job No RT/19/63292	Date 09-04-19 11-04-19	Ground Level (m)	Co-ordinates ()	
Client Enzygo Ltd				Sheet 5 of 7

Drilling Progress	Casing depth/size	Water level/ time/ date	Flush Return %	CORE RECOVERY & TESTS								STRATA			
				Depth (m) AL/ from to	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Depth	Fracture Index	Tests	Legend	Reduced Level	Depth (Thickness) (m)	Description	Instrument/ Backfill
												20.00 (0.60)	Dense reddish brown slightly silty slightly gravelly coarse SAND. Gravel is of sub rounded to rounded fine to coarse sandstone and quartz. <i>(continued)</i>		
												20.30	Very dense reddish brown COBBLES comprising rounded quartz and sandstone with some fine material. Fine material is of gravelly coarse sand. Gravel is of rounded fine to coarse quartz and sandstone.		
												(3.80)			
												24.10	Reddish brown medium to coarse grained arenaceous SANDSTONE. (Rotary open hole).		
												(1.10)			

REMARKS

Borehole terminated at 31.2m.
Cable percussion 0.0-19.1m.
Rotary open hole 19.1-25.2m.
Rotary core 25.2-31.2m.

All dimensions in metres Scale 1:32.3	Client D Frayne	Equipment Dando 2000/Comacchio 205	Logged By E Lodge
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Location Lord Street, Manchester				BOREHOLE No BH01 RC
Job No RT/19/63292	Date 09-04-19 11-04-19	Ground Level (m)	Co-ordinates ()	
Client Enzygo Ltd				Sheet 6 of 7

Drilling Progress	Casing depth/size	Water level/ time/ date	Flush Return %	CORE RECOVERY & TESTS							STRATA					
				Depth (m) AL/ from to	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Depth	Fracture Index	Tests	Legend	Reduced Level	Depth (Thickness) (m)	Description	Instrument/ Backfill	

REMARKS

Borehole terminated at 31.2m.
Cable percussion 0.0-19.1m.
Rotary open hole 19.1-25.2m.
Rotary core 25.2-31.2m.

All dimensions in metres Scale 1:32.3	Client D Frayne	Equipment Dando 2000/Comacchio 205	Logged By E Lodge
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Location Lord Street, Manchester				BOREHOLE No BH01 RC
Job No RT/19/63292	Date 09-04-19 11-04-19	Ground Level (m)	Co-ordinates ()	
Client Enzygo Ltd				

Drilling Progress	Casing depth/size	Water level/ time/ date	Flush Return %	CORE RECOVERY & TESTS							STRATA			
				Depth (m) AL/ from to	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Depth	Fracture Index	Tests	Legend	Reduced Level	Depth (Thickness) (m)	Description
											30.00	Medium strong reddish brown medium to coarse grained arenaceous SANDSTONE. Occasional interbedded rounded quartz clasts/conglomerate. (Notably 25.62-25.72). Fresh. (continued)		
											31.20			

REMARKS

Borehole terminated at 31.2m.
Cable percussion 0.0-19.1m.
Rotary open hole 19.1-25.2m.
Rotary core 25.2-31.2m.

All dimensions in metres Scale 1:32.3	Client D Frayne	Equipment Dando 2000/Comacchio 205	Logged By E Lodge
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Location Lord Street, Manchester				BOREHOLE No BH02
Job No RT/19/63292	Date 11-04-19 12-04-19	Ground Level (m)	Co-Ordinates ()	
Client Enzygo Ltd				Sheet 1 of 3

SAMPLES & TESTS			Water	STRATA				Instrument/ Backfill		
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION			
						0.15	MADE GROUND. Tarmac.			
						0.45	MADE GROUND. Light brown sandy gravel. Gravel is of angular fine to coarse sandstone.			
0.50	B1	N18 (3, 3, 4, 2, 2, 10)			(0.85)		MADE GROUND. Light grey mottled reddish brown slightly clayey sandy gravel with some cobbles. Gravel is of angular fine to coarse coal, brick and sandstone. Cobbles are of angular brick.			
0.50	D2									
0.50	ES1									
1.20	S3					1.30				
						(0.60)	MADE GROUND. Firm brown gravelly clay with occasional cobbles. Gravel is of angular fine to coarse brick, concrete and sandstone. Cobbles are of angular brick.			
1.70	B4	N19 (2, 3, 4, 4, 5, 6)			(1.30)	1.90				
1.70	D5									
2.00-2.45	S6									
2.00	ES2						Stiff brown slightly gravelly CLAY with some disturbed laminations. Gravel is of angular to rounded fine to medium quartz, sandstone and coal.			
						(1.30)				
2.70	B7	101 Blows			(1.30)					
2.70	D8									
3.00-3.45	U9									
						3.20				
3.45-3.50	D10						Stiff dark brown slightly sandy gravelly CLAY. Gravel is of angular to rounded fine to coarse quartz and sandstone.			
						(2.70)				
4.00-4.45	S11	3,5,5,6,7,7			(2.70)					
4.70	D12									
5.00-5.45	U13	131 Blows								
5.45-5.50	D14									
						5.90				
6.00-6.45	S15	13,20,50/55mm			(6.00)		Very dense light brown slightly silty fine SAND.			
6.50	D16									
6.50	B17									
7.50-7.95	S18	7,8,16,34/10mm								
9.00-9.45	S19	14,11+,21,29+,55mm								

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											Borehole terminated at 25.0m. Cable percussion 0.0-17.1m. Rotary open hole 17.1-25.0m.
All dimensions in metres Scale 1:62.5			Client Engineer D Frayne			Method/ Plant Used		Dando 2000/Comacchio 205		Logged By E Lodge	



Location Lord Street, Manchester				BOREHOLE No BH02
Job No RT/19/63292	Date 11-04-19 12-04-19	Ground Level (m)	Co-Ordinates ()	
Client Enzygo Ltd				Sheet 3 of 3

SAMPLES & TESTS			Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
20.00-20.45	SPT	N40 (5, 5, 10, 10, 10, 10)				(7.90)	Dense reddish brown sandy GRAVEL with some cobbles. Gravel is of rounded fine to coarse quartz and sandstone. Cobbles are of rounded quartz and sandstone. (continued)	
22.00-22.45	SPT	25/10,50/25mm						
25.00	SPT	25/20mm,50/18mm				25.00		

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
12-04-19	00.00	25.00	24.50	150mm							Borehole terminated at 25.0m. Cable percussion 0.0-17.1m. Rotary open hole 17.1-25.0m.
All dimensions in metres Scale 1:62.5			Client Engineer D Frayne			Method/ Plant Used		Dando 2000/Comacchio 205		Logged By E Lodge	



Location Lord Street, Manchester				BOREHOLE No BH03
Job No RT/19/63292	Date 11-04-19 15-04-19	Ground Level (m)	Co-Ordinates ()	
Client Enzygo Ltd				Sheet 1 of 3

SAMPLES & TESTS			Water	STRATA				Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
0.50	B1	N17 (2, 3, 4, 5, 4, 4)				0.10	MADE GROUND. Tarmac.	
0.50	D2					0.25	MADE GROUND. Light brown sandy gravel. Gravel is of angular fine to coarse sandstone.	
0.50	ES1					(0.50)		
						0.75	MADE GROUND. Light grey/dark brown slightly clayey sandy gravel with occasional dark brown clayey sand inclusions. Gravel is of angular fine to coarse brick, sandstone, concrete and slate.	
1.20	S3	250+/NR				(1.95)	MADE GROUND. Stiff brown fissured grey gravelly clay with some disturbed laminations and occasional cobbles. Gravel is of angular to rounded fine to coarse quartz, sandstone and mudstone.	
1.50	ES2							
2.00	U4					2.70		
2.00	B5							
2.80	B6	N17 (3, 3, 4, 4, 4, 5)				(1.90)	Stiff brown slightly gravelly CLAY with some disturbed laminations. Gravel is of angular to rounded fine to medium quartz, sandstone and coal.	
2.80	D7							
3.00-3.45	S8							
3.00	ES3							
3.80	D9	121				4.60		
4.00	U10							
4.45-4.50	D11							
4.70	B12							
4.70	D13	8,17,29,21/55mm				9.00	Very dense light brown slightly silty fine SAND.	
5.00-5.45	S14							
6.00	S15					(4.40)		
7.50	S16							
9.00	S17	N44 (9, 9, 9, 11, 12, 12)					Compact light brown clayey slightly sandy SILT.	

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											Borehole terminated at 25.0m. Cable percussion 0.0-12.45m. Rotary open hole 0-25m.
All dimensions in metres Scale 1:62.5			Client Engineer D Frayne			Method/ Plant Used Dando 2000/Comacchio 205			Logged By E Lodge		

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Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
12-04-19	00.00	12.00	12.00	150							Borehole terminated at 25.0m. Cable percussion 0.0-12.45m. Rotary open hole 0-25m.
All dimensions in metres Scale 1:62.5		Client Engineer D Frayne				Method/ Plant Used		Dando 2000/Comacchio 205			Logged By E Lodge

Appendix 3 – Laboratory Testing

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 19/03353
Issue Number: 1

Date: 16 April, 2019

Client: Enzygo Ltd (Manchester)
First Floor,
3 Hardman Square,
Manchester,
M3 3EB

Project Manager: David Oliver Frayne
Project Name: Not specified
Project Ref: SHF-258.002
Order No: SHF-258.002
Date Samples Received: 29/03/19
Date Instructions Received: 05/04/19
Date Analysis Completed: 16/04/19

Prepared by:



Holly Neary-King
Client Manager

Approved by:



Iain Haslock
Analytical Consultant

Envirolab Job Number: 19/03353

Client Project Name: Not specified

Client Project Ref: SHF-258.002

Lab Sample ID	19/03353/2	19/03353/11						Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS01	WS04								
Depth to Top	1.05	0.50								
Depth To Bottom										
Date Sampled	29-Mar-19	29-Mar-19								
Sample Type	Soil	Solid								
Sample Matrix Code	4A	7								
% Stones >10mm _A	16.6	<0.1						% w/w	0.1	A-T-044
Cyanide (total) _A ^{M#}	<1	<1						mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC _A	<0.2	<0.2						mg/kg	0.2	A-T-050s
Organic matter _D ^{M#}	9.8	2.8						% w/w	0.1	A-T-032 OM
Arsenic _D ^{M#}	35	6						mg/kg	1	A-T-024s
Cadmium _D ^{M#}	1.3	1.0						mg/kg	0.5	A-T-024s
Copper _D ^{M#}	105	23						mg/kg	1	A-T-024s
Chromium _D ^{M#}	18	36						mg/kg	1	A-T-024s
Chromium (hexavalent) _D	<1	<1						mg/kg	1	A-T-040s
Lead _D ^{M#}	113	553						mg/kg	1	A-T-024s
Mercury _D	0.55	0.35						mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	52	26						mg/kg	1	A-T-024s
Selenium _D ^{M#}	<1	<1						mg/kg	1	A-T-024s
Zinc _D ^{M#}	83	192						mg/kg	5	A-T-024s
Asbestos in Soil (inc. matrix) ^										
Asbestos in soil _A [#]	NAD	NAD								A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A								

