



Phase II Geoenvironmental Site Assessment
Eliza Yard, Jersey Street, Ancoats, Manchester

Reference:13-350-R2
Date: May 2021



PHASE II GEOENVIRONMENTAL SITE ASSESSMENT

Eliza Yard
Jersey Street,
Manchester,
M4 6JW

Prepared for:

Manchester Life Development Company 2 Limited

Report Ref: 13-729-R2-RevB

Date Issued: May 2021

E3P

Heliport Business Park
Liverpool Road
Eccles
Manchester
M30 7RU

+ 44 (0) 161 707 9612
<https://e3p.co.uk/>

Registered in England
CRN: 807255262

QUALITY ASSURANCE

PROJECT NUMBER	13-729		
VERSION	Version 1	Rev A	Rev B
REMARKS	Draft for Comment	Final	Final - Combining Gas Monitoring Results
DATE	February 2020	March 2021	May 2021
PREPARED BY	E. Moss	E. Moss	E. Moss
QUALIFICATIONS	BSc.(Hons), FGS	BSc.(Hons), FGS	BSc.(Hons), FGS
SIGNATURE			
CHECKED BY	R. Walker	R. Walker	R. Walker
QUALIFICATIONS	BSc.(Hons), FGS, AIEMA, AMICE	BSc.(Hons), FGS, AIEMA, AMICE	BSc.(Hons), FGS, AIEMA, AMICE
SIGNATURE			
AUTHORISED BY	M Dyer	M Dyer	M Dyer
QUALIFICATIONS	BSc, FGS, AIEMA, MEnvSc, CEnv	BSc, FGS, AIEMA, MEnvSc, CEnv	BSc, FGS, AIEMA, MEnvSc, CEnv
SIGNATURE			

EXECUTIVE SUMMARY

Site Address	Manchester Life, Back of Ancoats Phase 1 – Eliza Yard.	
Grid Reference	E 385200, N 398770	
Site Area	0.29 Hectares	
Current Site Use	The Site is bounded by Poland Street to the west, Jersey Street to the south, the City Court Trading Estate to the north, and a surface car park to the east. The Site can be accessed by pedestrians and vehicles via Jersey Street. The Site is currently used as a surface car park accessed from Jersey Street. The Site is enclosed by various means including security fencing and a wall along Poland Street. The existing surfacing consists of areas of hardstanding with limited areas of self-seeded vegetation. Modern industrial units lie to the north and west of the Site with the residential neighbourhood of Miles Platting further beyond to the east. The Rochdale Canal is located 0.1km south of the Site.	
Proposed Development	Development of land bounded by Poland Street to the west and Jersey Street to the south to deliver 118 residential units, ground floor commercial floorspace, and ancillary amenity space within an 8 storey building, cycle parking provision, hard and soft landscaping, access and servicing and other associated works.	
Environmental Setting	Drift Geology	Glacial Till (Devensian) – Diamicton
	Bedrock Geology	Manchester Marls Formation – Mudstone
	Faults	The Bradford Fault intersects the west and dips to the south west.
	Hydrogeology	Secondary Undifferentiated aquifer strata overlying a Secondary B Aquifer (Bedrock Geology). The site is within 40m of a nitrate vulnerable zone.
Environmental Setting	Hydrology	Historic mapping dated 1948 shows the site being intersected by Bengal Arm canal before being later cut off from the main canal to the south and eventually infilled. It is possible a connection remains. The River Irk runs circa 880m to the north. There are no groundwater abstraction points located within 1 km of the site
	Flood Risk	The site is located within Flood Risk Zone 1 and is considered unaffected by river flooding.
	Ecology	A number of semi and mature trees are present in the northern periphery of the site. The canal to the south is should also be considered as potentially supporting ecosystems.
	Subsidence Hazards	No hazard identified in data searches.



Site History	The site formerly had the canal branch (Bengal Arm) running east west along the northern boundary which was also infilled in the mid / late 1950's. From the earliest mapping the site has featured a wharf that later became corporation yard and a number of smaller industrial units. The was redeveloped in the late 50s, featuring a factory building in the west with a timber yard to the east.
Landfill Sites and Ground Gases	There are no current or historic landfill sites within 250 m of the site. However, there are two areas of potentially infilled land (Infilled Canal arm) within the site boundary and further areas within 250 m of the site (Further Canal infilling, phases of redevelopment/upfilling/grading) There are likely varying depths of Made Ground generated from historical development, demolition works, infilling of canal and areas of potentially infilled land. The presence of historic Made Ground may result in the generation of hazardous ground gases (such as carbon dioxide & methane) which can accumulate within deep excavations or migrate through permeable strata, foundation structures and/or service ducting and pose a potential low-level risk to construction workers and future residential site users.
Radon	Unaffected – no special precautions required.
Coal Mining/Land Stability	Geological mapping for the area notes that four seams are located to the north east of the site including Openshaw Coal Seam (875 m), Charlotte Coal (980 m), Bradford Threequarters Coal (1020 m) and Bradford Four Foot Coal (1030 m). All seams are dipping towards the site in a south westerly direction. The closest seam to site is the Openshaw Coal Seam which would be circa 75 m beneath the east of the site and is therefore deemed to be of low risk. Geological mapping also shows that the Bradford Fault intersects the west of the site and dips south west. There are no mine entries within 100 m of the site boundary. Based on the above the site has been deemed to be in an area of low risk and further assessment is therefore not required.
Hazardous Installations	No hazardous installations that could potentially prejudice the proposed construction of highly sensitive residential dwellings have been identified within influencing distance of the subject site.

SITE INVESTIGATION

Ground Investigation Works	E3P has completed an intrusive ground investigation comprising mechanically excavated trial pits, mechanically excavated trial trenches, window sample boreholes, cable percussive boreholes, ground water sampling, ground gas monitoring, geotechnical and environmental sampling and environmental monitoring installations
-----------------------------------	--



Ground Conditions	MADE GROUND Made Ground was encountered within all exploratory holes between ground level and 2.50 m bgl. The full depth of Made Ground was not determined in several exploratory hole locations due to the presence of obstructions, ingress of groundwater flooding the excavation and suspected basement floor slabs. The majority of exploratory holes were surfaced by concrete between ground level and 0.30 m bgl. TT102B, TT103A, TT103B, TT104A and TT104B were all underlain by concrete slabs below ground level between 0.50 m and 1.20 m bgl. Made Ground mainly comprised gravelly black ash with frequent cobbles with gravel of mudstone, concrete, brick and asphalt and cobbles of brick which was encountered between ground level and 2.50 m bgl. Gravelly ash which presented a strong hydrocarbon odour and sheen were encountered within TT101A, TT102A, TT104A, TP106, TP107, TP108, TP110 and WS109. Visual and olfactory contamination was present in the north and east of The site associated with the historically infilled canal. Large obstructions including brick and concrete were encountered within the majority of exploratory hole locations. A brick wall was encountered within the west and north of TT101B between ground level and 1.2 m. A brick wall was also encountered between the centre of TT101A and TT101B between ground level and 0.70 m bgl. Brick walls were also noted in TP105.
	DRIFT The natural drift deposits were identified across the site and were found to be generally uniform across the area. Natural clay strata directly underlay the Made Ground. Drift deposits comprised firm to very stiff brown slightly gravelly CLAY which was encountered between 0.60 m and 5.45 m bgl. Cable percussive drilling investigated the deeper soil horizons where natural clay strata was found to depths in excess of 10m bgl to a maximum proven depth of 13.80m bgl.
	SOLID Bedrock has been identified within the deeper exploratory hole locations completed by cable percussive drilling boreholes subsequent to the original site investigation. These identify bedrock at depths between 10.00m and 13.80m bgl. The closest BGS borehole encountered sandstone bedrock at 23.0 m bgl and confirms a dip to the west as identified in the E3P ground investigation.
	GROUNDWATER Groundwater strikes were encountered as seepages and what was considered to be water held within the former infilled reservoir. These were generally encountered between 0.70m and 2.20m bgl



CONTAMINATED LAND ASSESSMENT

Human Health	A Tier I human health risk assessment has been undertaken using the chemical analysis results of the soils and comparing to the relevant Tier I criteria. Laboratory analysis of the soils across the site has indicated the presence of elevated metals, non-volatile PAHs, and non-volatile TPH compounds within the Made Ground. Chlorinated solvents, naphthalene, mercury and volatile TPH were also identified throughout the site. Asbestos was also identified in six samples out of eight submitted for analysis by E3P. The majority of the identified elevated concentrations have primary exposure pathways related to dermal contact and ingestion, soil ingestion and consumption of homegrown produce. Where soils remain, these exceedances can be mitigated by the installation of a 300 mm chemically suitable cover system within all proposed landscaping areas. With regards to the elevated SVOCs, VOCs, naphthalene, mercury and TPHs, these present a potential volatilisation to indoor air risk and have been identified throughout the site. Further works will be required to appropriately assess the potential vapour production through vapour monitoring and DQRA and therefore the mitigation measures required to reduce the risk. Alternatively, a vapour membrane will be required in the structure of the building. With regards to the asbestos quantification identified in TP106 at 0.50 m, TP108 at 2.10m, TT104A at 2.20m, concentrations are below <0.001%. However, three samples were noted to have asbestos above >0.001% including TT101 at 1.20 m bgl (0.005%), TT103A at 1.50 m (0.002%) and TT102 A at 1.10 m bgl (0.100%). With reference to the E3P Asbestos Conceptual Site Model, Made Ground deposits will require placement below plots or a 300mm cover system (150mm topsoil, 150mm subsoil) in order to mitigate the risks to future residential end users (Figure 9.1) from asbestos <0.001%. Where asbestos is found >0.001% but <0.1% this can be placed at greater than 1.00m bgl. No sources of suitable topsoil have been identified on site. Chemical analysis of the natural clay drift deposits have identified these soils to be acceptable for use as subsoil within the proposed garden areas; with the exception of soils in the proximity of TP106 where exceedances in naphthalene have been identified.
Controlled Waters	A Tier 1 GQRA has been completed based on the leachate analysis of soils and groundwater samples obtained from boreholes during a post site investigation visit. This assessment identified the underlying aquifer as the most likely risk receptor given its sensitivity. The results of the assessment found Arsenic, lead, pH, Naphthalene, TPHC12-C35 fractions all elevated above the DWG criteria. Perched water within the former infilled canal is currently considered a risk, the boundary will require a stank in order to pump out the perched water and manage in a waste compliant manner. However, given the source can predominantly be associated to Made Ground and the lack of a viable migration pathway in the presence of significant thicknesses of low permeability clay protecting the underlying aquifer there is considered to be a resulting low risk to control waters at the subject site.



Ground Gas	Ground gas monitoring confirms that the site would be classed as Characteristic Situation 1, as such no gas protection measures will be required. Vapour membranes may be required given the potentially volatile nature of the contaminants identified in the infilled soils. Further assessment is required to determine.
Potable Water Infrastructure	This will need to be confirmed following the completion of a UKWIR risk assessment. Post-remediation and enabling works ground conditions may be different from those identified during this site investigation.

GEOTECHNICAL ASSESSMENT

Underground Obstructions	Significant concrete and brick obstructions have been encountered within the Made Ground, indicative of relic foundations from the former buildings and infilled canal running through the site. The presence of obstructions, brick walls and suspected concrete slabs also resulted in the premature termination in a number of locations. During a phase of cut-and-fill enabling works to create a developable platform, all below-ground obstructions will require grubbing out to the base of the Made Ground to enable the construction of proposed plots. Alternatively, controlled removal of obstructions in areas of sub structure only could be considered.
Allowable Bearing Pressure	Based on the assessment of the relative undrained shear strength, relative in-situ densities and corresponding safe net allowable bearing pressure, the suitable target founding stratum has been identified as the underlying firm to very stiff CLAY and localised areas of medium-dense sands. Within The site the underlying natural drift deposits comprised firm to very stiff CLAY with an ABP in the order of 100kN/m² achievable at 2.00m bgl increasing in excess of 120kN/m² from 3.00m bgl.
Foundation Options	Given the nature of the proposed development and the high rise nature, it is envisaged that an engineering structural design will be required to support the structure. As such given our experience of similar sites and construction types a driven or CFA pile will be the most viable in order to support a pad or strip footing in order to form the building. Foundation depths within the conjectured influence of former, existing or proposed trees will need to be deepened to ensure that structural loading bears within the underlying target founding stratum, which cannot be subject to volumetric instability associated with fluctuation in moisture content.
Building Floor Slabs	Ground-bearing floor slabs are unlikely to be viable given the anticipated depths or reworked Made Ground > 600 mm and shallow cohesive soils.
Heave Precautions	As the underlying cohesive deposits are deemed to be predominately of Moderate Volume Change Potential, Heave Precautions are required to the internal face of the external load bearing walls (outside or within tree influence).
Soakaway Drainage	The Made Ground and underlying soils are cohesive in nature and impacted by low-level inorganic and hydrocarbon compounds which would preclude the use of infiltration drainage systems.



	As part of the site investigation falling head permeability testing has been completed utilising the monitoring well installations. This assessment confirms that the material does not have sufficient permeability characteristics to support a drainage system however, where this drainage system is required, soakaway testing in accordance with BRE365 should be completed to inform the subsequent specialist design.
Sulphate Assessment	Concrete classification will be DS1 AC1s.
CBR Design %	Made Ground can be re-engineered to ensure a CBR in the order of 15%. Natural granular soils, if encountered can be re-engineered to provide 3-5% within the sub-grade during favourable climatic conditions. Natural clay soils will provide a CBR in the order of 2-4% during drier climatic periods, however if water is allowed to shed onto the formation, the CBR will reduce to <2% which will require specialist engineering of the sub-grade.
Cut/Fill	Development levels unknown at this time, however some cut fill will be required. It is likely that a significant quantity of recycled aggregate will be generated during the demolition of slabs and sub-structures.
Civil Engineering Excavations	The E3P Intrusive Ground Investigation has not identified the presence of weathered/competent bedrock at a shallow depth.
Waste Characterisation	Further testing will be required for waste classification. Any material that is to be disposed off-site should undergo assessment using Technical Guidance WM3: Waste Classification – <i>Guidance on the classification and assessment of waste</i> .

RECOMMENDATIONS

Based on the findings of the geoenvironmental site assessment, the following additional works are recommended to be completed in due course:

- Supplementary vapour risk assessment;
- Geotechnical earthworks strategy (infrastructure);
- Remediation and enabling works strategy.
- WM3 assessment of soil for offsite disposal.
- UKWIR assessment on completion of remedial works.



Table of Contents

EXECUTIVE SUMMARY	2
1. INTRODUCTION	10
1.1. Background	10
1.2. Proposed Development	10
1.3. Objectives	11
1.4. Limitations	11
1.5. Confidentiality	11
2. GROUND INVESTIGATION	12
2.1. Phase I Desk Study Summary	12
2.2. General Overview	13
2.3. In-Situ Standard Penetration Testing (SPT)	15
2.4. Permeability Tests	15
2.5. Laboratory Analysis	15
3. GROUND AND GROUNDWATER CONDITIONS	17
3.1. Summary of Ground Conditions	17
3.2. Trial Trenches Investigating Former Canal	18
3.3. Made Ground	18
3.4. Drift Deposits	18
3.5. Solid Geology	19
3.6. Groundwater	19
3.7. Visual and Olfactory Evidence of Contamination	19
3.8. Soil Consistency	20
3.9. Side Stability and Ease of Excavation	21
3.10. Soil Compressibility	26
3.11. Soil Infiltration	26
3.12. Soil Plasticity	27
3.13. pH and Sulphate	27
3.14. Ground Gas	28
3.15. Investigation Rationale	28
3.16. Monitoring Methodology	28
4. TIER I QUALITATIVE CONTAMINATED LAND RISK ASSESSMENT	31
4.1. Human Health Risk Assessment	31
4.2. Controlled Waters Risk Assessment	38
4.3. Ground Gas	42
4.3.1. Sources of Ground Gas	43
4.3.2. Groundwater	43
4.3.3. Gas Flow	43
4.3.4. Gas Concentrations	43
4.3.5. Gas Assessment	44
4.4. Potable water supply	45
4.5. Conceptual Site Model	47
5. GEOTECHNICAL ASSESSMENT	54
5.1. Proposed Development	54
5.2. Summary of Ground Conditions	54
5.3. Site Preparation	55
5.4. Foundation Conditions and Assessment of Potential Bearing Capacities	55
5.5. Ground Floor Slab	58
5.6. Heave Precautions	58



5.7.	Highways Construction	59
5.8.	Drainage	60
5.9.	Concrete Durability	60
5.10.	Excavations	60
5.11.	Slope Stability	61
5.12.	Further Works	61
5.13.	Construction Activity and Inspection	61
6.	CONCLUSIONS AND RECOMMENDATIONS.....	63
	Contaminated Land Assessment.....	63
	Geotechnical Assessment.....	64
	APPENDIX I LIMITATIONS.....	65
	APPENDIX II GLOSSARY	67
	APPENDIX III DRAWINGS	70
	APPENDIX IV PHOTOGRAPHS	71
	APPENDIX V E3P EXPLORATORY HOLE LOGS	74
	APPENDIX VI CHEMICAL TESTING RESULTS	75
	APPENDIX VII ORIGIN OF TIER I GENERIC ASSESSMENT CRITERIA	76
	APPENDIX VIII FALLING HEAD PERMEABILITY TEST CERTIFICATES.....	78
	APPENDIX IX GEOTECHNICAL LABORATORY TESTING RESULTS	79

DRAWING LIST

13-729-001 - Site Location Plan
13-729-002 - Site Features Plan
13-729-003 - Historical Features Plan
13-729-004 - Exploratory Hole Location Plan
13-729-005 - Depth of Made Ground Plan
13-729-006 - Depth to Founding Strata Plan
13-729-007 - Depth to Bedrock Plan
13-729-008 - Conceptual Site Model
13-729-009 - Trial Trench Cross Section



1. INTRODUCTION

1.1. BACKGROUND

E3P Ltd has been commissioned by Manchester Life Development Company 2 Limited (the Applicant), to undertake a Phase 2 Geoenvironmental Site Assessment at Manchester Life, Back of Ancoats Phase 1 – Eliza Yard.

This report is required to determine potential contaminated land liabilities, remediation requirements and geotechnical engineering works that will be required as part of the proposed development for a high rise residential development.

The scope of work includes the following elements:

- Detailed review of historic information;
- Detailed review of desk study;
- Design and complete a suitable intrusive ground investigation that includes:
 - Window sample probeholes with, and construction of, environmental monitoring installations;
 - Deep cable percussive boreholes with groundwater monitoring installations;
 - Falling Head Permeability Testing;
 - Mechanically excavated trial trenches to investigate historic canal;
 - Mechanically excavated trial pits;
 - In-situ geotechnical testing;
 - Chemical and geotechnical laboratory analysis;
 - Groundwater monitoring and sampling;
 - Ground gas monitoring;
 - Contamination risk assessment and conceptual site model;
 - Geotechnical assessment and interpretation; and
- Complete a detailed Phase II Geoenvironmental Assessment

1.2. PROPOSED DEVELOPMENT

Development of land bounded by Poland Street to the west and Jersey Street to the south to deliver 118 residential units, ground floor commercial floorspace, and ancillary amenity space within an 8 storey building, cycle parking provision, hard and soft landscaping, access and servicing and other associated works.



1.3. OBJECTIVES

The objectives of the geoenvironmental assessment are as follows:

- Undertake a preliminary stage of sampling and analysis to provide an overview of environmental issues identified.
- Assess the implications of any potential environmental risks, liabilities and development constraints associated with the site in relation to the future use of the site and in relation to off-site receptors.
- Assess the geotechnical information and provide preliminary recommendations in relation to foundations, pavement construction and floor slabs.
- Provide recommendations regarding future works required.

1.4. LIMITATIONS

The limitations of this report are presented in Appendix I.

1.5. CONFIDENTIALITY

E3P has prepared this report solely for the use of the client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from E3P; a charge may be levied against such approval.



2. GROUND INVESTIGATION

2.1. PHASE I DESK STUDY SUMMARY

Historic Features

The site formerly had the same canal branch (Bengal Arm) running east west along the northern boundary. This appears to have been infilled in the mid / late 1950's. In the 19th century, The site was largely undeveloped with the exception of the canal and small buildings in the western sector and by the early 20th century it was listed as a corporation yard in the eastern sector. In the mid to late 20th century the site was developed with industrial type buildings which remained in varying configurations until their demolition in the early 2000's.

Current Features

The site is currently surfaced by hardstanding and is used as a car park operated by Manchester Life. The area currently contains no structures with the exception of ticket machines and is secured by metal fencing to the south, north and west and a brick wall to the west.

Geology and Ground Conditions

The BGS recorded drift geology comprises CLAY, SAND and GRAVEL (Diamicton) and bedrock geology comprises MUDSTONE (Manchester Marls Formation).

Site Sensitivity

The site has been deemed to be located within a moderate sensitivity setting.

There is a nitrate vulnerable zone located 37 m north west of the site. .

The aquifer classification in the bedrock is a Secondary B through The site with a principal aquifer in close proximity.

The Rochdale Canal is located 40m south of the site and a canal basin is located 95 m south west of the site.

Human Health

Based on the information available to review, it is considered that there will be a moderate risk to human health as a number of sources of contamination have been identified in relation to historic land uses on the site.

Hydrocarbon compounds and chlorinated solvents may be present due to historic iron works, chimney, factories, garage and builders yard in addition to underlying Made Ground. Material deemed to have a potential vapour risk may require delineation and a hotspot removal.

The historic iron works is also thought to be a source of heavy metals, in particular iron. The presence of deep Made Ground may be a potential source of heavy metals, sulphates, asbestos and Polycyclic aromatic hydrocarbons (PAHs), however can be mitigated with the use of a minimum 300 mm cover system to all landscaped areas (as required by Manchester City Council).

Controlled Waters

Historical industrial land uses on the site, including works, garage, factories and builders yard, as well as Made Ground represent potential sources of mobile hydrocarbon contamination.



Glacial Till reduces the potential for migration of contaminants, if present, however, considering the underlying Secondary B Aquifer in addition to the Rochdale Canal considered to be a moderate risk to controlled waters. Intrusive investigation with chemical analysis of soil and groundwater samples is recommended to assess the presence of mobile contaminants and facilitate further risk assessment.

Ground Gas

There are likely varying depths of Made Ground generated from historical development, demolition works and infilling of canal. The Envirocheck report has also recorded two areas of potentially infilled land within the site boundary and nine areas within 250 m of the site. The presence of historic Made Ground may result in the generation of hazardous ground gases (such as carbon dioxide & methane) which can accumulate within deep excavations or migrate through permeable strata, foundation structures and/or service ducting and pose a potential low-level risk to construction workers and future residential site users.

Carbon dioxide and methane have associated asphyxiation and explosive risks, respectively. Should a ground gas risk be identified to end users, the risks can be mitigated through the adoption of suitable control measures within the building construction using guidance presented within CIRIA 665 (Assessing Risk Posed by Hazardous Ground Gases to Buildings) and BS8485(2015) +A1(2019) Code of Practice for the Characterisation and Remediation from Ground Gas in Affected Developments.

Geotechnical Risk

The site is located within a coal mining reporting area, however, is considered to be low risk;

The underlying superficial geology will likely comprise a cohesive soil matrix and, as such, is not likely to offer the required degree of permeability to make soak-away drainage viable in this instance.

Footings will require deepening in accordance with NHBC guidance 2016 Chapter 4.2 if the development incorporates any existing and proposed trees within any cohesive drift deposits.

The site is generally topographically level due to historic levelling. To construct the proposed residential high rise limited earthworks will be required to create a level developable platform.

Services have been identified within the site boundary. VSC would not be possible within close proximity to any sensitive infrastructure.

There is a retaining wall to the south east of the site which retains the road (Jersey Street) at an elevated level to the south and adjacent car park to the east. This will need to be assessed by a structural engineer prior to development.

Intrusive investigation will be required to assess the ground conditions and undertake in-situ geotechnical testing to determine possible foundation solutions.

Any underground obstructions will require grubbing out in their entirety, prior to the construction of the proposed development.

2.2. GENERAL OVERVIEW

A ground investigation has been designed based on the findings of the desk study, with exploratory holes advanced to target specific potential contaminant sources summarised in Table 2.1. The investigation has also been used to collect geotechnical information to assist in the design and construction of the proposed development.

Exploratory fieldwork was completed between 18th November and 20th November 2019. The works are summarised in Table 2.1.



TABLE 2.1 SUMMARY OF FIELDWORK

POTENTIAL SOURCE/RATIONALE	LOCATION HOLE	TYPE	MAXIMUM DEPTH (m bgl)	MONITORING WELLS RESPONSE ZONE (m bgl)
General Ground Conditions Including the Presence/Nature of Obstructions	TP111	Mechanically Excavated Trial Pit	1.50	N/A
Investigation of Former Clothing Factory	TP101		2.60	
Investigation of Former works building	TP104		1.70	
	TP105		2.40	
	TP106		2.40	
	TP107		2.30	
	TP110		1.00	
	WS101	Window Sample Probehole	5.45	1.50–5.00
	WS102		4.45	2.50–4.00
	WS106		5.45	1.00–2.00
Former Builders Yard	TP109	Mechanically Excavated Trial Pit	2.00	N/A
Investigation of Infilled Canal	TP108		2.30	
	TT101A	Mechanically Excavated Trial Trench	1.50	
	TT101B		1.20	
	TT102A		1.50	
	TT102B		1.80	
	TT103A		2.00	
	TT103B		3.00	
	TT104A		2.30	
	TT104B		1.20	
	WS107	Mechanically Excavated Trial Pit	5.45	1.00–2.00
	WS109		5.45	1.00–3.50



Investigation of Deeper Soil Horizons	CP101	Cable Percussive Borehole	15.00	N/A
	CP102		15.00	
	CP103		13.00	
	CP104		12.50	
	CP105		12.50	

Mechanically excavated trial pits were advanced to investigate ground conditions and to retrieve environmental samples, spatially distributed to offer the maximum site coverage whilst also being advanced to target specific contaminant sources.

Window sample probeholes were advanced to undertaken in-situ detailed geotechnical testing, obtain environmental samples and install groundwater and ground gas monitoring wells.

Mechanically excavated trial trenches were advanced within the proximity of the historically infilled canal to expose the infilled canal basin and assess its construction and relict structure.

In situ falling head permeability tests were undertaken to assess the potential porosity of the underlying drift deposits and inform the design of any infiltration drainage systems.

The sampling locations are illustrated in Drawing 13-729-004 (Appendix III). The ground conditions encountered are indicated on the logs, which are provided in Appendix V.

Return visits were made to monitor installations for groundwater level and gas concentrations. In addition, selected wells were purged and samples of groundwater recovered for chemical analysis.

2.3. IN-SITU STANDARD PENETRATION TESTING (SPT)

In-situ geotechnical testing was conducted using the standard penetration test (SPT) and, where the ground is granular, a 60° cone (SPT(C)) was used instead of the sampling tube. The results are shown in the probehole logs in Appendix VIII and presented in Table 3.6 and discussed in Section 5.

2.4. PERMEABILITY TESTS

Two falling head permeability tests were undertaken within environmental monitoring wells (WS101 and WS107) in order to assess the likely permeability of the underlying strata to determine the potential suitability for soakaway drainage within the proposed development. The results are presented in Table 3.8 and the test certificates are included within Appendix VIII.

2.5. LABORATORY ANALYSIS

Selected soil samples were submitted for a range of chemical analysis comprising:

- Metals.
- pH, total sulphate, water-soluble sulphate (2:1 extract).
- Sulphide.
- Cyanide.
- Phenols.



- Total and speciated polycyclic aromatic hydrocarbons (PAHs).
- Semi Volatile Organic Compounds (SVOC).
- Volatile Organic Compounds (VOC).
- Asbestos identification and quantification.
- Speciated and banded total petroleum hydrocarbon (TPH).

I2 Analytical undertook the analytical work and the testing results are included in Appendix VI and discussed in Section 4.

Selected samples were submitted to PSL Laboratory where the following geotechnical tests were undertaken:

- Atterberg limits determinations;
- Moisture Content;
- Single-stage triaxial tests;
- One Dimensional Consolidation Test

Laboratory analysis sheets are included in Appendix IX and are summarised in Section 3 and discussed in Section 5.



3. GROUND AND GROUNDWATER CONDITIONS

3.1. SUMMARY OF GROUND CONDITIONS

The ground investigation generally confirms the published geology and identifies the strata set out in Table 3.1.

TABLE 3.1 SUMMARY OF STRATA

HOLE	DEPTH TO STRATUM (m bgl)		
	MADE GROUND GRAVEL	CLAY	BEDROCK (SANDSTONE)
TP101	0.00–2.20	2.20–2.60	
TP104	0.00–1.20	1.20–1.70	
TP105	0.00–1.40	1.20–2.40	
TP106	0.00–1.40	1.40–2.40	
TP107	0.00–1.50	1.50–2.30	
TP108	0.00–2.30		
TP109	0.00–2.00		
TP110	0.00–1.00		
TP111	0.00–1.30	1.30–1.50	
TT101B	0.00–1.20		
TT102A	0.00–1.50		
TT102B	0.00–1.30	1.30–1.80	
TT103A	0.00–2.00		
TT103B	0.00–3.00		
TT104A	0.00–2.30		
TT104B	0.00–1.20		
WS101	0.00–1.30	1.30–5.45	
WS102	0.00–2.50	2.50–4.45	
WS106	0.00–1.60	1.60–5.45	
WS107	0.00–2.60	2.60–5.45	
WS109	0.00–2.00	2.00–5.45	
CP101	0.00–1.30	1.30–12.40	12.40–15.00
CP102	0.00–2.70	2.70–13.80	13.80–15.00
CP103	0.00–1.70	1.70–11.50	11.50–13.00
CP104	0.00–1.50	1.50–10.00	10.00–12.50
CP105	0.00–1.40	1.40–11.70	11.70–12.50



3.2. TRIAL TRENCHES INVESTIGATING FORMER CANAL

The locations of the exploratory investigations are detailed within the E3P Drawings included within Appendix III.

TT101A, TT102B, TT103A, TT103B, TT104A and TT104B were all also underlain by Made Ground comprising black gravel of ash which was heavily contaminated with visual and olfactory evidence of heavy end hydrocarbon at depths between 0.30 m and 1.50 m bgl.

A brick wall was encountered within the west and north of TT101B between ground level and 1.2 m. A brick wall was also encountered between the centre of TT101A and TT101B between ground level and 0.70 m bgl. The presence of such brick structures may have been the walls of the former canal which once bordered the northern periphery of the site

TT102B, TT103A, TT103B, TT104A and TT104B were all underlain by concrete slabs between 0.50 m and 1.20 m bgl.

Natural drift deposits were not encountered within any trial trenches with the exception TT102A and TT102B where CLAY was encountered between 1.3 m and 1.5 m bgl.

The former canal bridge is also evident to the south east of the site intersecting the wall that runs along the periphery.

3.3. MADE GROUND

Made Ground was encountered within all exploratory holes between ground level and 2.50 m bgl. The full depth of Made Ground was not determined in several exploratory hole locations due to the presence of obstructions, ingress of groundwater flooding the excavation and suspected basement floor slabs.

The majority of exploratory holes were surfaced by concrete between ground level and 0.30 m bgl. TT102B, TT103A, TT103B, TT104A and TT104B were all underlain by concrete slabs below ground level between 0.50 m and 1.20 m bgl.

Made Ground mainly comprised gravelly black ash with frequent cobbles with gravel of mudstone, concrete, brick and asphalt and cobbles of brick which was encountered between ground level and 2.50 m bgl.

Gravelly ash which presented a strong hydrocarbon odour and sheen were encountered within TT101A, TT102A, TT104A, TP106, TP107, TP108, TP110 and WS109. Visual and olfactory contamination was present in the north and east of the site associated with the historically infilled canal.

Large obstructions including brick and concrete were encountered within the majority of exploratory hole locations. A brick wall was encountered within the west and north of TT101B between ground level and 1.2 m. A brick wall was also encountered between the centre of TT101A and TT101B between ground level and 0.70 m bgl. Brick walls were also noted in TP105.

A Depth of Made Ground Plan is presented as Drawing 13-729-005 in Appendix III.

3.4. DRIFT DEPOSITS

The natural drift deposits were identified across the site and were found to be generally uniform across the area. Natural clay strata directly underlay the Made Ground.

Drift deposits comprised firm to very stiff brown slightly gravelly CLAY which was encountered between 0.60 m and 5.45 m bgl.



Cable percussive drilling investigated the deeper soil horizons where natural clay strata was found to depths in excess of 10m bgl to a maximum proven depth of 13.80m bgl.

3.5. SOLID GEOLOGY

Bedrock has been identified within the deeper exploratory hole locations completed by cable percussive drilling boreholes subsequent to the original site investigation. These identify bedrock at depths between 10.00m and 13.80m bgl.

The closest BGS borehole encountered sandstone bedrock at 23.0 m bgl and confirms a dip to the west as identified in the E3P ground investigation.

3.6. GROUNDWATER

Groundwater strikes were encountered as seepages and what was considered to be water held within the former infilled canal. These were generally encountered between 0.70m and 3.00m bgl. The depth of the seepages are shown on the exploratory hole records in Appendix V and are summarised in Table 3.2.

TABLE 3.2 SUMMARY GROUNDWATER STRIKES

LOCATION	DEPTH TO STRIKE (m)	NOTES
TT101 A	1.10	Rapid Ingress
TT102 A	1.10	Rapid Ingress
TT103 A	1.50	Rapid Ingress
TT103 B	2.00	Rapid Ingress
TT104 A	2.20	Rapid Ingress
TP106	0.70	Slow Ingress
TP108	2.10	Rapid Ingress
TP109	1.40	Slow Ingress
WS101	3.00	Slow Ingress
WS102	2.00	Slow Ingress
WS106	2.00	Slow Ingress
WS107	2.00	Slow Ingress
WS109	2.00	Slow Ingress
WS109	3.00	Slow Ingress

Monitoring was undertaken using an electronic dip meter and interface probe to record the depth to groundwater and the thickness of any free-phase hydrocarbon product, if present. These results are summarised in Table 3.12.

3.7. VISUAL AND OLFACTORY EVIDENCE OF CONTAMINATION

Visual and olfactory evidence of potential contamination has been identified during the site investigation and these are summarised in Table 3.3.



TABLE 3.3 SUMMARY VISUAL AND OLFACTORY EVIDENCE OF CONTAMINATION

LOCATION	DEPTH (m)	STRATUM	NOTES
TP106	0.20–1.40	MADE GROUND	Hydrocarbon odour and sheen
TP107	0.20–1.50	MADE GROUND	Hydrocarbon odour
TP108	0.90–2.30	MADE GROUND	Hydrocarbon odour
TP110	0.20–0.50	MADE GROUND	Hydrocarbon odour
TT101A	0.30–1.50	MADE GROUND	Hydrocarbon odour and sheen
TT102B	0.20–1.30	MADE GROUND	Hydrocarbon odour
TT103B	0.70–3.00	MADE GROUND	Hydrocarbon odour and sheen
TT104A	1.10–2.30	MADE GROUND	Hydrocarbon odour and sheen
WS107	1.00–2.60	MADE GROUND	Hydrocarbon odour and sheen
WS109	1.30–2.00	MADE GROUND	Hydrocarbon odour and sheen

3.8. SOIL CONSISTENCY

Undrained shear strength values were measured using both field hand shear vane tests and laboratory undrained triaxial tests. Results of the tests are presented in Table 3.4 and Table 3.5, which indicate the clay soils to vary between firm and very stiff. Strength test data is generally consistent with the field descriptions of the aforementioned soils.

TABLE 3.4 SUMMARY OF HAND SHEAR VANE TESTS

LOCATION	DEPTH	SHEAR STRENGTH (kPA)	CALCULATED ALLOWABLE BEARING PRESSURE (kN/m ²)
TP101	2.50	57.00	133.95
TP104	1.50	88.00	206.80
TP105	1.60	181.00	425.35
TP106	1.50	80.00	188.00
TP106	2.00	97.00	227.95
TP107	1.80	101.00	237.35
TP109	1.80	130.00	305.50
TP111	1.40	130.00	305.50
TT102 B	1.50	88.00	206.80

Results of the standard penetration tests, including undrained shear strengths derived from SPTs are included in Table 3.6.



TABLE 3.5 SUMMARY OF UNDRAINED SHEAR STRENGTH TEST RESULTS

LOCATION	SAMPLE DEPTH (m)	LAB DESCRIPTION	UNDRAINED SHEAR STRENGTH (kN/m ²)	CONSISTENCY
WS106	2.50–3.00	Firm brown slightly gravelly sandy CLAY	48	Firm
WS109	4.50–5.00	Firm brown slightly gravelly sandy CLAY	51	Firm
CP102	6.00-6.70	Firm Brown slightly sandy silty CLAY	59	Firm
CP104	6.00-6.60	Stiff Brown Slightly Gravelly Sandy Very Silty CLAY	116	Stiff

3.9. SIDE STABILITY AND EASE OF EXCAVATION

The majority of exploratory hole locations were noted to have been unstable due to the presence of loose ash.

The presence of brick and concrete cobbles within the Made Ground deposits meant that in certain places, excavation was slow through the Made Ground.

A number of locations could not be fully penetrated due to the presence of underlying concrete floor slabs, flooding of excavations and unstable ground conditions. Existing site constraints in the form of historic structures should be considered as these have the potential to limit the application of piling techniques without the requirement to pre bore. Obstructions in the Made Ground will require removal through a Made Ground turnover to facilitate the use of driven foundation solutions.

The natural strata was excavated with relative ease.