Envirolab Job Number: 19/03353

Client Project Name: Not specified

Client Project Ref: SHF-258.002

Lab Sample ID	19/03353/2	19/03353/11						Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS01	WS04								
Depth to Top	1.05	0.50								
Depth To Bottom										
Date Sampled	29-Mar-19	29-Mar-19								
Sample Type	Soil	Solid								
Sample Matrix Code	4A	7								
PAH-16MS										
Acenaphthene _A ^{M#}	<0.01	0.05						mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	<0.01	0.01						mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	<0.02	0.15						mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	<0.04	0.58						mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	0.05	0.56						mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	0.05	0.63						mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	<0.05	0.33						mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	<0.07	0.21						mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	<0.06	0.60						mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	<0.04	0.08						mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	<0.08	1.05						mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	<0.01	0.03						mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	0.04	0.36						mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	<0.03	<0.03						mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	0.06	0.62						mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	<0.07	1.03						mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	0.20	6.29						mg/kg	0.01	A-T-019s

Envirolab Job Number: 19/03353

Client Project Name: Not specified

Client Project Ref: SHF-258.002

Lab Sample ID	19/03353/2	19/03353/11						Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	WS01	WS04								
Depth to Top	1.05	0.50								
Depth To Bottom										
Date Sampled	29-Mar-19	29-Mar-19								
Sample Type	Soil	Solid								
Sample Matrix Code	4A	7								
TPH UKCWG										
Ali >C5-C6 _A [#]	<0.01	<0.01						mg/kg	0.01	A-T-022s
Ali >C6-C8 _A [#]	0.01	<0.01						mg/kg	0.01	A-T-022s
Ali >C8-C10 _A ^{M#}	<1	<1						mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	<1	<1						mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	2	<1						mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	2	1						mg/kg	1	A-T-055s
Ali >C21-C35 _A	4	5						mg/kg	1	A-T-055s
Ali >C35-C44 _A	<1	1						mg/kg	1	A-T-055s
Total Aliphatics _A	7	6						mg/kg	1	A-T-055s
Total Aliphatics _A	7	8						mg/kg	1	A-T-055s
Aro >C5-C7 _A [#]	<0.01	<0.01						mg/kg	0.01	A-T-022s
Aro >C7-C8 _A [#]	<0.01	<0.01						mg/kg	0.01	A-T-022s
Aro >C8-C10 _A ^{M#}	<1	<1						mg/kg	1	A-T-055s
Aro >C10-C12 _A ^{M#}	<1	<1						mg/kg	1	A-T-055s
Aro >C12-C16 _A	2	1						mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	6	9						mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	15	32						mg/kg	1	A-T-055s
Aro >C35-C44 _A	<1	1						mg/kg	1	A-T-055s
Total Aromatics _A	24	42						mg/kg	1	A-T-055s
Total Aromatics _A	24	43						mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C35) _A	31	48						mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C44) _A	31	51						mg/kg	1	A-T-055s
BTEX - Benzene _A [#]	<0.01	<0.01						mg/kg	0.01	A-T-022s
BTEX - Toluene _A [#]	<0.01	<0.01						mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	<0.01	<0.01						mg/kg	0.01	A-T-022s
BTEX - m & p Xylene _A [#]	<0.01	<0.01						mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	<0.01	<0.01						mg/kg	0.01	A-T-022s
MTBE _A [#]	<0.01	<0.01						mg/kg	0.01	A-T-022s

REPORT NOTES

General

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

The results reported herein relate only to the material supplied to the laboratory.

The residue of any samples contained within this report, and any received with the same delivery, will be disposed of six weeks after initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of six months after the initial Asbestos testing is completed.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

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

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

Soil chemical analysis:

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

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:

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

Electrical Conductivity of water by Method A-T-037:

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

Secondary Matrix Codes:

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

Key:

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 19/03734
Issue Number: 1

Date: 29 April, 2019

Client: Enzygo Ltd (Manchester)
First Floor,
3 Hardman Square,
Manchester,
M3 3EB

Project Manager: David Oliver Frayne
Project Name: Lord Street
Project Ref: SHF.258.002
Order No: SHF.258.002
Date Samples Received: 12/04/19
Date Instructions Received: 17/04/19
Date Analysis Completed: 29/04/19

Prepared by:



Melanie Marshall
Laboratory Coordinator

Approved by:



John Gustafson
Managing Director

Envirolab Job Number: 19/03734

Client Project Name: Lord Street

Client Project Ref: SHF.258.002

Lab Sample ID	19/03734/2	19/03734/4	19/03734/5					Units	Limit of Detection	Method ref
Client Sample No	2	2	1							
Client Sample ID	BH1	BH2	BH3							
Depth to Top	0.75	2.00	0.50							
Depth To Bottom										
Date Sampled	09-Apr-19	10-Apr-19	11-Apr-19							
Sample Type	Soil	Soil	Soil							
Sample Matrix Code	5A	5AB	4AB							
% Stones >10mm _A	<0.1	4.5	36.1					% w/w	0.1	A-T-044
Cyanide (total) _A ^{M#}	<1	<1	<1					mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC _A	<0.2	<0.2	<0.2					mg/kg	0.2	A-T-050s
Organic matter _D ^{M#}	1.6	2.7	2.0					% w/w	0.1	A-T-032 OM
Arsenic _D ^{M#}	2	6	3					mg/kg	1	A-T-024s
Cadmium _D ^{M#}	0.7	0.7	0.6					mg/kg	0.5	A-T-024s
Copper _D ^{M#}	16	27	50					mg/kg	1	A-T-024s
Chromium _D ^{M#}	27	26	15					mg/kg	1	A-T-024s
Chromium (hexavalent) _D	<1	<1	<1					mg/kg	1	A-T-040s
Lead _D ^{M#}	12	33	141					mg/kg	1	A-T-024s
Mercury _D	<0.17	<0.17	0.33					mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	28	27	16					mg/kg	1	A-T-024s
Selenium _D ^{M#}	<1	<1	<1					mg/kg	1	A-T-024s
Zinc _D ^{M#}	51	62	103					mg/kg	5	A-T-024s
Asbestos in Soil (inc. matrix) ^										
Asbestos in soil _A [#]	NAD	NAD	NAD							A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A	N/A							

Envirolab Job Number: 19/03734

Client Project Name: Lord Street

Client Project Ref: SHF.258.002

Lab Sample ID	19/03734/2	19/03734/4	19/03734/5					Units	Limit of Detection	Method ref
Client Sample No	2	2	1							
Client Sample ID	BH1	BH2	BH3							
Depth to Top	0.75	2.00	0.50							
Depth To Bottom										
Date Sampled	09-Apr-19	10-Apr-19	11-Apr-19							
Sample Type	Soil	Soil	Soil							
Sample Matrix Code	5A	5AB	4AB							
PAH-16MS										
Acenaphthene _A ^{M#}	<0.01	<0.01	0.05					mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	<0.01	<0.01	<0.01					mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	<0.02	<0.02	0.11					mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	<0.04	<0.04	0.28					mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	<0.04	<0.04	0.27					mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	<0.05	<0.05	0.35					mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	<0.05	<0.05	0.18					mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	<0.07	<0.07	0.11					mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	<0.06	<0.06	0.27					mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	<0.04	<0.04	0.04					mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	<0.08	<0.08	0.56					mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	<0.01	<0.01	0.05					mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	<0.03	<0.03	0.20					mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	<0.03	<0.03	<0.03					mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	0.08	0.09	0.54					mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	<0.07	<0.07	0.58					mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	0.08	0.09	3.59					mg/kg	0.01	A-T-019s

Envirolab Job Number: 19/03734

Client Project Name: Lord Street

Client Project Ref: SHF.258.002

Lab Sample ID	19/03734/2	19/03734/4	19/03734/5					Units	Limit of Detection	Method ref
Client Sample No	2	2	1							
Client Sample ID	BH1	BH2	BH3							
Depth to Top	0.75	2.00	0.50							
Depth To Bottom										
Date Sampled	09-Apr-19	10-Apr-19	11-Apr-19							
Sample Type	Soil	Soil	Soil							
Sample Matrix Code	5A	5AB	4AB							
TPH UKCWG										
Ali >C5-C6 _A [#]	<0.05	<0.05	<0.01					mg/kg	0.01	A-T-022s
Ali >C6-C8 _A [#]	<0.05	<0.05	<0.01					mg/kg	0.01	A-T-022s
Ali >C8-C10 _A ^{M#}	<1	<1	<1					mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	<1	<1	<1					mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	<1	2	1					mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	<1	1	3					mg/kg	1	A-T-055s
Ali >C21-C35 _A	1	2	18					mg/kg	1	A-T-055s
Ali >C35-C44 _A	<1	<1	10					mg/kg	1	A-T-055s
Total Aliphatics _A	1	6	23					mg/kg	1	A-T-055s
Total Aliphatics _A	1	6	32					mg/kg	1	A-T-055s
Aro >C5-C7 _A [#]	<0.05	<0.05	<0.01					mg/kg	0.01	A-T-022s
Aro >C7-C8 _A [#]	<0.05	<0.05	<0.01					mg/kg	0.01	A-T-022s
Aro >C8-C10 _A ^{M#}	<1	1	1					mg/kg	1	A-T-055s
Aro >C10-C12 _A ^{M#}	<1	<1	1					mg/kg	1	A-T-055s
Aro >C12-C16 _A	2	3	6					mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	2	3	23					mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	3	6	67					mg/kg	1	A-T-055s
Aro >C35-C44 _A	<1	<1	14					mg/kg	1	A-T-055s
Total Aromatics _A	8	14	99					mg/kg	1	A-T-055s
Total Aromatics _A	8	14	113					mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C35) _A	9	20	121					mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C44) _A	9	20	145					mg/kg	1	A-T-055s
BTEX - Benzene _A [#]	<0.05	<0.05	<0.01					mg/kg	0.01	A-T-022s
BTEX - Toluene _A [#]	<0.05	<0.05	<0.01					mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	<0.05	<0.05	<0.01					mg/kg	0.01	A-T-022s
BTEX - m & p Xylene _A [#]	<0.05	<0.05	<0.01					mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	<0.05	<0.05	<0.01					mg/kg	0.01	A-T-022s
MTBE _A [#]	<0.05	<0.05	<0.01					mg/kg	0.01	A-T-022s

REPORT NOTES

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

Soil chemical analysis:

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

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:

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

Electrical Conductivity of water by Method A-T-037:

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

Secondary Matrix Codes:

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

Key:

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

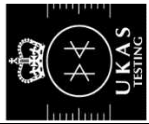
Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
BH1	4	D	1.50		Brown slightly gravelly sandy CLAY.
BH1	13	B	7.00		Brown very sandy clayey SILT.
BH1	22	U	13.00		Firm brown slightly gravelly slightly sandy CLAY.
BH1	20	B	12.00		Brown slightly gravelly slightly sandy CLAY.
BH1	28	B	15.00		Brown slightly gravelly slightly clayey very silty SAND.
BH2	8	D	2.70		Brown slightly gravelly sandy CLAY.
BH2	13	U	5.00		Very stiff brown slightly gravelly very sandy CLAY.
BH2	22	B	12.60		Brown very sandy very clayey SILT.
BH2	17	B	6.50		Brown clayey very silty SAND.
BH2	25	B	14.00		Brown slightly clayey very silty SAND.
BH3	7	B	2.80		Brown slightly gravelly sandy CLAY.
BH3	10	U	4.00		Very stiff brown slightly gravelly very sandy CLAY.
BH3	12	B	4.70		Brown slightly clayey very silty SAND.
BH3	18	S	10.50		Brown sandy slightly clayey SILT.



4043

PSL

Professional Soils Laboratory

Lord Street

Contract No:

PSL19/2628

Client Ref:

RT/19/63292

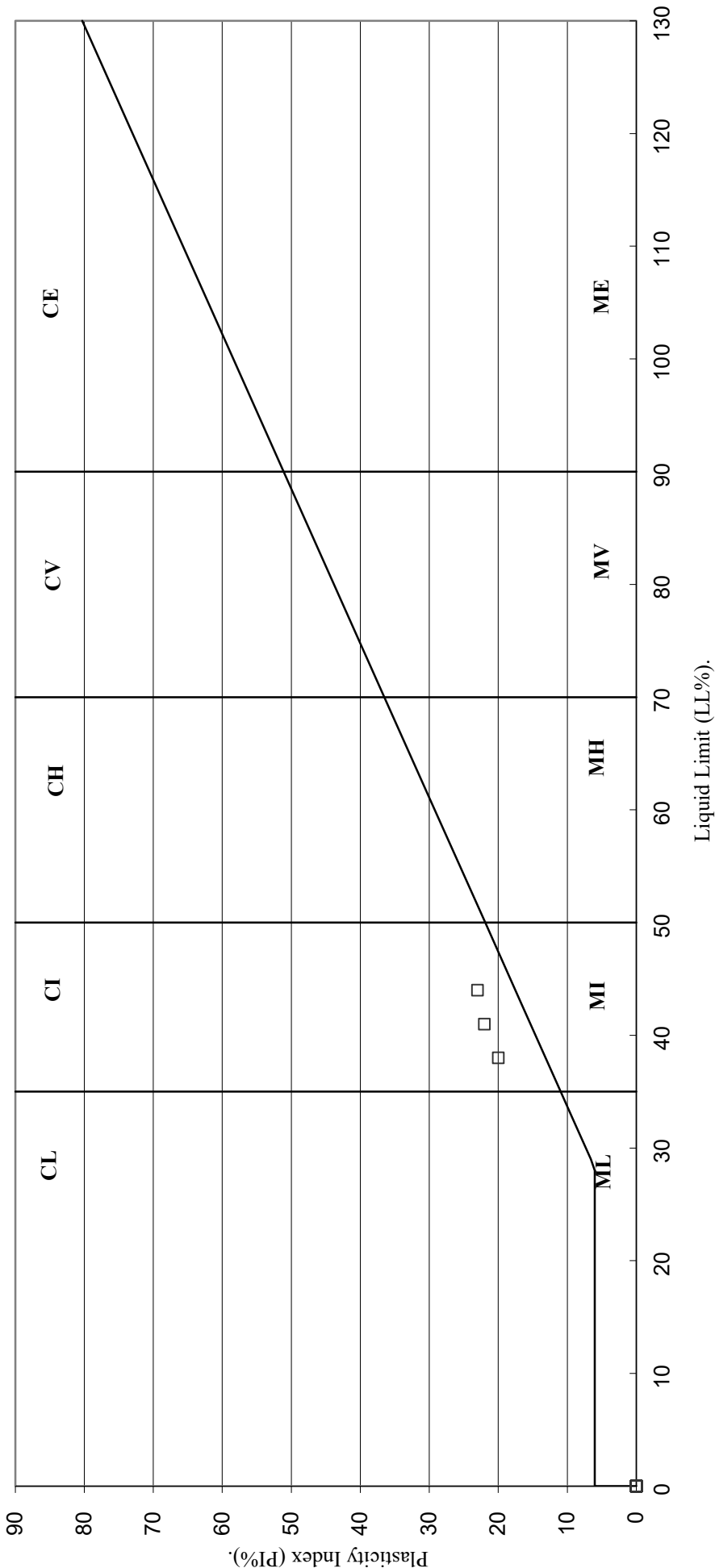
(BS1377 : PART 2 : 1990)

SYMBOLS: NP : Non Plastic

*** : Liquid Limit and Plastic Limit Wet Sieved.**

Lord Street	Contract No:
	PSL19/2628
	Client Ref:
	RT/19/63292

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



4043

PSL

Professional Soils Laboratory

Lord Street

Contract No:

PSL19/2628

Client Ref:

RT/19/63292

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

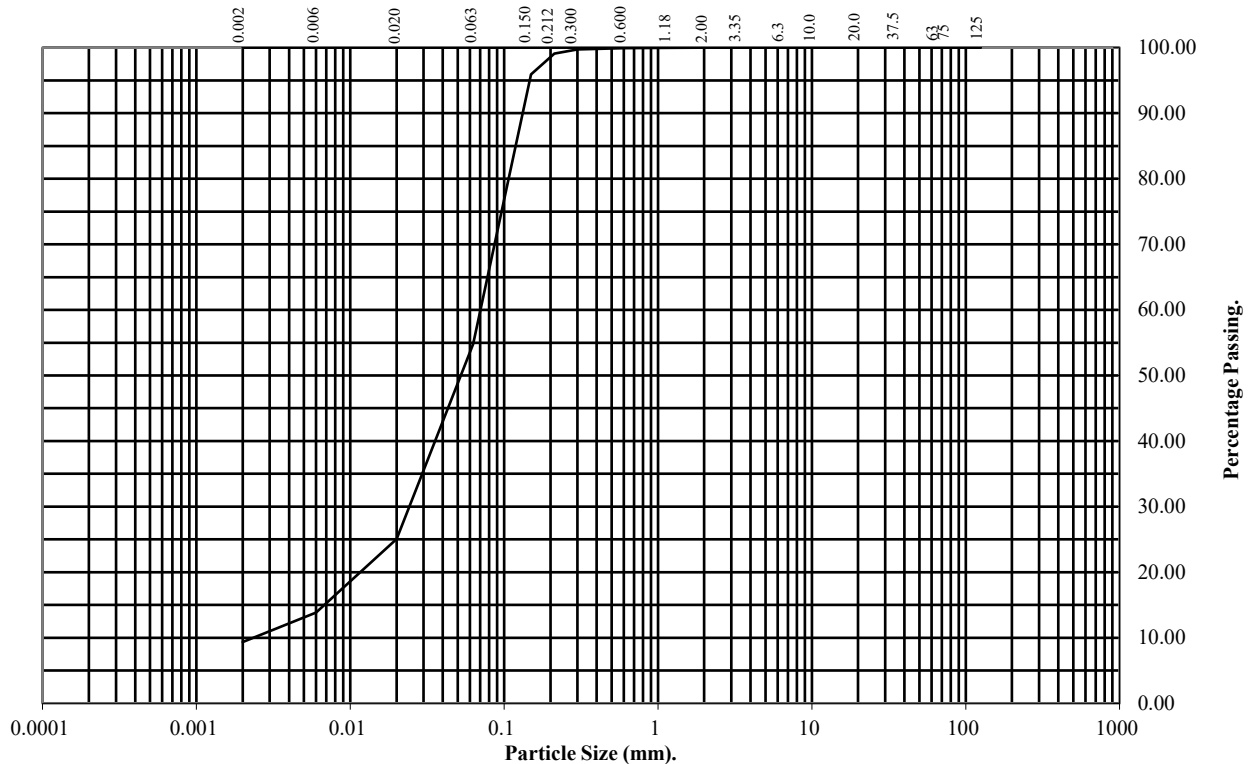
Hole Number: BH1

Top Depth (m): 7.00

Sample Number: 13

Base Depth(m):

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.6	100
0.3	100
0.212	99
0.15	96
0.063	55

Particle Diameter	Percentage Passing
0.02	25
0.006	14
0.002	9

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	45
Silt	46
Clay	9

Remarks:

See Summary of Soil Descriptions



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RT/19/63292

PARTICLE SIZE DISTRIBUTION TEST

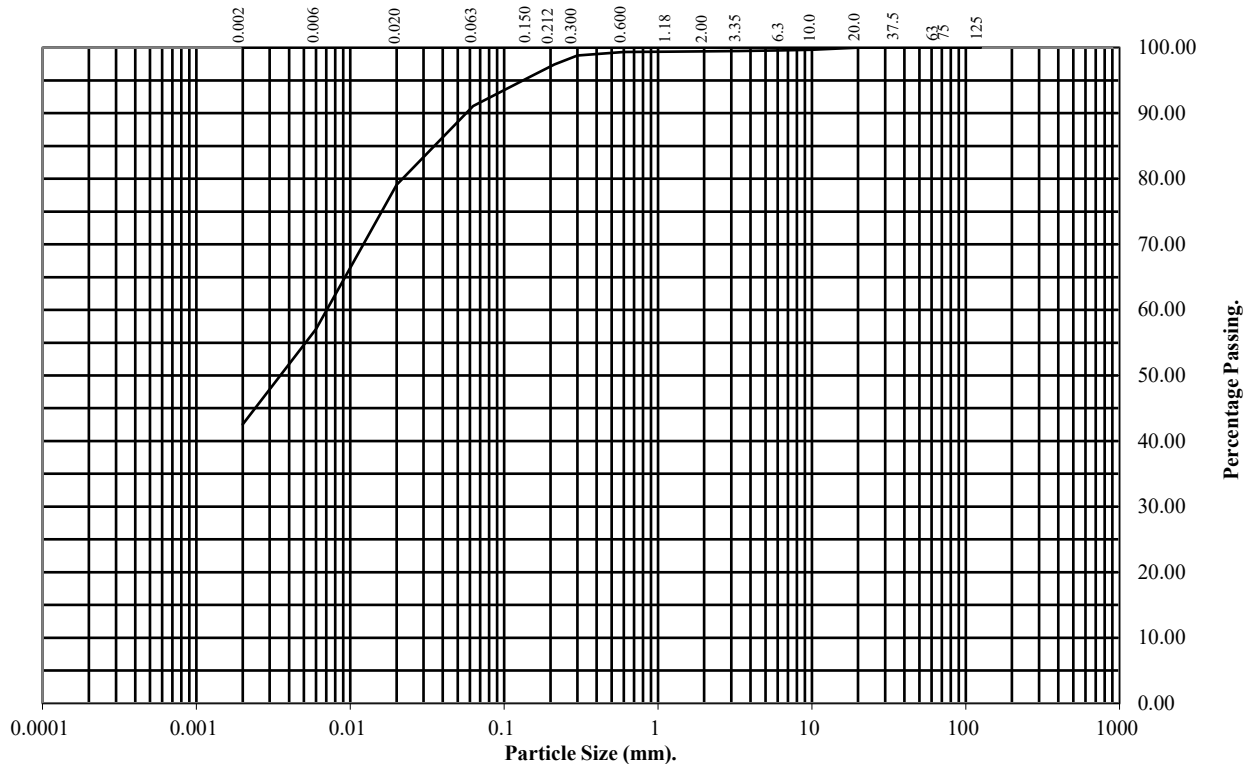
BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number: BH1 Top Depth (m): 12.00