TABLE 3.6 STANDARD/CONE PENETRATION TEST RESULTS

BOREHOLES	DEPTH (m bgl)	MATERIAL FIELD DESCRIPTION	CPT/SPT "N" VALUE	CORRECTED "N" VALUE (N ₁) ₆₀	TERZAGHI & PECK RELATIVE DENSITY (SANDS)	EUROCODE SOIL STRENGTH	CONSISTENCY (BS 5930)	TERZAGHI & PECK APPROXIMATE UNDRAINED SHEAR STRENGTH (kN/m ²)
WS101	2.00	CLAY	13	11.88	N/A	Medium strength	Stiff	59.38
WS101	3.00	CLAY	23	20.00	N/A	High strength	Very Stiff	100.01
WS101	4.00	CLAY	24	20.28	N/A	High strength	Very Stiff	101.38
WS101	5.00	CLAY	25	20.74	N/A	High strength	Very Stiff	103.70
WS102	3.00	CLAY	18	15.65	N/A	High strength	Very Stiff	78.27
WS102	4.00	CLAY	23	19.43	N/A	High strength	Very Stiff	97.16
WS106	2.00	CLAY	8	7.31	N/A	Low strength	Firm	36.54
WS106	3.00	CLAY	15	13.04	N/A	Medium strength	Stiff	65.22
WS106	4.00	CLAY	23	19.43	N/A	High strength	Very Stiff	97.16
WS106	5.00	CLAY	22	18.25	N/A	High strength	Very Stiff	91.26
WS107	3.00	CLAY	9	7.83	N/A	Low strength	Firm	39.13
WS107	4.00	CLAY	24	20.28	N/A	High strength	Very Stiff	101.38
WS107	5.00	CLAY	23	19.08	N/A	High strength	Very Stiff	95.41
WS108	1.00	CLAY	4	4.03	N/A	Low strength	Firm	20.16
WS109	2.00	CLAY	11	10.05	N/A	Medium strength	Stiff	50.24
WS109	3.00	CLAY	16	13.91	N/A	Medium strength	Stiff	69.57
WS109	4.00	CLAY	21	17.74	N/A	High strength	Very Stiff	88.71
WS109	5.00	CLAY	21	17.42	N/A	High strength	Very Stiff	87.11



BOREHOLES	DEPTH (m bgl)	MATERIAL FIELD DESCRIPTION	CPT/SPT "N" VALUE	CORRECTED "N" VALUE (N ₁) ₆₀	TERZAGHI & PECK RELATIVE DENSITY (SANDS)	EUROCODE SOIL STRENGTH	CONSISTENCY (BS 5930)	TERZAGHI & PECK APPROXIMATE UNDRAINED SHEAR STRENGTH (kN/m ²)
CP101	1.30	CLAY	21	20.37	N/A	High strength	Very Stiff	101.83
CP101	2.00	CLAY	21	19.18	N/A	High strength	Very Stiff	95.92
CP101	4.00	CLAY	29	24.50	N/A	High strength	Very Stiff	122.50
CP101	6.00	CLAY	26	21.32	N/A	High strength	Very Stiff	106.59
CP101	8.00	CLAY	51	41.28	N/A	Very high strength	Very Stiff	206.41
CP101	10.00	CLAY	55	44.29	N/A	Very high strength	Very Stiff	221.44
CP101	11.00	CLAY	50	38.67	N/A	Very high strength	Very Stiff	193.34
CP101	11.40	CLAY	55	41.88	N/A	Very high strength	Very Stiff	209.39
CP102	3.00	CLAY	15	13.04	N/A	Medium strength	Stiff	65.22
CP102	4.00	CLAY	19	16.05	N/A	High strength	Very Stiff	80.26
CP102	5.00	CLAY	15	12.44	N/A	Medium strength	Stiff	62.22
CP102	7.00	CLAY	16	13.02	N/A	Medium strength	Stiff	65.09
CP102	9.00	CLAY	21	16.94	N/A	High strength	Very Stiff	84.72
CP102	11.00	CLAY	51	39.44	N/A	Very high strength	Very Stiff	197.21
CP102	12.00	CLAY	48	35.72	N/A	Very high strength	Very Stiff	178.62
CP102	13.00	CLAY	51	36.59	N/A	Very high strength	Very Stiff	182.96
CP102	14.00	CLAY	51	35.33	Dense	N/A	N/A	N/A
CP102	15.00	CLAY	51	34.15	Dense	N/A	N/A	N/A
CP103	2.00	CLAY	20	18.27	N/A	High strength	Very Stiff	91.35



BOREHOLES	DEPTH (m bgl)	MATERIAL FIELD DESCRIPTION	CPT/SPT "N" VALUE	CORRECTED "N" VALUE (N ₁) ₆₀	TERZAGHI & PECK RELATIVE DENSITY (SANDS)	EUROCODE SOIL STRENGTH	CONSISTENCY (BS 5930)	TERZAGHI & PECK APPROXIMATE UNDRAINED SHEAR STRENGTH (kN/m ²)
CP103	3.00	CLAY	24	20.87	N/A	High strength	Very Stiff	104.36
CP103	4.00	CLAY	13	10.98	N/A	Medium strength	Stiff	54.92
CP103	5.00	CLAY	17	14.10	N/A	Medium strength	Stiff	70.52
CP103	7.50	CLAY	16	12.98	N/A	Medium strength	Stiff	64.90
CP103	10.50	CLAY	28	22.09	N/A	High strength	Very Stiff	110.45
CP103	12.00	CLAY	50	37.21	Dense	N/A	N/A	N/A
CP103	13.00	CLAY	50	35.87	Dense	N/A	N/A	N/A
CP104	2.00	CLAY	2	1.83	N/A	Extremely low strength	Very Soft	9.14
CP104	3.00	CLAY	2	1.74	N/A	Extremely low strength	Very Soft	8.70
CP104	4.00	CLAY	3	2.53	N/A	Very low strength	Soft	12.67
CP104	5.00	CLAY	14	11.61	N/A	Medium strength	Stiff	58.07
CP104	7.50	CLAY	19	15.41	N/A	High strength	Very Stiff	77.07
CP104	10.50	CLAY	50	39.45	Dense	N/A	N/A	N/A
CP104	12.00	CLAY	54	40.19	Dense	N/A	N/A	N/A
CP104	12.50	CLAY	52	37.99	Dense	N/A	N/A	N/A
CP105	2.00	CLAY	8	7.31	N/A	Low strength	Firm	36.54
CP105	3.00	CLAY	16	13.91	N/A	Medium strength	Stiff	69.57
CP105	4.00	CLAY	16	13.52	N/A	Medium strength	Stiff	67.59



BOREHOLES	DEPTH (m bgl)	MATERIAL FIELD DESCRIPTION	CPT/SPT "N" VALUE	CORRECTED "N" VALUE (N ₁) ₆₀	TERZAGHI & PECK RELATIVE DENSITY (SANDS)	EUROCODE SOIL STRENGTH	CONSISTENCY (BS 5930)	TERZAGHI & PECK APPROXIMATE UNDRAINED SHEAR STRENGTH (kN/m ²)
CP105	5.00	CLAY	18	14.93	N/A	Medium strength	Stiff	74.67
CP105	7.50	CLAY	17	13.79	N/A	Medium strength	Stiff	68.96
CP105	12.00	CLAY	51	37.96	Dense	N/A	N/A	N/A
CP105	12.50	CLAY	50	36.53	Dense	N/A	N/A	N/A



3.10. SOIL COMPRESSIBILITY

Consolidation tests have been undertaken on selected samples of CLAY using an odometer to obtain consolidation properties. Tests include an unload cycle to help assess potential heave. The results are included in Table 3.7 and show the CLAY to be of medium compressibility assuming a high-rise load in excess of 150 kN/m² is generated, which is consistent with the soils visual description.

TABLE 3.7 SUMMARY CONSOLIDATION TEST DATA

LOCATION	DEPTH (m)	LOAD INCREMENT	VOLUME CHANGE COEFFICIENT, M_v	CONSOLIDATION COEFFICIENT, C_v
WS106	2.50–3.00	0–55	0.797	1.901
		55–110	0.385	0.726
		110–220	0.267	0.557
		220–440	0.157	0.551
		440–55	0.044	2.475

The results have determined that the clay soil is of moderate compressibility between 75 kN/m² and 300 kN/m² in WS106 and WS112 assuming a high-rise bearing pressure in the region of 150kN/m² is generated. The assessment is consistent with the soils visual description.

3.11. SOIL INFILTRATION

In-situ variable (falling) head permeability tests were undertaken within the monitoring well installations located in two probeholes (WS101 and WS107). All of the installations were noted to have a head of water prior to the test being undertaken however were not flooded, therefore the tests were undertaken in the unsaturated zone. Tests in WS101 were undertaken within monitoring wells with response zones located in the natural cohesive drift stratum.

The results are presented in Table 3.8 and the test certificates are included within Appendix IX.

TABLE 3.8 SOIL INFILTRATION RESULTS

LOCATION	DEPTH (m)	MATERIAL	TEST No.	SOIL INFILTRATION RATE (m/s)
WS101	1.50-5.00	Stiff medium strength Brown Clay	1	4.63E-07
WS107	1.00-2.00	Made Ground: Black clayey Gravel	1	8.31E-07

Soil infiltration was taken over the wetted area from between 75% and 25% of the effective depth. All tests showed cohesive drift deposits to have poor soakage potential as a result of the cohesive nature of the materials and high water table found across the site.

Therefore, considering the significant volumes of low permeability clay on the site, it is considered that soakaway drainage is not suitable for the proposed development. However, the application of soakaway drainage will ultimately be dependent on the specific requirements of the development. All soakaways should be designed in accordance with BRE Special Digest 365 – *Soakaway Design*.



3.12. SOIL PLASTICITY

The liquid and plastic limits of samples of natural in-situ clay are determined using the cone penetrometer method and the rolling thread test. These tests enable determination of an average plasticity index (PI) for each “type” of clay, although judgement is applied where variable results are reported.

PI can be related to shrinkability (low, medium or high) and then to minimum founding depth.

E3P typically only consider a soil to be shrinkable if the proportion finer than 63 µm is > 35%.

PI results are compared against guidance given in the NHBC standards, Chapter 4.2 (revised January 2014), which advocates the use of modified plasticity index (I_p), defined as:

$$I_p = Ip \times (\% < 425 \mu\text{m}/100)$$

In other words, if PI is 30%, but the soil contains 80% < 425 µm, then I_p = 30 × 80/100 = 24%.

It should be noted that in accordance with the requirements of BS 1377, the % passing the 425 µm sieve is routinely reported by testing labs.

E3P apply engineering judgement where PI results are spread over a range of classifications. Consideration is given to the average values for each particular soil type (differentiate between residual soil and alluvium), the number of results in each class and the actual values.

The Atterberg limits determinations, summarised in Table 3.9, show the clay to be of predominantly low plasticity with discrete areas of moderate plasticity clay.

TABLE 3.9 SUMMARY OF PLASTICITY INDEX TEST RESULTS

LOCATION	DEPTH (m)	NATURAL MOISTURE CONTENT (%)	PLASTIC LIMIT (%)	LIQUID LIMIT (%)	PLASTICITY INDEX (%)	PASSING 425 µm SIEVE (%)	MODIFIED PLASTICITY INDEX	NHBC VOLUME CHANGE POTENTIAL
WS101	2.00	19	21	45	24	97	23.28	MEDIUM
WS106	2.00	29	22	47	25	97	24.25	MEDIUM
WS107	1.00	22	24	52	28	95	26.6	MEDIUM

The results of the Atterberg limits testing confirmed that the soils would be deemed to be medium Volume Change Potential in accordance with the classification system utilised by the LABC/NHBC industry guidance.

3.13. pH AND SULPHATE

Chemical analyses for pH and soluble sulphate content contained in Appendix VI (summarised in Table 3.10), shows that the soils at the site generally meet Class DS-1, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-1s in accordance with BRE *Special Digest 1* (2005). However, elevated sulphate concentrations in TT103A at 1.50 m bgl have been identified which classify the Made Ground deposits as DS-2 AC-1s. Upon completion of site enabling works, the site will, in all likelihood, be DS1 AC1s.



TABLE 3.10 SUMMARY OF pH AND SULPHATE DATA

LOCATION	DEPTH (m)	SO ₄ IN 2:1 WATER/SOIL (g/l)	pH VALUE	CLASSIFICATION
TP108	2.10	0.27	8.1	DS-1 AC-1s
TT102B	1.70	0.039	8.4	DS-1 AC-1s
TT103A	1.50	0.76	8.5	DS-2 AC-1s

3.14. GROUND GAS

A ground gas assessment has been completed in accordance with guidance provided within CIRIA 665 – *Assessing risk posed by hazardous ground gases to buildings*.

3.15. INVESTIGATION RATIONALE

The ICSM has identified that the underlying Made Ground and infilled land may represent a potential source of ground gas generation.

Based on the identification of these sources, E3P has determined that the site represents a low ground gas source generation potential.

Within the context of the proposed residential end use and ground gas generation potential, the gas assessment requires that six visits are required over three months, with at least two sets of readings at low or falling atmospheric pressure as set out within CIRIA 665 Tables 5.5a and 5.5b.

The spacing requirements for monitoring wells are detailed within CIRIA 665 Table 4.2, which indicates that for low gas hazard sites (Made Ground with limited degradable material, organic clay of limited thickness) and a high sensitivity development, nominal well spacing should be between 25 m and 50 m.

TABLE 3.11 GROUND GAS MONITORING LOCATION RATIONALE

LOCATION	GROUND GAS SOURCE	DEPTH OF MONITORING WELL (m)
WS101	CLAY	1.50–5.00
WS102	CLAY	2.50–4.00
WS106	Made Ground	1.00–2.00
WS107	Made Ground	1.00–2.00
WS109	Made Ground	1.00–3.50

3.16. MONITORING METHODOLOGY

Concentrations of methane (CH₄), carbon dioxide (CO₂) and oxygen (O₂) were measured using an infra-red gas analyser (GFM435) calibrated to a reference standard (before and after each survey) and gas flow rates were measured using an integrated flow meter.

Gas measurements were recorded for a minimum of 60 seconds at each location, at which point the maximum concentration of CH₄ and CO₂, together with the lowest concentration of O₂ were recorded. The results of the ground gas monitoring are presented in Table 3.12.



TABLE 3.12 SUMMARY OF GROUND GAS MONITORING RESULTS

WELL	DATE	CH ₄ INITIAL (%V/V)	CH ₄ STEADY (%V/V)	CH ₄ GSV (l/hr)	CO ₂ INITIAL (%V/V)	CO ₂ STEADY (%V/V)	CO ₂ GSV (l/hr)	O ₂ (%V/V)	ATMOS (mb)	ATMOS. DYNAMIC	FLOW (l/hr)	RESPONSE ZONE (m bgl)	DEPTH TO BASE (m bgl)	DEPTH TO WATER (m bgl)
WS101	09/12/19	0.10	0.10	0.00274	0.10	0.10	0.0027	19.90	1006	Rising	2.74	1.50-5.00	2.77	1.00
	05/02/20	0.10	0.10	0.0061	0.40	0.40	0.0244	16.80	1033	Falling	6.10		2.76	1.00
	24/02/20	0.10	0.10	0.0029	0.30	0.30	0.0087	17.20	1005	Falling	2.90		2.76	0.98
	12/03/20	0.10	0.10	0.0019	0.50	0.50	0.0095	16.60	999	Rising	1.90		2.75	0.69
	23/03/20	0.10	0.10	0.00224	0.30	0.30	0.0067	18.70	1019	Steady	2.24		2.79	1.10
	07/04/20	0.10	0.10	0.00317	0.20	0.20	0.0063	19.90	1025	Rising	3.17		2.81	1.26
WS102	09/12/19	Monitoring Well Destroyed – Could Not Be Repaired.										2.50-4.00	N/A	
	05/02/20													
	24/02/20													
	12/03/20													
	23/03/20													
	07/04/20													
WS106	09/12/19	0.10	0.10	-0.00679	0.30	0.30	-0.0204	19.80	1006	Rising	-6.79	1.00-2.00	1.56	0.80
	05/02/20	0.10	0.10	0.0069	1.00	1.00	0.0690	14.90	1033	Falling	6.90		1.57	0.85
	24/02/20	0.10	0.10	0.0074	0.90	0.90	0.0666	15.90	1005	Falling	7.40		1.56	0.89
	12/03/20	0.10	0.10	0.00475	0.80	0.80	0.0380	16.20	999	Rising	4.75		1.55	0.73
	23/03/20	0.10	0.10	0.00424	1.50	1.50	0.0636	13.90	1019	Steady	4.24		1.55	0.86
	07/04/20	0.10	0.10	0.00455	1.80	1.80	0.0819	12.40	1025	Rising	4.55		1.55	0.90



WELL	DATE	CH ₄ INITIAL (%V/V)	CH ₄ STEADY (%V/V)	CH ₄ GSV (l/hr)	CO ₂ INITIAL (%V/V)	CO ₂ STEADY (%V/V)	CO ₂ GSV (l/hr)	O ₂ (%V/V)	ATMOS (mb)	ATMOS. DYNAMIC	FLOW (l/hr)	RESPONSE ZONE (m bgl)	DEPTH TO BASE (m bgl)	DEPTH TO WATER (m bgl)
WS107	09/12/19	0.10	0.10	-0.00218	0.10	0.10	-0.0022	20.30	1006	Rising	-2.18	1.00-2.00	1.93	1.60
	05/02/20	0.10	0.10	-0.00196	0.10	0.10	-0.0020	20.20	1033	Falling	-1.96		2.07	1.66
	24/02/20	0.10	0.10	-0.0027	0.10	0.10	-0.0027	20.30	1005	Falling	-2.70		2.05	1.70
	12/03/20	0.10	0.10	-0.00294	0.20	0.20	-0.0059	20.10	999	Rising	-2.94		2.02	1.61
	23/03/20	0.10	0.10	0.00294	0.20	0.20	0.0059	19.90	1019	Steady	2.94		2.07	1.60
	07/04/20	0.10	0.10	0.00452	0.20	0.20	0.0090	19.50	1025	Rising	4.52		2.08	1.63
WS109	09/12/19	0.10	0.10	-0.00121	0.10	0.10	-0.0012	20.20	1006	Rising	-1.21	1.00-3.50	2.20	1.00
	05/02/20	0.10	0.10	-0.00086	0.10	0.10	-0.0009	20.30	1033	Falling	-0.86		2.15	1.03
	24/02/20	0.10	0.10	-0.00026	0.10	0.10	-0.0003	20.20	1005	-0.00026	-0.26		2.16	1.06
	12/03/20	0.10	0.10	-0.00052	0.20	0.20	-0.0010	20.10	999	-0.00104	-0.52		2.16	0.94
	23/03/20	0.10	0.10	0.00026	0.10	0.10	0.0003	20.30	1019	0.00026	0.26		2.10	1.14
	07/04/20	0.10	0.10	0.0001	0.10	0.10	0.0001	20.40	1025	0.0001	0.10		2.06	1.20



4. TIER I QUALITATIVE CONTAMINATED LAND RISK ASSESSMENT

E3P has undertaken a Tier 1 qualitative risk assessment to determine if any potential contaminants within the underlying soils and groundwater pose an unacceptable level of risk to the identified receptors.

4.1. HUMAN HEALTH RISK ASSESSMENT

At Tier 1 stage, the long term (chronic) human health toxicity of the soil has been assessed by comparing the on-site concentrations of organic and inorganic compounds with reference values published in LQM/CIEH S4UL (S4UL3267).

The results of this comparison have been summarised within Table 4.1.



TABLE 4.1 SUMMARY OF INORGANIC AND HYDROCARBON TOXICITY ASSESSMENT FOR A RESIDENTIAL END USE

DETERMINANT	UNIT	GAC	N	MC	LOC. OF EX	PATH-WAY	ASSESSMENT
Arsenic	mg/kg	37	17	40 45	WS109 1.10 m WS107 1.80 m	1	Further Action
Cadmium	mg/kg	17	17	12	N/A	1	No Further Action
Chromium (VI)	mg/kg	6.1	17	<.4.0	N/A	1	No Further Action
Lead	mg/kg	200	17	280 210 270 860 250 390 980	TT101 A 1.20 m TP106 0.50 m TP108 2.10 m TT103 A 1.50 m TT102 A 1.10 m TP104 A 2.20 m WS109 1.10 m	1	Further Action
Mercury	mg/kg	1.2	17	2.4	TT102A 1.10 m	3	Further Action
Nickel	mg/kg	180	17	58	N/A	1	No Further Action
Selenium	mg/kg	250	17	<1.0	N/A	1	No Further Action
Copper	mg/kg	2400	17	750	N/A	1	No Further Action
Zinc	mg/kg	3700	17	4900	TT103 A 1.50 m	1	Further Action
Cyanide – Total	mg/kg	791	16	200	N/A	1	No Further Action
Phenols – Total	mg/kg	210	3	<1.0	N/A	1	No Further Action
Asbestos	Fibres	NFD	8	0.005 <0.001 <0.001 0.002 0.100 <0.001	TT101 A 1.20 m TP106 0.50 m TP108 2.10 m TT103A 1.50 m TT102 A 1.10 m TT104 A 2.20 m	4	Further Action
Naphthalene	mg/kg	2.3	16	7.7 2.8 46 40 4.8 2.1 11	TP106 1.70 m WS107 1.80 m TT101A 1.20 m TP106 0.50 m TP108 2.10 m TT103A 1.50 m TT104A 2.20 m	3	Further Action
Acenaphthylene	mg/kg	170	16	30	N/A	2	No Further Action
Acenaphthene	mg/kg	210	16	170	N/A	1	No Further Action
Fluorene	mg/kg	170	16	110	N/A	1	No Further Action
Phenanthrene	mg/kg	95	16	550 550 250 130	TP107 0.50m TT101A 1.20 m TP106 0.50 m WS107 1.80 m	2	Further Action
Anthracene	mg/kg	2400	16	120	N/A	2	No Further Action
Fluoranthene	mg/kg	280	16	720 430	TT101A 1.20 m TP107 0.50m	2	Further Action



DETERMINANT	UNIT	GAC	N	MC	LOC. OF EX	PATH-WAY	ASSESSMENT
Pyrene	mg/kg	620	16	620	N/A	2	No Further Action
Benzo(a)Anthracene	mg/kg	7.2	16	74 330 110 27 39 21 35 16 190	WS107 2.80 m TT101A 1.20 m TP106 0.50 m TP108 2.10m TT105A 2.00m TT103A 1.50m TT104A 2.20m WS109 1.10m TP107 0.50m	2	Further Action
Chrysene	mg/kg	15	16	55 290 140 95 27 33	WS107 1.80m TT101A 1.20m TP107 0.50m TP106 0.50m TP108 2.10m TT104A 2.20m	2	Further Action
Benzo(b)Fluoranthene	mg/kg	2.6	16	3.2 140 63 380 100 23 15 5.9 37 13	TP106 1.70 m TP107 0.50m WS107 1.80 m TT101A 1.20 m TP106 0.50 m TP108 2.10 m TT103A 1.50 m TT102A 1.10 m TT104A 2.20 m WS109 1.10 m	2	Further Action
Benzo(k)Fluoranthene	mg/kg	77	16	140	TT101A 1.20 m	2	Further Action
Benzo(a)Pyrene**	mg/kg	2.2	16	3.6 140 55 280 89 28 17 6.2 31 16	TP106 1.70 m TP107 0.50m WS107 1.80 m TT101A 1.20 TP106 0.50 TP108 2.10 TT103A 1.50 m TT102A 1.10 m TT104A 2.20 m WS109 1.10 m	2	Further Action
Indeno(123-cd)Pyrene	mg/kg	27	16	150 52 33	TT101A 1.20m TP107 0.50m TP106 0.50m	2	Further Action
Dibenzo(a,h)Anthracene	mg/kg	0.24	16	41 19 13 7.0 4.3 3.5 2.7 2.2 1.0	TT101A 1.20m TP107 0.50m TP106 0.50m WS107 1.80m TT104A 2.20m TP108 2.10m TT103A 1.50m WS109 1.10m TT102A 1.10m	2	Further Action



DETERMINANT	UNIT	GAC	N	MC	LOC. OF EX	PATH-WAY	ASSESSMENT
Benzo(ghi)Perylene	mg/kg	320	16	170	N/A	2	No Further Action
TPH C5-C6 (aliphatic)*	mg/kg	42	15	<1.0	N/A	3	No Further Action
TPH C6-C8 (aliphatic)*	mg/kg	100	15	<0.1	N/A	3	No Further Action
TPH C8-C10 (aliphatic)*	mg/kg	27	15	<0.1	N/A	3	No Further Action
TPH C10-C12 (aromatic)*	mg/kg	74	15	220	TT101A 1.20 m	3	Further Action
TPH C12-C16 (aromatic)*	mg/kg	140	15	1300 180 420 720 290 420	TT101A 1.20 m TP108 2.10 m TT102 A 1.10 m WS109 1.10 m WS107 1.80 m TP106 0.50 m	3	Further Action
TPH C16-C21 (aromatic)*	mg/kg	260	15	3400 480 1200 610 1200 1400 1200 390	TT101 A 1.20m TP108 2.10m TT102 A 1.10m TT104A 2.20m WS109 1.10m WS107 1.80m TP106 0.50m TT103 A 1.50m	1	Further Action
TPH C21-C35 (aromatic)*	mg/kg	1100	15	5000 2000 2600 6800 3200 2600	TT101 a 1.20m TT102 A 1.10m TT104 A 2.20m WS107 1.80m TP106 0.50m TT103 A 1.50m	1	Further Action

Notes

Main exposure pathways: 1 = soil ingestion, 2 = dermal contact and ingestion, 3 = vapour inhalation (indoor), 4 = dust inhalation.

Abbreviations: GAC = general assessment criteria, n = number of samples, MC = maximum concentration; Loc of Ex = location of exceedance; NFD = no fibres detected.

Referring to Table 4.1, the results of this direct comparison indicates that the data exceeds the screening criteria for a residential end use for the following contaminants:

- Lead;
- Arsenic;
- Zinc;
- Mercury;
- Asbestos (Amosite and Chrysotile Fibres);
- Naphthalene;



- Phenanthrene;
- Benzo(a)Anthracene;
- Chrysene;
- Benzo(b)Fluoranthene;
- Benzo(k)Fluoranthene;
- Benzo(a)Pyrene;
- Indeno(123-cd)Pyrene
- Dibenzo(a,h)Anthracene;
- TPH C12-C16 (aromatic);
- TPH C16-C21 (aromatic);
- TPH C21-C35 (aromatic)

Laboratory analysis of the soils across the site has indicated the presence of elevated metals, non-volatile PAHs, and non-volatile TPH compounds within the Made Ground.

Naphthalene and mercury were also identified throughout the site. Exceedances in mercury were identified in TT102A at 1.20 m bgl. Elevated naphthalene was identified in TP106 at 1.70 m bgl, WS107 at 1.80 m bgl, TT101A at 1.20 m bgl, TP106 at 0.50 m bgl, TP108 at 2.10 m bgl, TT103A at 1.50 m bgl and TT104A at 2.20 m bgl.

Exceedances of aromatic hydrocarbons TPH C12–C35 were noted in TT101A at 1.20 m bgl, TT102 A at 1.10 m bgl, TT103A at 1.50m, TT104A at 2.20m, TP106 at 0.50 m bgl, TP108 at 2.10 m bgl, WS107 at 1.80 m bgl and WS109 at 1.10 m bgl.

Asbestos was identified in six samples out of eight submitted for analysis by E3P. Asbestos in the form of amosite was noted in TT101A at 1.20 m bgl, TT102A at 1.10 m bgl, TT103A at 1.50 m bgl and TP106 at 0.50 m bgl. Asbestos in the form of Chrysotile was also identified in TP108 at 2.10 m bgl and TT104A at 2.20 m bgl.

Five VOCs have been identified in TP107 at 0.50 m bgl above the limit of detection including Toluene, p & m-Xylene, o-Xylene, 1,3,5-Trimethylbenzene and 1,2,4-Trimethylbenzene.

The results of this direct comparison also indicate that the following SVOCs have been identified above the LOD:

- 2-Methylnaphthalene (TT101A at 1.20 m bgl, TT102A at 1.10 m bgl, TT103A at 1.50 m, TP106 at 0.50 m bgl, TP108 at 2.10 m)
- Dibenzofuran (TT102A at 1.10 m bgl, TT103A at 1.50 m, TP106 at 0.50 m bgl, TP108 at 2.10 m)
- Carbazole (TT101A at 1.20 m bgl, TT102A at 1.10 m bgl, TT103A at 1.50 m, TP106 at 0.50 m bgl and TP108 at 2.10 m)



Such sources of chlorinated solvents (VOCs and SVOCs) in the site may be associated with the historic site uses as a former works, factory and garage. The majority of the exceedances were noted in trial trenches located in the proximity of the former canal.

In relation to these exceedances, the following can be determined:

- The main exposure pathways based on the Tier I exceedances are:
 - Soil ingestion;
 - Vapour inhalation (indoor);
 - Dust inhalation
 - Dermal contact and ingestion;
 - Consumption of homegrown vegetables; and
- All exceedances have been identified in the Made Ground with the exception of an exceedance in naphthalene which has been identified in the CLAY deposits in TP106 at 1.70 m bgl.

HUMAN HEALTH RISK ASSESSMENT AND MITIGATION

The majority of the identified elevated concentrations have primary exposure pathways related to dermal contact and ingestion, soil ingestion and consumption of homegrown produce. These exceedances can be mitigated by the installed of a minimum 300 mm chemically suitable cover system within all proposed softstanding landscaped areas.

The specific design and installation process for the appropriate cover systems will be clearly defined within the site remediation and enabling works strategy; however, industry best practice (as outlined within BRE 465) will require the following minimum depths of certified clean cover:

- Landscaped areas within private dwellings – 300 mm;
- Public open space – 300 mm.

With regards to the elevated SVOCs, VOCs, naphthalene, mercury and TPHs, these present a potential volatilisation to indoor air risk and have been identified throughout the site. Therefore, it is recommended to undertake a more detailed DQRA and vapour risk assessment.

This would include:

- Installation of dedicated Vapour Monitoring Wells with specialist Tenax Sorption Tubes;
- DQRA assessment of sorption tube analysis to assess the risk to the proposed dwellings; and,
- Completing speciation of elevated mercury samples to understand if the type of mercury present poses a theoretical vapour risk.

Asbestos was identified in six samples out of eight submitted for analysis by E3P. Quantification identified TP106 at 0.50 m, TP108 at 2.10 m and TT104A at 2.20 m to have concentrations below <0.001%. However, three samples were noted to have asbestos above >0.001% including TT101 at 1.20 m bgl (0.005%), TT103A at 1.50 m (0.002%) and TT102 A at 1.10 m bgl (0.100%). With reference to the E3P Asbestos Conceptual Site Model shown below, Made Ground deposits will require placement below plots or a 300mm cover system (150mm topsoil, 150mm subsoil) in order to mitigate the risks to future residential end users (Figure 4.1).



Made Ground in locations where asbestos has been identified above <0.001% but less than 0.1% can be placed at greater than a meter depth.

Where Asbestos above 0.1% v/v is identified, soils will require removal from site by a licensed waste handler, with subsequent validation sampling to determine if asbestos remains at this location.

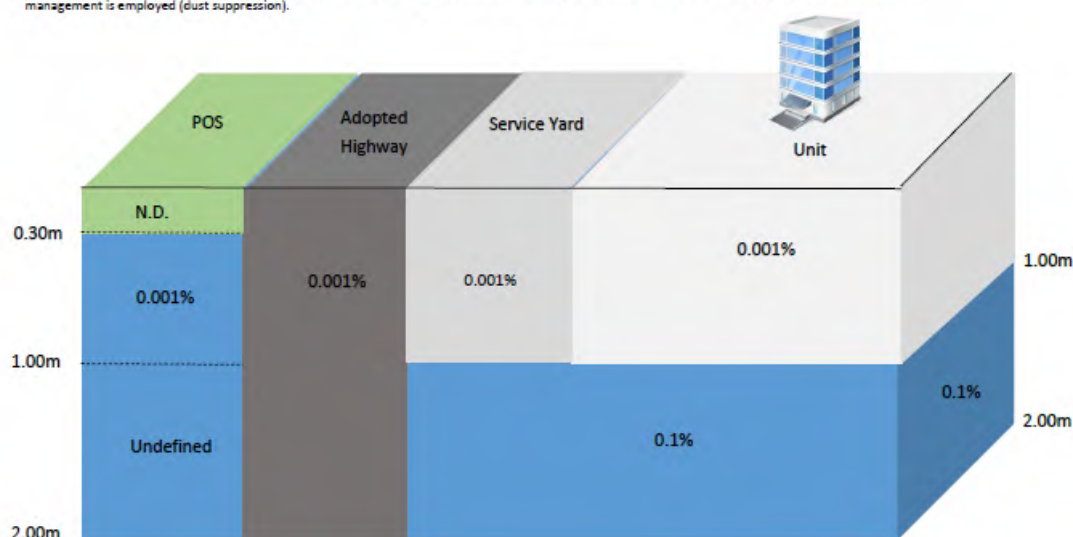
FIGURE 4.1 ASBESTOS RISK MITIGATION CONCEPTUAL SITE MODEL (RESIDENTIAL APARTMENT DEVELOPMENT)

Figure A1Asbestos in Soils Conceptual Site Model Residential Apartment Development

Notes:

N.D. – None Detected

0.001% - Soils may contain 0.001% asbestos using composite testing to ensure there is no potential risk to human health. This value is present within areas where there may be short term low level exposure of soils containing trace asbestos fibres by construction workers where an appropriate level of asbestos management is employed (dust suppression).



No sources of suitable topsoil have been identified on site. Chemical analysis of the natural clay drift deposits have identified these soils to be acceptable for use as subsoil within the proposed garden areas; with the exception of soils in the proximity of TP106 where exceedances in naphthalene have been identified.



4.2. CONTROLLED WATERS RISK ASSESSMENT

The site sensitivity with respect to controlled waters is summarised within Table 4.2.

TABLE 4.2 CONTROLLED WATERS SENSITIVITY PROFILE

RISK PROFILE	DISCUSSION	SENSITIVITY RATING
Groundwater Source Protection Zone or Drinking Water Safeguard Zone	The site is not located within a Groundwater Source Protection Zone or Drinking Water Safeguard Zone but is within 40m of a nitrate vulnerable zone.	Low
Distance to the Closest Groundwater Abstraction Point	There are no groundwater abstraction points located within 1km of the site.	Low
Aquifer Classification in Superficial Drift Deposits	The underlying superficial deposits located within the Secondary undifferentiated aquifer are likely to comprise gravelly sands interbedded with low-permeability clay soils to depths in excess of 5 m, which may reduce the potential for mobile phase contaminants to migrate towards the bedrock aquifer.	Low
Aquifer Classification in Bedrock	Secondary B Aquifer	Low
Viability for Anthropogenic Soil in Direct Contact with Aquifer (Drift or Bedrock)	Variable Made Ground with high-level (predominantly low-solubility) hydrocarbon impact is present throughout the Made Ground to maximum proven depth of 2.80m bgl.	Moderate
Is the Site Located Within 50 m of a Surface Watercourse?	The Rochdale Canal is located circa 40m from the site. No further surface water course are present within 800km of the site.	Low
SUMMARY The ICSM developed within the context of the site setting has identified a viable pollutant risks, which would be the downward migration of potentially mobile phase-soluble contaminants towards the underlying Secondary B aquifer and lateral migration towards the off-site Rochdale Canal.		

To further refine the ICSM, E3P has undertaken an initial qualitative assessment of the soil data analysis to assess the potential for a source of separate-phase or dissolved-phase contamination originating from either a defined on-site source or from impacted soils. This assessment is summarised in Table 4.3.



TABLE 4.3 QUALITATIVE RISK TO CONTROLLED WATERS FROM SOIL ANALYTICAL RESULTS

BTEX > 1 mg/kg	TPHC5-C6 has not been identified within the chemical analysis of soils at the site. However, levels of BTEX within the VOC analysis has identified compounds up to 28mg/kg (O-Xylene - TP107 0.50m bgl).
Total VOC > 1 mg/kg	
Total SVOC > 1 mg/kg	Exceedances in PAHs throughout the site with a maximum concentration of Fluoranthene at 720 mg/kg.
C5-C10 > 5 mg/kg	All concentrations are below the laboratory LOD
C10-C12 > 10 mg/kg	Exceedances in C10-C12 throughout the site with a maximum concentration in TT101A at 1.20 m bgl (220 mg/kg).
C12-C16 > 50 mg/kg	Exceedances in C12-C16 throughout the site with a maximum concentration in TT101A at 1.20 m bgl (1300 mg/kg).
Phenols > 2 mg/kg	All concentrations are below the laboratory LOD
Naphthalene > 2 mg/kg	The most soluble SVOC (naphthalene) has been identified at concentrations greater than 2 mg/kg with the greatest concentration occurring in TT101A at 1.20 m bgl (46 mg/kg).
Total PAH > 10 mg/kg	Concentrations of low solubility PAH compounds greater than 10mg/kg have been detected throughout the site with a maximum concentration of fluoranthene at 720 mg/kg.
PCB > 1 mg/kg	No potential sources of PCB have been identified
Heavy metals > 500 mg/kg	Heavy metals have been identified throughout the site at concentrations above 500 mg/kg, with a maximum concentration of zinc identified in TT103A at 1.50 m bgl (4900 mg/kg).

In due consideration of the ICSM, E3P has undertaken a Tier I controlled waters risk assessment. The Tier I assessment has included a comparison of leachate analysis and groundwater samples to drinking water standards (DWS) as the site is underlain by a Secondary B aquifer with significant contaminant in the near surface and, where absent, environmental surface water quality (EQS) due to the close proximity to the Rochdale Canal.

These are presented in Table 4.4.