Sample Number: 20 Base Depth(m):

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	99
2	99
1.18	99
0.6	99
0.3	99
0.212	97
0.15	96
0.063	91

Particle Diameter	Percentage Passing
0.02	79
0.006	57
0.002	43

Soil Fraction	Total Percentage
Cobbles	0
Gravel	1
Sand	8
Silt	48
Clay	43

Remarks:

See Summary of Soil Descriptions



PSL
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Lord Street

Contract No:
PSL19/2628
Client Ref:
RT/19/63292

PARTICLE SIZE DISTRIBUTION TEST

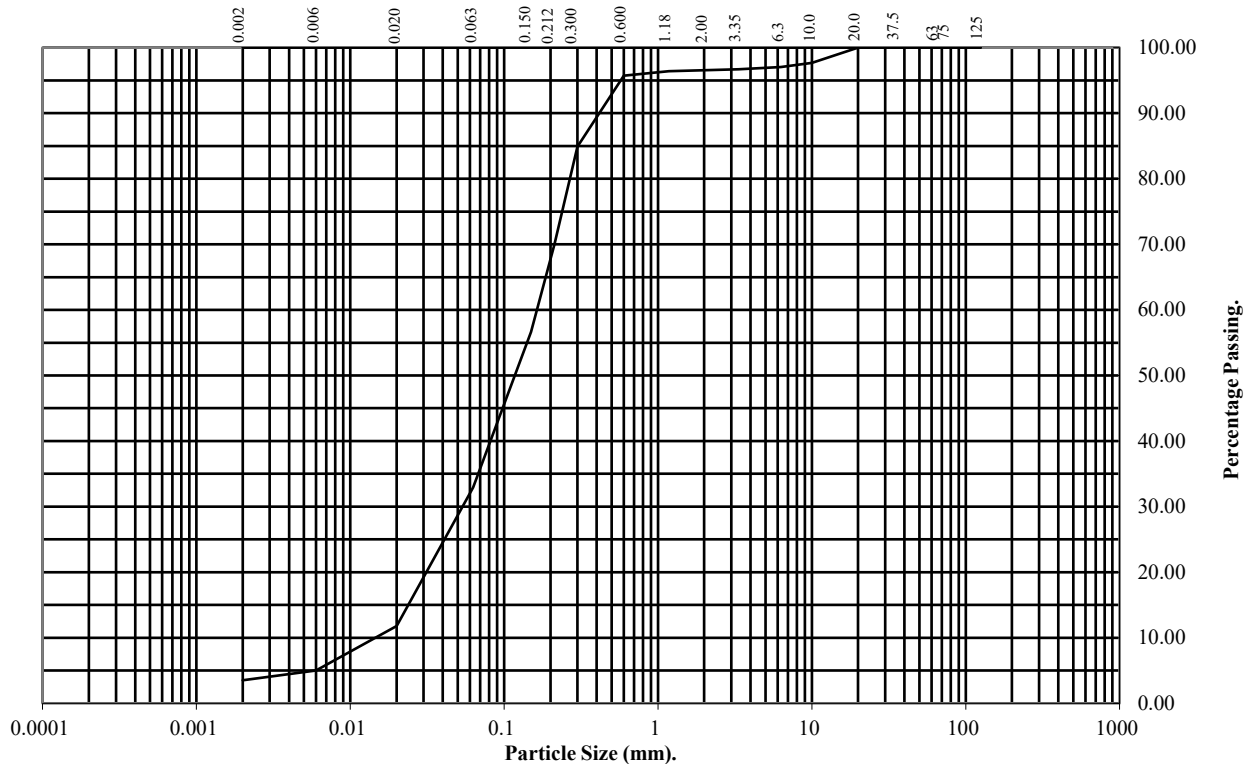
BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number: BH1 Top Depth (m): 15.00

Sample Number: 28 Base Depth(m):

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	98
6.3	97
3.35	97
2	97
1.18	96
0.6	96
0.3	85
0.212	70
0.15	57
0.063	33

Particle Diameter	Percentage Passing
0.02	12
0.006	5
0.002	4

Soil Fraction	Total Percentage
Cobbles	0
Gravel	3
Sand	64
Silt	29
Clay	4

Remarks:

See Summary of Soil Descriptions



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Lord Street

Contract No:
PSL19/2628
Client Ref:
RT/19/63292

PARTICLE SIZE DISTRIBUTION TEST

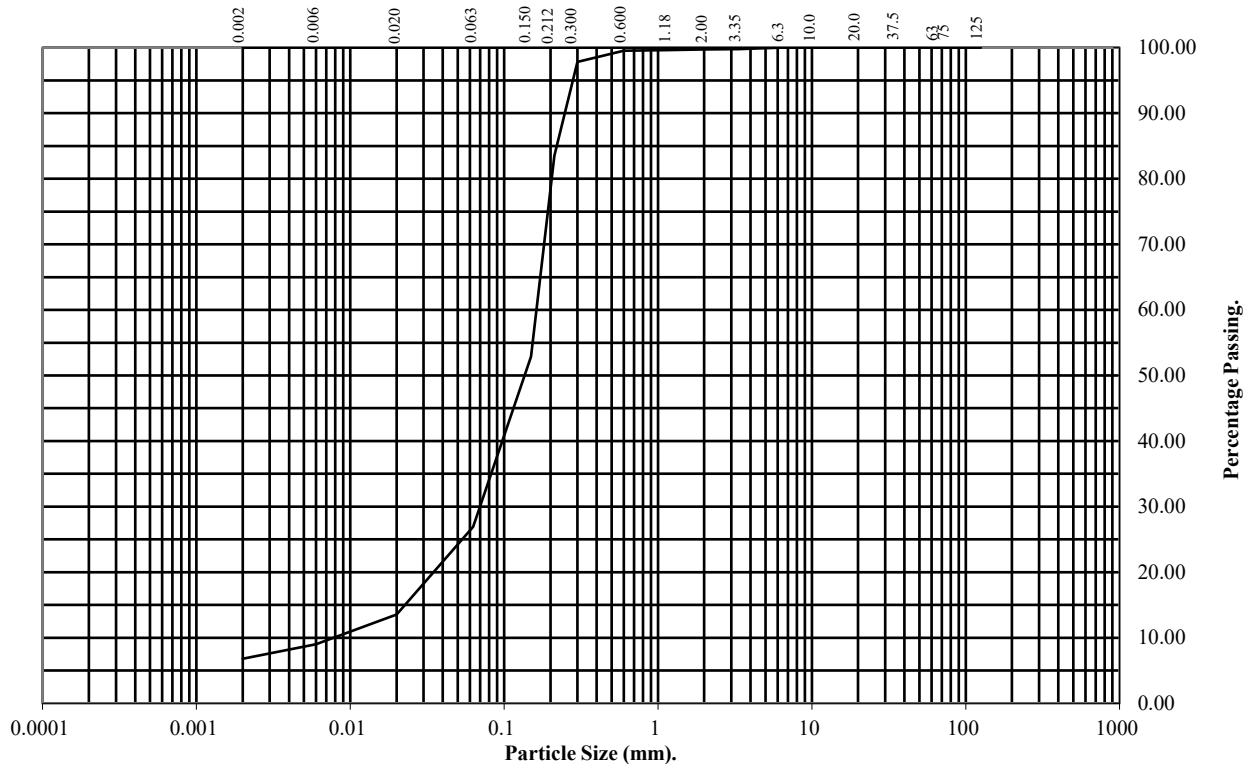
BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number: BH2 Top Depth (m): 6.50

Sample Number: 17 Base Depth(m):

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.6	100
0.3	98
0.212	84
0.15	53
0.063	27

Particle Diameter	Percentage Passing
0.02	14
0.006	9
0.002	7

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	73
Silt	20
Clay	7

Remarks:

See Summary of Soil Descriptions



PSL
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Lord Street

Contract No:
PSL19/2628
Client Ref:
RT/19/63292

PARTICLE SIZE DISTRIBUTION TEST

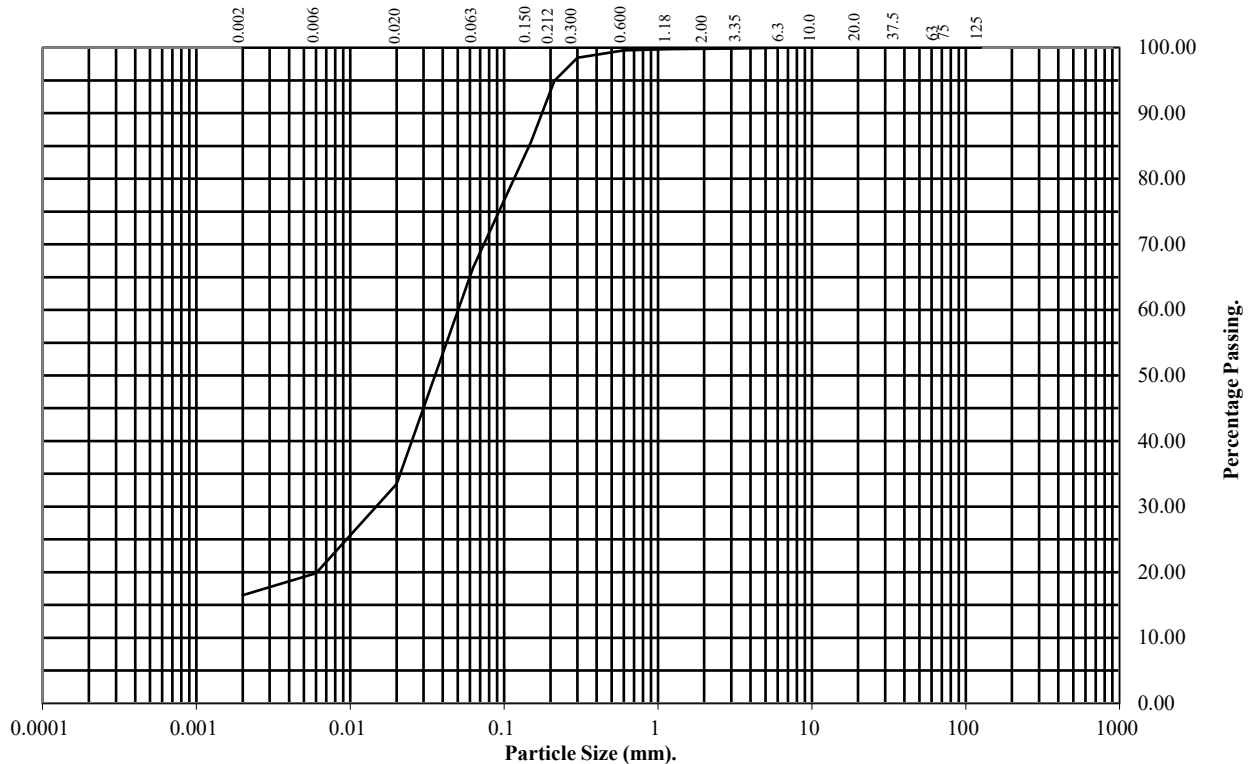
BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number: BH2 Top Depth (m): 12.60

Sample Number: 22 Base Depth(m):

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.6	100
0.3	98
0.212	95
0.15	86
0.063	66

Particle Diameter	Percentage Passing
0.02	33
0.006	20
0.002	16

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	34
Silt	50
Clay	16

Remarks:

See Summary of Soil Descriptions



PSL
Professional Soils Laboratory

Lord Street

Contract No:
PSL19/2628
Client Ref:
RT/19/63292

PARTICLE SIZE DISTRIBUTION TEST

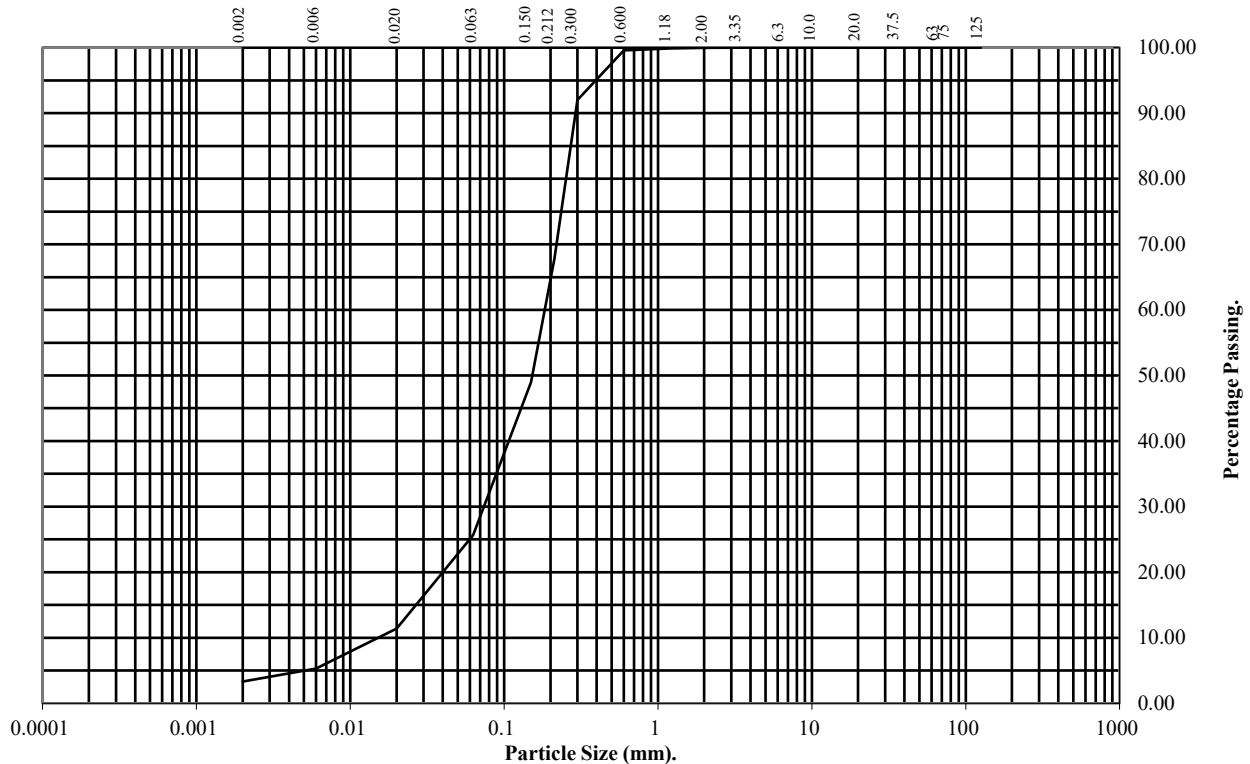
BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number: BH2 Top Depth (m): 14.00

Sample Number: 25 Base Depth(m):

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.6	100
0.3	92
0.212	68
0.15	49
0.063	26

Particle Diameter	Percentage Passing
0.02	11
0.006	5
0.002	3

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	74
Silt	23
Clay	3

Remarks:

See Summary of Soil Descriptions



PSL
Professional Soils Laboratory

Lord Street

Contract No:
PSL19/2628
Client Ref:
RT/19/63292

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

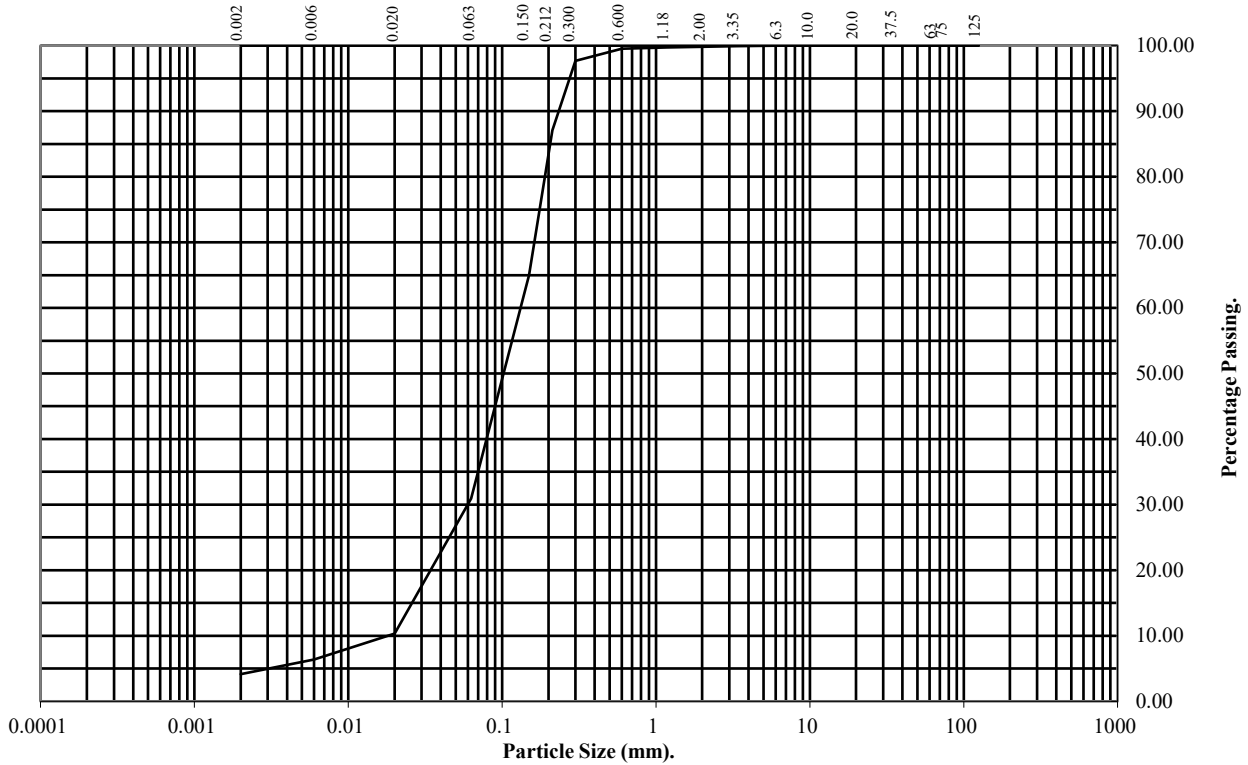
Hole Number: BH3

Top Depth (m): **4.70**

Sample Number: 12

Base Depth(m):

Sample Type: **B**



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.6	100
0.3	98
0.212	87
0.15	65
0.063	31

Particle Diameter	Percentage Passing
0.02	10
0.006	6
0.002	4

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	69
Silt	27
Clay	4

Remarks:

See Summary of Soil Descriptions



PSL

Professional Soils Laboratory

Lord Street

Contract No:

PSL19/2628

Client Ref:

RT/19/63292

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

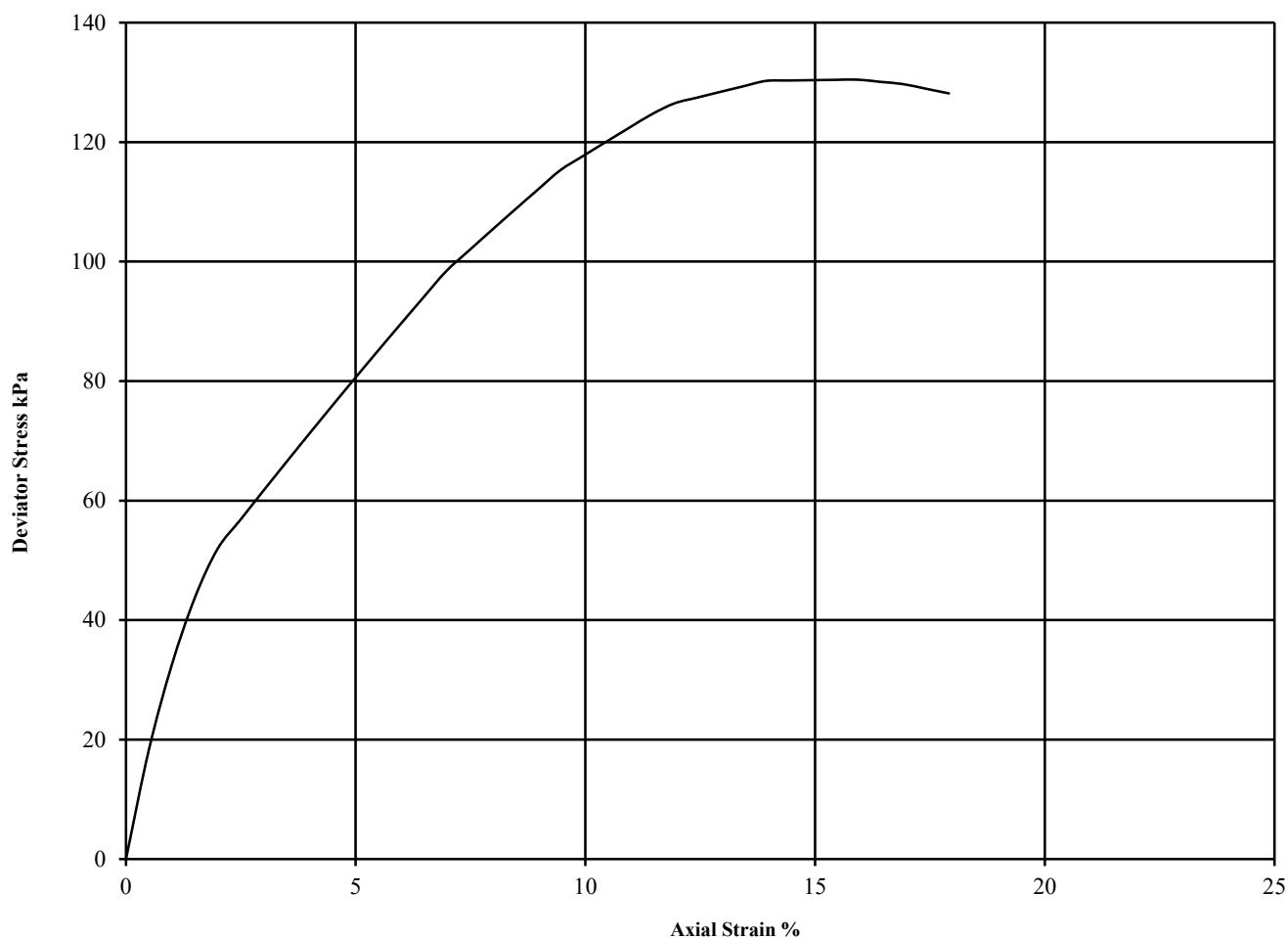
Hole Number: BH1

Top Depth (m): 13.00

Sample Number: 22

Base Depth (m):