TABLE 4.4 COMPARISON OF GROUNDWATER ANALYSIS WITH TIER 1 SCREENING LEVELS

DETERMINAND	UNIT	EQS SCREENING VALUE ^{1, 2, 3}		DWS 3,4,5	N		MC	LOC. OF EX	ASSESSMENT
		AA	MAC		L	GW			
Arsenic	µg/l	50	–	10	2	3	28.6	WS108	Further Action
Cadmium	µg/l	0.08	0.45	5	2	3	<0.08	–	No Further Action
Chromium (VI)	µg/l	3.4	–	–	2	3	<5.0	–	No Further Action
Chromium (III)	µg/l	4.7	–	50	2	3	20	-	No Further Action
Copper (hardness)	µg/l	1–28	–	2000	2	3	27	–	No Further Action
Total Cyanide	µg/l	1	–	50	2	3	6.4	-	No Further Action
Lead	µg/l	1.2	14	10	2	3	40 18	TP101 1.00 m WS110	Further Action
Mercury	µg/l	–	0.07	1.0	2	3	<0.5	–	No Further Action
Nickel	µg/l	4	34	20	2	3	4.6	–	No Further Action
Selenium	µg/l	–	–	10	2	3	6.6	-	No Further Action
Zinc (hardness)	µg/l	8–125	–	–	2	3	9.7	–	No Further Action
pH	6–9				2	3	7.6– 12.0	WS110	Further Action
PAH									
Naphthalene	µg/l	2	130	10*	2	3	15	WS109	Further Action
Anthracene	µg/l	0.1	0.1		2	3	0.78	-	No Further Action
Benzo[b]fluoranthene	µg/l	1.7–4	0.017		2	3	0.57	-	No Further Action
Benzo[k]fluoranthene	µg/l	1.7–4	0.017		2	3	0.37	-	No Further Action
Benzo(a)pyrene	µg/l	1.7–4	0.27		2	3	0.40	-	No Further Action
Fluoranthene	µg/l	0.0063	0.12		2	3	2.4	-	No Further Action
Benzo(ghi)perylene	µg/l	1.7–4	8.2– 3		2	3	<0.01	–	No Further Action
TPH-Aromatic									
TPH C5-C6 (benzene)	µg/l	10	50	1	2	3	<1.0	–	No Further Action
TPH C6-C8 (toluene)	µg/l	50	–	700	2	3	<1.0	–	No Further Action
TPH C8-C10 (ethyl Benzene)	µg/l	20	–	300	2	3	<1.0	–	No Further Action
TPH C10-C12 (xylene)	µg/l	30	–	500	2	3	110	-	No Further Action
TPH C12-C16	µg/l	2	130	90 ⁵	2	3	600	WS109	Further Action
TPH C16-C35	µg/l	50#	50#	90 ⁵	2	3	900	WS109	Further Action



TPH Aliphatic ⁵									
TPH C5-C6	µg/l	–	–	15000		3	<1.0	–	No Further Action
TPH C6-C8	µg/l	–	–	15000		3	<1.0	–	No Further Action
TPH C8-C10	µg/l	–	–	300		3	<1.0	–	No Further Action
TPH C10-C12	µg/l	–	–	300		3	140	–	No Further Action
TPH C12-C16	µg/l	–	–	300		3	2300	WS109	Further Action
TPH C16 – C21	µg/l	–	–	300**		3	470 3200	WS106 WS109	Further Action
TPH C21-C35	µg/l	–	–	300**		3	1800 3500	WS106 WS109	Further Action
VOC									
Tetrachloroethylene	µg/l	0.4	–	10	N/A	3	<1.0	–	No Further Action
Trichloroethylene	µg/l	10	–	10		3	<1.0	–	No Further Action
Trichlorobenzene	µg/l	0.4	–	–		3	<1.0	–	No Further Action
Trichloromethane	µg/l	2.5	–	–		3	<1.0	–	No Further Action
Dichloromethane	µg/l	20	–	200		3	<1.0	–	No Further Action
Carbon Tetrachloride	µg/l	12	–	3		3	<1.0	–	No Further Action
Vinyl Chloride	µg/l	–	–	0.3		3	<1.0	–	No Further Action

Notes

Solubility < 0.01 µg/l.

AA – Annual average.

MAC – Maximum admissible concentration.

* Sum of The specified compounds are benzo[b]fluoranthene (CAS 205-99-2), benzo[k]fluoranthene (CAS 207-08-9), benzo[g,h,i]perylene (CAS 191-24-2) and indeno[1,2,3-c,d]pyrene (CAS 193-39-5).

1. *The Water Environment (Water Framework Directive) (England and Wales) (Amendment) Regulations (2015).*
2. *Directive establishing a framework for Community action in the field of water policy (Water Framework Directive).*
3. *Council Directive on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community (Dangerous Substances Directive) – List II substances.*
4. *Council Directive on the quality of water intended for human consumption (Drinking Water Directive).*
5. *WHO Guidelines for Drinking Water Quality. Third edition (2004).*

CONTROLLED WATER RISK ASSESSMENT AND MITIGATION

This comparison indicates that the data exceeds the DGW values for the following inorganic compounds:

- pH
- Arsenic;
- Lead;
- Naphthalene;
- TPH C12-C16 (Aromatic);
- TPH C16-C35 (Aromatic);
- TPH C12-C16 (Aliphatic);



- TPH C16-C21 (Aliphatic);
- TPH C21-C35 (Aliphatic).

In the case of Leachate results, the aggressive nature of the test does not replicate the natural environmental setting and may force compounds into solution that wouldn't otherwise at the site.

Heavy Metals identified above could be considered (in low volume) to have low mobility and low solubility reducing their potential to migrate in solution should the conditions arise.

Given that the site is underlain by low-permeability, predominantly cohesive glacial till deposits, which will afford protection to the underlying secondary B and principal aquifer further limiting vertical migration, there is considered to be a low risk to controlled waters and the wider environ as, in the absence of a groundwater potable abstraction, no complete pollutant linkage can be determined.

Furthermore, the nearest surface watercourse is the adjacent canal which, due to being a managed watercourse, is not considered to be in hydraulic continuity with the site.

Based on the expected development at the site, it is envisaged that during excavation of materials to for a basement, groundwater pumping will be required based on the existing high water table. This water will require appropriate discharge with permits where applicable. However, in this process much of the impacted groundwater will be pumped out and the source soils removed to appropriate facilities.

Given the perched water currently held within the former canal, this will require pumping out with appropriate off site disposal with the potential contaminant issues considered.

Furthermore, processing/removal of Made Ground from site during the same process will remove the potential for further leaching of contaminants out of the soils.

Based on the above, there is considered to be no unacceptable level of risk to the controlled water receptors.

4.3. GROUND GAS

The potential impact on the development from ground gases has been assessed with reference to standards and guidelines published in CIRIA Report 665 – *Assessing risks posed by hazardous ground gases to buildings* (2007). However, it is recommended that the full ground gas assessment and recommended protection measures are agreed with the local authority prior to their adoption on site. Furthermore, all protection measures adopted should be validated by a suitably qualified engineer.

CIRIA C665 and NHBC Report No 10627-R01 provide assessments for carbon dioxide and methane based upon gas screening values (GSVs) utilising flow rates and concentrations. The site-based GSVs for steady state methane and carbon dioxide are based upon the following equation:

$$GSV = \frac{\text{concentration (by vol)}}{100} \times \text{flowrate (1 / hr)}$$

The GSVs within CIRIA C665 are based upon all buildings other than standard residential houses. The NHBC GSVs are based upon standard residential houses with precast concrete floors (block and beam). The CIRIA 665 report author (Steve Wilson) since provided further clarification regarding which guidance should be adopted for residential houses that have suspended cast in-situ concrete floor slab: for the avoidance of doubt, it was confirmed that the GSVs within the CIRIA 665 guidance should be adopted. The thresholds for GSVs based upon NHBC and CIRIA guidance are provided within Table 4.5.



TABLE 4.5 RESIDENTIAL THRESHOLDS FOR GAS SCREENING VALUES (GSV) IN ACCORDANCE WITH CIRIA C665 AND NHBS REPORT NO 10627-R01 – RESIDENTIAL END USE

CIRIA – NO SUBFLOOR VOID		NHBC – SUBFLOOR VOID		
CLASSIFICATION	GSV (METHANE AND CARBON DIOXIDE)	CLASSIFICATION	GSV (METHANE)	GSV (CARBON DIOXIDE)
CS1	< 0.07	Green	< 0.13	< 0.76
CS2	< 0.70	Amber 1	< 0.63	< 1.60
CS3	< 3.5	Amber 2	< 1.60	< 3.10
CS4	< 15	Red	> 1.60	> 3.10
CS5	< 70	N/A	N/A	N/A
CS6	> 70	N/A	N/A	N/A

4.3.1. SOURCES OF GROUND GAS

The Phase I report and subsequent ground investigation has identified the following potential sources of ground gas:

- Made Ground deposits; and
- Infilled ground
- Historic engineering and site uses (Spills/leaks/Etc)

4.3.2. GROUNDWATER

Monitoring well WS102 was damaged and beyond repair during the monitoring regime and therefore groundwater could not be monitored.

Within the remaining wells, WS101, WS106, WS107 and WS109, groundwater levels were observed to fluctuate over the monitoring period, with levels decreasing by 0.26 m over the monitoring period within WS101. WS101 was set within a low-permeability clay stratum and groundwater may be a result of surface water collecting in the well rather than a measure of true groundwater.

4.3.3. GAS FLOW

During the monitoring a positive flow was noted in WS101 and WS106. The measure of positive flow is considered to be the result of groundwater fluctuations and flooding of the well causing compression – as opposed to gas generation – as the highest flows are recorded during periods of high groundwater levels.

Negative flows were recorded in WS107 and WS109 and may be indicative of back pressure from wind being greater than the active flow from the wells.

4.3.4. GAS CONCENTRATIONS

No elevated concentrations of methane have been recorded within any monitoring wells (<0.10% v/v).



Carbon dioxide concentrations were recorded within all the monitoring wells at concentrations ranging from 0.10% v/v to 1.80% v/v (WS106). The maximum carbon dioxide levels were also associated with low oxygen concentrations and appear to be associated with Made Ground, identified in WS106.

4.3.5. GAS ASSESSMENT

In accordance with the methodology outlined with the CIRIA publication C665, E3P have utilised the results of the ground gas monitoring surveys to calculate a tentative gas screening value (GSV). The GSVs for the monitoring positions are summarised in Table 4.6.

TABLE 4.6 GAS RISK PROFILE AND LOCATION

LOCATION	MAX CO ₂ (% v/v)	GSV (l/hr)	MAX CH ₄ (% v/v)	GSV (l/hr)	CLASSIFICATION
WS101	0.50	0.0244	0.10	0.0061	CS1
WS102	Monitoring Well Destroyed.				
WS106	1.80	0.0819	0.10	0.0074	CS1
WS107	0.20	0.0090	0.10	0.00294	CS1
WS109	0.20	-0.0012	0.10	-0.00121	CS1

The GSV has been compared to the criteria outlined with CIRIA C665 to determine the level of risk to the proposed development and to ensure the appropriate remedial options are incorporated into any future building design in this area.

In WS106 the GSV marginally exceeds the threshold value for CS2 on one occasion, however, this is triggered by flow rate and with a low concentration of CO₂ measured during this visit and is therefore not a true signal of ground gas generation.

WS106 is predominantly set within the Made Ground with no notable putrescible material. The CO₂ levels detected could be a result of organic materials within the clay horizon in the base of the installation undergoing final aerobic degradation but to levels which would not pose a risk to human health.

In light of the above, the completed phase of ground gas monitoring confirms that the site can be classified as CS1 and it is considered that gas protection measures will not be required.



4.4. POTABLE WATER SUPPLY

This section provides a summary of the site investigation data with reference to the selection of potable water supply pipework. The assessment is made with reference to the UK Water Industry Research (UKWIR) publication "Guidance on the selection of Water Supply Pipes to be used in Brownfield Sites"

TABLE 4.7 PIPELINE SELECTION PE THRESHOLD CONCENTRATIONS

Contaminant Group	PE-threshold (mg/kg)	Concentrations at <u>Current</u> pipeline depth (mg/kg)
Total VOC	0.5	<1.0
Total BTEX And MTBE	0.1	<1.0
Total SVOCs (Excluding PAH and those substances marked with an *)	2	31 mg/kg TT101 A 1.20 m 170 mg/kg TT101 A 1.20 m 47 mg/kg TT101 A 1.20 m 110 mg/kg TT101 A 1.20 m 37 mg/kg TT101 A 1.20 m 8.7 mg/kg TT102A 1.10 m
EC5-EC10 Aliphatic and Aromatic Hydrocarbons	2	<1.0
EC10-EC16- Aliphatic and Aromatic Hydrocarbons	10	1000 mg/kg TT101A 1.2 m 420 mg/kg TT102A 1.10 m 720 mg/kg WS109 1.10 m
EC16-EC40 Aliphatic and Aromatic Hydrocarbons	500	8400 mg/kg TT101A 1.20 m 3200 mg/kg TT102A 1.10 m 670 mg/kg WS109 1.10 m
Phenols (From SVOC Analysis)*	2	<0.2
Cresols and Chlorinated Phenols (From SVOC Analysis)	2	<0.2
Ethers*	0.5	NA
Nitrobenzene*	0.5	NA
Ketones*	0.5	NA
Aldehydes*	0.5	NA
Amines	Fail	NA
Other Consideration		
Are there any exceedances of the PE threshold outside of the pipeline depth?	There were exceedances throughout the site outside of the pipeline depth, above the PE threshold.	
Is free product present in soil and groundwater?	A hydrocarbon sheen has been noted within TP106, TT101A, TT103B, TT104A, WS107 and WS109.	
Could hydrocarbon impact at greater depth than current pipeline depth be mobilised by rising groundwater levels?	Volatile hydrocarbon impact and PAH have been identified throughout the site. Moreover, groundwater has also been identified throughout the site within the intended pipeline depth.	



Will soils impacted with above determinands likely be utilised elsewhere on site?	Widespread contamination has been identified throughout the site, which may result in cross contamination.
Will soils be imported to site as part of any future earth works	Currently unknown, however it is unlikely soils will be required to be imported to site.

Notes - Pipe line depth normally between 0.75m–1.35m

Based on the assessment of current site conditions it is likely that barrier pipe will be required at the proposed development. However, a post remediation UK WIR assessment should be completed to inform the selection using the appropriate soils analysis.



4.5. CONCEPTUAL SITE MODEL

Following the completion of the intrusive site investigation, chemical analysis and risk assessment, the conceptual model shown in Table 4.8 has been prepared for the site.

TABLE 4.8 CONCEPTUAL MODEL

TABLE 10: CONCEPT RISK MODEL						
POLLUTANT LINKAGE	CONTAMINANT (SOURCE)	PATHWAY	RECEPTOR	PROBABILITY	CURRENT RISK	RESIDUAL RISK AFTER MITIGATION
PL1	Dermal contact.	Future site users.	Heavy metals (in Made Ground)	Present	Moderate	LOW
PL2	Dermal contact and ingestion.	Off-site receptors.				
Discussion: Heavy metals (Lead, Arsenic, Zinc and Mercury) and TPH fractions (Aromatic C12-C35) identified throughout Made Ground between depths of 0.50m to 2.20m bgl. Given that the proposed development is expected to have basement/undercroft parking it is envisaged that the majority of the Made Ground will be excavated and removed from site to circa 4m bgl. This will remove many of the contaminant sources at the site. Where Made Ground is not removed it is expected that hardstanding will be the overarching surface cover therefore mitigating the pathway. Recommendation: Cover system to any landscaped areas will prevent exposure to future site users. Construction works completed with PPE and provision of welfare during works.						



POLLUTANT LINKAGE	CONTAMINANT (SOURCE)	PATHWAY	RECEPTOR	PROBABILITY	CURRENT RISK	RESIDUAL RISK AFTER MITIGATION
PL3	Volatile Contaminants such as hydrocarbons, solvents, antifreeze (Made Ground, Engineering works, canal infill)	Inhalation of vapours. Migration through permeable strata and preferential pathways.	Future site users. Off-site receptors.	Present	Moderate	To be determined

Discussion:

Naphthalene and Mercury have been identified within the soils present at the site, predominantly identified within the Made Ground used as backfill within the area of the historic canal but have also been found across the site evident of historic spills and historic land use.

Again, it is expected that as part of the substructure build incorporating a basement/undercroft parking at the site, much of the contaminant source will be removed as part of the works. This will require regulatory compliant waste characterisation and there is the potential for the material to be hazardous and require hazardous landfill disposal.

Recommendation:

Where the material remains it is recommended that further works are carried out in this regard. With respect to mercury, delineation sampling in the location of TT102a is required to ensure the surrounding soils (to remain) are not also impacted. The arisings should then be tested for Mercury speciation to determine the nature of the Mercury (be it: elemental, inorganic or methyl) and subsequently determine the risk and future retention within the site.

Vapour monitoring tubes should be installed to the areas identifying Naphthalene to understand the vapour risk potential through the site. The results of this monitoring can then be applied to a Detailed Quantitative Risk Assessment (DQRA) for the site and specific target values established in accordance with guidance to suitably remediate the site to a safe and pragmatic level.

However, it is possible that material in these locations be excavated and removed from site given the expected excess of materials during the enabling works.



POLLUTANT LINKAGE	CONTAMINANT (SOURCE)	PATHWAY	RECEPTOR	PROBABILITY	CURRENT RISK	RESIDUAL RISK AFTER MITIGATION
PL4	ACM in Made Ground	Inhalation of dust.	Future site users. Buildings. Off-site land users.	Present	Moderate	LOW

Assessment:

Asbestos was identified in six samples out of eight submitted for analysis by E3P. Quantification identified TP106 at 0.50 m, TP108 at 2.10 m, TT104A at 2.20 m to have concentrations below <0.001%.

However, three samples were noted to have asbestos above >0.001% including TT101 at 1.20 m bgl (0.005%), TT103A at 1.50 m (0.002%) and TT102 A at 1.10 m bgl (0.100%).

It is expected that as part of the works to install undercroft parking or a basement within the proposed development that the majority of the Made Ground will be excavated and removed from site, removing much of the contaminant source.

Recommendation:

During the remediation and enabling works, asbestos impacted materials should be carefully managed to ensure no release of fibres. The E3P conceptual model demonstrates the regulatory compliant placement of impacted materials based on the level of impact. Any remaining asbestos impacted materials will be placed at depth beneath areas of hardstanding/beneath plot/under cover systems to mitigate the risk in the future development.

Made Ground in locations where asbestos has been identified above <0.001% but less than 0.1% can be placed at greater than a meter depth. Asbestos above 0.1% v/v will require removal from site by a licensed waste handler, with subsequent validation sampling to determine if asbestos remains at this location.



POLLUTANT LINKAGE	CONTAMINANT (SOURCE)	PATHWAY	RECEPTOR	PROBABILITY	CURRENT RISK	RESIDUAL RISK AFTER MITIGATION
PL5	Methane, carbon dioxide (Made Ground and infilled features on and within 250 m of the site)	Inhalation of gas. Migration through permeable strata and preferential pathways. Explosion in confined spaces.	Future site users. Buildings. Off-site land users.	Low likelihood	Low	Low
Assessment: Low likelihood due to the currently identified level of ground gas being Green/CS1 not requiring mitigation. However, given the nature of the ground conditions at the site coupled with sensitive nature of the proposed development (residential) there remains a potential that CS2 mitigation measures will be required. It is expected that as part of the works to install undercroft parking or a basement within the proposed development that the majority of the Made Ground and source of ground gas will be excavated and removed from site, therefore reducing the risk. Recommendation: Completed phase of ground gas monitoring or precautionary CS2 measures required.						



POLLUTANT LINKAGE	CONTAMINANT (SOURCE)	PATHWAY	RECEPTOR	PROBABILITY	CURRENT RISK	RESIDUAL RISK AFTER MITIGATION
PL6	Mobile contaminants such as metals, PAHs, hydrocarbons, volatile compounds (Made Ground, works, canal and yards)	Surface runoff. Migration through permeable strata and preferential pathways. Perched waters migration.	Groundwater (Secondary B aquifer). Surface water (Canal).	Likely	Low	Low

Assessment:

Likely probability as significant sources of mobile contamination identified. Leakages/spillages of mobile contamination are considered possible. Glacial till across the site may reduce downward migration into the underlying bedrock aquifer.

Whilst contaminants have been identified the lack of viable pathways reduces the risk rating. Furthermore, the managed nature of the canal confirms that this is not in hydraulic continuity with other surface water in the wider area and also with an aquifer beneath the site.

It is expected that as part of the works to install undercroft parking or a basement within the proposed development that the majority of the Made Ground will be excavated and removed from site, removing much of the contaminant source. Furthermore, given the high water table at the site, in order to construct sub surface structures the groundwater will require pumping out and further disposal from site. As such it is expected the majority of the groundwater impact and source soils will be removed as part of these works.

Recommendation:

Hotspots and sources of contamination (infilled canal and Made Ground) will be managed as part of the site remediation and enabling works package, in some cases these sources will be removed from site, however, where the materials remain these will be placed in a low risk area of the site (ie not in piling locations/areas where preferential pathways exist/not where human interaction with soils can take place).



POLLUTANT LINKAGE	CONTAMINANT (SOURCE)	PATHWAY	RECEPTOR	PROBABILITY	CURRENT RISK	RESIDUAL RISK AFTER MITIGATION
PL7	Sulphate (potential ash within Made Ground)	Sulphate attack on concrete.	Building structure.	Unlikely	Low	Low
Assessment: pH and Sulphate levels have been assessed from soil samples obtained during the site investigation. This highlighted one location that would require DS-2 AC-1s concrete classification, all other locations confirmed the requirement for DS-1 AC-1s class of concrete. Recommendation: Following the remediation and enabling works in all likelihood the classification throughout will be DS-1 AC-1s.						
PL8	Organic contaminants such as hydrocarbons, solvents (Made Ground)	Ingestion of tainted water supply.	Future site users. Water pipes.	Likely	Moderate	Low
Assessment: Likely probability as significant contamination has been identified across the site. Currently soil contaminant levels at the site have been used to complete a UK WIR assessment that points towards Barrier Pipe being a requirement. However, the most appropriate comparison is with soils post remediation at pipeline depth given the finished floor levels. In addition it is expected that as part of the works to prepare the site for construction of a basement/undercroft parking much of the source impacted materials will be removed from the site and as such pose no further risk in the future development. Recommendation: Following the remediation and enabling works completed at the site, soil samples should be obtained from the proposed location of pipeline runs at the anticipated depth in order to inform an accurate UK WIR United Utilities pipeline risk assessment. It is recommended at this stage that an allowance for Barrier pipeline to be utilised throughout the site should be retained.						



Main exposure pathways:

PL1 = soil ingestion, PL2 = dermal contact and ingestion, PL3 = vapour inhalation (indoor), PL4 = dust inhalation; PL5 = Explosive/Asphyxiation; PL6 = Vertical/lateral migration; PL7 = Corrosion of concrete; PL8=Tainting of water supply;



5. GEOTECHNICAL ASSESSMENT

5.1. PROPOSED DEVELOPMENT

Development of land bounded by Poland Street to the west and Jersey Street to the south to deliver 118 residential units, ground floor commercial floorspace, and ancillary amenity space within an 8 storey building, cycle parking provision, hard and soft landscaping, access and servicing and other associated works.

5.2. SUMMARY OF GROUND CONDITIONS

Made Ground

Made Ground was encountered within all exploratory holes between ground level and 2.50 m bgl. The full depth of Made Ground was not determined in several exploratory hole locations due to the presence of obstructions, ingress of groundwater flooding the excavation and suspected basement floor slabs.

The majority of exploratory holes were surfaced by concrete between ground level and 0.30 m bgl. TT102B, TT103A, TT103B, TT104A and TT104B were all underlain by concrete slabs below ground level between 0.50 m and 1.20 m bgl.

Made Ground mainly comprised gravelly black ash with frequent cobbles with gravel of mudstone, concrete, brick and asphalt and cobbles of brick which was encountered between ground level and 2.50 m bgl.

Gravelly ash which presented a strong hydrocarbon odour and sheen were encountered within TT101A, TT102A, TT104A, TP106, TP107, TP108, TP110 and WS109. Visual and olfactory contamination was present in the north and east of the site associated with the historically infilled canal.

Large obstructions including brick and concrete were encountered within the majority of exploratory hole locations. A brick wall was encountered within the west and north of TT101B between ground level and 1.2 m. A brick wall was also encountered between the centre of TT101A and TT101B between ground level and 0.70 m bgl. Brick walls were also noted in TP105.

A Depth of Made Ground Plan is presented as Drawing 13-729-005 in Appendix III.

Drift

The natural drift deposits were identified across the site and were found to be generally uniform across the area. Natural clay strata directly underlay the Made Ground.

Drift deposits comprised firm to very stiff brown slightly gravelly CLAY which was encountered between 0.60 m and 5.45 m bgl.

Cable percussive drilling investigated the deeper soil horizons where natural clay strata was found to depths in excess of 10m bgl to a maximum proven depth of 13.80m bgl.



Solid

Bedrock has been identified within the deeper exploratory hole locations completed by cable percussive drilling boreholes subsequent to the original site investigation. These identify bedrock at depths between 10.00m and 13.80m bgl.

The closest BGS borehole encountered sandstone bedrock at 23.0 m bgl and confirms a dip to the west as identified in the E3P ground investigation.

Groundwater

Groundwater strikes were encountered as seepages and what was considered to be water held within the former infilled canal. These were generally encountered between 0.70m and 3.00m bgl.

5.3. SITE PREPARATION

The site should be cleared and any vegetation below areas of proposed development stripped in accordance with Series 200 of the *Manual of Contract Documents for Highway Works (MCHW)*. This should include the following:

- Roots present below the footprint of proposed structures and infrastructure should be grubbed out and the resulting void infilled with suitable compacted engineered fill.
- Demolition of all existing buildings and removal of all concrete hardstanding.
- Redundant services should be sealed off and grubbed out and replaced with suitable compacted engineered fill.
- Buried structures and old foundations have been encountered on site. These should be excavated from below the proposed development footprint with the resulting void backfilled.
- Excavation of Made Ground Soils in their entirety with oversize materials removed. Where an excess of soils are identified in order to construct a basement at the site, Made Ground Soils should be disposed off site with all compliant waste assessments completed.
- In order to prepare the site for basement structures an element of ground water pumping will be required with suitable discharge options established with regulatory approval. It is possible an element of pre-treatment may be required given the contaminant element.

5.4. FOUNDATION CONDITIONS AND ASSESSMENT OF POTENTIAL BEARING CAPACITIES

In due consideration of the identified ground conditions, in-situ and laboratory geotechnical testing, E3P has undertaken an assessment of the net safe allowable bearing pressure (ABP) within the underlying natural stratum to assist in the detailed design of foundations and infrastructure and determine the target founding stratum. The results of this assessment are summarised in Table 5.1.



TABLE 5.1 SUMMARY OF ABPS

COHESIVE SOILS			
Description	Depth (range m bgl)	Undrained Shear Strength (Cu) (kN/m ²)	Allowable Bearing Pressure (kN/m ²)
Firm Gravelly CLAY	2.00-2.45	36	75
	3.00-3.45	19	80
Stiff to very stiff gravelly CLAY	2.00-2.45	50-59	103-122
	3.00-3.45	65-100	134-205
	4.00-4.45	88-101	182-208
	5.00-5.45	87-103	179-213

Based on the assessment of the relative undrained shear strength, relative in-situ densities and corresponding safe net allowable bearing pressure, the suitable target founding stratum has been identified as the underlying firm to very stiff CLAY and localised areas of medium-dense sands.

Within the underlying natural drift deposits comprised firm to very stiff CLAY with an ABP of circa 100kN/m² from 2.00m bgl generally increasing in excess of 125kN/m² from 3.00m bgl.

Given the nature of the proposed structure these materials are likely to be excavated and the anticipated the founding strata is likely to be the underlying bedrock. Based on the height of the development further works may be required to understand the bearing capacity of the rocks to ensure >1500kN/m² can be achieved. This is currently outside the scope of this report.



TABLE 5.2 ANTICIPATED FOUNDATIONS

LOCATION	ANTICIPATED FOUNDING STRATA DEPTH (m bgl)	GROUND WATER (m bgl)	TARGET STRATUM	TREES	FOUNDATION TYPE	TYPE OF CONCRETE
TP101	>2.50	–	Bedrock	N	It is expected given the proposed development that a driven pile or CFA pile will be the optimum foundation solution. This will required a structural engineers design	DS-1 AC-1s
TP104	>2.50	–	Bedrock	N		DS-1 AC-1s
TP105	>2.50	–	Bedrock	N		DS-1 AC-1s
TP106	>2.50	0.70	Bedrock	N		DS-1 AC-1s
TP107	>2.50	–	Bedrock	N		DS-1 AC-1s
TP108	>2.50	2.10	Bedrock	N		DS-1 AC-1s
TP109	>2.50	1.40	Bedrock	N		DS-1 AC-1s
TP110	>2.50	–	Bedrock	N		DS-1 AC-1s
TP111	>2.50	–	Bedrock	N		DS-1 AC-1s
TT101A	>2.50	1.10	Bedrock	N		DS-1 AC-1s
TT101B	>2.50	–	Bedrock	N		DS-1 AC-1s
TT102A	>2.50	1.10	Bedrock	N		DS-1 AC-1s
TT102B	>2.50	–	Bedrock	N		DS-1 AC-1s
TT103A	>2.50	1.50	Bedrock	N		DS-2 AC-1s
TT103B	>2.50	2.00	Bedrock	N		DS-1 AC-1s
TT104A	>2.50	2.20	Bedrock	N		DS-1 AC-1s
TT104B	>2.50	–	Bedrock	N		DS-1 AC-1s
WS101	>2.50	3.00	Bedrock	N		DS-1 AC-1s
WS102	>2.50	2.00	Bedrock	N		DS-1 AC-1s
WS106	>2.50	2.00	Bedrock	N		DS-1 AC-1s
WS107	>2.50	2.00	Bedrock	N		DS-1 AC-1s
WS109	>2.50	2.00 3.00	Bedrock	N		DS-1 AC-1s
CP101	>2.50		Bedrock			DS-1 AC-1s
CP102	>2.50		Bedrock			DS-1 AC-1s
CP103	>2.50		Bedrock			DS-1 AC-1s
CP104	>2.50		Bedrock			DS-1 AC-1s
CP105	>2.50		Bedrock			DS-1 AC-1s

It is recommended that, at working drawing stage, a foundation schedule is prepared for the development taking account of the physical change of natural clay soils and the current/proposed locations of trees.



At this time it is not possible to accurately define the foundation types due to the absence of a detailed building design, tree survey and final development levels; however, based on our extensive experience of similar high rise sites in the surrounding area, we would anticipate that the final foundation solution would be a combination of the following:

- Driven pile seated into bedrock to support a cast in situ slab bearing on firm to very stiff gravelly CLAY,
- Or similarly a CFA Pile to support a cast in situ slab as above.

It is not considered that either of these options would give rise to a contaminant risk given the removal of Made Ground to excavate and enable a basement structure.

A concept depth to founding strata is included as Drawing 13-729-006 in Appendix III.

5.5. GROUND FLOOR SLAB

A ground-bearing slab will be viable for the proposed structures; however, it will need to be constructed utilising a sub-base with the thickness designed by a structural engineer to ensure that settlement tolerances are taken into consideration.

Where a ground-bearing floor slab is to be constructed within the conjectured zone of tree influence, the clay will need to be removed to ensure that any desiccated soil cannot swell and induce heave to the structure. Alternatively, it may be possible to design the structure to resist the influence of clay heave using exaggerated sub-base and additional reinforcement within the slab to be designed by the structural engineer. It is unlikely that this will be a requirement however, given the floor slab is to be constructed at basement level below the tree influence level.

Where it is necessary to undertake cut-and-fill works utilising site-derived cohesive soils, careful consideration must be given to seasonal climatic conditions, which will have a significant impact of moisture conditions and the ability to compact clay soils in the wetter winter months. It may be necessary to undertake an element of stabilisation works through the addition of lime to ensure the soils can be engineered to the required performance standards.

It would be possible to utilise soil stabilisation techniques that incorporate the addition of lime and OPC to construct a stiffened soil horizon with a CBR > 15% to constitute a sub-base replacement layer that could then be capped with Type 1 MOT. The use of soil stabilisation could be extended within the conjectured zone of tree influence to modify the structure of clay soils and negate the potential for volumetric instability.

Depending on the design requirements of the proposed structure, and its location on-site, it would be possible to utilise either a suspended or cast in-situ floor slab to incorporate the principals outlined above.

5.6. HEAVE PRECAUTIONS

The site has been proven to be underlain by clay soils, which are susceptible to volumetric instability due to fluctuations in moisture content, particularly within influencing distance of trees as per the NHBC/LABC conjectured zones of influence.

As the clay is deemed to be low to moderate volume change potential, heave precautions are not required to the internal face of the external load-bearing walls (outside or within tree influence).



If a ground beam is to be constructed within the zone of tree influence, heave precautions are required to the underside of this and edge beams.

If the ground floor slab is to be constructed with a beam and block floor, a minimum subfloor void of 200 mm to 250 mm is required within any structures located in the zone of conjectured tree influence.

If the ground floor slab is constructed with a cast in-situ suspended floor slab, then heave precautions that can tolerate 50 mm of clay swelling are required within any part of the floor slab to be located within the zone of influence of a tree.

A summary of heave precautions is presented in Table 5.3.

TABLE 5.3 SUMMARY OF HEAVE PRECAUTIONS

		MINIMUM VOID DIMENSION FOR FOUNDATIONS, GROUND BEAMS AND SUSPENDED IN-SITU CONCRETE GROUND FLOORS		MINIMUM VOID DIMENSIONS UNDER PRECAST CONCRETE AND SUSPENDED TIMBER FLOORS
Plasticity Index of Soil	Required Foundation Depth (m)	Thickness of Void Former Against Side of Foundation or Ground Beam (mm)	Thickness of Void Former on Underside of Edge Beam and Floor Slab (mm)	Void Dimension (mm)
High Plasticity (> 40)	> 2.5	Engineer Design		Engineer Design
	2.0–2.5	35	150	300
	1.5–2.0	25	75	
Moderate Plasticity (20–40)	> 2.5	Engineer Design		Engineer Design
	2.0–2.5	25	100	250
	1.5–2.0	25	50	
Low Plasticity (< 20)	2.0–2.5	N/A	50	200
	> 2.0	No Special Precautions		

5.7. HIGHWAYS CONSTRUCTION

A programme of remediation and enabling works will be required to remediate the proposed road subgrade in accordance with the requirements of the *highways design manual* (series 600) for a method compaction.

It is considered that the material can be re-engineered using method compaction to achieve a CBR in excess of 5% if works are completed in favourable climatic conditions.



5.8. DRAINAGE

The presence of substantial depths of Made Ground across some areas of the site may result in settlement. It is therefore recommended that drain runs are designed using steeper gradients and flexible joints to allow for some differential settlement.

Furthermore, the site is predominantly underlain by circa 1–2 m of likely low-permeability gravelly CLAY. Therefore, the use of soakaway drainage will be limited, and as the lateral continuity of the Made Ground cannot be assured, it is not recommended that soakaways are utilised for disposal of surface water runoff.

If soakaway drainage is to be considered, full BRE 365 testing must be completed to inform the detailed design.

5.9. CONCRETE DURABILITY

Chemical analyses for pH and soluble sulphate content, shows that the soils at the site generally meet Class DS-1, Aggressive Chemical Environment for Concrete Classification (ACEC) AC-1s in accordance with BRE Special Digest 1 (2005).

However, elevated sulphate concentrations in TT103A at 1.50 m bgl have been identified which classify the Made Ground deposits as been classes as DS-2 AC-1s. However, upon completion of site enabling works it will, in all likelihood, be DS1 AC1s.

5.10. EXCAVATIONS

The majority of exploratory hole locations were noted to have been unstable due to the presence of loose ash.

The presence of brick and concrete cobbles within the Made Ground deposits meant that in certain places, excavation was slow through the Made Ground.

A number of locations could not be fully penetrated due to the presence of underlying concrete floor slabs, flooding of excavations and unstable ground conditions. Existing site constraints in the form of historic structures should be considered as these have the potential to limit the application of piling techniques without the requirement to pre bore. Obstructions in the Made Ground will require removal through a Made Ground turnover to facilitate the use of driven foundation solutions. The natural strata was excavated with relative ease.

However, due to the depth and variability of the Made Ground and likelihood of trench collapse, it is considered that all excavations are supported or battered back in accordance with guidance contained in CIRIA R97.

If local pumping of groundwater is required during the advancement of excavations for the proposed foundations then consideration should be given to the potential for dewatering gravels in the surrounding areas that may cause structural damage to building substructures in close proximity to the site.



TABLE 5.4 CIVIL ENGINEERING EXCAVATION RISK MATRIX

RISK ITEM	PRESENT	COMMENT
Running Sands	No	No running sand has been identified.
Minor Water Ingress	Yes	Water ingress will require localised dewatering/sump pumping during the construction of site drainage infrastructure. Ingress of water into foundation excavation will potentially flood foundation excavations, limiting the viability of spread foundations to be constructed.
Shallow Bedrock	No	Shallow bedrock has been identified within Cable Percussive exploratory holes and is found at depths in excess of 10m bgl. However, obstructions in the near surface have been identified that will impede the advancement of excavations.

5.11. SLOPE STABILITY

Jersey Street is retained to the south eastern corner of the site and will require consideration in the future design and construction.

5.12. FURTHER WORKS

Based on the findings of the intrusive site investigation, the following additional works are recommended to be completed in due course:

- Investigation of retaining wall in east of by structural engineer;
- Further assessment of Volatile Organic Compounds, TPH's and Mercury (DQRA) where these are not removed as part of the enabling works;
- Geotechnical earthworks strategy (infrastructure);
- Remediation and enabling works strategy; and,

5.13. CONSTRUCTION ACTIVITY AND INSPECTION

The following activities and inspections should be incorporated into the site works:

- Due to the variability of the soils at the site, it is recommended that sufficient allowance is made for the inspection of formations and sub-formations to foundations and pavement construction.
- Excavations where access is required should be subject to a risk assessment from a competent person and, where appropriate, mitigation measures such as benching back the sides or use of support systems in accordance with CIRIA R97 should be utilised.
- It is considered that dewatering may be required, especially following periods of heavy rainfall. Removal of surface water and water within trenches should be possible with conventional sump pumping. Discharge of any water should be agreed with the relevant



regulatory body and be undertaken under a trade effluent discharge, where required. Measures to remove silt and suspended solids may be required and consideration should be given to provision of space for settling tanks or an attenuation pond.

- Where access to confined spaces is required, appropriate mitigation measures should be addressed within the construction stage health and safety plan. Particular account should be taken of the gas results.
- The presence of potential contamination and mitigation measures should be addressed as part of the construction stage health and safety plan and should include measures to design out the risks, reduce their impact and, finally, to include the use of personnel protective equipment (PPE).
- Where Made Ground is in excess and removed as part of the enabling works to construct a basement, the soils should be appropriately assessed and disposed of to a licenced facility or appropriate alternatives under EA/CL:AIRE guidance.



6. CONCLUSIONS AND RECOMMENDATIONS

CONTAMINATED LAND ASSESSMENT

Human Health

A Tier I human health risk assessment has been undertaken using the chemical analysis results of the soils and comparing to the relevant Tier I criteria.

Laboratory analysis of the soils across the site has indicated the presence of elevated metals, non-volatile PAHs, and non-volatile TPH compounds within the Made Ground. Chlorinated solvents, naphthalene, mercury and volatile TPH were also identified throughout the site. Asbestos was also identified in six samples out of eight submitted for analysis by E3P.

It is expected as part of the enabling works to construct a basement or undercroft structures at the site the majority of the Made Ground will be removed from the site and therefore the source of many of the contaminants will be removed. It is considered that much of the contamination relates to the former infilled canal, following specialised dewatering and compliant disposal of the waters, and excavation and waste compliant disposal of the soils, many of these contaminant will have been removed from the subject site.