Sample Type U



Diameter (mm):		103	Height (mm):		207	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m ³)	Dry Density (Mg/m ³)	Cell Pressure (kPa)	Corr. Max. Deviator Stress (kPa)	Shear Strength Cu (kPa)	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.34 See summary of soil descriptions
1	25	1.99	1.60	260	130	65	15.9	Plastic	



PSL
Professional Soils Laboratory

Lord Street

Contract No:

PSL19/2628

Client Ref:

RT/19/63292

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

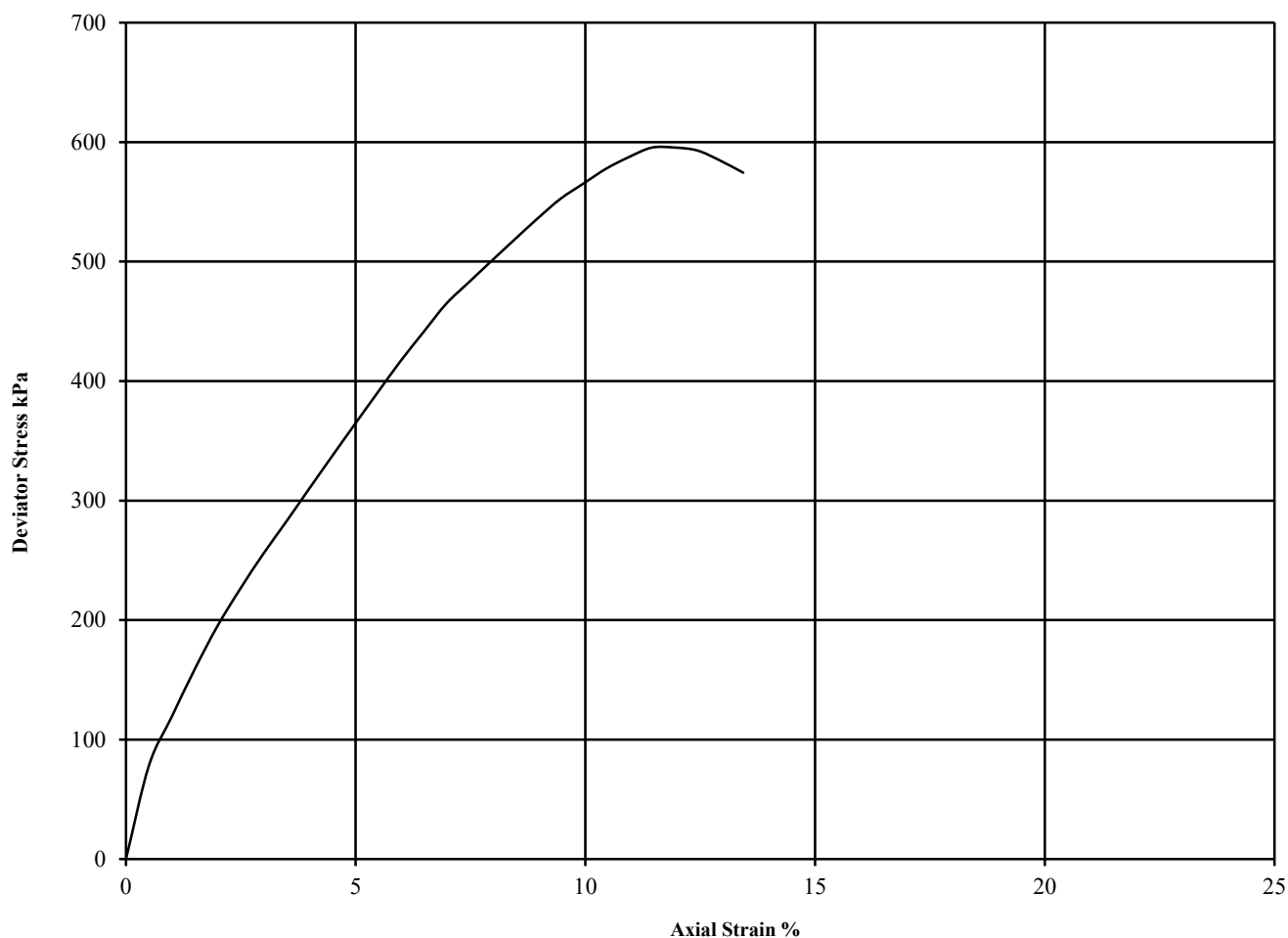
Hole Number: BH2

Top Depth (m): 5.00

Sample Number: 13

Base Depth (m):

Sample Type U



Diameter (mm):		103	Height (mm):		207	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m ³)	Dry Density (Mg/m ³)	Cell Pressure (kPa)	Corr. Max. Deviator Stress (kPa)	Shear Strength Cu (kPa)	Failure Strain (%)	Mode of Failure	Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.35 See summary of soil descriptions
				θ_3	$(\theta_1 - \theta_3)_f$	$\frac{1}{2}(\theta_1 - \theta_3)_f$			
1	16	2.17	1.88	100	595	298	11.9	Brittle	



PSL
Professional Soils Laboratory

Lord Street

Contract No:

PSL19/2628

Client Ref:

RT/19/63292

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

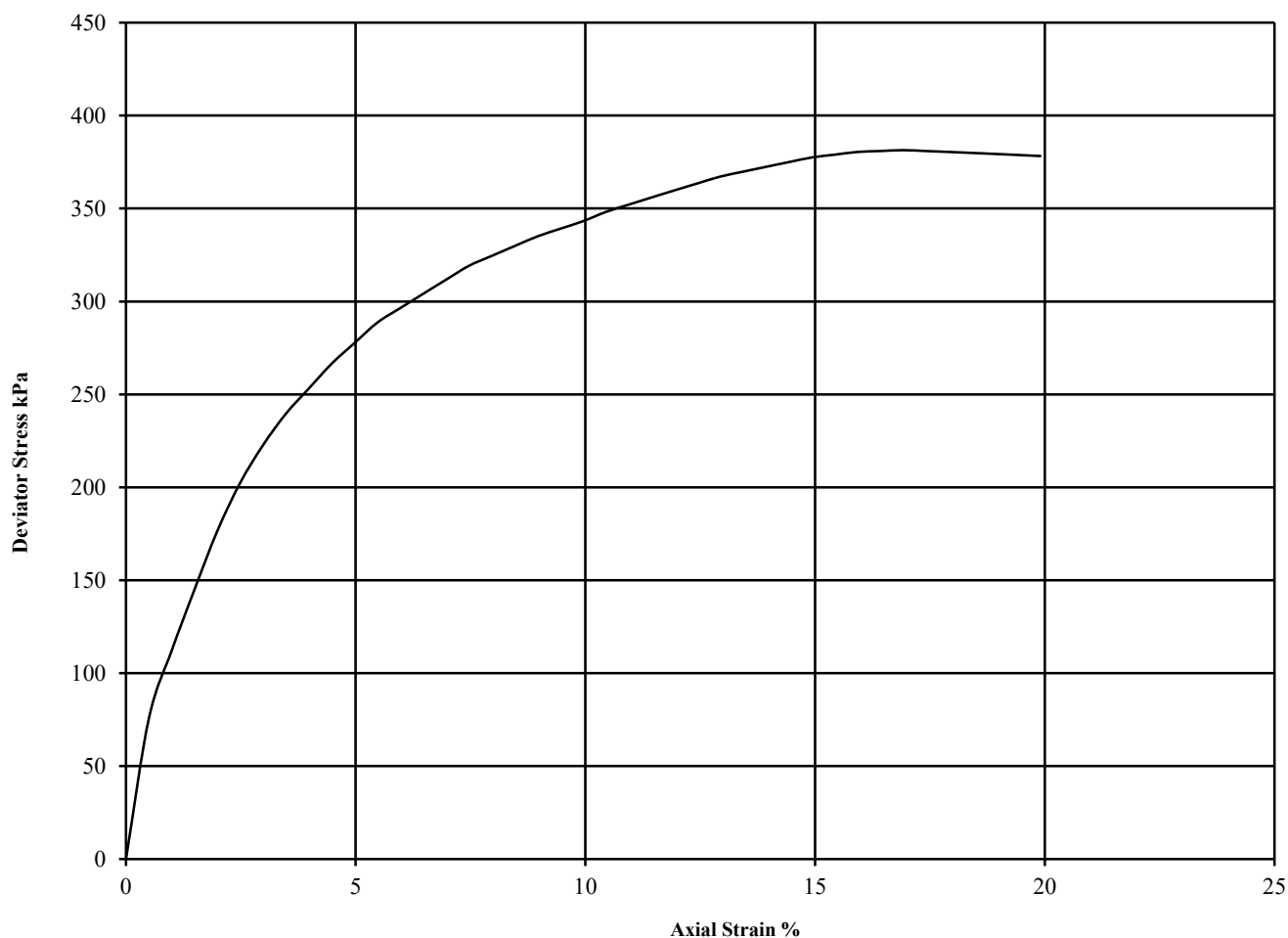
Hole Number: BH3

Top Depth (m): 4.00

Sample Number: 10

Base Depth (m):

Sample Type U



Diameter (mm):		103	Height (mm):		207	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	Cell Pressure (kPa) θ_3	Corr. Max. Deviator Stress (kPa) $(\theta_1-\theta_3)_f$	Shear Strength Cu (kPa) $^{1}/_2(\theta_1-\theta_3)_f$	Failure Strain (%)	Mode of Failure	Undisturbed Sample
									Sample taken from top of tube
									Rate of strain = 2 %/min
									Latex Membrane used 0.2 mm thick,
1	16	2.13	1.84	80	381	191	16.9	Plastic	Correction applied 0.34 See summary of soil descriptions



PSL
Professional Soils Laboratory

Lord Street

Contract No:

PSL19/2628

Client Ref:

RT/19/63292

ISRM Suggested Methods : 2007

***Note** All testing carried out on samples at as received water content

Par = parallel, Perp = perpendicular, U = Random

A = Axial, D = Diametral, I = Irregular

***Note**

Contract No:
PSL19/2628
Client Ref:
RT/19/63292

ISRM Suggested Methods : 2007

Par = parallel, Perp = perpendicular, U = Random

All testing carried out on samples as received water content

Par = parallel, Perp = perpendicular, U = Random

Lord Street

Contract No:

PSL19/2628

Client Ref:

RT/19/63292

ISRM Suggested Methods, pp 111–116, 1981.