The majority of the identified elevated concentrations have primary exposure pathways related to dermal contact and ingestion, soil ingestion and consumption of homegrown produce. Where soils remain, these exceedances can be mitigated by the installation of a 300 mm chemically suitable cover system within all proposed landscaping areas.

With regards to the elevated SVOCs, VOCs, naphthalene, mercury and TPHs, these present a potential volatilisation to indoor air risk and have been identified throughout the site. Further works will be required to appropriately assess the potential vapour production through vapour monitoring and DQRA and therefore the mitigation measures required to reduce the risk. Alternatively, a vapour membrane will be required in the structure of the building.

With regards to the asbestos quantification identified in TP106 at 0.50 m, TP108 at 2.10m, TT104A at 2.20m, concentrations are below <0.001%. However, three samples were noted to have asbestos above >0.001% including TT101 at 1.20 m bgl (0.005%), TT103A at 1.50 m (0.002%) and TT102 A at 1.10 m bgl (0.100%). With reference to the E3P Asbestos Conceptual Site Model, Made Ground deposits will require placement below plots or a 300mm cover system (150mm topsoil, 150mm subsoil) in order to mitigate the risks to future residential end users (Figure 9.1) from asbestos <0.001%. Where asbestos is found >0.001% but <0.1% this can be placed at greater than 1.00m bgl.

No sources of suitable topsoil have been identified on site. Chemical analysis of the natural clay drift deposits have identified these soils to be acceptable for use as subsoil within the proposed garden areas; with the exception of soils in the proximity of TP106 where exceedances in naphthalene have been identified.



Controlled Waters	Low risk to controlled waters.
Ground Gas	Ground gas monitoring confirms that the site would be classed as Characteristic Situation 1, as such no gas protection measures will be required. Vapour membranes may be required given the potentially volatile nature of the contaminants identified in the infilled soils. Further assessment is required to determine.
Potable Water	This will need to be confirmed following the completion of a UKWIR risk assessment. Post-remediation and enabling works ground conditions may be different from those identified during this site investigation. Given the currently soils chemistry an allowance for barrier pipe is recommended.

GEOTECHNICAL ASSESSMENT

Significant concrete and brick obstructions have been encountered within the Made Ground, indicative of relic foundations from the former building and potential infilled basements across the site. Furthermore, significant evidence of the former canal arm (Bengal Arm & Prussia Street Arm) have been identified through the presence of impacted Made Ground, subsurface concrete and brick structures in the associated locations.

During a phase of cut-and-fill enabling works to create a developable platform, all below-ground obstructions will require grubbing out to the base of the Made Ground to enable the construction of proposed plots. The Made Ground will then require processing and an element of re-engineering to ensure minimal settlement in the material. It is likely that as part of the enabling works to create a basement/undercroft parking at the site, Made Ground for the most part will require removal from site.

The underlying natural clay drift deposits have been assessed as being very stiff, high-strength with a net ABP in the order of 100 kN/m² at circa 2.00 m bgl increasing in excess of 120 kN/m² at circa 3 m bgl. However, as above this is likely to be excavated as part of the works. As such the likely founding strata is expected to be the underlying bedrock from circa 10m bgl. Given the height of the building this may require in excess of 1500kN/m².

Given the high rise nature of the proposed development it is likely that the foundation will require engineering input and so given our experience of similar sites in both location and build type, it is envisaged that a driven or CFA pile will be the most viable option in order to support a ground bearing cast in situ slab.

END OF REPORT



APPENDIX I

LIMITATIONS

1. This report and its findings should be considered in relation to the terms of reference and objectives agreed between E3P and the client as indicated in Section 1.3.
2. For the work, reliance has been placed on publicly available data obtained from the sources identified. The information is not necessarily exhaustive and further information relevant to the site may be available from other sources. When using the information it has been assumed it is correct. No attempt has been made to verify the information.
3. This report has been produced in accordance with current UK policy and legislative requirements for land and groundwater contamination which are enforced by the local authority and the Environment Agency. Liabilities associated with land contamination are complex and requires advice from legal professionals.
4. During the site walkover, reasonable effort has been made to obtain an overview of the site conditions. However, during the site walkover, no attempt has been made to enter areas of the site that are unsafe or present a risk to health and safety, are locked, barricaded, overgrown, or the location of the area has not been made known or accessible.
5. Access considerations, the presence of services and the activities being carried out on the site limited the locations where sampling locations could be installed and the techniques that could be used.
6. Site sensitivity assessments have been made based on available information at the time of writing and are ultimately for the decision of the regulatory authorities.
7. Where mention has been made to the identification of Japanese Knotweed and other invasive plant species and asbestos or asbestos-containing materials, this is for indicative purposes only and do not constitute or replace full and proper surveys.
8. The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.
9. E3P cannot be held responsible for any use of the report or its contents for any purpose other than that for which it was prepared. The copyright in this report and other plans and documents prepared by E3P is owned by them and no such plans or documents may be reproduced, published or adapted without written consent. Complete copies of this may, however, be made and distributed by the client as is expected in dealing with matters related to its commission. Should the client pass copies of the report to other parties for information, the whole report should be copied, but no professional liability or warranties shall be extended to other parties by E3P in this connection without their explicit written agreement there to by E3P.
10. New information, revised practices or changes in legislation may necessitate the re-interpretation of the report, in whole or in part.



APPENDIX II

GLOSSARY

TERMS

ACM	Asbestos-containing material	MMP	Materials management plan
ADS	Acoustic design statement	ND	Not detected
AST	Above-ground storage tank	NDP	Nuclear density probe
BGS	British Geological Survey	NMP	Noise management plan
BSI	British Standards Institute	NPSE	Noise policy statement for England
BTEX	Benzene, toluene, ethylbenzene, xylenes	NR	Not recorded
CA	Coal Authority	PAH	Polycyclic aromatic hydrocarbon
CBR	California bearing ratio	PCB	Polychlorinated biphenyl
CIEH	Chartered Institute of Environmental Health	PI	Plasticity index
CIRIA	Construction Industry Research Association	PID	Photo ionisation detector
CLEA	Contaminated land exposure assessment	POS	Public open space
CML	Council of Mortgage Lenders	PPE	Personnel protective equipment
CoC	Contaminants of concern	ProPG	Professional practice guidance
CSM	Conceptual site model	QA	Quality assurance
DNAPL	Dense non-aqueous phase liquid (chlorinated solvents, PCB)	SGV	Soil guideline value
DWS	Drinking water standard	SPH	Separate-phase hydrocarbon
EA	Environment Agency	SPT	Standard penetration test
EQS	Environmental quality standard	SVOC	Semi-volatile organic compound
FFL	Finished floor level	TPH	Total and speciated petroleum hydrocarbon
GAC	General assessment criteria	TPH CWG	Total Petroleum Hydrocarbon (Criteria Working Group)
GL	Ground level	UKWIR	United Kingdom Water Infrastructure Risk
GSV	Gas screening value	UST	Underground storage tank
HCV	Health criteria value	VCC	Vibro-concrete column
ICSM	Initial conceptual site model	VOC	Volatile organic compound
LEL	Lower explosive limit	VRSC	Vibro-replacement stone columns
LMRL	Lower method reporting limit	VSC	Vibro-stone columns
LNAPL	Light non-aqueous phase liquid (petrol, diesel, kerosene)	WHO	World Health Organisation
MCV	Moisture condition value	WRAP	Waste and Resources Action Programme

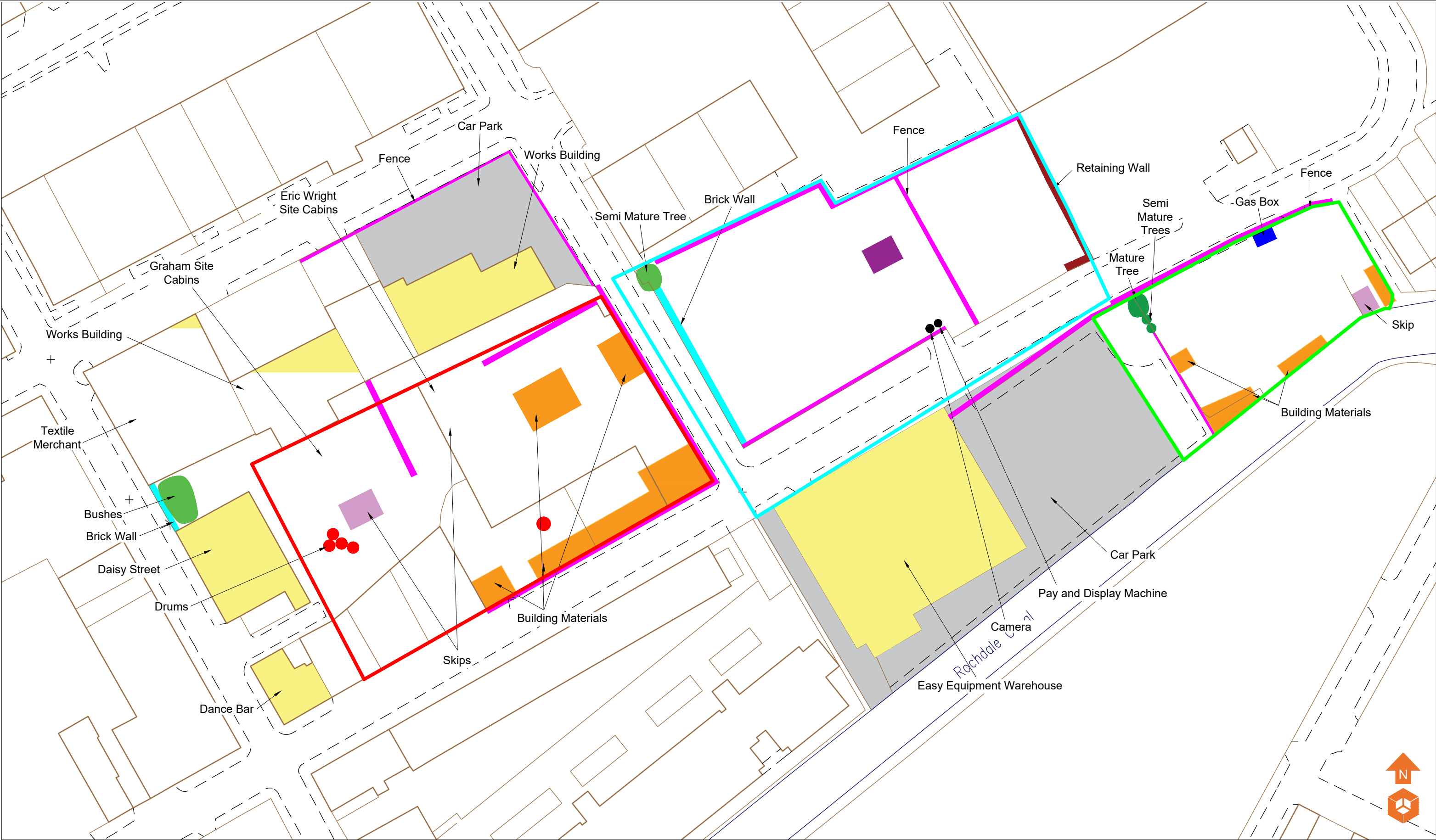


MIBK	Methyl isobutyl ketone	WTE	Water table elevation
m	Metres	ppm	Parts per million
km	Kilometres	mg/m³	Milligram per metre cubed
% v/v	Percent volume in air	m bgl bgl	Metres below ground level
mb	Millibars (atmospheric pressure)	m bcl	Metre below cover level
l/hr	Litres per hour	mAOD	Metres above ordnance datum (sea level)
µg/l	Micrograms per litre (parts per billion)	kN/m²	Kilonewtons per metre squared
ppb	Parts per billion	µm	Micrometre
mg/kg	Milligrams per kilogram (parts per million)	SSRT	Site Specific Remediation Target
PSD	Particle Size Distribution	DD	Dry Density
CL:AIRE	Contaminated Land: Applications in Real Environments	Mc	Moisture Content
ρ	Bulk Density	GPR	Ground Penetrating Radar
NDP	Nuclear Density Probe	FFL	Finished Floor Level
LEL	Lower Explosive Limit	UKWIR	UK Water Industry Research
CIRIA	Construction Industry Research and Information Association	LOD	Limit of Detection

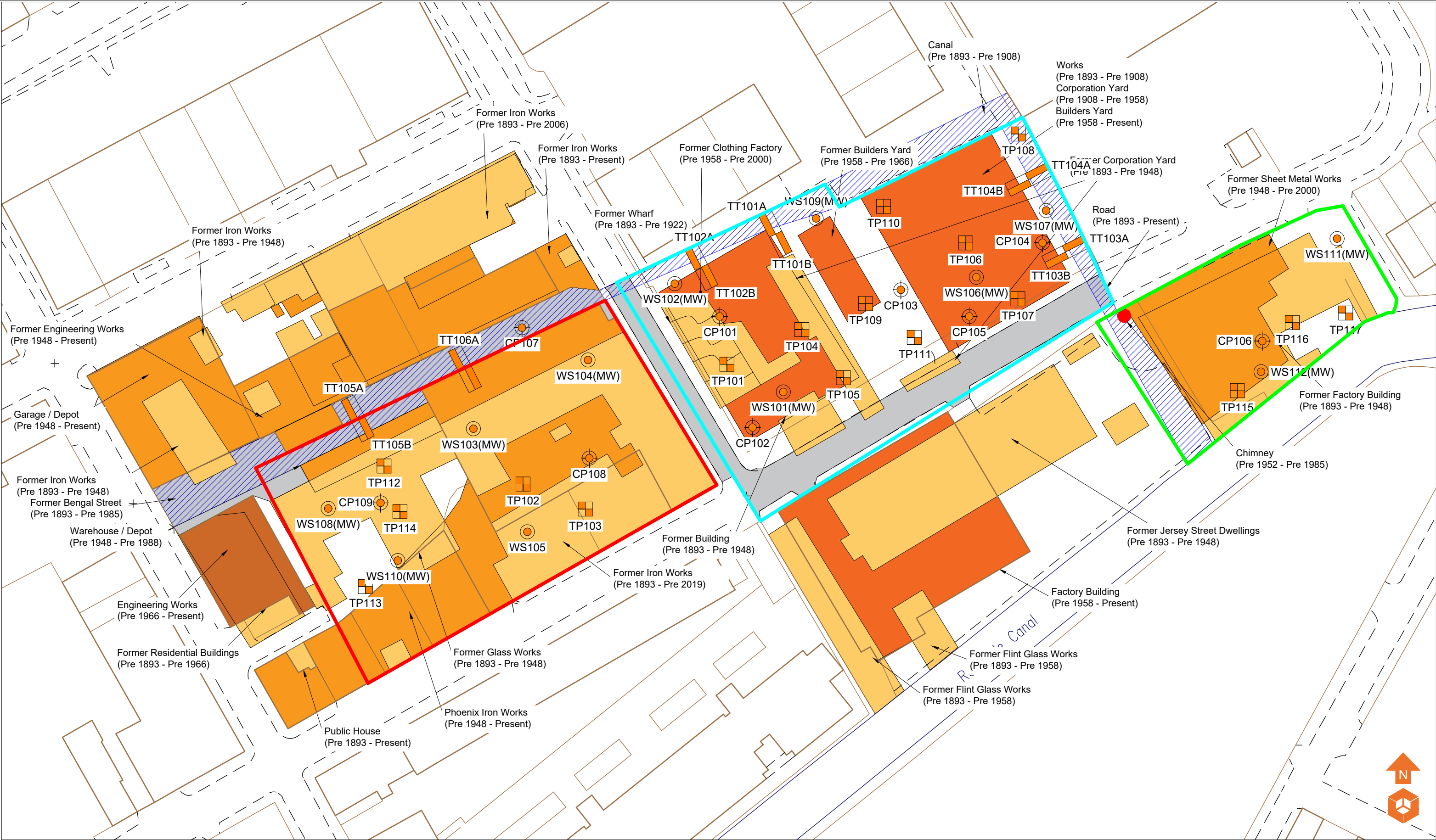


APPENDIX III

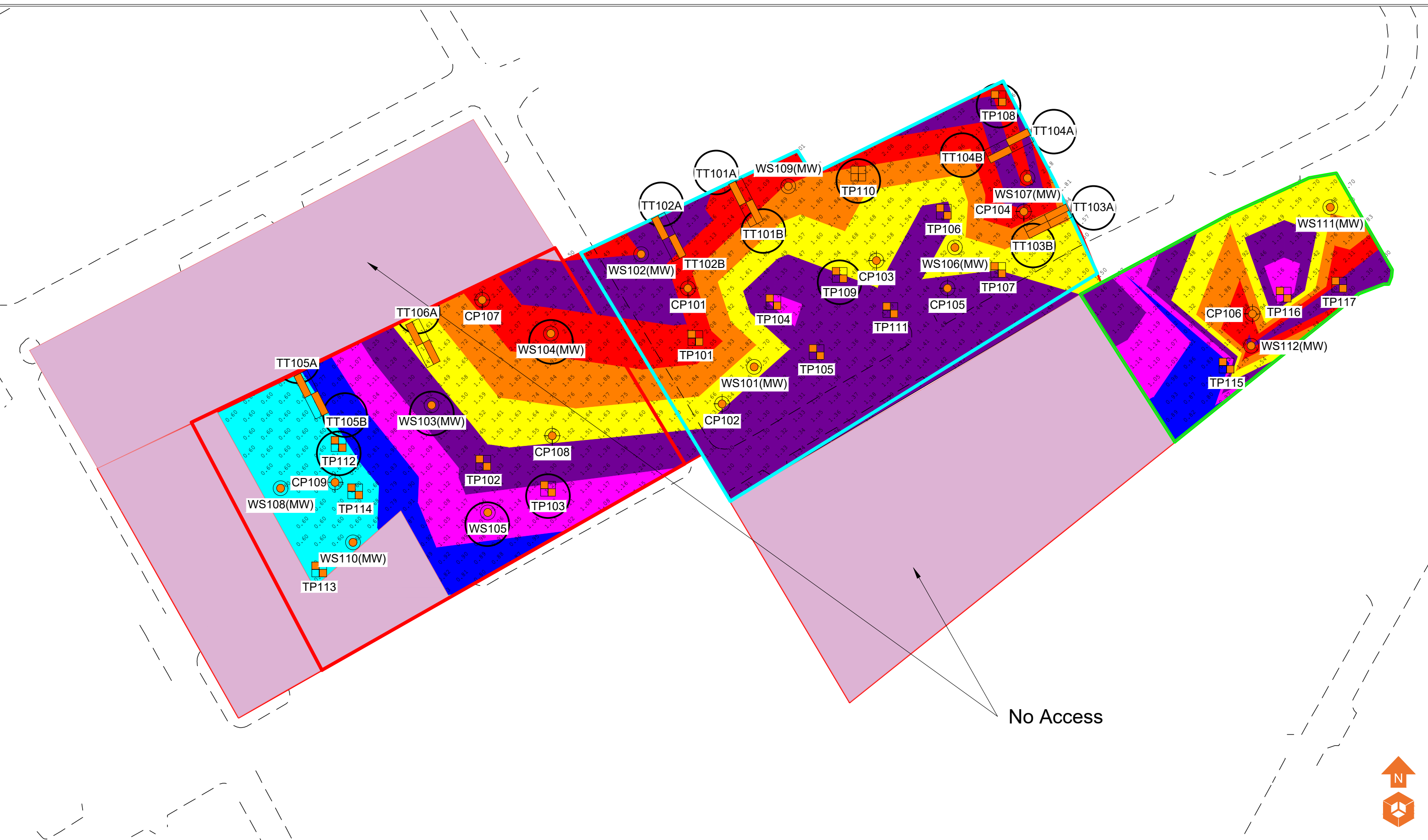
DRAWINGS



Current Site Features Skips Existing Commercial Buildings Trees/Bushes Site Cabins Gas Box Building Materials Retaining Wall Car Park Drums Brick Wall Fence Camera/Pay and Display Machine Parcel A Parcel B Parcel C	Notes:	Client: Manchester Life	Job No: 13-729	Date: 02.12.2019	 Environmental Engineering Partnerships Ltd City Heliport & Business Centre Eccles, Manchester, M30 7RU Tel: 0161 707 9612 E-mail: info@e3p.co.uk Website: www.e3p.co.uk
		Job Title: Jersey Street	Drawing No: 002	Scale: NTS	
	P1 - 02.12.2019 DRAFT CB RJW Phase Revision Date Issue Drawn Checked	Job Title: Jersey Street	Drawing Title: Site Features Plan	The client must not amend any drawing, design or other intellectual property produced by E3P Ltd without permission in writing from E3P Ltd in advance of any amendments being made. In the event that such written permission is not obtained in advance of the amendments being made, E3P Ltd shall not be liable for any damage and/or losses occurring as a result of the amended drawing, design or intellectual property.	



Historical Features Former Canal Former Chimney Former Works Building Former Works Building Former Works Building Location Symbols Approximate Window Sample Probehole Location Approximate Trial Pit Location Approximate Slit Trench Location Parcel A Parcel B Parcel C							Notes:						Client: Manchester Life		Job No: 13-729	Date: 01.11.2019	 Environmental Engineering Partnerships Ltd City Heliport & Business Centre Eccles, Manchester, M30 7RU Tel: 0161 707 9612 E-mail: info@e3p.co.uk Website: www.e3p.co.uk	
													Drawing No: 003		Scale: NTS			
							Job Title: Jersey Street						Drawing Title: Historical Features Plan		The client must not amend any drawing, design or other intellectual property produced by E3P Ltd without permission in writing from E3P Ltd in advance of any amendments being made. In the event that such written permission is not obtained in advance of the amendments being made, E3P Ltd shall not be liable for any damage and/or losses occurring as a result of the amended drawing, design or intellectual property.			
P1							-	01.11.2019	DRAFT	HM	RJW							
Phase							Revision	Date	Issue	Drawn	Checked							



Location Symbols

Approximate Window Sample Probehole Location

Approximate Trial Pit Location

Approximate Silt Trench Location

No Access

Full Depth of Made Ground not Proven - Depth has been Inferred

Parcel A

Parcel B

Parcel C

Made Ground Depth (m)

Depth of Made Ground 0.00 - 0.29m

Depth of Made Ground 0.30 - 0.59m

Depth of Made Ground 0.60 - 0.89m

Depth of Made Ground 0.90 - 1.19m

Depth of Made Ground 1.20 - 1.49m

Depth of Made Ground 1.50 - 1.79m

Depth of Made Ground 1.80 - 2.09m

Depth of Made Ground 2.10 - 2.39m

Depth of Made Ground >2.40m

Notes:

P1

-

04.12.2019

DRAFT

CB

RJW

Phase

Revision

Date

Issue

Drawn

Checked

Client:

Manchester Life

Job Title:

Jersey Street

Job No:

13-729

Drawing No:

005

Date:

04.12.2019

Scale:

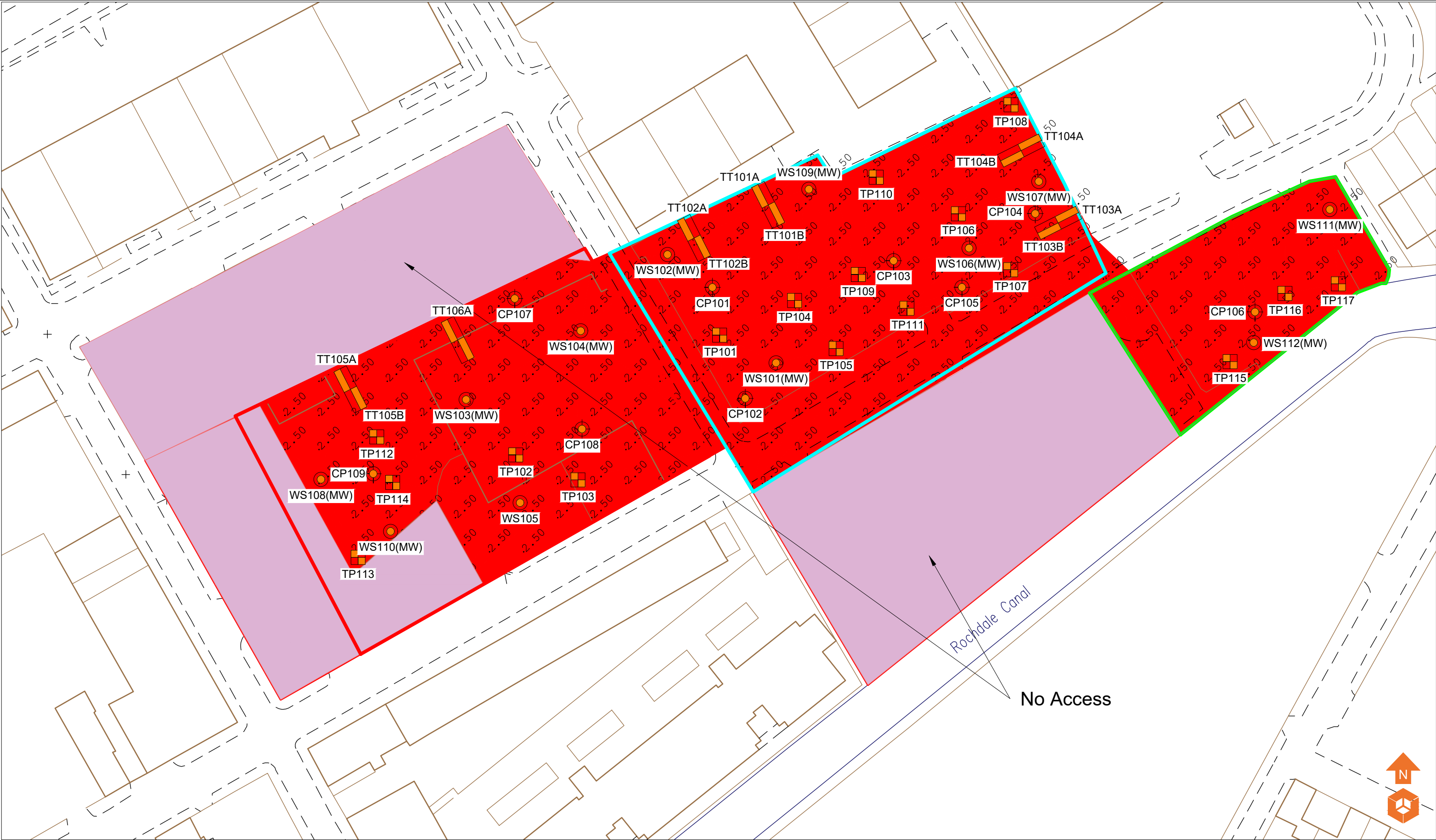
NTS

e3p

Environmental Engineering Partnerships Ltd
City Heliport & Business Centre
Eccles, Manchester, M30 7RU
Tel: 0161 707 9612
E-mail: info@e3p.co.uk
Website: www.e3p.co.uk

The client must not amend any drawing, design or other intellectual property produced by E3P Ltd without permission in writing from E3P Ltd in advance of any amendments being made. In the event that such written permission is not obtained in advance of the amendments being made, E3P Ltd shall not be liable for any damage and/or losses occurring as a result of the amended drawing, design or intellectual property.

Depth of Made Ground Plan

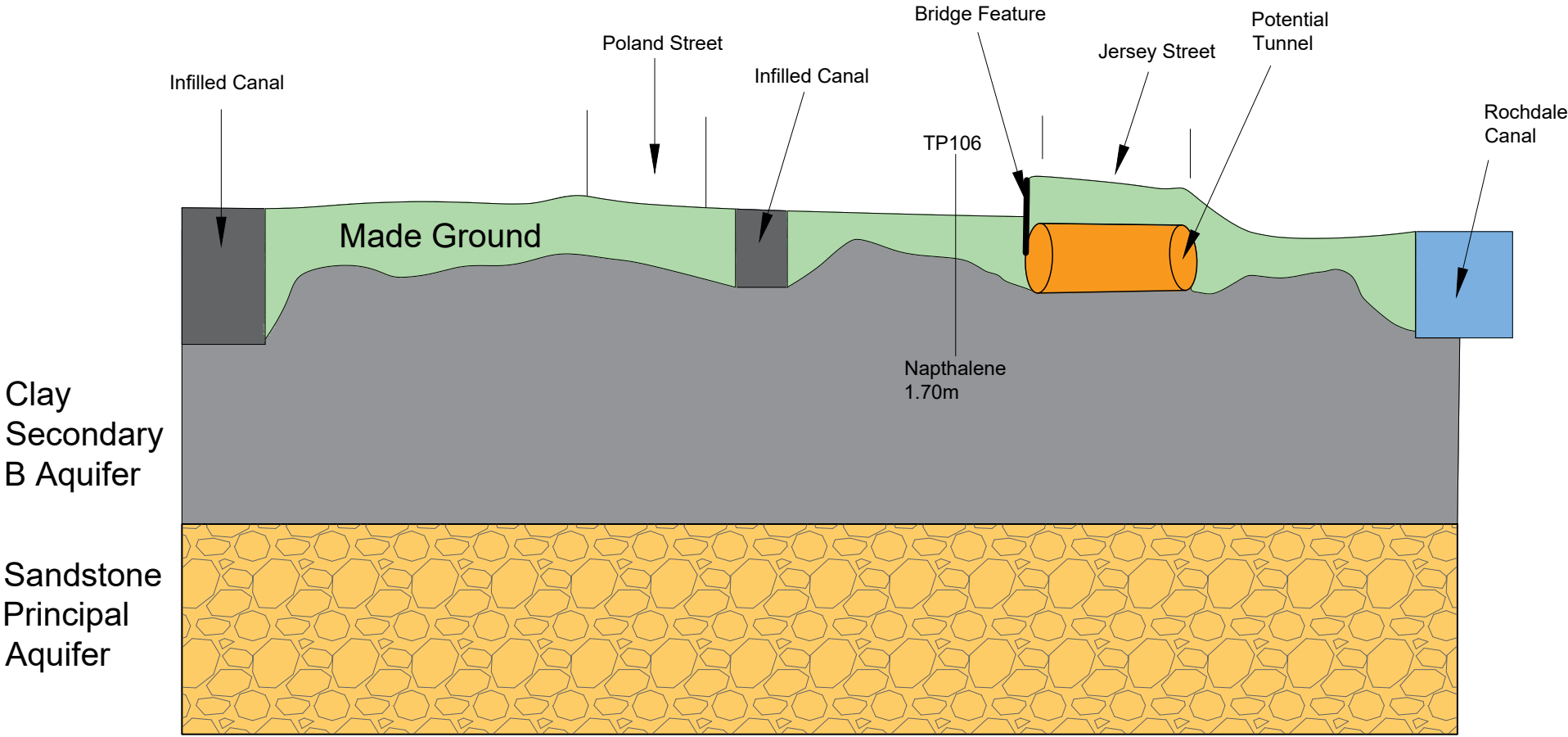
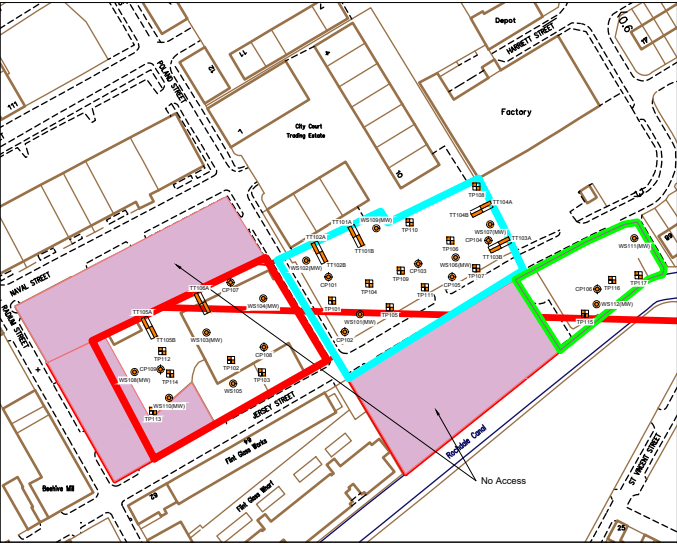


Location Symbols Approximate Window Sample Probehole Location Approximate Trial Pit Location Approximate Silt Trench Location No Access Parcel A Parcel B Parcel C Shallow Spread Footings Depth to Founding Strata 0.00 - 1.24m Depth to Founding Strata 1.25 - 1.49m Mass Trench Fill Footings Depth to Founding Strata 1.50 - 1.74m Depth to Founding Strata 1.75 - 1.99m Depth to Founding Strata 2.00 - 2.24m Engineered Footings Depth to Founding Strata 2.25 - 2.49m Depth to Founding Strata >2.50m	Notes:						Client: Manchester Life		Job No: 13-729	Date: 24.02.2020	e3p Environmental Engineering Partnerships Ltd City Heliport & Business Centre Eccles, Manchester, M30 7RU Tel: 0161 707 9612 E-mail: info@e3p.co.uk Website: www.e3p.co.uk																						
	<table><tr><td>P1</td><td>R2</td><td>24.02.2020</td><td>REVISION</td><td>HM</td><td>RJW</td></tr><tr><td>P1</td><td>R1</td><td>19.02.2019</td><td>REVISION</td><td>LM</td><td>RJW</td></tr><tr><td>P1</td><td>-</td><td>04.12.2019</td><td>DRAFT</td><td>CB</td><td>RJW</td></tr><tr><td>Phase</td><td>Revision</td><td>Date</td><td>Issue</td><td>Drawn</td><td>Checked</td></tr></table>	P1	R2	24.02.2020	REVISION	HM	RJW	P1	R1	19.02.2019		REVISION	LM	RJW	P1	-	04.12.2019	DRAFT	CB	RJW	Phase	Revision	Date	Issue	Drawn	Checked	Job Title: Jersey Street						Drawing No: 006
P1	R2	24.02.2020	REVISION	HM	RJW																												
P1	R1	19.02.2019	REVISION	LM	RJW																												
P1	-	04.12.2019	DRAFT	CB	RJW																												
Phase	Revision	Date	Issue	Drawn	Checked																												