PST
Professional Soils Laboratory

Contract No:	PSL19/2628	Client Ref:	RT/19/63292
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DETS

Certificate of Analysis

Certificate Number 19-08356

13-May-19

Client Professional Soils Laboratory Ltd
5/7 Hexthorpe Road
Hexthorpe
DN4 0AR

Our Reference 19-08356

Client Reference PSL19/2628

Order No (not supplied)

Contract Title Lord Street, Manchester

Description 9 Soil samples.

Date Received 07-May-19

Date Started 07-May-19

Date Completed 13-May-19

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By



Adam Fenwick
Contracts Manager





Summary of Chemical Analysis Soil Samples

Our Ref 19-08356
Client Ref PSL19/2628
Contract Title Lord Street, Manchester

Test	Method	LOD	Units	
Metals				
Magnesium Aqueous Extract	DETSC 2076*	10	mg/l	
Inorganics				
pH	DETSC 2008#			
Chloride Aqueous Extract	DETSC 2055	1	mg/l	
Nitrate Aqueous Extract as NO3	DETSC 2055	1	mg/l	
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	
Sulphur as S, Total	DETSC 2320	0.01	%	
Sulphate as SO4, Total	DETSC 2321#	0.01	%	

1497171	1497172	1497173	1497174	1497175	1497176	1497177	1497178	1497179
BH1	BH1	BH1	BH1	BH2	BH2	BH2	BH3	BH3
3.50	8.00	12.00	18.00	1.70	2.70	14.00	2.00-2.45	4.70
SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
03/05/19	03/05/19	03/05/19	03/05/19	03/05/19	03/05/19	03/05/19	03/05/19	03/05/19
n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s

Information in Support of the Analytical Results

Our Ref 19-08356
 Client Ref PSL19/2628
 Contract Lord Street, Manchester

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1497171	BH1 3.50 SOIL	03/05/19	PT 1L		
1497172	BH1 8.00 SOIL	03/05/19	PT 1L		
1497173	BH1 12.00 SOIL	03/05/19	PT 500ml		
1497174	BH1 18.00 SOIL	03/05/19	PT 1L		
1497175	BH2 1.70 SOIL	03/05/19	PT 1L		
1497176	BH2 2.70 SOIL	03/05/19	PT 500ml		
1497177	BH2 14.00 SOIL	03/05/19	PT 1L		
1497178	BH3 2.00-2.45 SOIL	03/05/19	PT 500ml		
1497179	BH3 4.70 SOIL	03/05/19	PT 500ml		

Key: P-Plastic T-Tub

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix 4 – Monitoring Results

Ground Gas and Groundwater Monitoring Record Sheet

JOB DETAILS:

Client: Beaumont Morgan Developments Ltd
Site: One Lord Street, Manchester
Date: 25/04/2019

Job No: SHF.248.002
Visit No: 1 of 6
Operator: DF

Project Manager: David Frayne



	GAS CONCENTRATIONS										VOLATILES		FLOW DATA				WELL AND WATER DATA					Comments
Monitoring Point	Methane (%v/v)		Carbon dioxide (%v/v)		Carbon Monoxide (ppm)		Hydrogen sulphide (ppm)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Water level (mbgl)	Depth of well (m)	Reduced level (mAOD)	Water level (mAOD)	Response Zone	
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady								
WS01	0	0	0.2	0.1	0	0	0	0	20.6	20.6	ND	ND	0	0	ND	ND	3.26	5	ND	ND		
BH01	0	0	0.5	0.3	0	0	0	0	20.7	20.7	ND	ND	0	0	ND	ND	13.18	20	ND	ND		
Max	0	0	0.5	0.3	0	0	0	0	20.7	20.7	0	0	0	0	0	0	13.18	20	0	0.00		
Min	0	0	0.2	0.1	0	0	0	0	20.6	20.6	0	0	0	0	0	0	3.26	5	0	0.00		
GSV (l/hr)	0		0																			

METEOROLOGICAL AND SITE INFORMATION:

(Select correct box with X or enter data, as applicable)

State of ground: Dry ☒ Moist ☐ Wet ☐ Snow ☐
Wind: Calm ☒ Light ☐ Moderate ☐ Strong ☐
Cloud cover: None ☐ Slight ☐ Cloudy ☒ Overcast ☐
Precipitation: None ☒ Slight ☐ Moderate ☐ Heavy ☐
Barometric pressure (mbar): 996 Before ☐ After ☐
Pressure trend: Falling ☒ Steady ☐ Rising ☐
Air Temperature (Deg. C): Before ☐ After ☐

INSTRUMENTATION TECHNICAL SPECIFICATIONS:

Ground gas meter:

Gas concentration: CH₄ CO₂ 0-100% O₂ 0-25% CO₂ ND O₂
Gas Range: CH₄ CO₂ 0-100% O₂ 0-25%
Gas Flow range: -100l/hr to +300l/hr
Differential Pressure: -0.10mbar to +0.80mbar
Date of last calibration:

Ground Gas and Groundwater Monitoring Record Sheet

JOB DETAILS:

Client: Beaumont Morgan Developments Ltd
Site: One Lord Street, Manchester
Date: 10/05/2019

Job No: SHF.248.002
Visit No: 2 of 6
Operator: DF

Project Manager: David Frayne



	GAS CONCENTRATIONS										VOLATILES		FLOW DATA				WELL AND WATER DATA					Comments
Monitoring Point	Methane (%v/v)		Carbon dioxide (%v/v)		Carbon Monoxide (ppm)		Hydrogen sulphide (ppm)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Water level (mbgl)	Depth of well (m)	Reduced level (mAOD)	Water level (mAOD)	Response Zone	
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady								
WS01	0	0	0.5	0.3	0	0	0	0	20.6	20.6	ND	ND	0	0	ND	ND	3.3	5	ND	ND		
BH01	0	0	0	0	0	0	0	0	20.7	20.7	ND	ND	0	0	ND	ND	13.16	20	ND	ND		
Max	0	0	0.5	0.3	0	0	0	0	20.7	20.7	0	0	0	0	0	0	13.16	20	0	0.00		
Min	0	0	0	0	0	0	0	0	20.6	20.6	0	0	0	0	0	0	3.3	5	0	0.00		
GSV (l/hr)	0		0																			

METEOROLOGICAL AND SITE INFORMATION:

(Select correct box with X or enter data, as applicable)

State of ground:	Dry	☒	Moist	☐	Wet	☐	Snow	☐
Wind:	Calm	☐	Light	☐	Moderate	☒	Strong	☐
Cloud cover:	None	☐	Slight	☐	Cloudy	☒	Overcast	☐
Precipitation:	None	☒	Slight	☐	Moderate	☐	Heavy	☐
Barometric pressure (mbar):		☐	Before	☐		☐	After	☐
Pressure trend:		☐	Falling	☐	Steady	☒	Rising	☐
Air Temperature (Deg. C):		☐	Before	☐		☐	After	☐

INSTRUMENTATION TECHNICAL SPECIFICATIONS:

Ground gas meter:

Gas concentration: CH₄ CO₂ 0-100% O₂ 0-25% CO₂ ND O₂

Gas Range: CH₄ CO₂ 0-100% O₂ 0-25%

Gas Flow range: -100l/hr to +300l/hr

Differential Pressure: -0.10mbar to +0.80mbar

Date of last calibration:

Ground Gas and Groundwater Monitoring Record Sheet

JOB DETAILS:

Client: Beaumont Morgan Developments Ltd
Site: One Lord Street, Manchester
Date: 16/05/2019

Job No: SHF.248.002
Visit No: 3 of 6
Operator: DF

Project Manager: David Frayne



	GAS CONCENTRATIONS										VOLATILES		FLOW DATA				WELL AND WATER DATA					Comments
Monitoring Point	Methane (%v/v)		Carbon dioxide (%v/v)		Carbon Monoxide (ppm)		Hydrogen sulphide (ppm)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Water level (mbgl)	Depth of well (m)	Reduced level (mAOD)	Water level (mAOD)	Response Zone	
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady								
WS01	0.1	0.1	0.4	0.4	0	0	0	0	20.6	20.6	ND	ND	0	0	ND	ND	3.1	5	ND	ND		
BH01	0	0	2	1.2	0	0	0	0	16	16	ND	ND	0	0	ND	ND	13.15	20	ND	ND		
Max	0.1	0.1	2	1.2	0	0	0	0	20.6	20.6	0	0	0	0	0	0	13.15	20	0	0.00		
Min	0	0	0.4	0.4	0	0	0	0	16	16	0	0	0	0	0	0	3.1	5	0	0.00		
GSV (l/hr)	0		0																			

METEOROLOGICAL AND SITE INFORMATION:

(Select correct box with X or enter data, as applicable)

State of ground: Dry ☒ Moist ☐ Wet ☐ Snow ☐
Wind: Calm ☒ Light ☐ Moderate ☐ Strong ☐
Cloud cover: None ☐ Slight ☐ Cloudy ☒ Overcast ☐
Precipitation: None ☒ Slight ☐ Moderate ☐ Heavy ☐
Barometric pressure (mbar): Before After
Pressure trend: Falling ☐ Steady ☒ Rising ☐
Air Temperature (Deg. C): Before After

INSTRUMENTATION TECHNICAL SPECIFICATIONS:

Ground gas meter:

Gas concentration: CH₄ CO₂ 0-100% O₂ 0-25% CO₂ ND O₂
Gas Range: CH₄ CO₂ 0-100% O₂ 0-25%
Gas Flow range: -100l/hr to +300l/hr
Differential Pressure: -0.10mbar to +0.80mbar
Date of last calibration:

Ground Gas and Groundwater Monitoring Record Sheet

JOB DETAILS:

Client: Beaumont Morgan Developments Ltd
Site: One Lord Street, Manchester
Date: 23/05/2019

Job No: SHF.248.002
Visit No: 4 of 6
Operator: DF

Project Manager: David Frayne



	GAS CONCENTRATIONS										VOLATILES		FLOW DATA				WELL AND WATER DATA					Comments
Monitoring Point	Methane (%v/v)		Carbon dioxide (%v/v)		Carbon Monoxide (ppm)		Hydrogen sulphide (ppm)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Water level (mbgl)	Depth of well (m)	Reduced level (mAOD)	Water level (mAOD)	Response Zone	
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady								
WS01	0	0	0.3	0.3	0	0	0	0	20.9	20.9	ND	ND	0	0	ND	ND	3.3	5	ND	ND		
BH01	0	0	0	0	0	0	0	0	20.7	20.7	ND	ND	0	0	ND	ND	13.18	20	ND	ND		
Max	0	0	0.3	0.3	0	0	0	0	20.9	20.9	0	0	0	0	0	0	13.18	20	0	0.00		
Min	0	0	0	0	0	0	0	0	20.7	20.7	0	0	0	0	0	0	3.3	5	0	0.00		
GSV (l/hr)	0		0																			

METEOROLOGICAL AND SITE INFORMATION:

(Select correct box with X or enter data, as applicable)

State of ground: Dry ☐ Moist ☒ Wet ☐ Snow ☐
Wind: Calm ☐ Light ☒ Moderate ☐ Strong ☐
Cloud cover: None ☐ Slight ☐ Cloudy ☒ Overcast ☐
Precipitation: None ☐ Slight ☐ Modera ☒ Heavy ☐
Barometric pressure (mbar): 1017 Before ☐ After ☐ 1017
Pressure trend: Falling ☒ Steady ☐ Rising ☐
Air Temperature (Deg. C): Before ☐ After ☐

INSTRUMENTATION TECHNICAL SPECIFICATIONS:

Ground gas meter:

Gas concentration: CH₄ CO₂ 0-100% O₂ 0-25% CO₂ ND O₂
Gas Range: CH₄ CO₂ 0-100% O₂ 0-25%
Gas Flow range: -100l/hr to +300l/hr
Differential Pressure: -0.10mbar to +0.80mbar
Date of last calibration:

Ground Gas and Groundwater Monitoring Record Sheet

JOB DETAILS:

Client: Beaumont Morgan Developments Ltd
Site: One Lord Street, Manchester
Date: 10/06/2019

Job No: SHF.248.002
Visit No: 5 of 6
Operator: DF

Project Manager: David Frayne



	GAS CONCENTRATIONS										VOLATILES		FLOW DATA				WELL AND WATER DATA					Comments
Monitoring Point	Methane (%v/v)		Carbon dioxide (%v/v)		Carbon Monoxide (ppm)		Hydrogen sulphide (ppm)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Water level (mbgl)	Depth of well (m)	Reduced level (mAOD)	Water level (mAOD)	Response Zone	
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady								
WS01	0.1	0.1	0.4	0.4	0	0	0	0	20.6	20.6	ND	ND	0	0	ND	ND	3.1	5	ND	ND		
BH01	0.1	0.1	3.3	3.3	0	0	0	0	16.2	16.1	ND	ND	0	0	ND	ND	13.18	20	ND	ND		
Max	0.1	0.1	3.3	3.3	0	0	0	0	20.6	20.6	0	0	0	0	0	0	13.18	20	0	0.00		
Min	0.1	0.1	0.4	0.4	0	0	0	0	16.2	16.1	0	0	0	0	0	0	3.1	5	0	0.00		
GSV (l/hr)	0		0																			

METEOROLOGICAL AND SITE INFORMATION:

(Select correct box with X or enter data, as applicable)

State of ground: Dry ☐ Moist ☒ Wet ☐ Snow ☐
Wind: Calm ☐ Light ☒ Moderate ☐ Strong ☐
Cloud cover: None ☐ Slight ☐ Cloudy ☒ Overcast ☐
Precipitation: None ☐ Slight ☐ Moderate ☐ Heavy ☒
Barometric pressure (mbar): 1008 Before ☐ After ☒
Pressure trend: Falling ☒ Steady ☐ Rising ☐
Air Temperature (Deg. C): Before ☐ After ☐

INSTRUMENTATION TECHNICAL SPECIFICATIONS:

Ground gas meter:

Gas concentration: CH₄ CO₂ 0-100% O₂ 0-25% CO₂ ND O₂
Gas Range: CH₄ CO₂ 0-100% O₂ 0-25%
Gas Flow range: -100l/hr to +300l/hr
Differential Pressure: -0.10mbar to +0.80mbar
Date of last calibration:

Ground Gas and Groundwater Monitoring Record Sheet

JOB DETAILS:

Client: Beaumont Morgan Developments Ltd
Site: One Lord Street, Manchester
Date: 10/06/2019

Job No: SHF.248.002
Visit No: 6 of 6
Operator: DF

Project Manager: David Frayne



	GAS CONCENTRATIONS										VOLATILES		FLOW DATA				WELL AND WATER DATA					Comments
Monitoring Point	Methane (%v/v)		Carbon dioxide (%v/v)		Carbon Monoxide (ppm)		Hydrogen sulphide (ppm)		Oxygen (%v/v)		PID Peak (ppm)	Product thickness (mm)	Flow rate (l/hr)		Differential borehole Pressure (Pa)	Time for flow to equalise (secs)	Water level (mbgl)	Depth of well (m)	Reduced level (mAOD)	Water level (mAOD)	Response Zone	
	Peak	Steady	Peak	Steady	Peak	Steady	Peak	Steady	Min.	Steady			Peak	Steady								
WS01	0	0	0.1	0.1	0	0	0	0	20.7	20.7	ND	ND	0	0	ND	ND	3.01	5	ND	ND		
BH01	0.1	0.1	2	2	0	0	0	0	17.9	17.9	ND	ND	0	0	ND	ND	13.28	20	ND	ND		
Max	0.1	0.1	2	2	0	0	0	0	20.7	20.7	0	0	0	0	0	0	13.28	20	0	0.00		
Min	0	0	0.1	0.1	0	0	0	0	17.9	17.9	0	0	0	0	0	0	3.01	5	0	0.00		
GSV (l/hr)	0		0																			

METEOROLOGICAL AND SITE INFORMATION:

(Select correct box with X or enter data, as applicable)

State of ground: Dry ☐ Moist ☒ Wet ☐ Snow ☐
Wind: Calm ☐ Light ☒ Moderate ☐ Strong ☐
Cloud cover: None ☐ Slight ☐ Cloudy ☒ Overcast ☐
Precipitation: None ☐ Slight ☐ Modera ☒ Heavy ☐
Barometric pressure (mbar): 1019 Before ☐ After ☐ 1019
Pressure trend: Falling ☐ Steady ☐ Rising ☒
Air Temperature (Deg. C): Before ☐ After ☐

INSTRUMENTATION TECHNICAL SPECIFICATIONS:

Ground gas meter:

Gas concentration: CH₄ CO₂ 0-100% O₂ 0-25% CO₂ ND O₂
Gas Range: CH₄ CO₂ 0-100% O₂ 0-25%
Gas Flow range: -100l/hr to +300l/hr
Differential Pressure: -0.10mbar to +0.80mbar
Date of last calibration:

Appendix 5 - Human Health Assessment Reference Values

Determinant	Units	GAC Value Residential					
		With Plant Uptake			Without Plant Uptake		
Arsenic	mg/kg	37			40		
Cadmium	mg/kg	11			85		
Chromium	mg/kg	910			910		
Chromium VI	mg/kg	6			6		
Lead	mg/kg	200			310		
Mercury	mg/kg	40			56		
Nickel	mg/kg	130			180		
Selenium	mg/kg	250			430		
Copper	mg/kg	2400			7100		
Zinc	mg/kg	3700			40000		
Cyanide	mg/kg	791			800		
SOM	%	1	2.5	6	1	2.5	6
Phenol	mg/kg	280	550	1100	750	1300	2300
Napthalene	mg/kg	2.3	5.6	13	2.3	5.6	13
Acenaphthylene	mg/kg	170	420	920	2900	4600	6000
Acenaphthene	mg/kg	210	510	1100	3000	4700	6000
Flourene	mg/kg	170	400	860	2800	3800	4500
Phenanthrene	mg/kg	95	220	440	1300	1500	1500
Anthracene	mg/kg	2400	5400	11000	31000	35000	37000
Fluoranthene	mg/kg	280	560	890	1500	1600	1600
Pyrene	mg/kg	620	1200	2000	3700	3800	3800
Benzo(a)Anthracene	mg/kg	7.2	11	13	11	14	15
Chrysene	mg/kg	15	22	27	30	31	32
Benzo(b)Flouranthene	mg/kg	2.6	3.3	3.7	3.9	4.0	4.0
Benzo(k)Flouranthene	mg/kg	77	93	100	110	110	110
Benzo(a)Pyrene	mg/kg	2.2	2.7	3.0	3.2	3.2	3.2
Indeno(123-cd)Pyrene	mg/kg	27	36	41	45	46	46
Dibenzo(a,h)Anthracene	mg/kg	0.24	0.28	0.3	0.31	0.32	0.32
Benzo(ghi)Perylene	mg/kg	320	340	350	360	360	360
TPH C ₅ -C ₆ Aliphatic	mg/kg	42	78	160	42	78	160
TPH C ₆ -C ₈ Aliphatic	mg/kg	100	230	530	100	230	530
TPH C ₈ -C ₁₀ Aliphatic	mg/kg	27	65	150	27	65	150
TPH C ₁₀ -C ₁₂ Aliphatic	mg/kg	130	330	760	130	330	770
TPH C ₁₂ -C ₁₆ Aliphatic	mg/kg	1100	2400	4300	1100	2400	4400
TPH C ₁₆ -C ₃₅ Aliphatic	mg/kg	65000	92000	110000	65000	92000	110000
TPH C ₃₅ -C ₄₄ Aliphatic	mg/kg	65000	92000	110000	65000	92000	110000
TPH C ₅ -C ₇ Aromatic	mg/kg	70	140	300	370	690	1400
TPH C ₇ -C ₈ Aromatic	mg/kg	130	290	660	860	1800	3900
TPH C ₈ -C ₁₀ Aromatic	mg/kg	34	83	190	47	110	270
TPH C ₁₀ -C ₁₂ Aromatic	mg/kg	74	180	380	250	590	1200
TPH C ₁₂ -C ₁₆ Aromatic	mg/kg	140	330	660	1800	2300	2500
TPH C ₁₆ -C ₂₁ Aromatic	mg/kg	260	540	930	1900	1900	1900
TPH C ₂₁ -C ₃₅ Aromatic	mg/kg	1100	1500	1700	1900	1900	1900
TPH C ₃₅ -C ₄₄ Aromatic	mg/kg	1100	1500	1700	1900	1900	1900
Benzene	mg/kg	0.087	0.17	0.37	0.38	0.70	1.4
Toluene	mg/kg	130	290	660	880	1900	3900
Ethylebenzene	mg/kg	47	110	260	83	190	440
Xylene	mg/kg	56	130	310	79	180	430

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Appendix D: Existing Sewer Records



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Appendix E: Environment Agency's Flood Map

Flood map for planning

Your reference
Unspecified

Location (easting/northing)
384138/399430

Created
30 June 2025 16:02

Your selected location is in flood zone 1, an area with a low probability of flooding.

You will need to do a flood risk assessment if your site is **any of the following**:

- bigger than 1 hectare (ha)
- in an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

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Flood map for planning

Your reference

Unspecified

Location (easting/northing)

384138/399430

Scale

1:2,500

Created

30 Jun 2025 16:02

-  Selected area
-  Flood zone 3
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Water storage area



0 20 40 60m

Appendix F: Drainage Strategy