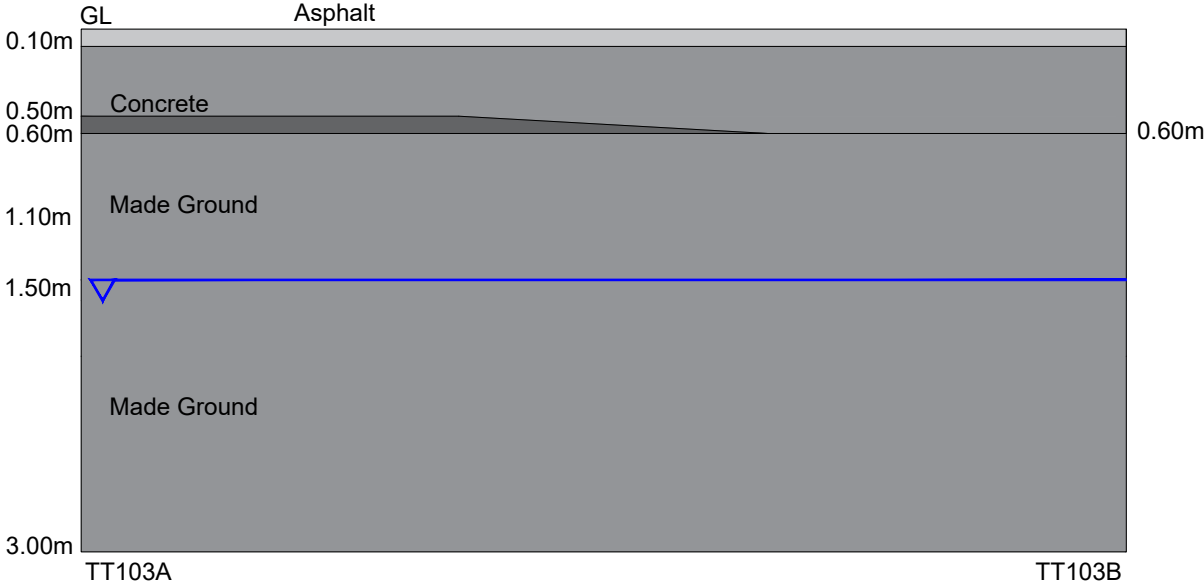
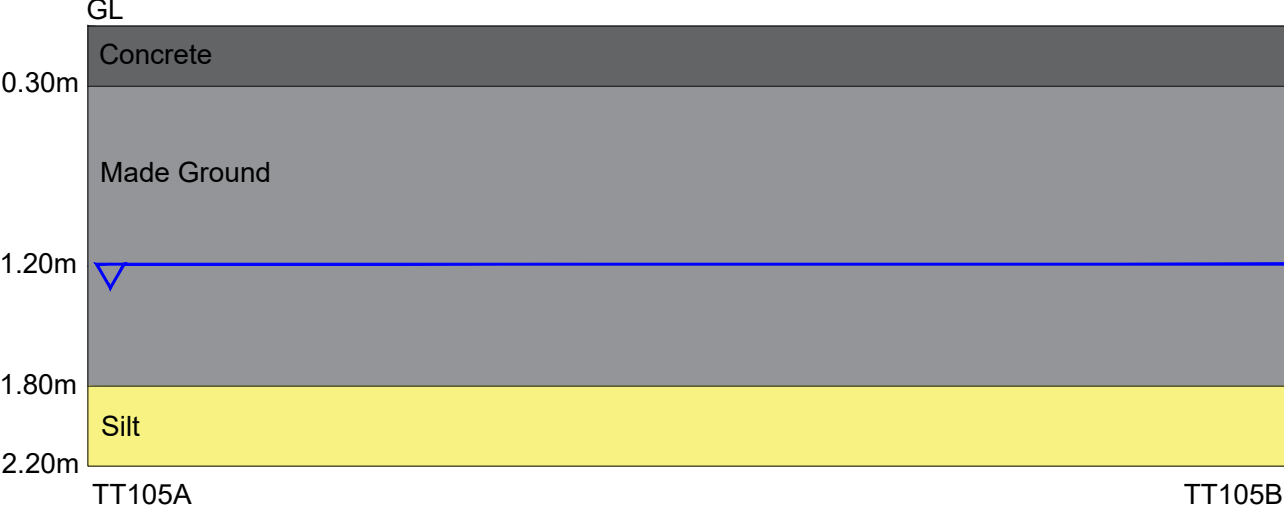
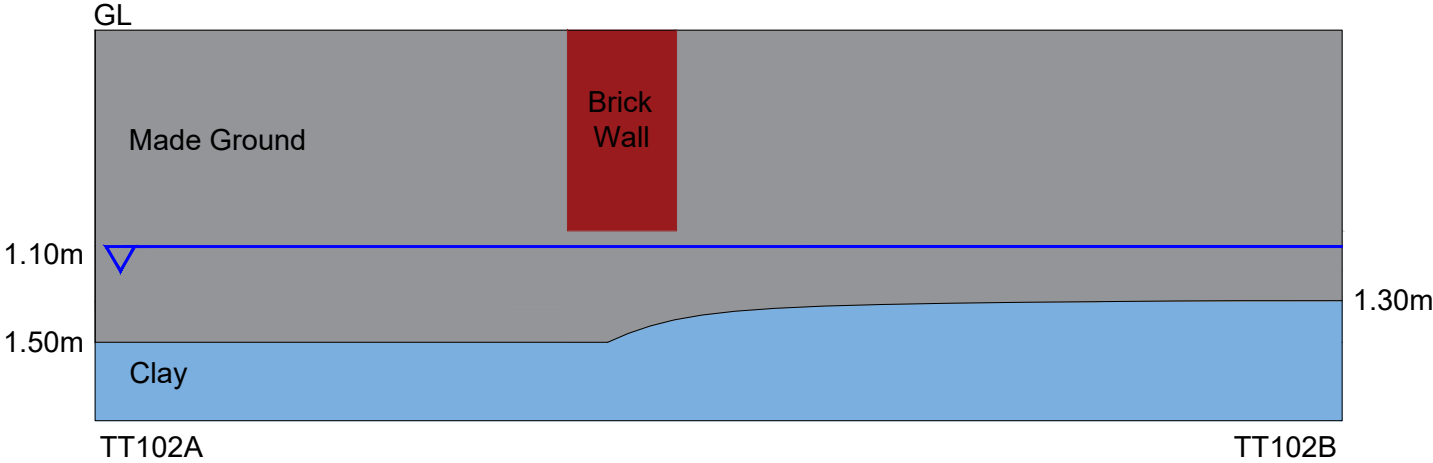
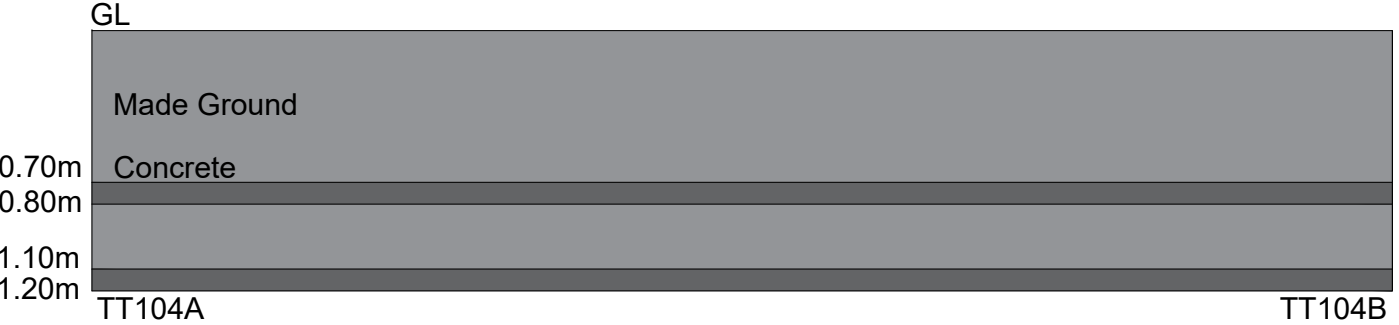
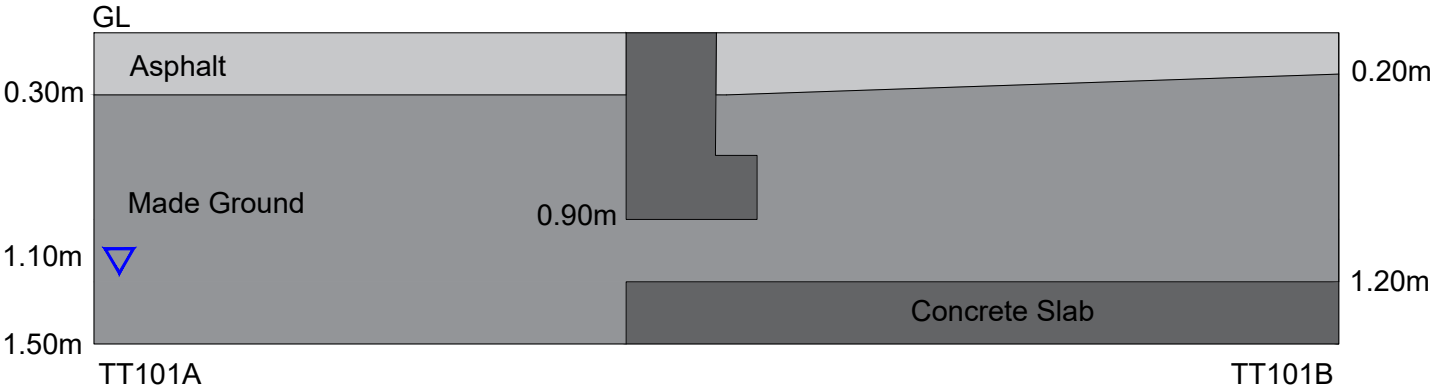


Location Symbols Approximate Window Sample Probehole Location Approximate Trial Pit Location Approximate Silt Trench Location No Access Full Extent of Made Ground Not Identified Parcel A Parcel B Parcel C Depth to Bedrock (m) Depth to Bedrock 0.00 - 1.99m Depth to Bedrock 2.00 - 3.99m Depth to Bedrock 4.00 - 5.99m Depth to Bedrock 6.00 - 7.99m Depth to Bedrock 8.00 - 9.99m Depth to Bedrock 10.00 - 11.99m Depth to Bedrock 12.00 - 13.99m Depth to Bedrock 14.00 - 15.99m Depth to Bedrock >16.00m	Notes: <table><tr><td>P1</td><td>-</td><td>17.02.2020</td><td>DRAFT</td><td>LM</td><td>RJW</td></tr><tr><td>Phase</td><td>Revision</td><td>Date</td><td>Issue</td><td>Drawn</td><td>Checked</td></tr></table>	P1	-	17.02.2020	DRAFT	LM	RJW	Phase	Revision	Date	Issue	Drawn	Checked	Client: Manchester Life Jersey Street	Job No: 13-729 007	Date: 17.02.2020 NTS	e3p Environmental Engineering Partnerships Ltd City Heliport & Business Centre Eccles, Manchester, M30 7RU Tel: 0161 707 9612 E-mail: info@e3p.co.uk Website: www.e3p.co.uk The client must not amend any drawing, design or other intellectual property produced by E3P Ltd without permission in writing from E3P Ltd in advance of any amendments being made. In the event that such written permission is not obtained in advance of the amendments being made, E3P Ltd shall not be liable for any damage and/or losses occurring as a result of the amended drawing, design or intellectual property.
P1	-	17.02.2020	DRAFT	LM	RJW												
Phase	Revision	Date	Issue	Drawn	Checked												

ID	SOURCE	EXPOSURE	POTENTIAL PATHWAY
HUMAN HEALTH			
1	Heavy Metals, heavy end Hydrocarbons & Non Volatile Polycyclic Aromatic Hydrocarbon (PAH)	Dermal Contact and Ingestion	Construction Workers &
		Consumption of Home-grown Produce	Residential End Users
2	Semi Volatile Polycyclic Aromatic, and petroleum and diesel range Hydrocarbon Compounds, Chlorinated Hydrocarbons	Volatilisation / Accumulation, Vapour Inhalation	Construction Workers &
			Residential End Users
3	Asbestos Containing Materials (ACM)	Fibre / Dust Inhalation	Construction Workers, Residential End Users &Third Party Property
4	Hazardous Ground Gases	Inhalation	Construction Workers
		Accumulation	Residential End Users
5	PCB's	Dermal Contact and Ingestion	Construction Workers &
		Consumption of Home-grown Produce	Residential End Users
CONTROLLED WATERS			
6	Water Soluble Mobile Contaminants	Vertical Migration	Secondary A Aquifer
7	Water Soluble Mobile Contaminants	Lateral Migration	Surface Water Courses
BUILDING & INFRASTRUCTURE			
8	pH & Sulphate	Corrosion of Concrete	Foundations / Concrete
9	VOC, TPH's Phenols, pH	Chemical Corrosion	Potable Water Supply



Made Ground Depth (m) Made Ground Rochdale Canal Infilled Canals Clay (Secondary B Aquifer) Potential Tunnel Sandstone Principal Aquifer Parcel A Parcel B Parcel C	Notes:	Client: Manchester Life	Job No: 13-729	Date: 13.02.2020	Environmental Engineering Partnerships Ltd City Heliport & Business Centre Eccles, Manchester, M30 7RU Tel: 0161 707 9612 E-mail: info@e3p.co.uk Website: www.e3p.co.uk												
		Job Title: Jersey Street	Drawing No: 008	Scale: NTS	Drawing Title: Conceptual Site Model												
<table><tr><td>P1</td><td>-</td><td>13.02.2020</td><td>DRAFT</td><td>LM</td><td>RW</td></tr><tr><td>Phase</td><td>Revision</td><td>Date</td><td>Issue</td><td>Drawn</td><td>Checked</td></tr></table>	P1	-	13.02.2020	DRAFT	LM	RW	Phase	Revision	Date	Issue	Drawn	Checked					The client must not amend any drawing, design or other intellectual property produced by E3P Ltd without permission in writing from E3P Ltd in advance of any amendments being made. In the event that such written permission is not obtained in advance of the amendments being made, E3P Ltd shall not be liable for any damage and/or losses occurring as a result of the amended drawing, design or intellectual property.
P1	-	13.02.2020	DRAFT	LM	RW												
Phase	Revision	Date	Issue	Drawn	Checked												



- Legend
- Concrete
 - Made Ground
 - Asphalt
 - Clay
 - Silt
 - Brick Wall
 - Water Strike

Notes:					
P1	-	04.12.2019	DRAFT	CB	RJW
Phase	Revision	Date	Issue	Drawn	Checked

Client:	
Manchester Life	
Job Title:	
Jersey Street	

Job No:	13-729
Drawing No:	009
Date:	04.12.2019
Scale:	NTS
Drawing Title:	
Trial Trench Cross Section Plan	



Environmental Engineering Partnerships Ltd
City Heliport & Business Centre
Eccles, Manchester, M30 7RU
Tel: 0161 707 9612
E-mail: info@e3p.co.uk
Website: www.e3p.co.uk

The client must not amend any drawing, design or other intellectual property produced by E3P Ltd without permission in writing from E3P Ltd in advance of any amendments being made. In the event that such written permission is not obtained in advance of the amendments being made, E3P Ltd shall not be liable for any damage and/or losses occurring as a result of the amended drawing, design or intellectual property.

APPENDIX IV PHOTOGRAPHS

PLATE 1 VIEW NORTH WEST



PLATE 2 VIEW TOWARDS SOUTH EAST CORNER (LEVEL CHANGE OVER BRIDGE STRUCTURE)



PLATE 5 BRIDGE STRUCTURE UNDER JERSEY STREET



APPENDIX V

E3P EXPLORATORY HOLE LOGS

Project Name: Phase 3	Project No. 13-729	Co-ords: - Level:	Date 18/11/2019
Location: Jersey Street, Ancoats		Dimensions (m): Depth 2.60	Scale 1:30 Logged EM
Client: Manchester Life			

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.20			MADE GROUND: Concrete with rebar.	
	1.00	ES					MADE GROUND: Black gravel with frequent cobbles. Gravel is fine to coarse, sub-angular to sub-rounded of sandstone, mudstone, ash, concrete and brick. Cobbles are sub-angular of brick.	1
	2.30	ES		2.20			Firm medium strength brown gravelly CLAY. Gravel is fine to coarse, sub-angular to sub-rounded of mudstone.	2
	2.50	HVP	57	2.60			End of Pit at 2.60m	3
								4

Trial Pit Photographs



Trial Pit 101

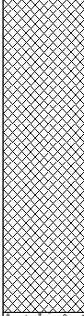
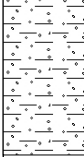


Trial Pit 101 Spoil

Remarks: Complete

Stability: Stable

Project Name: Phase 3	Project No. 13-729	Co-ords: - Level:	Date 18/11/2019
Location: Jersey Street, Ancoats		Dimensions (m): Depth 1.70	Scale 1:24 Logged EM
Client: Manchester Life			

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.20			MADE GROUND: Concrete with rebar.	
				1.20			MADE GROUND: Black gravelly medium to coarse sand with occasional cobbles and boulders. Gravel is fine to coarse, sub-angular to sub-rounded of sandstone, mudstone, ash, concrete and brick. Cobbles are sub-angular of brick and concrete. Boulders are sub-angular to sub-rounded of concrete.	1
	1.50 1.50	ES HVP	88	1.70			Stiff medium strength brown gravelly CLAY. Gravel is fine to coarse, sub-angular to sub-rounded of mudstone.	2
							End of Pit at 1.70m	3
								4
								5

Remarks: Complete

Stability: Stable



e3p

Trial Pit Log

TrialPit No
TP105
Sheet 1 of 1

Project Name: Phase 3

Project No.
13-729Co-ords: -
Level:Date
18/11/2019

Location: Jersey Street, Ancoats

Dimensions
(m):

2.00

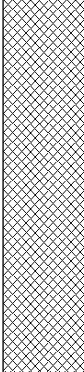
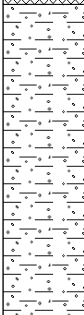
Scale
1:24

Client: Manchester Life

Depth
2.40

1.00

Logged
EM

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.20			MADE GROUND: Concrete with rebar.	
				1.40			MADE GROUND: Black gravelly medium to coarse sand with occasional cobbles and boulders. Gravel is fine to coarse, sub-angular to sub-rounded of sandstone, mudstone, ash, concrete and brick. Cobbles are sub-angular of brick and concrete. Boulders are sub-angular to sub-rounded of concrete.	1
				2.40			Stiff high strength brown gravelly CLAY. Gravel is fine to coarse, sub-angular to sub-rounded of mudstone. (brittle clay).	2
							End of Pit at 2.40m	3
								4
								5

Remarks: 1.Complete. 2.Brick wall encountered between groundlevel and 1.4 m bgl. 3. HSV test not possible due to brittle clay.

Stability: Stable





e3p

Trial Pit Log

TrialPit No
TP106
Sheet 1 of 1

Project Name: Phase 3

Project No.
13-729Co-ords: -
Level:Date
19/11/2019

Location: Jersey Street, Ancoats

Dimensions
(m):

2.00

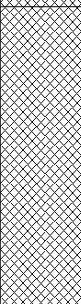
Scale
1:30

Client: Manchester Life

Depth
2.40

1.00

Logged
EM

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
 0.70	0.50	ES		0.20			MADE GROUND: Concrete with rebar.	
							MADE GROUND: Black sandy gravel with frequent cobbles. Gravel is fine to coarse, sub-angular to sub-rounded of sandstone, mudstone, concrete, ash, coal, brick and asphalt. Cobbles are sub-angular of brick and concrete. (Strong hydrocarbon odour and sheen)	1
	1.50	HVP	80	1.40			Stiff high strength brown CLAY.	2
	2.00	HVP	97	2.40			End of Pit at 2.40m	3
								4

Trial Pit Photographs



Trial Pit 106



Trial Pit 106 Spoil

Remarks: 1.Complete . 2.Excavation very slow due to compact Made Ground. 3.Slow groundwater strike at 0.7 m bgl. 2.Excavation very slow due to compact Made Ground.

Stability: Made Ground unstable.

e3p

Project Name: Phase 3	Project No. 13-729	Co-ords: - Level:	Date 19/11/2019
Location: Jersey Street, Ancoats		Dimensions (m): 2.00 1.00	Scale 1:30
Client: Manchester Life		Depth 2.30	Logged EM

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.20			MADE GROUND: Concrete with rebar.	
				0.60			MADE GROUND: Black gravel with occasional cobbles and blue plastic sheeting. Gravel is fine to coarse, sub-angular to sub-rounded of sandstone, ash, mudstone, concrete, brick and asphalt. Cobbles are sub-angular of concrete. (hydrocarbon odour)	
				0.70			MADE GROUND: Concrete.	
							MADE GROUND: Black gravel with occasional cobbles. Gravel is fine to coarse, sub-angular to sub-rounded of sandstone, ash, mudstone, concrete, brick and asphalt. Cobbles are sub-angular of concrete. (hydrocarbon odour)	1
	1.80	HVP	101	1.50			Stiff high strength brown CLAY.	2
				2.30			End of Pit at 2.30m	3
								4

Trial Pit Photographs



Trial Pit 107



Trial Pit 107 Spoil

Remarks: 1.Complete.

Stability: Stable

Project Name: Phase 3	Project No. 13-729	Co-ords: - Level:	Date 19/11/2019
Location: Jersey Street, Ancoats		Dimensions (m): 2.00 1.00	Scale 1:30
Client: Manchester Life		Depth 2.30	Logged EM

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
▼ 2.10				0.80			MADE GROUND: Brown sandy gravel with frequent cobbles and occasional boulders. Gravel is fine to coarse, sub-angular to sub-round of sandstone, mudstone, concrete and brick. Cobbles are sub-angular of concrete and brick. Boulders are sub-angular of concrete.	
				0.90			MADE GROUND: Concrete.	1
				2.30			MADE GROUND: Black red, gravel with frequent cobbles. Gravel is fine to coarse, sub-angular to sub-rounded of sandstone, ash, concrete, brick and asphalt. Cobbles are sub-angular of concrete and brick. (Brick Fill. Hydrocarbon odour and sheen)	2
							End of Pit at 2.30m	3
								4

Trial Pit Photographs



Trial Pit 108



Trial Pit 108 Spoil

Remarks: 1.Terminated due to rapid groundwater strike at 2.1 m bgl.

Stability: Unstable

Project Name: Phase 3	Project No. 13-729	Co-ords: - Level:	Date 20/11/2019
Location: Jersey Street, Ancoats		Dimensions (m): 2.00 1.00	Scale 1:30
Client: Manchester Life		Depth 2.00	Logged EM

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
 1.40				0.20			MADE GROUND: Concrete.	
							MADE GROUND: Black sandy gravel with frequent cobbles and occasional boulders. Gravel is fine to coarse, sub-angular to sub-rounded of ash, concrete, brick, mudstone and coal. Cobbles are sub-angular of brick and concrete. Boulders are sub-angular of concrete.	1
	1.80	HVP	130	1.50			Stiff high strength brown slightly gravelly CLAY. Gravel is fine to coarse, sub-angular to sub-rounded of mudstone.	
				2.00			End of Pit at 2.00m	2
								3
								4

Trial Pit Photographs



Trial Pit 109



Trial Pit 109 Spoil

Remarks: 1.Complete. 2. Excavation very slow due to compact Made Ground. 2.Slow groundwater strike at 1.4 m bgl.

Stability: Made Ground unstable.

Project Name: Phase 3	Project No. 13-729	Co-ords: - Level:	Date 20/11/2019
Location: Jersey Street, Ancoats		Dimensions (m): Depth 1.00	Scale 1:30 Logged EM
Client: Manchester Life			

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.20			MADE GROUND: Concrete.	
				0.50			MADE GROUND: Brown sandy gravel with frequent cobbles and occasional boulders. Gravel is fine to coarse, sub-angular to sub-roundned of sandstone, mudstone, concrete and brick. Cobbles are sub-angular of concrete and brick. Boulders are sub-angular of concrete. (hydrocarbon odour)	
				1.00			MADE GROUND: Black sandy gravel with frequent cobbles and occasional boulders. Gravel is fine to coarse, sub-angular to sub-rounded of concrete, brick, ash, mudstone and coal. Cobbles are sub-angular of brick and concrete. Boulders are sub-angular of concrete.	
							End of Pit at 1.00m	

Trial Pit Photographs



Trial Pit 110



Trial Pit 110 Spoil

Remarks: 1.Terminated due to concrete slab at 1.0 m bgl

Stability: Unstable Made Ground

Project Name: Phase 3

Project No.
13-729

Co-ords: -
Level:

Date
20/11/2019

Location: Jersey Street, Ancoats

Dimensions
(m):

2.00

Scale
1:24

Client: Manchester Life

Depth
1.50

1.00

Logged
EM

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.20			MADE GROUND: Concrete with rebar.	
							MADE GROUND: Black sandy gravel with frequent cobbles and occasional boulders. Gravel is fine to coarse, sub-angular to sub-rounded of concrete, ash, brick, mudstone and coal. Cobbles are sub-angular of brick and concrete. Boulders are sub-angular of concrete.	1
	1.35 1.40	ES HVP	130	1.30 1.50			Stiff high strength brown slightly gravelly CLAY. Gravel is fine to coarse, sub-angular to sub-rounded of mudstone.	
							End of Pit at 1.50m	2
								3
								4
								5

Remarks: 1.Complete.

Stability: Stable

Project Name: Phase 3

Project No.
13-729

Co-ords:

Hole Type
WS

Location: Jersey Street, Ancoats

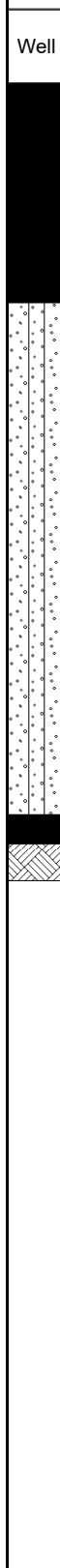
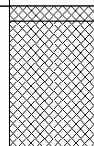
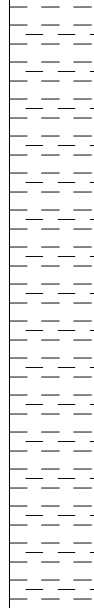
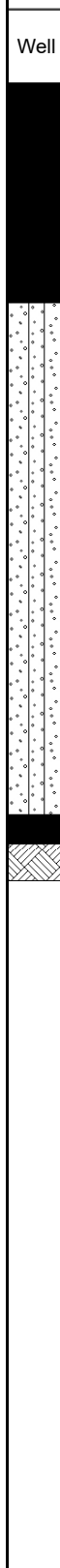
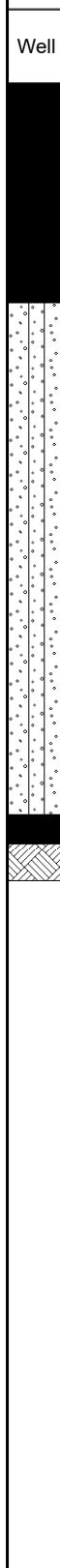
Level:

Scale
1:50

Client: Manchester Life

Dates: 18/11/2019

Logged By
EM

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.10			MADE GROUND: Concrete with rebar.	
								MADE GROUND: Brown sandy gravel. Gravel is fine to coarse, sub-angular to sub-rounded of sandstone, ash, mudstone, concrete and brick.	
		1.00	SPT	N=11 (2,3/4,3,2,2)	1.00				1
					1.30			MADE GROUND: Red sandy gravel. Gravel is fine to coarse, sub-angular to sub-rounded of sandstone and brick.	
		2.00	SPT	N=13 (2,2/2,3,4,4)					2
								Stiff medium strength brown CLAY. (Becoming very stiff very high strength at circa 3.00m bgl).	
		3.00	SPT	N=23 (3,4/5,6,6,6)					3
		4.00	SPT	N=24 (5,6/6,6,6,6)					4
		5.00	SPT	N=25 (4,5/6,6,6,7)					5
					5.45				6
								End of Borehole at 5.45m	7
									8
									9
									10

Remarks

1.Complete. 2.Slow groundwater strike at 3.00 m bgl. 3.Monitoring well installed.

Borehole Log

Borehole No.

WS102

Sheet 1 of 1

Project Name: Phase 3

Project No.
13-729

Co-ords:

Hole Type
WS

Location: Jersey Street, Ancoats

Level:

Scale
1:50

Client: Manchester Life

Dates: 18/11/2019

Logged By
EM

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.20			MADE GROUND: Concrete with rebar.	
		1.00	SPT	N=20 (2,6/6,7,4,3)				MADE GROUND: Black gravel with frequent cobbles. Gravel is fine to coarse, sub-angular to sub-rounded of sandstone, ash, mudstone, concrete and brick. Cobbles are sub-angular of brick. (No return between 1.00m and 2.00m bgl, assumed strata).	1
		2.00	SPT	N=12 (2,2/3,3,3,3)					2
		2.80 3.00	D SPT	N=18 (3,4/4,4,5,5)	2.50			Very stiff high strength brown gravelly CLAY. Gravel is fine to coarse, sub-angular to sub-rounded of mudstone.	3
		4.00	SPT	N=23 (3,4/5,6,6,6)	4.45			End of Borehole at 4.45m	4
									5
									6
									7
									8
									9
									10

Remarks

1.Terminated due to well falling in at 4.00 m bgl. 2.Slow groundwater strike at 2.00 m bgl. 3.Monitoring well installed.

Project Name: Phase 3

Project No.
13-729

Co-ords:

Hole Type
WS

Location: Jersey Street, Ancoats

Level:

Scale
1:50

Client: Manchester Life

Dates: 19/11/2019

Logged By
EM

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20			0.20			MADE GROUND: Concrete with rebar.	
		0.40			0.40			MADE GOUND: Red gravel. Gravel is fine to coarse, sub-angular to sub-rounded of brick, asphalt and concrete.	
		0.90	ES					MADE GROUND: Black gravel with frequent cobbles. Gravel is fine to coarse, sub-angular to sub-rounded of asphalt, ash, concrete and brick. Cobbles are sub-angular of concrete.	1
		1.00	SPT	N=10 (4,3/3,2,2,3)					
		1.60			1.60			Stiff medium strength to very stiff high strength brown CLAY.	2
		2.00	SPT	N=8 (2,2/2,2,2,2)					
		3.00	SPT	N=15 (2,3/3,4,4,4)					3
		4.00	SPT	N=23 (3,4/5,6,6,6)					4
		5.00	SPT	N=22 (3,4/4,5,6,7)					5
		5.45			5.45			End of Borehole at 5.45m	6
									7
									8
									9
									10

Remarks

1.Complete. 2.Continued collapse. 3.Groundwater strike at 2.0 m bgl 4.Monitoring well installed.

Project Name: Phase 3

Project No.
13-729

Co-ords:

Hole Type
WS

Location: Jersey Street, Ancoats

Level:

Scale
1:50

Client: Manchester Life

Dates: 19/11/2019

Logged By
EM

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.20			MADE GROUND: Concrete with rebar	
		1.00	SPT	N=7 (2,4/3,1,1,2)	1.00			MADE GROUND: Red brown sandy gravel. Gravel is fine to coarse, sub-angular to sub-rounded of sandstone, ash, mudstone, concrete, brick and asphalt. Cobbles are sub-angular of concrete and brick.	1
		1.80	ES					MADE GROUND: Black clayey gravel. Gravel is fine to coarse, sub-angular to sub-rounded of mudstone, concrete and brick. (hydrocarbon odour and sheen).	
		2.00	SPT	N=4 (2,3/1,1,1,1)					2
					2.60			Firm low strength brown CLAY. (Becoming very stiff high strength at circa 4.00m bgl).	
		3.00	SPT	N=9 (2,2/2,2,2,3)					3
		4.00	SPT	N=24 (4,5/6,6,6,6)					4
		5.00	SPT	N=23 (4,5/5,6,6,6)				End of Borehole at 5.45m	5
					5.45				6
									7
									8
									9
									10

Remarks

1.Complete. 2.Continued collapse. 3. Monitoring well installed. 4.Slow groundwater strike at 2.0 m bgl.

Project Name: Phase 3

Project No.
13-729

Co-ords:

Hole Type
WS

Location: Jersey Street, Ancoats

Level:

Scale
1:50

Client: Manchester Life

Dates: 20/11/2019

Logged By
EM

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
								MADE GROUND: Concrete with rebar.	
		1.10	ES		0.80			MADE GROUND: Black gravel. Gravel is fine to coarse, sub-angular to sub-rounded of asphalt, ash, brick and concrete.	1
					1.00			MADE GROUND: Brown gravel. Gravel is fine to coarse, sub-angular to sub-rounded of mudstone and concrete.	
					1.30			MADE GROUND: Brown gravelly silt. Gravel is fine to coarse, sub-angular of sub-rounded of sandstone, mudstone, concrete and brick. (hydrocarbon odour and sheen)	
					2.00			Stiff medium strength brown CLAY. (Becoming very stiff high strength at circa 4.00m bgl).	2
									3
									4
		4.20	ES						5
					5.45			End of Borehole at 5.45m	6
									7
									8
									9
									10

Remarks

1.Complete. 2.Monitoring well installed. 3.Rapid groundwater strikes at 2.0 m and 3.0 m bgl.

Project Name: Phase 3	Project No. 13-729	Co-ords: - Level:	Date 18/11/2019
Location: Jersey Street, Ancoats		Dimensions (m): 2.00 1.00	Scale 1:30
Client: Manchester Life		Depth 1.50	Logged EM

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
 1.10	1.20	ES		0.30			MADE GROUND: Concrete with rebar.	1
							MADE GROUND: Black gravel with frequent cobbles. Gravel is fine to coarse, sub-angular to sub-rounded of mudstone, concrete, ash, brick and asphalt. (strong hydrocarbon odour and sheen)	
				1.50			End of Pit at 1.50m	2
								3
								4

Trial Pit Photographs



Trial Trench 101



Trial Trench 101 Spoil

Remarks: 1.Terminated at 1.5 m bgl due to continued collapse and rapid groundwater strike flooding of excavation.
2.Rapid groundwater strike at 1.1 m bgl. 3.Strong hydrocarbon odour and sheen at 0.3 m to 1.5 m bgl.

Stability: Unstable

Project Name: Phase 3

Project No.
13-729

Co-ords: -
Level:

Date
18/11/2019

Location: Jersey Street, Ancoats

Dimensions (m):

2.00

1.00

Depth
1.20

Scale
1:30

Logged
EM

Client: Manchester Life

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.80	ES		0.20			MADE GROUND: Concrete with rebar.	
							MADE GROUND: Brown gravel with frequent cobbles. Gravel is fine to coarse, sub-angular to sub-rounded of sandstone, mudstone, concrete, brick and slate. Cobbles are sub-angular of brick and concrete.	
				1.20			End of Pit at 1.20m	

Trial Pit Photographs



Trial Trench 102 A



Trial Trench 102 A Spoil

Remarks: 1.Terminated at 1.2 m bgl. 2.Brick wall west of excavation to 1.2 m bgl.

Stability: Unstable throughout



e3p

Trial Pit Log

TrialPit No
TT102 B
Sheet 1 of 1

Project Name: Phase 3

Project No.
13-729Co-ords: -
Level:Date
19/11/2019

Location: Jersey Street, Ancoats

Dimensions
(m):

2.00

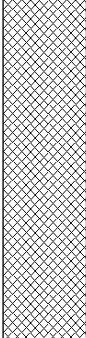
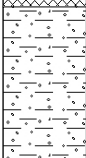
Scale
1:24

Client: Manchester Life

Depth
1.80

1.00

Logged
EM

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.20			MADE GROUND: Concrete with rebar.	
							MADE GROUND: Black gravelly medium to coarse sand with occasional cobbles. Gravel is fine to coarse, sub-angular to sub-rounded of sandstone, mudstone, ahs, concrete and brick. Cobbles are sub-angular of brick and concrete. (hydrocarbon odour)	1
	1.50	HVP	88	1.30			Stiff high strength brown gravelly CLAY. Gravel is fine to coarse, sub-angular to sub-rounded of mudstone.	
	1.70	ES		1.80			End of Pit at 1.80m	2
								3
								4
								5

Remarks: 1.Complete. 2.Brick wall encountered to the north of pit at 0.5 m and 2.0 m bgl.

Stability: Stable



Project Name: Phase 3	Project No. 13-729	Co-ords: - Level:	Date 19/11/2019
Location: Jersey Street, Ancoats		Dimensions (m): 2.00 1.00	Scale 1:24
Client: Manchester Life		Depth 2.00	Logged EM

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.10			MADE GROUND: Asphalt.	
				0.50			MADE GROUND: Black red, gravel with frequent cobbles. Gravel is fine to coarse, sub-angular to sub-rounded of sandstone, ash, concrete, brick and asphalt. Cobbles are sub-angular of concrete and brick.	
				0.60			MADE GROUND: Concrete.	
							MADE GROUND: Brown red, gravel with frequent cobbles. Gravel is fine to coarse, sub-angular to sub-rounded of sandstone, ash, concrete, brick and asphalt. Cobbles are sub-angular of concrete and brick.	
	1.30	ES						1
▼ 1.50								
				2.00			End of Pit at 2.00m	2
								3
								4
								5

Remarks: 1.Terminated due to rapid groundwater strike at 1.5 m bgl. 2.Excavation slow due to compact Made Ground.

Stability: Unstable throughout

Project Name: Phase 3	Project No. 13-729	Co-ords: - Level:	Date 19/11/2019
Location: Jersey Street, Ancoats		Dimensions (m): 2.00 1.00	Scale 1:30
Client: Manchester Life		Depth 3.00	Logged EM

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
 2.00				0.60			MADE GROUND: Brown red gravel with frequent cobbles. Gravel is fine to coarse, sub-angular to sub-rounded of brick, ash, asphalt and concrete. Cobbles are sub-angular of brick and concrete. Boulders are sub-angular of concrete.	
				0.70			MADE GROUND: Concrete.	
				3.00			MADE GROUND: Brown red gravel with frequent cobbles. Gravel is fine to coarse, sub-angular to sub-rounded of ash, brick, asphalt and concrete. Cobbles are sub-angular of brick and concrete. Boulders are sub-angular of concrete. (Brick fill. Strong hydrocarbon odour and sheen)	1
							End of Pit at 3.00m	2
								3
								4

Trial Pit Photographs



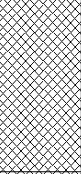
Trial Trench 103 B



Trial Trench 103 B Spoil

Remarks: 1.Terminated due to rapid groundwater strike at 2.0 m bgl.

Stability: Unstable throughout

				Trial Pit Log			TrialPit No TT104 A Sheet 1 of 1	
Project Name: Phase 3				Project No. 13-729		Co-ords: - Level:		Date 19/11/2019
Location: Jersey Street, Ancoats						Dimensions (m): 2.00		Scale 1:30
Client: Manchester Life						Depth 2.30		Logged EM
Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
 2.20	2.20	ES		0.70			MADE GROUND: Black red gravel with frequent cobbles. Gravel is fine to coarse, sub-angular to sub-rounded of sandstone, ash, concrete, brick and asphalt. Cobbles are sub-angular of concrete and brick.	1 2 3 4
				0.80			MADE GROUND: Concrete.	
				1.10			MADE GROUND: Black red, gravel with frequent cobbles. Gravel is fine to coarse, sub-angular to sub-rounded of ash, sandstone, concrete, brick and asphalt. Cobbles are sub-angular of concrete and brick.	
				1.10			MADE GROUND: Concrete.	
							MADE GROUND: Black red, gravel with frequent cobbles. Gravel is fine to coarse, sub-angular to sub-rounded of ash, sandstone, concrete, brick and asphalt. Cobbles are sub-angular of concrete and brick. (hydrocarbon odour and sheen)	
				2.30			End of Pit at 2.30m	

Trial Pit Photographs



Trial Trench 104 A



Trial Trench 104 A Spoil

Remarks: 1.Terminated due to rapid groundwater strike at 2.2 m bgl.

Stability: **Unstable**



Project Name: Phase 3	Project No. 13-729	Co-ords: - Level:	Date 19/11/2019
Location: Jersey Street, Ancoats		Dimensions (m): 2.00 Depth 1.20	Scale 1:30 Logged EM
Client: Manchester Life			

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.70 0.80 1.10 1.20			MADE GROUND: Black red, gravel with frequent cobbles. Gravel is fine to coarse, sub-angular to sub-rounded of ash, sandstone, concrete, brick and asphalt. Cobbles are sub-angular of concrete and brick. MADE GROUND: Concrete. MADE GROUND: Black red, gravel with frequent cobbles. Gravel is fine to coarse, sub-angular to sub-rounded of ash, sandstone, concrete, brick and asphalt. Cobbles are sub-angular of concrete and brick. (brick fill) MADE GROUND: Concrete. End of Pit at 1.20m

Trial Pit Photographs



Trial Trench 104 B



Trial Trench 104 B Spoil

Remarks: Terminated due to concrete slab.

Stability: Unstable

Borehole Log

Borehole No.

CP101

Sheet 1 of 2

Project Name: Phase 3

Project No.
13-729

Co-ords:

Hole Type
CP

Location: Jersey Street, Ancoats

Level:

Scale
1:50

Client: Manchester Life

Dates: 18/12/2019

Logged By
R. Walker

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.00	B		0.30			MADE GROUND: Concrete.	1
		0.30	B						
		0.30	SPT	N=10 (2,2/1,2,3,4)				MADE GROUND: Black silty sand with frequent gravel. Gravel is fine to coarse sub-angular of brick, ash and concrete.	
		1.00	B		1.30				
		1.00	SPT	N=22 (3,4/5,6,5,6)					
		1.30	B						
		1.30	SPT	N=21 (3,4/4,5,6,6)				Very stiff high strength brown CLAY with occasional bands of red medium sand. (Becoming very stiff very high strength at circa 8.00m bgl).	2
		2.00	B						
		2.00	SPT	N=21 (3,4/4,5,6,6)					
		3.00	B						3
		3.00	U	Ublow=112					
		4.00	B						4
		4.00	SPT	N=29 (2,4/5,8,8,8)					
		5.00	B						5
		5.00	U	Ublow=133					
		6.00	B						6
		6.00	SPT	N=26 (2,3/4,6,7,9)					
		7.00	B						7
		7.00	U	Ublow=109					
		8.00	B						8
		8.00	SPT	N=51 (2,4/8,8,16,19)					
		9.00	B						9
		9.00	U	Ublow=213					
		10.00	B						

Remarks

1. Complete. 2. Chiselling from 12.50m to 15.00m bgl for 3 hours.

Borehole Log

Borehole No.

CP101

Sheet 2 of 2

Project Name: Phase 3

Project No.
13-729

Co-ords:

Hole Type
CP

Location: Jersey Street, Ancoats

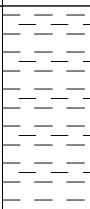
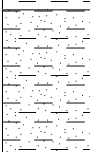
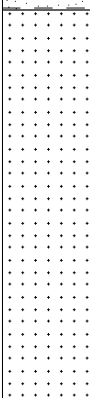
Level:

Scale
1:50

Client: Manchester Life

Dates: 18/12/2019

Logged By
R. Walker

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Type	Results						
		10.00	SPT	55 (5,11/55 for 315mm)	11.40			Very stiff high strength brown CLAY with occasional bands of red medium sand. (Becoming very stiff very high strength at circa 8.00m bgl).	11	
		11.00	B	50 (6,18/50 for 290mm)						
		11.00	SPT							
		11.40	B	55 (14,27/40,15,,)						Very stiff very high strength brown sandy CLAY.
		11.40	SPT							
		12.40	B				Red brown SANDSTONE.			
		13.00	B							
		14.00	B							
									15.00	
							16			
							17			
							18			
							19			
							20			

Remarks

1. Complete. 2. Chiselling from 12.50m to 15.00m bgl for 3 hours.



Borehole Log

Borehole No.

CP102

Sheet 1 of 2

Project Name: Phase 3

Project No.
13-729

Co-ords:

Hole Type
CP

Location: Jersey Street, Ancoats

Level:

Scale
1:50

Client: Manchester Life

Dates: 06/01/2020

Logged By
R. Walker

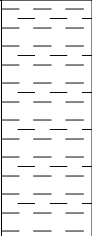
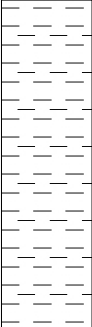
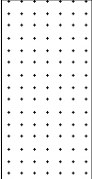
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.00	B					MADE GROUND: Black silty gravel. Gravel is fine to coarse sub-angular of brick, ash and concrete.	
		1.00 1.00	B SPT	N=8 (2,1/2,2,2,2)					1
		2.00 2.00	B SPT	N=15 (2,2/3,7,3,2)					2
		2.70	B		2.70				
		3.00 3.00	B SPT	N=15 (1,2/3,4,4,4)				Stiff medium strength to stiff high strength brown CLAY with bands of sand. (Becoming very stiff very high strength from circa 11.00m bgl).	3
		4.00 4.00	B SPT	N=19 (2,3/4,5,5,5)					4
		5.00 5.00	B SPT	N=15 (2,2/3,3,4,5)					5
		6.00	B						6
		7.00 7.00	B SPT	N=16 (2,2/3,4,4,5)					7
		8.00	B						8
		9.00 9.00	B SPT	N=21 (2,3/4,5,6,6)					9
		10.00	B						10

Remarks

1. Complete. 2. Chiseling from 14.00m to 15.00m bgl for 60 minutes.



				Borehole Log				Borehole No. CP102 Sheet 2 of 2	
Project Name: Phase 3				Project No. 13-729		Co-ords:		Hole Type CP	
Location: Jersey Street, Ancoats						Level:		Scale 1:50	
Client: Manchester Life						Dates: 06/01/2020		Logged By R. Walker	

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		11.00 11.00	B SPT	N=51 (2,3/8,8,16,19)	11.60			Stiff medium strength to stiff high strength brown CLAY with bands of sand. (Becoming very stiff very high strength from circa 11.00m bgl).	11
		11.60	B						
		12.00 12.00	B SPT	N=48 (5,6/9,11,13,15)	13.80			Very stiff very high strength brown CLAY.	12
		13.00 13.00	B SPT	N=51 (3,4/8,13,14,16)					
		13.80 14.00 14.00	B B SPT	51 (5,14/51 for 290mm)				Dense brown yellow SANDSTONE.	14
		15.00	SPT	51 (11,16/25,26,,)	15.00				End of Borehole at 15.00m
									16
									17
									18
									19
									20

Remarks
 1. Complete. 2. Chiseling from 14.00m to 15.00m bgl for 60 minutes.



Borehole Log

Borehole No.

CP103

Sheet 1 of 2

Project Name: Phase 3

Project No.
13-729

Co-ords:

Hole Type
CP

Location: Jersey Street, Ancoats

Level:

Scale
1:50

Client: Manchester Life

Dates: 08/01/2020

Logged By
R. Walker

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	B		0.20			MADE GROUND: Concrete.	
								MADE GROUND: Black silty gravel. Gravel is fine to coarse sub-angular of brick, ash and concrete.	1
		1.00	SPT	N=3 (1,0/1,1,0,1)					
					1.70				
		2.00	SPT	N=20 (1,3/4,5,5,6)				Stiff medium strength to very stiff high strength brown CLAY with occasional bands of sand.	2
		3.00	B						3
		3.00	SPT	N=24 (3,3/5,6,6,7)					
		4.00	SPT	N=13 (2,2/3,3,3,4)					4
		5.00	SPT	N=17 (2,2/3,4,5,5)					5
		7.00	B						7
		7.50	SPT	N=16 (2,3/3,3,5,5)					8
		9.00	B						9
		10.00	B		10.00				10

Remarks

1. Complete. 2. Chiseling from 11.50m to 13.00m bgl for 60 minutes.



Borehole Log

Borehole No.

CP103

Sheet 2 of 2

Project Name: Phase 3

Project No.
13-729

Co-ords:

Hole Type
CP

Location: Jersey Street, Ancoats

Level:

Scale
1:50

Client: Manchester Life

Dates: 08/01/2020

Logged By
R. Walker

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		10.50	SPT	N=28 (3,3/4,7,7,10)	11.50			Brown CLAY.	11
		12.00 12.00	B SPT	50 (12,21/50 for 260mm)				Dense brown yellow SANDSTONE.	12
		13.00	SPT	40 (15,26/40 for 280mm)	13.00			End of Borehole at 13.00m	13
									14
									15
									16
									17
									18
									19
									20

Remarks

1. Complete. 2. Chiseling from 11.50m to 13.00m bgl for 60 minutes.



Project Name: Phase 3

Project No.
13-729

Co-ords:

Hole Type
CP

Location: Jersey Street, Ancoats

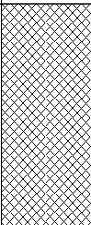
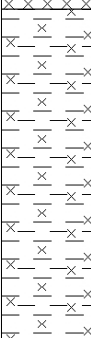
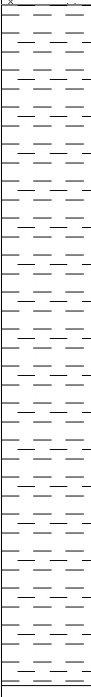
Level:

Scale
1:50

Client: Manchester Life

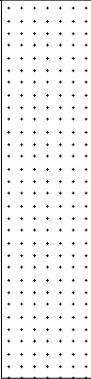
Dates: 10/01/2020

Logged By
R. Walker

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		1.00 1.00	B SPT	N=15 (2,3/5,4,4,2)	1.50			MADE GROUND: Black silty gravel. Gravel is fine to coarse sub-angular of brick, concrete and ash.	1
		2.00 2.00	B SPT	N=2 (5,2/1,0,0,1)				Very soft extremely low strength black gravelly SILT. Gravel is fine to coarse sub-angular of brick.	2
		3.00	SPT	N=2 (2,1/0,0,0,2)	3.30			Soft very low strength brown silty CLAY. (Becoming stiff medium strength at circa 5.00m bgl).	3
		3.50	B						4
		4.00	SPT	N=3 (3,2/1,0,1,1)	5.50			Very stiff high strength brown CLAY with occasional bands of medium sand.	5
		5.00	SPT	N=14 (3,3/3,3,4,4)					6
		7.00	B						7
		7.50	SPT	N=19 (2,3/4,4,5,6)					8
		8.00	B						9
		10.00	B		10.00				10

Remarks

1. Complete. 2. Water strike encountered at 1.50m bgl. 3. Chiseling from 10.00 to 12.50m bgl for two hours.

				Borehole Log				Borehole No. CP104 Sheet 2 of 2	
Project Name: Phase 3				Project No. 13-729		Co-ords:		Hole Type CP	
Location: Jersey Street, Ancoats						Level:		Scale 1:50	
Client: Manchester Life						Dates: 10/01/2020		Logged By R. Walker	
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		10.50	SPT	50 (5,7/50 for 270mm)	12.50			Dense yellow brown SANDSTONE.	
		11.00	B						
		12.00	SPT	54 (8,20/54 for 250mm)					
		12.50	SPT	52 (11,28/52 for 260mm)					
		End of Borehole at 12.50m							
Remarks 1. Complete. 2. Water strike encountered at 1.50m bgl. 3. Chiseling from 10.00 to 12.50m bgl for two hours.									

Project Name: Phase 3

Project No.
13-729

Co-ords:

Hole Type
CP

Location: Jersey Street, Ancoats

Level:

Scale
1:50

Client: Manchester Life

Dates: 14/01/2020

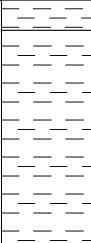
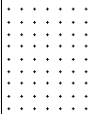
Logged By
R. Walker

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.00	B		0.20			MADE GROUND: Concrete.	
								MADE GROUND: Black silty sand with frequent gravel. Gravel is fine to coarse sub-angular of brick, ash and concrete.	1
		1.00	SPT	N=7 (1,0/1,1,2,3)	1.40				
		2.00	B					Firm low strength brown CLAY with occasional bands of medium sand. (Becoming stiff medium strength from circa 3.00m bgl).	2
		2.00	SPT	N=8 (1,2/2,2,2,2)					
		3.00	SPT	N=16 (2,4/3,4,4,5)					3
		4.00	SPT	N=16 (3,3/3,4,4,5)					4
		5.00	SPT	N=18 (3,3/5,4,4,5)					5
		6.00	B						6
		6.00	U	Ublow=112					
		7.50	SPT	N=17 (3,3/3,4,5,5)					7
		8.00	B						8
		9.00	U	Ublow=206					9
		10.00	B						10

Remarks

1. Complete. 2. Chiseling from 11.70m to 12.50m bgl for 60 minutes.

				Borehole Log				Borehole No. CP105 Sheet 2 of 2	
Project Name: Phase 3				Project No. 13-729		Co-ords:		Hole Type CP	
Location: Jersey Street, Ancoats						Level:		Scale 1:50	
Client: Manchester Life						Dates: 14/01/2020		Logged By R. Walker	

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		10.50	SPT	58 (5,11/58 for 375mm)	10.20		 Firm low strength brown CLAY with occasional bands of medium sand. (Becoming stiff medium strength from circa 3.00m bgl). Very stiff very high strength brown CLAY.	11	
		11.70	B		11.70			 Dense brown SANDSTONE.	12
		12.00	SPT	51 (6,9/51 for 320mm)					
		12.50	SPT	41 (12,26/41 for 340mm)	12.50			End of Borehole at 12.50m	13
								14	
								15	
								16	
								17	
								18	
								19	
								20	

Remarks
 1. Complete. 2. Chiseling from 11.70m to 12.50m bgl for 60 minutes.



APPENDIX VI

CHEMICAL TESTING

RESULTS

**Ella Moss**

e3p
Office 4
Heliport Business Park
Eccles
Liverpool Road
Manchester
M30 7RU

t: 0161 707 9612

e: EMoss@e3p.co.uk

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404

f: 01923 237404

e: reception@i2analytical.com

Analytical Report Number : 19-74625

Project / Site name: Manchester Life

Samples received on: 28/11/2019

Your job number: 13-729

Samples instructed on: 28/11/2019

Your order number:

Analysis completed by: 05/12/2019

Report Issue Number: 1

Report issued on: 05/12/2019

Samples Analysed: 2 water samples

Signed:



Katarzyna Lewicka
Head of Reporting Section

For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement. Application of uncertainty of measurement would provide a range within which the true result lies. An estimate of measurement uncertainty can be provided on request.



Analytical Report Number: 19-74625

Project / Site name: Manchester Life

Lab Sample Number				1376318	1376319			
Sample Reference				WS109	WS110			
Sample Number				None Supplied	None Supplied			
Depth (m)				None Supplied	None Supplied			
Date Sampled				27/11/2019	27/11/2019			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Water Analysis)								
	Units	Limit of detection	Accreditation Status					

General Inorganics

pH	pH Units	N/A	ISO 17025	7.5	12.0			
Total Cyanide (Low Level 1 µg/l)	µg/l	1	ISO 17025	< 1.0	3.7			

Total Phenols

Total Phenols (monohydric)	µg/l	1	ISO 17025	87	27			
----------------------------	------	---	-----------	----	----	--	--	--

Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	0.15	ISO 17025	4.64	2.86			
Cadmium (dissolved)	µg/l	0.02	ISO 17025	< 0.02	< 0.02			
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	U/S			
Chromium (dissolved)	µg/l	0.2	ISO 17025	0.4	20			
Copper (dissolved)	µg/l	0.5	ISO 17025	1.7	18			
Lead (dissolved)	µg/l	0.2	ISO 17025	0.6	18			
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05	< 0.05			
Nickel (dissolved)	µg/l	0.5	ISO 17025	2.1	4.6			
Selenium (dissolved)	µg/l	0.6	ISO 17025	3.3	6.6			
Zinc (dissolved)	µg/l	0.5	ISO 17025	2.1	0.9			

Monoaromatics & Oxygenates

Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0			
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0			
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0			

Petroleum Hydrocarbons

TPH1 (C10 - C40)	µg/l	10	NONE	11000	< 10			
------------------	------	----	------	-------	------	--	--	--

TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0	< 1.0			
TPH-CWG - Aliphatic >C6 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0			
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0			
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	2300	< 10			
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	3200	< 10			
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	3500	< 10			
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	9000	< 10			

TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	< 1.0			
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0			
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0			
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	110	< 10			
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	600	< 10			
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	600	< 10			
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	300	< 10			
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	1600	< 10			



Analytical Report Number: 19-74625

Project / Site name: Manchester Life

Lab Sample Number				1376318	1376319			
Sample Reference				WS109	WS110			
Sample Number				None Supplied	None Supplied			
Depth (m)				None Supplied	None Supplied			
Date Sampled				27/11/2019	27/11/2019			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Water Analysis)				Units	Limit of detection	Accreditation Status		

VOCs

Chloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Chloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Bromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Vinyl Chloride	µg/l	1	NONE	< 1.0	< 1.0			
Trichlorofluoromethane	µg/l	1	NONE	< 1.0	< 1.0			
1,1-Dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1,2-Trichloro-1,2,2-trifluoroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Cis-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0			
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1-Dichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
2,2-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Trichloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1,1-Trichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2-Dichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1-Dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Trans-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Tetrachloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Trichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Dibromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Bromodichloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Cis-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Trans-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1,2-Trichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,3-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Dibromochloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Tetrachloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2-Dibromoethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Chlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1,1,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
p & m-Xylene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Styrene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Tribromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
o-Xylene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1,2,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Isopropylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Bromobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
n-Propylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
2-Chlorotoluene	µg/l	1	ISO 17025	< 1.0	< 1.0			
4-Chlorotoluene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,3,5-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
tert-Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2,4-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
sec-Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,3-Dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
p-Isopropyltoluene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2-Dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,4-Dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2-Dibromo-3-chloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2,4-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Hexachlorobutadiene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2,3-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			



Analytical Report Number: 19-74625

Project / Site name: Manchester Life

Lab Sample Number				1376318	1376319			
Sample Reference				WS109	WS110			
Sample Number				None Supplied	None Supplied			
Depth (m)				None Supplied	None Supplied			
Date Sampled				27/11/2019	27/11/2019			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Water Analysis)								
	Units	Limit of detection	Accreditation Status					

SVOCs

Aniline	µg/l	0.05	NONE	< 0.05	< 0.05			
Phenol	µg/l	0.05	NONE	3.1	< 0.05			
2-Chlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05			
Bis(2-chloroethyl)ether	µg/l	0.05	NONE	< 0.05	< 0.05			
1,3-Dichlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05			
1,2-Dichlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05			
1,4-Dichlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05			
Bis(2-chloroisopropyl)ether	µg/l	0.05	NONE	< 0.05	< 0.05			
2-Methylphenol	µg/l	0.05	NONE	5.1	< 0.05			
Hexachloroethane	µg/l	0.05	NONE	< 0.05	< 0.05			
Nitrobenzene	µg/l	0.05	NONE	< 0.05	< 0.05			
4-Methylphenol	µg/l	0.05	NONE	9.6	< 0.05			
Isophorone	µg/l	0.05	NONE	< 0.05	< 0.05			
2-Nitrophenol	µg/l	0.05	NONE	< 0.05	< 0.05			
2,4-Dimethylphenol	µg/l	0.05	NONE	7.9	< 0.05			
Bis(2-chloroethoxy)methane	µg/l	0.05	NONE	< 0.05	< 0.05			
1,2,4-Trichlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05			
Naphthalene	µg/l	0.01	ISO 17025	15	1.1			
2,4-Dichlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05			
4-Chloroaniline	µg/l	0.05	NONE	< 0.05	< 0.05			
Hexachlorobutadiene	µg/l	0.05	NONE	< 0.05	< 0.05			
4-Chloro-3-methylphenol	µg/l	0.05	NONE	< 0.05	< 0.05			
2,4,6-Trichlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05			
2,4,5-Trichlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05			
2-Methylnaphthalene	µg/l	0.05	NONE	2.5	0.32			
2-Chloronaphthalene	µg/l	0.05	NONE	< 0.05	< 0.05			
Dimethylphthalate	µg/l	0.05	NONE	< 0.05	< 0.05			
2,6-Dinitrotoluene	µg/l	0.05	NONE	< 0.05	< 0.05			
Acenaphthylene	µg/l	0.01	ISO 17025	0.64	< 0.01			
Acenaphthene	µg/l	0.01	ISO 17025	2.1	0.21			
2,4-Dinitrotoluene	µg/l	0.05	NONE	< 0.05	< 0.05			
Dibenzofuran	µg/l	0.05	NONE	< 0.05	< 0.05			
4-Chlorophenyl phenyl ether	µg/l	0.05	NONE	< 0.05	< 0.05			
Diethyl phthalate	µg/l	0.05	NONE	< 0.05	< 0.05			
4-Nitroaniline	µg/l	0.05	NONE	< 0.05	< 0.05			
Fluorene	µg/l	0.01	ISO 17025	3.0	0.22			
Azobenzene	µg/l	0.05	NONE	< 0.05	< 0.05			
Bromophenyl phenyl ether	µg/l	0.05	NONE	< 0.05	< 0.05			
Hexachlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05			
Phenanthrene	µg/l	0.01	ISO 17025	4.9	0.67			
Anthracene	µg/l	0.01	ISO 17025	0.78	0.13			
Carbazole	µg/l	0.05	NONE	< 0.05	< 0.05			
Dibutyl phthalate	µg/l	0.05	NONE	< 0.05	< 0.05			
Anthraquinone	µg/l	0.05	NONE	< 0.05	< 0.05			
Fluoranthene	µg/l	0.01	ISO 17025	2.4	0.36			
Pyrene	µg/l	0.01	ISO 17025	2.7	0.34			
Butyl benzyl phthalate	µg/l	0.05	NONE	< 0.05	< 0.05			
Benzo(a)anthracene	µg/l	0.01	ISO 17025	0.74	< 0.01			
Chrysene	µg/l	0.01	ISO 17025	0.74	< 0.01			
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	0.57	< 0.01			
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	0.37	< 0.01			
Benzo(a)pyrene	µg/l	0.01	ISO 17025	0.40	< 0.01			
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			

U/S = Unsuitable Sample I/S = Insufficient Sample



Analytical Report Number : 19-74625

Project / Site name: Manchester Life

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
BTEX and MTBE in water (Monoaromatics)	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Low level total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 *for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Monohydric phenols in water - LOW LEVEL 1 ug/l	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
pH at 20oC in water (automated)	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	W	ISO 17025
Semi-volatile organic compounds in water	Determination of semi-volatile organic compounds in leachate by extraction in dichloromethane followed by GC-MS.	In-house method based on USEPA 8270	L102B-PL	W	NONE
TPH1 (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS.	In-house method	L070-PL	W	NONE
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-PL	W	NONE
Volatile organic compounds in water	Determination of volatile organic compounds in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

**Ella Moss**

e3p
Office 4
Heliport Business Park
Eccles
Liverpool Road
Manchester
M30 7RU

t: 0161 707 9612

e: EMoss@e3p.co.uk

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404

f: 01923 237404

e: reception@i2analytical.com

Analytical Report Number : 19-75415

Project / Site name:	Jersey St	Samples received on:	03/12/2019
Your job number:	13729	Samples instructed on:	03/12/2019
Your order number:	13729	Analysis completed by:	10/12/2019
Report Issue Number:	1	Report issued on:	10/12/2019
Samples Analysed:	2 water samples		

Signed:

Rachel Bradley

Deputy Quality Manager

For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement. Application of uncertainty of measurement would provide a range within which the true result lies. An estimate of measurement uncertainty can be provided on request.

Iss No 19-75415-1 Jersey St 13729

This certificate should not be reproduced, except in full, without the express permission of the laboratory.

The results included within the report are representative of the samples submitted for analysis.

Page 1 of 5



Analytical Report Number: 19-75415

Project / Site name: Jersey St

Your Order No: 13729

Lab Sample Number	1380646	1380647					
Sample Reference	WS108	WS106					
Sample Number	None Supplied	None Supplied					
Depth (m)	None Supplied	None Supplied					
Date Sampled	02/12/2019	02/12/2019					
Time Taken	None Supplied	None Supplied					
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status				

General Inorganics

pH	pH Units	N/A	ISO 17025	7.6	7.6			
Total Cyanide (Low Level 1 µg/l)	µg/l	1	ISO 17025	< 1.0	< 1.0			

Total Phenols

Total Phenols (monohydric)	µg/l	1	ISO 17025	3.5	63			
----------------------------	------	---	-----------	-----	----	--	--	--

Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	0.15	ISO 17025	28.6	2.66			
Cadmium (dissolved)	µg/l	0.02	ISO 17025	< 0.02	< 0.02			
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0			
Chromium (dissolved)	µg/l	0.2	ISO 17025	< 0.2	0.3			
Copper (dissolved)	µg/l	0.5	ISO 17025	0.8	7.5			
Lead (dissolved)	µg/l	0.2	ISO 17025	0.9	9.6			
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05	< 0.05			
Nickel (dissolved)	µg/l	0.5	ISO 17025	2.2	0.5			
Selenium (dissolved)	µg/l	0.6	ISO 17025	1.0	< 0.6			
Zinc (dissolved)	µg/l	0.5	ISO 17025	4.0	5.9			

Monoaromatics & Oxygenates

Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0			
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0			
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0			

Petroleum Hydrocarbons

TPH1 (C10 - C40)	µg/l	10	NONE	< 10	3100			
TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0	< 1.0			
TPH-CWG - Aliphatic >C6 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0			
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0			
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	140			
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10	250			
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10	470			
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	1800			
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10	2700			
TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	< 1.0			
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0			
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0			
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	< 10	91			
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	< 10	170			
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	< 10	110			
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	< 10	370			



Analytical Report Number: 19-75415

Project / Site name: Jersey St

Your Order No: 13729

Lab Sample Number				1380646	1380647			
Sample Reference				WS108	WS106			
Sample Number				None Supplied	None Supplied			
Depth (m)				None Supplied	None Supplied			
Date Sampled				02/12/2019	02/12/2019			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

VOCs

Chloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Chloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Bromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Vinyl Chloride	µg/l	1	NONE	< 1.0	< 1.0			
Trichlorofluoromethane	µg/l	1	NONE	< 1.0	< 1.0			
1,1-Dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1,2-Trichloro-1,2,2-trifluoroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Cis-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0			
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1-Dichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
2,2-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Trichloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1,1-Trichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2-Dichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1-Dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Trans-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Tetrachloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Trichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Dibromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Bromodichloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Cis-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Trans-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1,2-Trichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,3-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Dibromochloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Tetrachloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2-Dibromoethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Chlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1,1,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
p & m-Xylene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Styrene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Tribromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
o-Xylene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1,2,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Isopropylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Bromobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
n-Propylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
2-Chlorotoluene	µg/l	1	ISO 17025	< 1.0	< 1.0			
4-Chlorotoluene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,3,5-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
tert-Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2,4-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
sec-Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,3-Dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
p-Isopropyltoluene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2-Dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,4-Dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2-Dibromo-3-chloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2,4-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Hexachlorobutadiene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2,3-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			



Analytical Report Number: 19-75415

Project / Site name: Jersey St

Your Order No: 13729

Lab Sample Number	1380646	1380647				
Sample Reference	WS108	WS106				
Sample Number	None Supplied	None Supplied				
Depth (m)	None Supplied	None Supplied				
Date Sampled	02/12/2019	02/12/2019				
Time Taken	None Supplied	None Supplied				
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status			

SVOCs

Aniline	µg/l	0.05	NONE	< 0.05	< 0.05		
Phenol	µg/l	0.05	NONE	< 0.05	< 0.05		
2-Chlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05		
Bis(2-chloroethyl)ether	µg/l	0.05	NONE	< 0.05	< 0.05		
1,3-Dichlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05		
1,2-Dichlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05		
1,4-Dichlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05		
Bis(2-chloroisopropyl)ether	µg/l	0.05	NONE	< 0.05	< 0.05		
2-Methylphenol	µg/l	0.05	NONE	< 0.05	14		
Hexachloroethane	µg/l	0.05	NONE	< 0.05	< 0.05		
Nitrobenzene	µg/l	0.05	NONE	< 0.05	< 0.05		
4-Methylphenol	µg/l	0.05	NONE	< 0.05	6.1		
Isophorone	µg/l	0.05	NONE	< 0.05	< 0.05		
2-Nitrophenol	µg/l	0.05	NONE	< 0.05	< 0.05		
2,4-Dimethylphenol	µg/l	0.05	NONE	< 0.05	10		
Bis(2-chloroethoxy)methane	µg/l	0.05	NONE	< 0.05	< 0.05		
1,2,4-Trichlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05		
Naphthalene	µg/l	0.01	ISO 17025	< 0.01	8.2		
2,4-Dichlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05		
4-Chloroaniline	µg/l	0.05	NONE	< 0.05	< 0.05		
Hexachlorobutadiene	µg/l	0.05	NONE	< 0.05	< 0.05		
4-Chloro-3-methylphenol	µg/l	0.05	NONE	< 0.05	< 0.05		
2,4,6-Trichlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05		
2,4,5-Trichlorophenol	µg/l	0.05	NONE	< 0.05	< 0.05		
2-Methylnaphthalene	µg/l	0.05	NONE	< 0.05	0.81		
2-Chloronaphthalene	µg/l	0.05	NONE	< 0.05	< 0.05		
Dimethylphthalate	µg/l	0.05	NONE	< 0.05	< 0.05		
2,6-Dinitrotoluene	µg/l	0.05	NONE	< 0.05	< 0.05		
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	0.29		
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	0.97		
2,4-Dinitrotoluene	µg/l	0.05	NONE	< 0.05	< 0.05		
Dibenzofuran	µg/l	0.05	NONE	< 0.05	< 0.05		
4-Chlorophenyl phenyl ether	µg/l	0.05	NONE	< 0.05	< 0.05		
Diethyl phthalate	µg/l	0.05	NONE	< 0.05	< 0.05		
4-Nitroaniline	µg/l	0.05	NONE	< 0.05	< 0.05		
Fluorene	µg/l	0.01	ISO 17025	< 0.01	1.1		
Azobenzene	µg/l	0.05	NONE	< 0.05	< 0.05		
Bromophenyl phenyl ether	µg/l	0.05	NONE	< 0.05	< 0.05		
Hexachlorobenzene	µg/l	0.05	NONE	< 0.05	< 0.05		
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	1.5		
Anthracene	µg/l	0.01	ISO 17025	< 0.01	0.36		
Carbazole	µg/l	0.05	NONE	< 0.05	1.3		
Dibutyl phthalate	µg/l	0.05	NONE	< 0.05	< 0.05		
Anthraquinone	µg/l	0.05	NONE	< 0.05	< 0.05		
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	1.0		
Pyrene	µg/l	0.01	ISO 17025	< 0.01	1.1		
Butyl benzyl phthalate	µg/l	0.05	NONE	< 0.05	< 0.05		
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	0.34		
Chrysene	µg/l	0.01	ISO 17025	< 0.01	0.28		
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01		
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01		
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01		
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01		
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01		
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01		

U/S = Unsuitable Sample I/S = Insufficient Sample

Iss No 19-75415-1 Jersey St 13729

This certificate should not be reproduced, except in full, without the express permission of the laboratory.

The results included within the report are representative of the samples submitted for analysis.



Analytical Report Number : 19-75415

Project / Site name: Jersey St

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
BTEX and MTBE in water (Monoaromatics)	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Low level total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 *for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Monohydric phenols in water - LOW LEVEL 1 ug/l	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
pH at 20oC in water (automated)	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	W	ISO 17025
Semi-volatile organic compounds in water	Determination of semi-volatile organic compounds in leachate by extraction in dichloromethane followed by GC-MS.	In-house method based on USEPA 8270	L102B-PL	W	NONE
TPH1 (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS.	In-house method	L070-PL	W	NONE
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-PL	W	NONE
Volatile organic compounds in water	Determination of volatile organic compounds in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

**Ella Moss**

e3p
Office 4
Heliport Business Park
Eccles
Liverpool Road
Manchester
M30 7RU

t: 0161 707 9612

e: EMoss@e3p.co.uk

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404

f: 01923 237404

e: reception@i2analytical.com

Analytical Report Number : 19-73873

Project / Site name:	Manchester Life	Samples received on:	21/11/2019
Your job number:	13729	Samples instructed on:	26/11/2019
Your order number:		Analysis completed by:	04/12/2019
Report Issue Number:	1	Report issued on:	04/12/2019
Samples Analysed:	3 leachate samples - 32 soil samples		

Signed:

Zina Abdul Razzak
Senior Quality Specialist

For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement. Application of uncertainty of measurement would provide a range within which the true result lies. An estimate of measurement uncertainty can be provided on request.



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372505	1372506	1372507	1372508	1372509
Sample Reference				TT101 A	TP101	TP101	TP102	TP105
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.20	1.00	2.30	0.80	1.40
Date Sampled				20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	23	13	15	15	13
Total mass of sample received	kg	0.001	NONE	0.50	0.43	0.40	0.40	0.40

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Amosite	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Detected	-	-	Not-detected	-
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	0.005	-	-	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	0.005	-	-	-	-

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	-	-	-	-	-
Total Cyanide	mg/kg	1	MCERTS	10	< 1	< 1	< 1	< 1
Total Sulphate as SO ₄	mg/kg	50	MCERTS	-	-	-	-	-
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	-	-	-	-	-
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-	-	-	-
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	-	-	-
Sulphide	mg/kg	1	MCERTS	-	-	-	-	-
Total Sulphur	mg/kg	50	MCERTS	-	-	-	-	-
Total Organic Carbon (TOC)	%	0.1	MCERTS	4.6	-	-	-	-

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	-	-	-	-	-
----------------------------	-------	---	--------	---	---	---	---	---

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	-	-	0.27	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	-	-	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	-	-	0.10	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	-	-	0.12	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	-	-	0.54	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	-	-	0.09	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	-	-	0.35	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	-	-	0.16	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-	0.35	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	-	-	0.38	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	-	0.11	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	-	0.15	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-	0.05	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	-	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-	< 0.05	< 0.05	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	-	-	2.67	< 0.80	< 0.80
-----------------------------	-------	-----	--------	---	---	------	--------	--------



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number	1372505	1372506	1372507	1372508	1372509
Sample Reference	TT101 A	TP101	TP101	TP102	TP105
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	1.20	1.00	2.30	0.80	1.40
Date Sampled	20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	20	13	7.6	25	7.3
Barium (aqua regia extractable)	mg/kg	1	MCERTS	470	150	160	130	150
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.3	0.56	1.2	1.1	1.0
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	1.0	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	85	29	18	540	17
Iron (aqua regia extractable)	mg/kg	40	MCERTS	-	-	-	56000	-
Fe ²⁺	mg/kg	2	NONE	-	-	-	62.0	-
Fe ³⁺	mg/kg	2	NONE	-	-	-	56400	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	280	140	13	160	12
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.5	0.7	< 0.3	0.4	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	27	11	35	30	31
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	55	20	31	46	29
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	390	46	56	150	49

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	-	-	-	-	-
Toluene	µg/kg	1	MCERTS	-	-	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
p & m-xylene	µg/kg	1	MCERTS	-	-	-	-	-
o-xylene	µg/kg	1	MCERTS	-	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	-	-

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	-

TPH (C5 - C6)	mg/kg	1	NONE	< 1.0	-	< 1.0	< 1.0	< 1.0
TPH (C6 - C8)	mg/kg	0.1	MCERTS	< 0.1	-	< 0.1	< 0.1	< 0.1
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1	-	< 0.1	< 0.1	< 0.1
TPH (C10 - C12)	mg/kg	2	MCERTS	220	-	< 2.0	< 2.0	< 2.0
TPH (C12 - C16)	mg/kg	4	MCERTS	1300	-	4.8	< 4.0	< 4.0
TPH (C16 - C21)	mg/kg	1	MCERTS	3400	-	10	7.2	5.7
TPH (C21 - C35)	mg/kg	1	MCERTS	5000	-	11	39	8.5
TPH (C35 - C40)	mg/kg	10	MCERTS	130	-	< 10	< 10	< 10
TPH Total C5 - C40	mg/kg	10	MCERTS	10000	-	30	48	18



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number	1372505	1372506	1372507	1372508	1372509
Sample Reference	TT101 A	TP101	TP101	TP102	TP105
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	1.20	1.00	2.30	0.80	1.40
Date Sampled	20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		

VOCs

Chloromethane	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
Chloroethane	µg/kg	1	NONE	< 1.0	-	-	-	-
Bromomethane	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
Vinyl Chloride	µg/kg	1	NONE	< 1.0	-	-	-	-
Trichlorofluoromethane	µg/kg	1	NONE	< 1.0	-	-	-	-
1,1-Dichloroethene	µg/kg	1	NONE	< 1.0	-	-	-	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,1-Dichloroethane	µg/kg	1	MCERTS	< 1.0	-	-	-	-
2,2-Dichloropropane	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Trichloromethane	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,1,1-Trichloroethane	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,2-Dichloroethane	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,1-Dichloropropene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Trans-1,2-dichloroethene	µg/kg	1	NONE	< 1.0	-	-	-	-
Benzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Tetrachloromethane	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,2-Dichloropropane	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Trichloroethene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Dibromomethane	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Bromodichloromethane	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
Toluene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,1,2-Trichloroethane	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,3-Dichloropropane	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
Dibromochloromethane	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
Tetrachloroethene	µg/kg	1	NONE	< 1.0	-	-	-	-
1,2-Dibromoethane	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
Chlorobenzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
p & m-Xylene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Styrene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Tribromomethane	µg/kg	1	NONE	< 1.0	-	-	-	-
o-Xylene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Isopropylbenzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Bromobenzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
n-Propylbenzene	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
2-Chlorotoluene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
4-Chlorotoluene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
tert-Butylbenzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
sec-Butylbenzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
p-Isopropyltoluene	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
1,2-Dichlorobenzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,4-Dichlorobenzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Butylbenzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	< 1.0	-	-	-	-
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Hexachlorobutadiene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	< 1.0	-	-	-	-



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number	1372505	1372506	1372507	1372508	1372509
Sample Reference	TT101 A	TP101	TP101	TP102	TP105
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	1.20	1.00	2.30	0.80	1.40
Date Sampled	20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		

SVOCs

Aniline	mg/kg	0.1	NONE	< 0.1	-	-	-	-
Phenol	mg/kg	0.2	ISO 17025	< 0.2	-	-	-	-
2-Chlorophenol	mg/kg	0.1	MCERTS	< 0.1	-	-	-	-
Bis(2-chloroethyl)ether	mg/kg	0.2	MCERTS	< 0.2	-	-	-	-
1,3-Dichlorobenzene	mg/kg	0.2	MCERTS	< 0.2	-	-	-	-
1,2-Dichlorobenzene	mg/kg	0.1	MCERTS	< 0.1	-	-	-	-
1,4-Dichlorobenzene	mg/kg	0.2	MCERTS	< 0.2	-	-	-	-
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	< 0.1	-	-	-	-
2-Methylphenol	mg/kg	0.3	MCERTS	< 0.3	-	-	-	-
Hexachloroethane	mg/kg	0.05	MCERTS	< 0.05	-	-	-	-
Nitrobenzene	mg/kg	0.3	MCERTS	< 0.3	-	-	-	-
4-Methylphenol	mg/kg	0.2	NONE	< 0.2	-	-	-	-
Isophorone	mg/kg	0.2	MCERTS	< 0.2	-	-	-	-
2-Nitrophenol	mg/kg	0.3	MCERTS	< 0.3	-	-	-	-
2,4-Dimethylphenol	mg/kg	0.3	MCERTS	< 0.3	-	-	-	-
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	< 0.3	-	-	-	-
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	< 0.3	-	-	-	-
Naphthalene	mg/kg	0.05	MCERTS	46	-	-	-	-
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	< 0.3	-	-	-	-
4-Chloroaniline	mg/kg	0.1	NONE	< 0.1	-	-	-	-
Hexachlorobutadiene	mg/kg	0.1	MCERTS	< 0.1	-	-	-	-
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	< 0.1	-	-	-	-
2,4,6-Trichlorophenol	mg/kg	0.1	MCERTS	< 0.1	-	-	-	-
2,4,5-Trichlorophenol	mg/kg	0.2	MCERTS	< 0.2	-	-	-	-
2-Methylnaphthalene	mg/kg	0.1	NONE	31	-	-	-	-
2-Chloronaphthalene	mg/kg	0.1	MCERTS	< 0.1	-	-	-	-
Dimethylphthalate	mg/kg	0.1	MCERTS	< 0.1	-	-	-	-
2,6-Dinitrotoluene	mg/kg	0.1	MCERTS	< 0.1	-	-	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	3.3	-	-	-	-
Acenaphthene	mg/kg	0.05	MCERTS	170	-	-	-	-
2,4-Dinitrotoluene	mg/kg	0.2	MCERTS	< 0.2	-	-	-	-
Dibenzofuran	mg/kg	0.2	MCERTS	47	-	-	-	-
4-Chlorophenyl phenyl ether	mg/kg	0.3	ISO 17025	< 0.3	-	-	-	-
Diethyl phthalate	mg/kg	0.2	MCERTS	< 0.2	-	-	-	-
4-Nitroaniline	mg/kg	0.2	MCERTS	< 0.2	-	-	-	-
Fluorene	mg/kg	0.05	MCERTS	110	-	-	-	-
Azobenzene	mg/kg	0.3	MCERTS	< 0.3	-	-	-	-
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	< 0.2	-	-	-	-
Hexachlorobenzene	mg/kg	0.3	MCERTS	< 0.3	-	-	-	-
Phenanthrene	mg/kg	0.05	MCERTS	550	-	-	-	-
Anthracene	mg/kg	0.05	MCERTS	170	-	-	-	-
Carbazole	mg/kg	0.3	MCERTS	37	-	-	-	-
Dibutyl phthalate	mg/kg	0.2	MCERTS	< 0.2	-	-	-	-
Anthraquinone	mg/kg	0.3	MCERTS	29	-	-	-	-
Fluoranthene	mg/kg	0.05	MCERTS	720	-	-	-	-
Pyrene	mg/kg	0.05	MCERTS	620	-	-	-	-
Butyl benzyl phthalate	mg/kg	0.3	ISO 17025	< 0.3	-	-	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	330	-	-	-	-
Chrysene	mg/kg	0.05	MCERTS	290	-	-	-	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	380	-	-	-	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	140	-	-	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	280	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	150	-	-	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	41	-	-	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	170	-	-	-	-



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372510	1372511	1372512	1372513	1372514
Sample Reference				TP106	TP106	TP107	TP108	TP109
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	1.70	0.50	2.10	1.00
Date Sampled				20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	13	19	19	19	13
Total mass of sample received	kg	0.001	NONE	0.40	0.40	0.40	0.40	0.40

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Amosite	-	-	Chrysotile	-
Asbestos in Soil	Type	N/A	ISO 17025	Detected	-	-	Detected	-
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	< 0.001	-	-	< 0.001	-
Asbestos Quantification Total	%	0.001	ISO 17025	< 0.001	-	-	< 0.001	-

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	-	-	-	8.1	-
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	3	-
Total Sulphate as SO ₄	mg/kg	50	MCERTS	-	-	-	1100	-
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	-	-	-	540	-
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-	-	0.27	-
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	-	272	-
Sulphide	mg/kg	1	MCERTS	-	-	-	54	-
Total Sulphur	mg/kg	50	MCERTS	-	-	-	1900	-
Total Organic Carbon (TOC)	%	0.1	MCERTS	-	-	-	-	1.9

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	-	-	-	< 1.0	-
----------------------------	-------	---	--------	---	---	---	-------	---

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	-	7.7	250	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	-	0.78	30	-	-
Acenaphthene	mg/kg	0.05	MCERTS	-	2.2	89	-	-
Fluorene	mg/kg	0.05	MCERTS	-	3.3	140	-	-
Phenanthrene	mg/kg	0.05	MCERTS	-	14	550	-	-
Anthracene	mg/kg	0.05	MCERTS	-	3.1	120	-	-
Fluoranthene	mg/kg	0.05	MCERTS	-	11	430	-	-
Pyrene	mg/kg	0.05	MCERTS	-	11	480	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	4.7	190	-	-
Chrysene	mg/kg	0.05	MCERTS	-	5.2	140	-	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	3.2	140	-	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	2.2	69	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	3.6	140	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	1.3	52	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	< 0.05	19	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	1.8	64	-	-

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	-	75.7	2910	-	-
-----------------------------	-------	-----	--------	---	------	------	---	---



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372510	1372511	1372512	1372513	1372514
Sample Reference				TP106	TP106	TP107	TP108	TP109
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	1.70	0.50	2.10	1.00
Date Sampled				20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	21	9.2	34	19	-
Barium (aqua regia extractable)	mg/kg	1	MCERTS	150	110	180	-	-
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.6	1.3	2.2	-	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	0.9	-
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	26	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	110	25	210	130	-
Iron (aqua regia extractable)	mg/kg	40	MCERTS	-	-	-	-	-
Fe ²⁺	mg/kg	2	NONE	-	-	-	-	-
Fe ³⁺	mg/kg	2	NONE	-	-	-	-	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	210	40	780	270	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.6	< 0.3	1.4	0.4	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	32	34	34	35	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	39	34	47	-	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	96	58	120	390	-

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Toluene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
p & m-xylene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
o-xylene	µg/kg	1	MCERTS	< 1.0	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	-	-	-	-

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	0.099	-	-	-	-
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	20	-	-	-	-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	180	-	-	-	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	590	-	-	-	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	4800	-	-	-	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	5600	-	-	-	-
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	-	-	-	-
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	56	-	-	-	-
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	420	-	-	-	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	1200	-	-	-	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	3200	-	-	-	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	4900	-	-	-	-

TPH (C5 - C6)	mg/kg	1	NONE	-	< 1.0	-	< 1.0	-
TPH (C6 - C8)	mg/kg	0.1	MCERTS	-	< 0.1	-	< 0.1	-
TPH (C8 - C10)	mg/kg	0.1	MCERTS	-	< 0.1	-	< 0.1	-
TPH (C10 - C12)	mg/kg	2	MCERTS	-	24	-	11	-
TPH (C12 - C16)	mg/kg	4	MCERTS	-	60	-	180	-
TPH (C16 - C21)	mg/kg	1	MCERTS	-	110	-	480	-
TPH (C21 - C35)	mg/kg	1	MCERTS	-	170	-	1100	-
TPH (C35 - C40)	mg/kg	10	MCERTS	-	< 10	-	65	-
TPH Total C5 - C40	mg/kg	10	MCERTS	-	400	-	1900	-

Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372510	1372511	1372512	1372513	1372514
Sample Reference				TP106	TP106	TP107	TP108	TP109
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	1.70	0.50	2.10	1.00
Date Sampled				20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		

VOCs

Chloromethane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	-
Chloroethane	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	-
Bromomethane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	-
Vinyl Chloride	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	-
Trichlorofluoromethane	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	-
1,1-Dichloroethene	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	-
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
1,1-Dichloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
2,2-Dichloropropane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Trichloromethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
1,1,1-Trichloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
1,2-Dichloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
1,1-Dichloropropene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Trans-1,2-dichloroethene	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	-
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	5.4	< 1.0	-
Tetrachloromethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
1,2-Dichloropropane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Trichloroethene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Dibromomethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Bromodichloromethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	-
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	-
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	16	< 1.0	-
1,1,2-Trichloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
1,3-Dichloropropane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	-
Dibromochloromethane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	-
Tetrachloroethene	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	-
1,2-Dibromoethane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	-
Chlorobenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
p & m-Xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	31	< 1.0	-
Styrene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Tribromomethane	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	-
o-Xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	28	< 1.0	-
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Isopropylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Bromobenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
n-Propylbenzene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	-
2-Chlorotoluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
4-Chlorotoluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	< 1.0	< 1.0	29	< 1.0	-
tert-Butylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	< 1.0	< 1.0	53	< 1.0	-
sec-Butylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	-
p-Isopropyltoluene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	-
1,2-Dichlorobenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
1,4-Dichlorobenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Butylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	-
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
Hexachlorobutadiene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	-
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	-



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372510	1372511	1372512	1372513	1372514
Sample Reference				TP106	TP106	TP107	TP108	TP109
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	1.70	0.50	2.10	1.00
Date Sampled				20/11/2019	20/11/2019	20/11/2019	20/11/2019	20/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
SVOCs								
Aniline	mg/kg	0.1	NONE	< 0.1	-	-	< 0.1	-
Phenol	mg/kg	0.2	ISO 17025	< 0.2	-	-	< 0.2	-
2-Chlorophenol	mg/kg	0.1	MCERTS	< 0.1	-	-	< 0.1	-
Bis(2-chloroethyl)ether	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
1,3-Dichlorobenzene	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
1,2-Dichlorobenzene	mg/kg	0.1	MCERTS	< 0.1	-	-	< 0.1	-
1,4-Dichlorobenzene	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	< 0.1	-	-	< 0.1	-
2-Methylphenol	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	-
Hexachloroethane	mg/kg	0.05	MCERTS	< 0.05	-	-	< 0.05	-
Nitrobenzene	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	-
4-Methylphenol	mg/kg	0.2	NONE	< 0.2	-	-	< 0.2	-
Isophorone	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
2-Nitrophenol	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	-
2,4-Dimethylphenol	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	-
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	-
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	-
Naphthalene	mg/kg	0.05	MCERTS	40	-	-	4.8	-
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	-
4-Chloroaniline	mg/kg	0.1	NONE	< 0.1	-	-	< 0.1	-
Hexachlorobutadiene	mg/kg	0.1	MCERTS	< 0.1	-	-	< 0.1	-
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	< 0.1	-	-	< 0.1	-
2,4,6-Trichlorophenol	mg/kg	0.1	MCERTS	< 0.1	-	-	< 0.1	-
2,4,5-Trichlorophenol	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
2-Methylnaphthalene	mg/kg	0.1	NONE	19	-	-	4.5	-
2-Chloronaphthalene	mg/kg	0.1	MCERTS	< 0.1	-	-	< 0.1	-
Dimethylphthalate	mg/kg	0.1	MCERTS	< 0.1	-	-	< 0.1	-
2,6-Dinitrotoluene	mg/kg	0.1	MCERTS	< 0.1	-	-	< 0.1	-
Acenaphthylene	mg/kg	0.05	MCERTS	11	-	-	1.4	-
Acenaphthene	mg/kg	0.05	MCERTS	40	-	-	6.0	-
2,4-Dinitrotoluene	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
Dibenzofuran	mg/kg	0.2	MCERTS	17	-	-	4.1	-
4-Chlorophenyl phenyl ether	mg/kg	0.3	ISO 17025	< 0.3	-	-	< 0.3	-
Diethyl phthalate	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
4-Nitroaniline	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
Fluorene	mg/kg	0.05	MCERTS	60	-	-	7.3	-
Azobenzene	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	-
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
Hexachlorobenzene	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	-
Phenanthrene	mg/kg	0.05	MCERTS	250	-	-	39	-
Anthracene	mg/kg	0.05	MCERTS	61	-	-	11	-
Carbazole	mg/kg	0.3	MCERTS	11	-	-	2.6	-
Dibutyl phthalate	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
Anthraquinone	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	-
Fluoranthene	mg/kg	0.05	MCERTS	240	-	-	40	-
Pyrene	mg/kg	0.05	MCERTS	270	-	-	43	-
Butyl benzyl phthalate	mg/kg	0.3	ISO 17025	< 0.3	-	-	< 0.3	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	110	-	-	27	-
Chrysene	mg/kg	0.05	MCERTS	95	-	-	27	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	100	-	-	23	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	33	-	-	18	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	89	-	-	28	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	33	-	-	12	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	13	-	-	3.5	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	42	-	-	13	-



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372515	1372516	1372517	1372518	1372519
Sample Reference				TP112	TP113	TP115	TP116	TP117
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	0.90	0.50	0.80	1.60
Date Sampled				21/11/2019	21/11/2019	21/11/2019	21/11/2019	21/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	17	16	20	18	19
Total mass of sample received	kg	0.001	NONE	0.40	0.30	1.4	0.40	0.40

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Chrysotile	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Detected	-	Not-detected	-	Not-detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	0.008	-	-	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	0.008	-	-	-	-

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	-	-	-	-	9.1
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Total Sulphate as SO ₄	mg/kg	50	MCERTS	-	-	-	-	2500
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	-	-	-	-	940
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-	-	-	0.47
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	-	-	470
Sulphide	mg/kg	1	MCERTS	-	-	-	-	30
Total Sulphur	mg/kg	50	MCERTS	-	-	-	-	3000
Total Organic Carbon (TOC)	%	0.1	MCERTS	1.4	-	-	-	-

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	-	-	-	-	< 1.0
----------------------------	-------	---	--------	---	---	---	---	-------

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	0.53
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	-	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.21	< 0.05	< 0.05	-	0.29
Fluorene	mg/kg	0.05	MCERTS	0.20	< 0.05	< 0.05	-	0.38
Phenanthrene	mg/kg	0.05	MCERTS	2.2	0.49	< 0.05	-	2.1
Anthracene	mg/kg	0.05	MCERTS	0.48	< 0.05	< 0.05	-	0.46
Fluoranthene	mg/kg	0.05	MCERTS	5.2	0.43	< 0.05	-	2.1
Pyrene	mg/kg	0.05	MCERTS	5.4	0.38	< 0.05	-	2.3
Benzo(a)anthracene	mg/kg	0.05	MCERTS	3.8	< 0.05	< 0.05	-	1.3
Chrysene	mg/kg	0.05	MCERTS	3.3	< 0.05	< 0.05	-	1.1
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	4.0	< 0.05	< 0.05	-	0.82
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	3.4	< 0.05	< 0.05	-	0.75
Benzo(a)pyrene	mg/kg	0.05	MCERTS	4.7	< 0.05	< 0.05	-	1.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	2.8	< 0.05	< 0.05	-	0.41
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.85	< 0.05	< 0.05	-	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	3.4	< 0.05	< 0.05	-	0.50

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	39.8	1.30	< 0.80	-	14.1
-----------------------------	-------	-----	--------	------	------	--------	---	------



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372515	1372516	1372517	1372518	1372519
Sample Reference				TP112	TP113	TP115	TP116	TP117
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	0.90	0.50	0.80	1.60
Date Sampled				21/11/2019	21/11/2019	21/11/2019	21/11/2019	21/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	39	9.9	29	32	40
Barium (aqua regia extractable)	mg/kg	1	MCERTS	180	300	170	230	-
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.6	1.6	2.0	1.5	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	1.5	0.4	< 0.2	18	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	25
Copper (aqua regia extractable)	mg/kg	1	MCERTS	1000	27	74	110	160
Iron (aqua regia extractable)	mg/kg	40	MCERTS	-	-	-	-	-
Fe ²⁺	mg/kg	2	NONE	-	-	-	-	-
Fe ³⁺	mg/kg	2	NONE	-	-	-	-	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	410	23	91	200	160
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.6	< 0.3	0.4	0.7	0.5
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	53	49	42	53	57
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	67	38	49	53	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	380	87	92	1100	110

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	-	-	-	-	-
Toluene	µg/kg	1	MCERTS	-	-	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
p & m-xylene	µg/kg	1	MCERTS	-	-	-	-	-
o-xylene	µg/kg	1	MCERTS	-	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	-	-

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	-

TPH (C5 - C6)	mg/kg	1	NONE	< 1.0	< 1.0	< 1.0	-	< 1.0
TPH (C6 - C8)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	-	< 0.1
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	-	< 0.1
TPH (C10 - C12)	mg/kg	2	MCERTS	5.4	8.3	< 2.0	-	3.6
TPH (C12 - C16)	mg/kg	4	MCERTS	15	61	< 4.0	-	21
TPH (C16 - C21)	mg/kg	1	MCERTS	99	100	< 1.0	-	78
TPH (C21 - C35)	mg/kg	1	MCERTS	400	380	< 1.0	-	350
TPH (C35 - C40)	mg/kg	10	MCERTS	56	53	< 10	-	38
TPH Total C5 - C40	mg/kg	10	MCERTS	580	610	< 10	-	500



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372515	1372516	1372517	1372518	1372519
Sample Reference				TP112	TP113	TP115	TP116	TP117
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	0.90	0.50	0.80	1.60
Date Sampled				21/11/2019	21/11/2019	21/11/2019	21/11/2019	21/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		

VOCs

Chloromethane	µg/kg	1	ISO 17025	-	-	-	-	-
Chloroethane	µg/kg	1	NONE	-	-	-	-	-
Bromomethane	µg/kg	1	ISO 17025	-	-	-	-	-
Vinyl Chloride	µg/kg	1	NONE	-	-	-	-	-
Trichlorofluoromethane	µg/kg	1	NONE	-	-	-	-	-
1,1-Dichloroethene	µg/kg	1	NONE	-	-	-	-	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	-	-	-	-	-
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	-	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	-	-
1,1-Dichloroethane	µg/kg	1	MCERTS	-	-	-	-	-
2,2-Dichloropropane	µg/kg	1	MCERTS	-	-	-	-	-
Trichloromethane	µg/kg	1	MCERTS	-	-	-	-	-
1,1,1-Trichloroethane	µg/kg	1	MCERTS	-	-	-	-	-
1,2-Dichloroethane	µg/kg	1	MCERTS	-	-	-	-	-
1,1-Dichloropropene	µg/kg	1	MCERTS	-	-	-	-	-
Trans-1,2-dichloroethene	µg/kg	1	NONE	-	-	-	-	-
Benzene	µg/kg	1	MCERTS	-	-	-	-	-
Tetrachloromethane	µg/kg	1	MCERTS	-	-	-	-	-
1,2-Dichloropropane	µg/kg	1	MCERTS	-	-	-	-	-
Trichloroethene	µg/kg	1	MCERTS	-	-	-	-	-
Dibromomethane	µg/kg	1	MCERTS	-	-	-	-	-
Bromodichloromethane	µg/kg	1	MCERTS	-	-	-	-	-
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-	-	-	-
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-	-	-	-
Toluene	µg/kg	1	MCERTS	-	-	-	-	-
1,1,2-Trichloroethane	µg/kg	1	MCERTS	-	-	-	-	-
1,3-Dichloropropane	µg/kg	1	ISO 17025	-	-	-	-	-
Dibromochloromethane	µg/kg	1	ISO 17025	-	-	-	-	-
Tetrachloroethene	µg/kg	1	NONE	-	-	-	-	-
1,2-Dibromoethane	µg/kg	1	ISO 17025	-	-	-	-	-
Chlorobenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
p & m-Xylene	µg/kg	1	MCERTS	-	-	-	-	-
Styrene	µg/kg	1	MCERTS	-	-	-	-	-
Tribromomethane	µg/kg	1	NONE	-	-	-	-	-
o-Xylene	µg/kg	1	MCERTS	-	-	-	-	-
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-	-	-	-
Isopropylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
Bromobenzene	µg/kg	1	MCERTS	-	-	-	-	-
n-Propylbenzene	µg/kg	1	ISO 17025	-	-	-	-	-
2-Chlorotoluene	µg/kg	1	MCERTS	-	-	-	-	-
4-Chlorotoluene	µg/kg	1	MCERTS	-	-	-	-	-
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	-	-	-	-	-
tert-Butylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	-	-	-	-	-
sec-Butylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	-	-	-	-	-
p-Isopropyltoluene	µg/kg	1	ISO 17025	-	-	-	-	-
1,2-Dichlorobenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,4-Dichlorobenzene	µg/kg	1	MCERTS	-	-	-	-	-
Butylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	-	-	-	-	-
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	-	-	-	-	-
Hexachlorobutadiene	µg/kg	1	MCERTS	-	-	-	-	-
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	-	-	-	-	-



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372515	1372516	1372517	1372518	1372519
Sample Reference				TP112	TP113	TP115	TP116	TP117
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	0.90	0.50	0.80	1.60
Date Sampled				21/11/2019	21/11/2019	21/11/2019	21/11/2019	21/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
SVOCs								
Aniline	mg/kg	0.1	NONE	-	-	-	-	-
Phenol	mg/kg	0.2	ISO 17025	-	-	-	-	-
2-Chlorophenol	mg/kg	0.1	MCERTS	-	-	-	-	-
Bis(2-chloroethyl)ether	mg/kg	0.2	MCERTS	-	-	-	-	-
1,3-Dichlorobenzene	mg/kg	0.2	MCERTS	-	-	-	-	-
1,2-Dichlorobenzene	mg/kg	0.1	MCERTS	-	-	-	-	-
1,4-Dichlorobenzene	mg/kg	0.2	MCERTS	-	-	-	-	-
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	-	-	-	-	-
2-Methylphenol	mg/kg	0.3	MCERTS	-	-	-	-	-
Hexachloroethane	mg/kg	0.05	MCERTS	-	-	-	-	-
Nitrobenzene	mg/kg	0.3	MCERTS	-	-	-	-	-
4-Methylphenol	mg/kg	0.2	NONE	-	-	-	-	-
Isophorone	mg/kg	0.2	MCERTS	-	-	-	-	-
2-Nitrophenol	mg/kg	0.3	MCERTS	-	-	-	-	-
2,4-Dimethylphenol	mg/kg	0.3	MCERTS	-	-	-	-	-
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	-	-	-	-	-
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	-	-	-	-	-
Naphthalene	mg/kg	0.05	MCERTS	-	-	-	-	-
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	-	-	-	-	-
4-Chloroaniline	mg/kg	0.1	NONE	-	-	-	-	-
Hexachlorobutadiene	mg/kg	0.1	MCERTS	-	-	-	-	-
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	-	-	-	-	-
2,4,6-Trichlorophenol	mg/kg	0.1	MCERTS	-	-	-	-	-
2,4,5-Trichlorophenol	mg/kg	0.2	MCERTS	-	-	-	-	-
2-Methylnaphthalene	mg/kg	0.1	NONE	-	-	-	-	-
2-Chloronaphthalene	mg/kg	0.1	MCERTS	-	-	-	-	-
Dimethylphthalate	mg/kg	0.1	MCERTS	-	-	-	-	-
2,6-Dinitrotoluene	mg/kg	0.1	MCERTS	-	-	-	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	-	-	-	-	-
Acenaphthene	mg/kg	0.05	MCERTS	-	-	-	-	-
2,4-Dinitrotoluene	mg/kg	0.2	MCERTS	-	-	-	-	-
Dibenzofuran	mg/kg	0.2	MCERTS	-	-	-	-	-
4-Chlorophenyl phenyl ether	mg/kg	0.3	ISO 17025	-	-	-	-	-
Diethyl phthalate	mg/kg	0.2	MCERTS	-	-	-	-	-
4-Nitroaniline	mg/kg	0.2	MCERTS	-	-	-	-	-
Fluorene	mg/kg	0.05	MCERTS	-	-	-	-	-
Azobenzene	mg/kg	0.3	MCERTS	-	-	-	-	-
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	-	-	-	-	-
Hexachlorobenzene	mg/kg	0.3	MCERTS	-	-	-	-	-
Phenanthrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Carbazole	mg/kg	0.3	MCERTS	-	-	-	-	-
Dibutyl phthalate	mg/kg	0.2	MCERTS	-	-	-	-	-
Anthraquinone	mg/kg	0.3	MCERTS	-	-	-	-	-
Fluoranthene	mg/kg	0.05	MCERTS	-	-	-	-	-
Pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Butyl benzyl phthalate	mg/kg	0.3	ISO 17025	-	-	-	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Chrysene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-	-	-	-

Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372520	1372521	1372522	1372523	1372524
Sample Reference				TP117	TT105 A	TT102 B	TT103 A	TT102 A
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				2.90	2.00	1.70	1.50	1.10
Date Sampled				21/11/2019	21/11/2019	21/11/2019	21/11/2019	21/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	23	46	16	23	23
Total mass of sample received	kg	0.001	NONE	0.40	0.40	0.40	0.50	0.40

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	Amosite	Amosite
Asbestos in Soil	Type	N/A	ISO 17025	-	Not-detected	-	Detected	Detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	0.002	0.100
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	0.002	0.100

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	6.9	-	8.4	8.5	-
Total Cyanide	mg/kg	1	MCERTS	< 1	-	< 1	200	2
Total Sulphate as SO ₄	mg/kg	50	MCERTS	560	-	240	3600	-
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	320	-	77	1500	-
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.16	-	0.039	0.76	-
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	161	-	38.5	758	-
Sulphide	mg/kg	1	MCERTS	26	-	3.4	90	-
Total Sulphur	mg/kg	50	MCERTS	1500	-	300	4500	-
Total Organic Carbon (TOC)	%	0.1	MCERTS	-	-	-	-	3.7

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	-
----------------------------	-------	---	--------	-------	---	-------	-------	---

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	-
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	-
Fluorene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	-
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	-
Anthracene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	-
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	-
Pyrene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	-
Chrysene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	-

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	-	< 0.80	-	-
-----------------------------	-------	-----	--------	--------	---	--------	---	---



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372520	1372521	1372522	1372523	1372524
Sample Reference				TP117	TT105 A	TT102 B	TT103 A	TT102 A
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				2.90	2.00	1.70	1.50	1.10
Date Sampled				21/11/2019	21/11/2019	21/11/2019	21/11/2019	21/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	7.2	-	9.4	31	23
Barium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	470
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	-	-	-	-	3.4
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	-	< 0.2	12	0.8
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	-	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	25	-	30	56	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	9.1	-	20	750	210
Iron (aqua regia extractable)	mg/kg	40	MCERTS	-	52000	-	-	-
Fe ²⁺	mg/kg	2	NONE	-	49.8	-	-	-
Fe ³⁺	mg/kg	2	NONE	-	51800	-	-	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	17	-	13	860	250
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	-	< 0.3	0.6	2.4
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	17	-	37	40	58
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	68
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	38	-	55	4900	380

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
Toluene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
Ethylbenzene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
p & m-xylene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
o-xylene	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	-	< 0.001	-	< 0.001	-
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	-	< 0.001	-	< 0.001	-
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	< 0.001	-	< 0.001	-
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	4.8	-	4.5	-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	44	-	41	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	390	-	250	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	7100	-	2500	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	7500	-	2800	-
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	-	< 0.001	-	< 0.001	-
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	-	< 0.001	-	< 0.001	-
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	< 0.001	-	< 0.001	-
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	2.1	-	3.9	-
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	53	-	65	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	390	-	390	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	2200	-	2600	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	2600	-	3000	-

TPH (C5 - C6)	mg/kg	1	NONE	< 1.0	< 1.0	< 1.0	-	< 1.0
TPH (C6 - C8)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	-	< 0.1
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	-	< 0.1
TPH (C10 - C12)	mg/kg	2	MCERTS	< 2.0	6.9	4.6	-	15
TPH (C12 - C16)	mg/kg	4	MCERTS	< 4.0	97	38	-	420
TPH (C16 - C21)	mg/kg	1	MCERTS	< 1.0	780	71	-	1200
TPH (C21 - C35)	mg/kg	1	MCERTS	< 1.0	9200	61	-	2000
TPH (C35 - C40)	mg/kg	10	MCERTS	< 10	3500	11	-	250
TPH Total C5 - C40	mg/kg	10	MCERTS	< 10	14000	190	-	3900



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372520	1372521	1372522	1372523	1372524
Sample Reference				TP117	TT105 A	TT102 B	TT103 A	TT102 A
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				2.90	2.00	1.70	1.50	1.10
Date Sampled				21/11/2019	21/11/2019	21/11/2019	21/11/2019	21/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		

VOCs

Chloromethane	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	< 1.0
Chloroethane	µg/kg	1	NONE	< 1.0	-	< 1.0	< 1.0	< 1.0
Bromomethane	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	< 1.0
Vinyl Chloride	µg/kg	1	NONE	< 1.0	-	< 1.0	< 1.0	< 1.0
Trichlorofluoromethane	µg/kg	1	NONE	< 1.0	-	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	µg/kg	1	NONE	< 1.0	-	< 1.0	< 1.0	< 1.0
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	< 1.0
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
2,2-Dichloropropane	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
Trichloromethane	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
Trans-1,2-dichloroethene	µg/kg	1	NONE	< 1.0	-	< 1.0	< 1.0	< 1.0
Benzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
Tetrachloromethane	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
Trichloroethene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
Dibromomethane	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
Bromodichloromethane	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	< 1.0
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	< 1.0
Dibromochloromethane	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	< 1.0
Tetrachloroethene	µg/kg	1	NONE	< 1.0	-	< 1.0	< 1.0	< 1.0
1,2-Dibromoethane	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	< 1.0
Chlorobenzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
p & m-Xylene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
Styrene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
Tribromomethane	µg/kg	1	NONE	< 1.0	-	< 1.0	< 1.0	< 1.0
o-Xylene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
Isopropylbenzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
Bromobenzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
n-Propylbenzene	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	< 1.0
2-Chlorotoluene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
4-Chlorotoluene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	< 1.0
tert-Butylbenzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	< 1.0
sec-Butylbenzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	< 1.0
p-Isopropyltoluene	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
Butylbenzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	µg/kg	1	MCERTS	< 1.0	-	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	< 1.0	-	< 1.0	< 1.0	< 1.0



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372520	1372521	1372522	1372523	1372524
Sample Reference				TP117	TT105 A	TT102 B	TT103 A	TT102 A
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				2.90	2.00	1.70	1.50	1.10
Date Sampled				21/11/2019	21/11/2019	21/11/2019	21/11/2019	21/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
SVOCs								
Aniline	mg/kg	0.1	NONE	-	< 0.1	-	< 0.1	< 0.1
Phenol	mg/kg	0.2	ISO 17025	-	< 0.2	-	< 0.2	< 0.2
2-Chlorophenol	mg/kg	0.1	MCERTS	-	< 0.1	-	< 0.1	< 0.1
Bis(2-chloroethyl)ether	mg/kg	0.2	MCERTS	-	< 0.2	-	< 0.2	< 0.2
1,3-Dichlorobenzene	mg/kg	0.2	MCERTS	-	< 0.2	-	< 0.2	< 0.2
1,2-Dichlorobenzene	mg/kg	0.1	MCERTS	-	< 0.1	-	< 0.1	< 0.1
1,4-Dichlorobenzene	mg/kg	0.2	MCERTS	-	< 0.2	-	< 0.2	< 0.2
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	-	< 0.1	-	< 0.1	< 0.1
2-Methylphenol	mg/kg	0.3	MCERTS	-	< 0.3	-	< 0.3	< 0.3
Hexachloroethane	mg/kg	0.05	MCERTS	-	< 0.05	-	< 0.05	< 0.05
Nitrobenzene	mg/kg	0.3	MCERTS	-	< 0.3	-	< 0.3	< 0.3
4-Methylphenol	mg/kg	0.2	NONE	-	< 0.2	-	< 0.2	< 0.2
Isophorone	mg/kg	0.2	MCERTS	-	< 0.2	-	< 0.2	< 0.2
2-Nitrophenol	mg/kg	0.3	MCERTS	-	< 0.3	-	< 0.3	< 0.3
2,4-Dimethylphenol	mg/kg	0.3	MCERTS	-	< 0.3	-	< 0.3	< 0.3
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	-	< 0.3	-	< 0.3	< 0.3
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	-	< 0.3	-	< 0.3	< 0.3
Naphthalene	mg/kg	0.05	MCERTS	-	< 0.05	-	2.1	0.54
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	-	< 0.3	-	< 0.3	< 0.3
4-Chloroaniline	mg/kg	0.1	NONE	-	< 0.1	-	< 0.1	< 0.1
Hexachlorobutadiene	mg/kg	0.1	MCERTS	-	< 0.1	-	< 0.1	< 0.1
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	-	< 0.1	-	< 0.1	< 0.1
2,4,6-Trichlorophenol	mg/kg	0.1	MCERTS	-	< 0.1	-	< 0.1	< 0.1
2,4,5-Trichlorophenol	mg/kg	0.2	MCERTS	-	< 0.2	-	< 0.2	< 0.2
2-Methylnaphthalene	mg/kg	0.1	NONE	-	1.0	-	2.4	0.9
2-Chloronaphthalene	mg/kg	0.1	MCERTS	-	< 0.1	-	< 0.1	< 0.1
Dimethylphthalate	mg/kg	0.1	MCERTS	-	< 0.1	-	< 0.1	< 0.1
2,6-Dinitrotoluene	mg/kg	0.1	MCERTS	-	< 0.1	-	< 0.1	< 0.1
Acenaphthylene	mg/kg	0.05	MCERTS	-	2.3	-	1.1	0.39
Acenaphthene	mg/kg	0.05	MCERTS	-	12	-	8.2	1.1
2,4-Dinitrotoluene	mg/kg	0.2	MCERTS	-	< 0.2	-	< 0.2	< 0.2
Dibenzofuran	mg/kg	0.2	MCERTS	-	2.7	-	2.6	0.6
4-Chlorophenyl phenyl ether	mg/kg	0.3	ISO 17025	-	< 0.3	-	< 0.3	< 0.3
Diethyl phthalate	mg/kg	0.2	MCERTS	-	< 0.2	-	< 0.2	< 0.2
4-Nitroaniline	mg/kg	0.2	MCERTS	-	< 0.2	-	< 0.2	< 0.2
Fluorene	mg/kg	0.05	MCERTS	-	13	-	4.7	1.2
Azobenzene	mg/kg	0.3	MCERTS	-	< 0.3	-	< 0.3	< 0.3
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	-	< 0.2	-	< 0.2	< 0.2
Hexachlorobenzene	mg/kg	0.3	MCERTS	-	< 0.3	-	< 0.3	< 0.3
Phenanthrene	mg/kg	0.05	MCERTS	-	36	-	26	8.7
Anthracene	mg/kg	0.05	MCERTS	-	17	-	7.3	1.8
Carbazole	mg/kg	0.3	MCERTS	-	< 0.3	-	2.0	< 0.3
Dibutyl phthalate	mg/kg	0.2	MCERTS	-	< 0.2	-	< 0.2	< 0.2
Anthraquinone	mg/kg	0.3	MCERTS	-	< 0.3	-	< 0.3	< 0.3
Fluoranthene	mg/kg	0.05	MCERTS	-	130	-	27	11
Pyrene	mg/kg	0.05	MCERTS	-	130	-	29	12
Butyl benzyl phthalate	mg/kg	0.3	ISO 17025	-	< 0.3	-	< 0.3	< 0.3
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	39	-	21	6.2
Chrysene	mg/kg	0.05	MCERTS	-	39	-	14	5.8
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	30	-	15	5.9
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	14	-	10	3.5
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	27	-	17	6.2
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	11	-	8.1	3.3
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	3.6	-	2.7	1.0
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	14	-	9.3	3.7



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372525	1372526	1372527	1372528	1372529
Sample Reference				TT104 A	WS104	WS105	WS109	WS109
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				2.20	0.70	0.50	1.10	4.20
Date Sampled				21/11/2019	20/11/2019	20/11/2019	21/11/2019	21/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	20	18	13	34	24
Total mass of sample received	kg	0.001	NONE	0.40	0.40	0.39	0.40	0.43

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	Chrysotile	-	-	-	-
Asbestos in Soil	Type	N/A	ISO 17025	Detected	Not-detected	-	Not-detected	-
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	< 0.001	-	-	-	-
Asbestos Quantification Total	%	0.001	ISO 17025	< 0.001	-	-	-	-

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	-	-	-	-	-
Total Cyanide	mg/kg	1	MCERTS	59	< 1	< 1	< 1	< 1
Total Sulphate as SO ₄	mg/kg	50	MCERTS	-	-	-	-	-
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	-	-	-	-	-
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-	-	-	-
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	-	-	-
Sulphide	mg/kg	1	MCERTS	-	-	-	-	-
Total Sulphur	mg/kg	50	MCERTS	-	-	-	-	-
Total Organic Carbon (TOC)	%	0.1	MCERTS	-	-	-	-	-

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	-	-	-	-	-
----------------------------	-------	---	--------	---	---	---	---	---

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	0.40
Acenaphthylene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	0.25
Fluorene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	0.22
Phenanthrene	mg/kg	0.05	MCERTS	-	0.76	-	-	1.0
Anthracene	mg/kg	0.05	MCERTS	-	0.12	-	-	0.15
Fluoranthene	mg/kg	0.05	MCERTS	-	0.87	-	-	0.84
Pyrene	mg/kg	0.05	MCERTS	-	0.94	-	-	0.77
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	0.62	-	-	0.41
Chrysene	mg/kg	0.05	MCERTS	-	0.51	-	-	0.45
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	0.59	-	-	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	0.45	-	-	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	0.58	-	-	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	0.31	-	-	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	< 0.05	-	-	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	0.22	-	-	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	-	5.97	-	-	4.50
-----------------------------	-------	-----	--------	---	------	---	---	------



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372525	1372526	1372527	1372528	1372529
Sample Reference				TT104 A	WS104	WS105	WS109	WS109
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				2.20	0.70	0.50	1.10	4.20
Date Sampled				21/11/2019	20/11/2019	20/11/2019	21/11/2019	21/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	32	23	13	40	7.4
Barium (aqua regia extractable)	mg/kg	1	MCERTS	440	200	180	220	100
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.2	1.0	0.76	1.9	1.0
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	3.5	< 0.2	0.3	1.4	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	290	550	190	210	21
Iron (aqua regia extractable)	mg/kg	40	MCERTS	-	-	-	-	-
Fe ²⁺	mg/kg	2	NONE	-	-	-	-	-
Fe ³⁺	mg/kg	2	NONE	-	-	-	-	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	390	590	160	980	22
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.9	< 0.3	< 0.3	0.8	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	49	31	23	55	31
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	3.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	40	47	33	46	27
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	1700	150	190	540	51

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	-	-	-	-	-
Toluene	µg/kg	1	MCERTS	-	-	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
p & m-xylene	µg/kg	1	MCERTS	-	-	-	-	-
o-xylene	µg/kg	1	MCERTS	-	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	-	-

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	-

TPH (C5 - C6)	mg/kg	1	NONE	< 1.0	< 1.0	-	< 1.0	< 1.0
TPH (C6 - C8)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	-	< 0.1	< 0.1
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	-	< 0.1	< 0.1
TPH (C10 - C12)	mg/kg	2	MCERTS	16	3.2	-	37	9.6
TPH (C12 - C16)	mg/kg	4	MCERTS	130	15	-	720	33
TPH (C16 - C21)	mg/kg	1	MCERTS	610	82	-	1200	54
TPH (C21 - C35)	mg/kg	1	MCERTS	2600	210	-	670	61
TPH (C35 - C40)	mg/kg	10	MCERTS	940	62	-	68	< 10
TPH Total C5 - C40	mg/kg	10	MCERTS	4300	380	-	2700	170

Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number	1372525	1372526	1372527	1372528	1372529
Sample Reference	TT104 A	WS104	WS105	WS109	WS109
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	2.20	0.70	0.50	1.10	4.20
Date Sampled	21/11/2019	20/11/2019	20/11/2019	21/11/2019	21/11/2019
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		

VOCs

Chloromethane	µg/kg	1	ISO 17025	< 1.0	-	-	< 1.0	-
Chloroethane	µg/kg	1	NONE	< 1.0	-	-	< 1.0	-
Bromomethane	µg/kg	1	ISO 17025	< 1.0	-	-	< 1.0	-
Vinyl Chloride	µg/kg	1	NONE	< 1.0	-	-	< 1.0	-
Trichlorofluoromethane	µg/kg	1	NONE	< 1.0	-	-	< 1.0	-
1,1-Dichloroethene	µg/kg	1	NONE	< 1.0	-	-	< 1.0	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	< 1.0	-	-	< 1.0	-
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
1,1-Dichloroethane	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
2,2-Dichloropropane	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
Trichloromethane	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
1,1,1-Trichloroethane	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
1,2-Dichloroethane	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
1,1-Dichloropropene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
Trans-1,2-dichloroethene	µg/kg	1	NONE	< 1.0	-	-	< 1.0	-
Benzene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
Tetrachloromethane	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
1,2-Dichloropropane	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
Trichloroethene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
Dibromomethane	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
Bromodichloromethane	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	< 1.0	-	-	< 1.0	-
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	< 1.0	-	-	< 1.0	-
Toluene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
1,1,2-Trichloroethane	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
1,3-Dichloropropane	µg/kg	1	ISO 17025	< 1.0	-	-	< 1.0	-
Dibromochloromethane	µg/kg	1	ISO 17025	< 1.0	-	-	< 1.0	-
Tetrachloroethene	µg/kg	1	NONE	< 1.0	-	-	< 1.0	-
1,2-Dibromoethane	µg/kg	1	ISO 17025	< 1.0	-	-	< 1.0	-
Chlorobenzene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
p & m-Xylene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
Styrene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
Tribromomethane	µg/kg	1	NONE	< 1.0	-	-	< 1.0	-
o-Xylene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
Isopropylbenzene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
Bromobenzene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
n-Propylbenzene	µg/kg	1	ISO 17025	< 1.0	-	-	< 1.0	-
2-Chlorotoluene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
4-Chlorotoluene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	< 1.0	-	-	< 1.0	-
tert-Butylbenzene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	< 1.0	-	-	< 1.0	-
sec-Butylbenzene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	< 1.0	-	-	< 1.0	-
p-Isopropyltoluene	µg/kg	1	ISO 17025	< 1.0	-	-	< 1.0	-
1,2-Dichlorobenzene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
1,4-Dichlorobenzene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
Butylbenzene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	< 1.0	-	-	< 1.0	-
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
Hexachlorobutadiene	µg/kg	1	MCERTS	< 1.0	-	-	< 1.0	-
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	< 1.0	-	-	< 1.0	-



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372525	1372526	1372527	1372528	1372529
Sample Reference				TT104 A	WS104	WS105	WS109	WS109
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				2.20	0.70	0.50	1.10	4.20
Date Sampled				21/11/2019	20/11/2019	20/11/2019	21/11/2019	21/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
SVOCs								
Aniline	mg/kg	0.1	NONE	< 0.1	-	-	< 0.1	-
Phenol	mg/kg	0.2	ISO 17025	< 0.2	-	-	< 0.2	-
2-Chlorophenol	mg/kg	0.1	MCERTS	< 0.1	-	-	< 0.1	-
Bis(2-chloroethyl)ether	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
1,3-Dichlorobenzene	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
1,2-Dichlorobenzene	mg/kg	0.1	MCERTS	< 0.1	-	-	< 0.1	-
1,4-Dichlorobenzene	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	< 0.1	-	-	< 0.1	-
2-Methylphenol	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	-
Hexachloroethane	mg/kg	0.05	MCERTS	< 0.05	-	-	< 0.05	-
Nitrobenzene	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	-
4-Methylphenol	mg/kg	0.2	NONE	< 0.2	-	-	< 0.2	-
Isophorone	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
2-Nitrophenol	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	-
2,4-Dimethylphenol	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	-
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	-
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	-
Naphthalene	mg/kg	0.05	MCERTS	11	-	-	0.59	-
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	-
4-Chloroaniline	mg/kg	0.1	NONE	< 0.1	-	-	< 0.1	-
Hexachlorobutadiene	mg/kg	0.1	MCERTS	< 0.1	-	-	< 0.1	-
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	< 0.1	-	-	< 0.1	-
2,4,6-Trichlorophenol	mg/kg	0.1	MCERTS	< 0.1	-	-	< 0.1	-
2,4,5-Trichlorophenol	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
2-Methylnaphthalene	mg/kg	0.1	NONE	7.1	-	-	< 0.1	-
2-Chloronaphthalene	mg/kg	0.1	MCERTS	< 0.1	-	-	< 0.1	-
Dimethylphthalate	mg/kg	0.1	MCERTS	< 0.1	-	-	< 0.1	-
2,6-Dinitrotoluene	mg/kg	0.1	MCERTS	< 0.1	-	-	< 0.1	-
Acenaphthylene	mg/kg	0.05	MCERTS	3.2	-	-	1.3	-
Acenaphthene	mg/kg	0.05	MCERTS	11	-	-	1.3	-
2,4-Dinitrotoluene	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
Dibenzofuran	mg/kg	0.2	MCERTS	6.0	-	-	< 0.2	-
4-Chlorophenyl phenyl ether	mg/kg	0.3	ISO 17025	< 0.3	-	-	< 0.3	-
Diethyl phthalate	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
4-Nitroaniline	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
Fluorene	mg/kg	0.05	MCERTS	15	-	-	2.6	-
Azobenzene	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	-
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
Hexachlorobenzene	mg/kg	0.3	MCERTS	< 0.3	-	-	< 0.3	-
Phenanthrene	mg/kg	0.05	MCERTS	74	-	-	12	-
Anthracene	mg/kg	0.05	MCERTS	18	-	-	3.0	-
Carbazole	mg/kg	0.3	MCERTS	3.1	-	-	< 0.3	-
Dibutyl phthalate	mg/kg	0.2	MCERTS	< 0.2	-	-	< 0.2	-
Anthraquinone	mg/kg	0.3	MCERTS	4.7	-	-	< 0.3	-
Fluoranthene	mg/kg	0.05	MCERTS	79	-	-	23	-
Pyrene	mg/kg	0.05	MCERTS	75	-	-	24	-
Butyl benzyl phthalate	mg/kg	0.3	ISO 17025	< 0.3	-	-	< 0.3	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	35	-	-	16	-
Chrysene	mg/kg	0.05	MCERTS	33	-	-	13	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	37	-	-	13	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	14	-	-	9.0	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	31	-	-	16	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	13	-	-	5.8	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	4.3	-	-	2.2	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	16	-	-	6.6	-



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372530	1372531	1372532	1372533	1372534
Sample Reference				WS106	WS110	WS111	WS111	WS112
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.90	0.90	0.80	1.90	1.20
Date Sampled				21/11/2019	21/11/2019	21/11/2019	21/11/2019	21/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	21	20	20	20	14
Total mass of sample received	kg	0.001	NONE	0.40	0.40	0.40	0.30	0.40

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-	-	-	Chrysotile
Asbestos in Soil	Type	N/A	ISO 17025	-	-	Not-detected	-	Detected
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-	-	-	< 0.001
Asbestos Quantification Total	%	0.001	ISO 17025	-	-	-	-	< 0.001

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	-	-	-	-	-
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	-	< 1	< 1
Total Sulphate as SO ₄	mg/kg	50	MCERTS	-	-	-	-	-
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	-	-	-	-	-
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-	-	-	-
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	-	-	-
Sulphide	mg/kg	1	MCERTS	-	-	-	-	-
Total Sulphur	mg/kg	50	MCERTS	-	-	-	-	-
Total Organic Carbon (TOC)	%	0.1	MCERTS	-	-	-	-	-

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	-	-	-	-	-
----------------------------	-------	---	--------	---	---	---	---	---

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.23	< 0.05	0.21
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.19
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	0.24
Phenanthrene	mg/kg	0.05	MCERTS	0.54	< 0.05	2.0	< 0.05	1.4
Anthracene	mg/kg	0.05	MCERTS	0.10	< 0.05	0.39	< 0.05	0.26
Fluoranthene	mg/kg	0.05	MCERTS	0.39	< 0.05	2.5	< 0.05	1.6
Pyrene	mg/kg	0.05	MCERTS	0.38	< 0.05	2.6	< 0.05	1.7
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	1.5	< 0.05	1.1
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	1.1	< 0.05	0.98
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	1.2	< 0.05	1.0
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.79	< 0.05	0.65
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	1.3	< 0.05	1.3
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.61	< 0.05	0.69
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.21	< 0.05	0.26
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.58	< 0.05	0.81

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	1.41	< 0.80	15.0	< 0.80	12.4
-----------------------------	-------	-----	--------	------	--------	------	--------	------



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372530	1372531	1372532	1372533	1372534
Sample Reference				WS106	WS110	WS111	WS111	WS112
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.90	0.90	0.80	1.90	1.20
Date Sampled				21/11/2019	21/11/2019	21/11/2019	21/11/2019	21/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	6.6	8.3	-	10	17
Barium (aqua regia extractable)	mg/kg	1	MCERTS	130	110	-	100	180
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.2	1.4	-	0.98	1.3
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	-	< 0.2	0.5
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	-	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	-	-	-	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	22	19	-	19	120
Iron (aqua regia extractable)	mg/kg	40	MCERTS	-	-	-	-	-
Fe ²⁺	mg/kg	2	NONE	-	-	-	-	-
Fe ³⁺	mg/kg	2	NONE	-	-	-	-	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	34	20	-	76	96
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	-	< 0.3	0.5
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	32	32	-	25	36
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	-	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	32	38	-	32	39
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	55	63	-	44	130

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	-	-	-	-	-
Toluene	µg/kg	1	MCERTS	-	-	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
p & m-xylene	µg/kg	1	MCERTS	-	-	-	-	-
o-xylene	µg/kg	1	MCERTS	-	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	-	-

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	-

TPH (C5 - C6)	mg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH (C6 - C8)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH (C10 - C12)	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	3.5
TPH (C12 - C16)	mg/kg	4	MCERTS	8.7	7.1	< 4.0	< 4.0	11
TPH (C16 - C21)	mg/kg	1	MCERTS	20	17	7.8	< 1.0	73
TPH (C21 - C35)	mg/kg	1	MCERTS	70	49	16	< 1.0	350
TPH (C35 - C40)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	47
TPH Total C5 - C40	mg/kg	10	MCERTS	100	77	26	< 10	490



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372530	1372531	1372532	1372533	1372534
Sample Reference				WS106	WS110	WS111	WS111	WS112
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.90	0.90	0.80	1.90	1.20
Date Sampled				21/11/2019	21/11/2019	21/11/2019	21/11/2019	21/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		

VOCs

Chloromethane	µg/kg	1	ISO 17025	-	-	-	-	-
Chloroethane	µg/kg	1	NONE	-	-	-	-	-
Bromomethane	µg/kg	1	ISO 17025	-	-	-	-	-
Vinyl Chloride	µg/kg	1	NONE	-	-	-	-	-
Trichlorofluoromethane	µg/kg	1	NONE	-	-	-	-	-
1,1-Dichloroethene	µg/kg	1	NONE	-	-	-	-	-
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	-	-	-	-	-
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	-	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	-	-
1,1-Dichloroethane	µg/kg	1	MCERTS	-	-	-	-	-
2,2-Dichloropropane	µg/kg	1	MCERTS	-	-	-	-	-
Trichloromethane	µg/kg	1	MCERTS	-	-	-	-	-
1,1,1-Trichloroethane	µg/kg	1	MCERTS	-	-	-	-	-
1,2-Dichloroethane	µg/kg	1	MCERTS	-	-	-	-	-
1,1-Dichloropropene	µg/kg	1	MCERTS	-	-	-	-	-
Trans-1,2-dichloroethene	µg/kg	1	NONE	-	-	-	-	-
Benzene	µg/kg	1	MCERTS	-	-	-	-	-
Tetrachloromethane	µg/kg	1	MCERTS	-	-	-	-	-
1,2-Dichloropropane	µg/kg	1	MCERTS	-	-	-	-	-
Trichloroethene	µg/kg	1	MCERTS	-	-	-	-	-
Dibromomethane	µg/kg	1	MCERTS	-	-	-	-	-
Bromodichloromethane	µg/kg	1	MCERTS	-	-	-	-	-
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-	-	-	-
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-	-	-	-
Toluene	µg/kg	1	MCERTS	-	-	-	-	-
1,1,2-Trichloroethane	µg/kg	1	MCERTS	-	-	-	-	-
1,3-Dichloropropane	µg/kg	1	ISO 17025	-	-	-	-	-
Dibromochloromethane	µg/kg	1	ISO 17025	-	-	-	-	-
Tetrachloroethene	µg/kg	1	NONE	-	-	-	-	-
1,2-Dibromoethane	µg/kg	1	ISO 17025	-	-	-	-	-
Chlorobenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
p & m-Xylene	µg/kg	1	MCERTS	-	-	-	-	-
Styrene	µg/kg	1	MCERTS	-	-	-	-	-
Tribromomethane	µg/kg	1	NONE	-	-	-	-	-
o-Xylene	µg/kg	1	MCERTS	-	-	-	-	-
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-	-	-	-
Isopropylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
Bromobenzene	µg/kg	1	MCERTS	-	-	-	-	-
n-Propylbenzene	µg/kg	1	ISO 17025	-	-	-	-	-
2-Chlorotoluene	µg/kg	1	MCERTS	-	-	-	-	-
4-Chlorotoluene	µg/kg	1	MCERTS	-	-	-	-	-
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	-	-	-	-	-
tert-Butylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	-	-	-	-	-
sec-Butylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	-	-	-	-	-
p-Isopropyltoluene	µg/kg	1	ISO 17025	-	-	-	-	-
1,2-Dichlorobenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,4-Dichlorobenzene	µg/kg	1	MCERTS	-	-	-	-	-
Butylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	-	-	-	-	-
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	-	-	-	-	-
Hexachlorobutadiene	µg/kg	1	MCERTS	-	-	-	-	-
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	-	-	-	-	-



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372530	1372531	1372532	1372533	1372534
Sample Reference				WS106	WS110	WS111	WS111	WS112
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.90	0.90	0.80	1.90	1.20
Date Sampled				21/11/2019	21/11/2019	21/11/2019	21/11/2019	21/11/2019
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
SVOCs								
Aniline	mg/kg	0.1	NONE	-	-	-	-	-
Phenol	mg/kg	0.2	ISO 17025	-	-	-	-	-
2-Chlorophenol	mg/kg	0.1	MCERTS	-	-	-	-	-
Bis(2-chloroethyl)ether	mg/kg	0.2	MCERTS	-	-	-	-	-
1,3-Dichlorobenzene	mg/kg	0.2	MCERTS	-	-	-	-	-
1,2-Dichlorobenzene	mg/kg	0.1	MCERTS	-	-	-	-	-
1,4-Dichlorobenzene	mg/kg	0.2	MCERTS	-	-	-	-	-
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	-	-	-	-	-
2-Methylphenol	mg/kg	0.3	MCERTS	-	-	-	-	-
Hexachloroethane	mg/kg	0.05	MCERTS	-	-	-	-	-
Nitrobenzene	mg/kg	0.3	MCERTS	-	-	-	-	-
4-Methylphenol	mg/kg	0.2	NONE	-	-	-	-	-
Isophorone	mg/kg	0.2	MCERTS	-	-	-	-	-
2-Nitrophenol	mg/kg	0.3	MCERTS	-	-	-	-	-
2,4-Dimethylphenol	mg/kg	0.3	MCERTS	-	-	-	-	-
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	-	-	-	-	-
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	-	-	-	-	-
Naphthalene	mg/kg	0.05	MCERTS	-	-	-	-	-
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	-	-	-	-	-
4-Chloroaniline	mg/kg	0.1	NONE	-	-	-	-	-
Hexachlorobutadiene	mg/kg	0.1	MCERTS	-	-	-	-	-
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	-	-	-	-	-
2,4,6-Trichlorophenol	mg/kg	0.1	MCERTS	-	-	-	-	-
2,4,5-Trichlorophenol	mg/kg	0.2	MCERTS	-	-	-	-	-
2-Methylnaphthalene	mg/kg	0.1	NONE	-	-	-	-	-
2-Chloronaphthalene	mg/kg	0.1	MCERTS	-	-	-	-	-
Dimethylphthalate	mg/kg	0.1	MCERTS	-	-	-	-	-
2,6-Dinitrotoluene	mg/kg	0.1	MCERTS	-	-	-	-	-
Acenaphthylene	mg/kg	0.05	MCERTS	-	-	-	-	-
Acenaphthene	mg/kg	0.05	MCERTS	-	-	-	-	-
2,4-Dinitrotoluene	mg/kg	0.2	MCERTS	-	-	-	-	-
Dibenzofuran	mg/kg	0.2	MCERTS	-	-	-	-	-
4-Chlorophenyl phenyl ether	mg/kg	0.3	ISO 17025	-	-	-	-	-
Diethyl phthalate	mg/kg	0.2	MCERTS	-	-	-	-	-
4-Nitroaniline	mg/kg	0.2	MCERTS	-	-	-	-	-
Fluorene	mg/kg	0.05	MCERTS	-	-	-	-	-
Azobenzene	mg/kg	0.3	MCERTS	-	-	-	-	-
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	-	-	-	-	-
Hexachlorobenzene	mg/kg	0.3	MCERTS	-	-	-	-	-
Phenanthrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Carbazole	mg/kg	0.3	MCERTS	-	-	-	-	-
Dibutyl phthalate	mg/kg	0.2	MCERTS	-	-	-	-	-
Anthraquinone	mg/kg	0.3	MCERTS	-	-	-	-	-
Fluoranthene	mg/kg	0.05	MCERTS	-	-	-	-	-
Pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Butyl benzyl phthalate	mg/kg	0.3	ISO 17025	-	-	-	-	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Chrysene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	-	-	-	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-	-	-	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-	-	-	-



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372535	1372539			
Sample Reference				WS112	WS107			
Sample Number				None Supplied	None Supplied			
Depth (m)				2.80	1.80			
Date Sampled				21/11/2019	20/11/2019			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)								
	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1			
Moisture Content	%	N/A	NONE	15	44			
Total mass of sample received	kg	0.001	NONE	0.30	0.36			

Asbestos in Soil Screen / Identification Name	Type	N/A	ISO 17025	-	-			
Asbestos in Soil	Type	N/A	ISO 17025	-	Not-detected			
Asbestos Quantification (Stage 2)	%	0.001	ISO 17025	-	-			
Asbestos Quantification Total	%	0.001	ISO 17025	-	-			

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	-	-			
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1			
Total Sulphate as SO ₄	mg/kg	50	MCERTS	-	-			
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	-	-			
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	-			
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-			
Sulphide	mg/kg	1	MCERTS	-	-			
Total Sulphur	mg/kg	50	MCERTS	-	-			
Total Organic Carbon (TOC)	%	0.1	MCERTS	0.8	-			

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	-	-			
----------------------------	-------	---	--------	---	---	--	--	--

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	2.8			
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	2.3			
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	36			
Fluorene	mg/kg	0.05	MCERTS	< 0.05	28			
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	130			
Anthracene	mg/kg	0.05	MCERTS	< 0.05	32			
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	160			
Pyrene	mg/kg	0.05	MCERTS	< 0.05	170			
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	74			
Chrysene	mg/kg	0.05	MCERTS	< 0.05	55			
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	63			
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	18			
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	55			
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	20			
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	7.0			
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	24			

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	870			
-----------------------------	-------	-----	--------	--------	-----	--	--	--



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372535	1372539			
Sample Reference				WS112	WS107			
Sample Number				None Supplied	None Supplied			
Depth (m)				2.80	1.80			
Date Sampled				21/11/2019	20/11/2019			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	6.8	45			
Barium (aqua regia extractable)	mg/kg	1	MCERTS	130	160			
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.97	1.2			
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	4.5			
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0			
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	-			
Copper (aqua regia extractable)	mg/kg	1	MCERTS	22	210			
Iron (aqua regia extractable)	mg/kg	40	MCERTS	-	-			
Fe ²⁺	mg/kg	2	NONE	-	-			
Fe ³⁺	mg/kg	2	NONE	-	-			
Lead (aqua regia extractable)	mg/kg	1	MCERTS	11	290			
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	1.0			
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	47	48			
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0			
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	28	31			
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	55	1900			

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	-	-			
Toluene	µg/kg	1	MCERTS	-	-			
Ethylbenzene	µg/kg	1	MCERTS	-	-			
p & m-xylene	µg/kg	1	MCERTS	-	-			
o-xylene	µg/kg	1	MCERTS	-	-			
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-			

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	-	-			
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	-	-			
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-			
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	-			
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	-			
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	-			
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	-			
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-			
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	-	-			
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	-	-			
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-			
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	-			
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	-			
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	-			
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	-			
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-			

TPH (C5 - C6)	mg/kg	1	NONE	< 1.0	< 1.0			
TPH (C6 - C8)	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH (C10 - C12)	mg/kg	2	MCERTS	7.1	30			
TPH (C12 - C16)	mg/kg	4	MCERTS	14	290			
TPH (C16 - C21)	mg/kg	1	MCERTS	22	1400			
TPH (C21 - C35)	mg/kg	1	MCERTS	160	6800			
TPH (C35 - C40)	mg/kg	10	MCERTS	29	1200			
TPH Total C5 - C40	mg/kg	10	MCERTS	240	9800			



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372535	1372539			
Sample Reference				WS112	WS107			
Sample Number				None Supplied	None Supplied			
Depth (m)				2.80	1.80			
Date Sampled				21/11/2019	20/11/2019			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		

VOCs

Chloromethane	µg/kg	1	ISO 17025	-	-			
Chloroethane	µg/kg	1	NONE	-	-			
Bromomethane	µg/kg	1	ISO 17025	-	-			
Vinyl Chloride	µg/kg	1	NONE	-	-			
Trichlorofluoromethane	µg/kg	1	NONE	-	-			
1,1-Dichloroethene	µg/kg	1	NONE	-	-			
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	-	-			
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	-	-			
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-			
1,1-Dichloroethane	µg/kg	1	MCERTS	-	-			
2,2-Dichloropropane	µg/kg	1	MCERTS	-	-			
Trichloromethane	µg/kg	1	MCERTS	-	-			
1,1,1-Trichloroethane	µg/kg	1	MCERTS	-	-			
1,2-Dichloroethane	µg/kg	1	MCERTS	-	-			
1,1-Dichloropropene	µg/kg	1	MCERTS	-	-			
Trans-1,2-dichloroethene	µg/kg	1	NONE	-	-			
Benzene	µg/kg	1	MCERTS	-	-			
Tetrachloromethane	µg/kg	1	MCERTS	-	-			
1,2-Dichloropropane	µg/kg	1	MCERTS	-	-			
Trichloroethene	µg/kg	1	MCERTS	-	-			
Dibromomethane	µg/kg	1	MCERTS	-	-			
Bromodichloromethane	µg/kg	1	MCERTS	-	-			
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-			
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	-	-			
Toluene	µg/kg	1	MCERTS	-	-			
1,1,2-Trichloroethane	µg/kg	1	MCERTS	-	-			
1,3-Dichloropropane	µg/kg	1	ISO 17025	-	-			
Dibromochloromethane	µg/kg	1	ISO 17025	-	-			
Tetrachloroethene	µg/kg	1	NONE	-	-			
1,2-Dibromoethane	µg/kg	1	ISO 17025	-	-			
Chlorobenzene	µg/kg	1	MCERTS	-	-			
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-			
Ethylbenzene	µg/kg	1	MCERTS	-	-			
p & m-Xylene	µg/kg	1	MCERTS	-	-			
Styrene	µg/kg	1	MCERTS	-	-			
Tribromomethane	µg/kg	1	NONE	-	-			
o-Xylene	µg/kg	1	MCERTS	-	-			
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	-	-			
Isopropylbenzene	µg/kg	1	MCERTS	-	-			
Bromobenzene	µg/kg	1	MCERTS	-	-			
n-Propylbenzene	µg/kg	1	ISO 17025	-	-			
2-Chlorotoluene	µg/kg	1	MCERTS	-	-			
4-Chlorotoluene	µg/kg	1	MCERTS	-	-			
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	-	-			
tert-Butylbenzene	µg/kg	1	MCERTS	-	-			
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	-	-			
sec-Butylbenzene	µg/kg	1	MCERTS	-	-			
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	-	-			
p-Isopropyltoluene	µg/kg	1	ISO 17025	-	-			
1,2-Dichlorobenzene	µg/kg	1	MCERTS	-	-			
1,4-Dichlorobenzene	µg/kg	1	MCERTS	-	-			
Butylbenzene	µg/kg	1	MCERTS	-	-			
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	-	-			
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	-	-			
Hexachlorobutadiene	µg/kg	1	MCERTS	-	-			
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	-	-			



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372535	1372539			
Sample Reference				WS112	WS107			
Sample Number				None Supplied	None Supplied			
Depth (m)				2.80	1.80			
Date Sampled				21/11/2019	20/11/2019			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
SVOCs								
Aniline	mg/kg	0.1	NONE	-	-			
Phenol	mg/kg	0.2	ISO 17025	-	-			
2-Chlorophenol	mg/kg	0.1	MCERTS	-	-			
Bis(2-chloroethyl)ether	mg/kg	0.2	MCERTS	-	-			
1,3-Dichlorobenzene	mg/kg	0.2	MCERTS	-	-			
1,2-Dichlorobenzene	mg/kg	0.1	MCERTS	-	-			
1,4-Dichlorobenzene	mg/kg	0.2	MCERTS	-	-			
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	-	-			
2-Methylphenol	mg/kg	0.3	MCERTS	-	-			
Hexachloroethane	mg/kg	0.05	MCERTS	-	-			
Nitrobenzene	mg/kg	0.3	MCERTS	-	-			
4-Methylphenol	mg/kg	0.2	NONE	-	-			
Isophorone	mg/kg	0.2	MCERTS	-	-			
2-Nitrophenol	mg/kg	0.3	MCERTS	-	-			
2,4-Dimethylphenol	mg/kg	0.3	MCERTS	-	-			
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	-	-			
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	-	-			
Naphthalene	mg/kg	0.05	MCERTS	-	-			
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	-	-			
4-Chloroaniline	mg/kg	0.1	NONE	-	-			
Hexachlorobutadiene	mg/kg	0.1	MCERTS	-	-			
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	-	-			
2,4,6-Trichlorophenol	mg/kg	0.1	MCERTS	-	-			
2,4,5-Trichlorophenol	mg/kg	0.2	MCERTS	-	-			
2-Methylnaphthalene	mg/kg	0.1	NONE	-	-			
2-Chloronaphthalene	mg/kg	0.1	MCERTS	-	-			
Dimethylphthalate	mg/kg	0.1	MCERTS	-	-			
2,6-Dinitrotoluene	mg/kg	0.1	MCERTS	-	-			
Acenaphthylene	mg/kg	0.05	MCERTS	-	-			
Acenaphthene	mg/kg	0.05	MCERTS	-	-			
2,4-Dinitrotoluene	mg/kg	0.2	MCERTS	-	-			
Dibenzofuran	mg/kg	0.2	MCERTS	-	-			
4-Chlorophenyl phenyl ether	mg/kg	0.3	ISO 17025	-	-			
Diethyl phthalate	mg/kg	0.2	MCERTS	-	-			
4-Nitroaniline	mg/kg	0.2	MCERTS	-	-			
Fluorene	mg/kg	0.05	MCERTS	-	-			
Azobenzene	mg/kg	0.3	MCERTS	-	-			
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	-	-			
Hexachlorobenzene	mg/kg	0.3	MCERTS	-	-			
Phenanthrene	mg/kg	0.05	MCERTS	-	-			
Anthracene	mg/kg	0.05	MCERTS	-	-			
Carbazole	mg/kg	0.3	MCERTS	-	-			
Dibutyl phthalate	mg/kg	0.2	MCERTS	-	-			
Anthraquinone	mg/kg	0.3	MCERTS	-	-			
Fluoranthene	mg/kg	0.05	MCERTS	-	-			
Pyrene	mg/kg	0.05	MCERTS	-	-			
Butyl benzyl phthalate	mg/kg	0.3	ISO 17025	-	-			
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	-			
Chrysene	mg/kg	0.05	MCERTS	-	-			
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	-			
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	-			
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	-			
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	-			
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	-			
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	-			



Analytical Report Number: **19-73873**
Project / Site name: **Manchester Life**
Your Order No:

Certificate of Analysis - Asbestos Quantification

Methods:

Qualitative Analysis

The samples were analysed qualitatively for asbestos by polarising light and dispersion staining as described by the Health and Safety Executive in HSG 248.

Quantitative Analysis

The analysis was carried out using our documented in-house method A006 based on HSE Contract Research Report No: 83/1996: Development and Validation of an analytical method to determine the amount of asbestos in soils and loose aggregates (Davies et al, 1996) and HSG 248. Our method includes initial examination of the entire representative sample, then fractionation and detailed analysis of each fraction, with quantification by hand picking and weighing.

The limit of detection (reporting limit) of this method is 0.001 %.

The method has been validated using samples of at least 100 g, results for samples smaller than this should be interpreted with caution.

Both Qualitative and Quantitative Analyses are UKAS accredited.

Sample Number	Sample ID	Sample Depth (m)	Sample Weight (g)	Asbestos Containing Material Types Detected (ACM)	PLM Results	Asbestos by hand picking/weighing (%)	Total % Asbestos in Sample
1372505	TT101 A	1.20	107	Loose Fibrous Debris	Amosite	0.005	0.005
1372510	TP106	0.50	103	Loose Fibres	Amosite	< 0.001	< 0.001
1372513	TP108	2.10	134	Loose Fibres	Chrysotile	< 0.001	< 0.001
1372515	TP112	0.50	132	Loose Fibrous Debris	Chrysotile	0.008	0.008
1372523	TT103 A	1.50	128	Loose Fibrous Debris	Amosite	0.002	0.002
1372524	TT102 A	1.10	113	Loose Fibres & Loose Fibrous Debris	Amosite	0.100	0.100
1372525	TT104 A	2.20	109	Loose Fibres	Chrysotile	< 0.001	< 0.001
1372534	WS112	1.20	131	Loose Fibres	Chrysotile	< 0.001	< 0.001

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372536	1372537	1372538		
Sample Reference				TP101	TP116	WS103		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				1.00	0.80	0.80		
Date Sampled				20/11/2019	21/11/2019	20/11/2019		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Leachate Analysis)				Units	Limit of detection	Accreditation Status		

General Inorganics

pH	pH Units	N/A	ISO 17025	8.4	8.0	8.1		
Total Cyanide (Low Level 1 µg/l)	µg/l	1	ISO 17025	1.4	4.4	< 1.0		

Total Phenols

Total Phenols (monohydric)	µg/l	1	ISO 17025	3.3	3.1	4.2		
----------------------------	------	---	-----------	-----	-----	-----	--	--

Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01		
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01		
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01		

Total PAH

Total EPA-16 PAHs	µg/l	0.2	NONE	< 0.2	< 0.2	< 0.2		
-------------------	------	-----	------	-------	-------	-------	--	--

Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	1.1	ISO 17025	8.3	7.5	5.1		
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08	< 0.08	< 0.08		
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0	< 5.0		
Chromium (dissolved)	µg/l	0.4	ISO 17025	5.4	2.8	1.9		
Copper (dissolved)	µg/l	0.7	ISO 17025	5.7	9.0	5.6		
Lead (dissolved)	µg/l	1	ISO 17025	40	16	9.6		
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5	< 0.5		
Nickel (dissolved)	µg/l	0.3	ISO 17025	1.6	2.2	0.4		
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0	< 4.0	< 4.0		
Zinc (dissolved)	µg/l	0.4	ISO 17025	9.7	10	12		



Analytical Report Number: 19-73873

Project / Site name: Manchester Life

Lab Sample Number				1372536	1372537	1372538		
Sample Reference				TP101	TP116	WS103		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				1.00	0.80	0.80		
Date Sampled				20/11/2019	21/11/2019	20/11/2019		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Leachate Analysis)				Units	Limit of detection	Accreditation Status		

Monoaromatics & Oxygenates

Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
MTBE (Methyl Tertiary Butyl Ether)	µg/l	10	NONE	< 10	< 10	< 10		

Petroleum Hydrocarbons

TPH1 (C10 - C40)	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aliphatic >C6 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10		



Analytical Report Number : 19-73873

Project / Site name: Manchester Life

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1372505	TT101 A	None Supplied	1.20	Brown clay and sand.
1372506	TP101	None Supplied	1.00	Brown loam and clay with gravel and vegetation.
1372507	TP101	None Supplied	2.30	Brown clay and sand.
1372508	TP102	None Supplied	0.80	Brown loam and sand with gravel.
1372509	TP105	None Supplied	1.40	Brown clay with gravel.
1372510	TP106	None Supplied	0.50	Brown loam and clay with gravel.
1372511	TP106	None Supplied	1.70	Brown loam and clay with gravel.
1372512	TP107	None Supplied	0.50	Black loam and sand with gravel.
1372513	TP108	None Supplied	2.10	Brown loam and clay with gravel and brick.
1372514	TP109	None Supplied	1.00	Black loam and sand with gravel and brick.
1372515	TP112	None Supplied	0.50	Brown loam and clay with gravel.
1372516	TP113	None Supplied	0.90	Brown loam and clay with gravel.
1372517	TP115	None Supplied	0.50	Brown loam and clay with gravel.
1372518	TP116	None Supplied	0.80	Brown loam and clay with gravel.
1372519	TP117	None Supplied	1.60	Brown loam and clay with gravel.
1372520	TP117	None Supplied	2.90	Brown loam and clay with gravel.
1372521	TT105 A	None Supplied	2.00	Black loam and clay with gravel.
1372522	TT102 B	None Supplied	1.70	Black loam and clay with gravel.
1372523	TT103 A	None Supplied	1.50	Black loam and clay with gravel.
1372524	TT102 A	None Supplied	1.10	Brown loam and clay with gravel and brick.
1372525	TT104 A	None Supplied	2.20	Brown loam and clay with gravel and brick.
1372526	WS104	None Supplied	0.70	Brown loam and clay with gravel and brick.
1372527	WS105	None Supplied	0.50	Brown clay and sand with gravel.
1372528	WS109	None Supplied	1.10	Brown loam and clay with gravel.
1372529	WS109	None Supplied	4.20	Brown loam and clay with gravel.
1372530	WS106	None Supplied	1.90	Brown loam and clay with gravel.
1372531	WS110	None Supplied	0.90	Brown loam and clay with gravel.
1372532	WS111	None Supplied	0.80	Brown loam and clay with gravel.
1372533	WS111	None Supplied	1.90	Brown clay and sand.
1372534	WS112	None Supplied	1.20	Brown clay and sand with gravel.
1372535	WS112	None Supplied	2.80	Brown clay and sand with gravel.
1372539	WS107	None Supplied	1.80	Grey clay and sand with vegetation.

Analytical Report Number : 19-73873

Project / Site name: Manchester Life

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Asbestos Quantification - Gravimetric	Asbestos quantification by gravimetric method - in house method based on references.	HSE Report No: 83/1996, HSG 248, HSG 264 & SCA Blue Book (draft).	A006-PL	D	ISO 17025
BS EN 12457-1 (2:1) Leachate Prep	2:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-1.	L043-PL	W	NONE
BTEX and MTBE in leachates (Monoaromatics)	Determination of BTEX and MTBE in leachates by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Cations in soil by ICP-OES	Determination of cations in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
D.O. for Gravimetric Quant if Screen/ID positive	Dependent option for Gravimetric Quant if Screen/ID positive scheduled.	In house asbestos methods A001 & A006.	A006-PL	D	NONE
Hexavalent chromium in leachate	Determination of hexavalent chromium in leachate by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	ISO 17025
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Iron (II) and Iron (III) in soils	Determination of Iron II and Iron III in soil by coloration with phenanthroline and calculation	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L079	W	NONE
Metals by ICP-OES in leachate	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In-house method based on BS1377 Part 2, 1990, Classification tests	L019-UK/PL	W	NONE
Monohydric phenols in leachate - LOW LEVEL 1 ug/l	Determination of phenols in leachate by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
pH at 20oC in leachate	Determination of pH in leachate by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	ISO 17025
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS

Iss No 19-73873-1 Manchester Life 13729

This certificate should not be reproduced, except in full, without the express permission of the laboratory.

The results included within the report are representative of the samples submitted for analysis.

Page 34 of 36

Analytical Report Number : 19-73873

Project / Site name: Manchester Life

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds in soil by extraction in dichloromethane and hexane followed by GC-MS.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Speciated EPA-16 PAHs in leachate	Determination of PAH compounds in leachate by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L102B-PL	W	NONE
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES.	L038-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total cyanide in leachate - 1µg/l	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	ISO 17025
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests ^{***}	L009-PL	D	MCERTS
Total sulphate (as SO ₄ in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L038-PL	D	MCERTS
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, and MEWAM 2006 Methods for the Determination of Metals in Soil	L038-PL	D	MCERTS
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	MCERTS
TPH1 (Leachates)	Determination of dichloromethane extractable hydrocarbons in leachate by GC-MS.	In-house method	L070-PL	W	NONE
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/cleanup.	L088/76-PL	W	MCERTS
Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30°C.



Sample ID	Other_ID	Sample Type	Job	Sample Number	Sample Deviation Code	test_name	test_ref	Test Deviation code
TP102		S	19-73873	1372508	c	Iron (II) and Iron (III) in soils	L079	c
TT105 A		S	19-73873	1372521	c	Iron (II) and Iron (III) in soils	L079	c

**Ella Moss**

e3p
Office 4
Heliport Business Park
Eccles
Liverpool Road
Manchester
M30 7RU

t: 0161 707 9612

e: EMoss@e3p.co.uk

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404

f: 01923 237404

e: reception@i2analytical.com

Analytical Report Number : 19-74385

Replaces Analytical Report Number : 19-74385, issue no. 1

Project / Site name:	Manchester Life	Samples received on:	21/11/2019
Your job number:	13729	Samples instructed on:	28/11/2019
Your order number:		Analysis completed by:	11/12/2019
Report Issue Number:	2	Report issued on:	11/12/2019
Samples Analysed:	1 leachate sample		

Signed:

Rachel Bradley

Deputy Quality Manager

For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement. Application of uncertainty of measurement would provide a range within which the true result lies. An estimate of measurement uncertainty can be provided on request.

Iss No 19-74385-2 Manchester Life 13729

This certificate should not be reproduced, except in full, without the express permission of the laboratory.

The results included within the report are representative of the samples submitted for analysis.

Page 1 of 4



Analytical Report Number: 19-74385

Project / Site name: Manchester Life

Lab Sample Number				1375084				
Sample Reference				TP110				
Sample Number				None Supplied				
Depth (m)				0.80				
Date Sampled				20/11/2019				
Time Taken				None Supplied				
Analytical Parameter (Leachate Analysis)				Units	Limit of detection	Accreditation Status		

General Inorganics

pH	pH Units	N/A	ISO 17025	7.8				
Total Cyanide (Low Level 1 µg/l)	µg/l	1	ISO 17025	6.4				

Total Phenols

Total Phenols (monohydric)	µg/l	1	ISO 17025	130				
----------------------------	------	---	-----------	-----	--	--	--	--

Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	< 0.01				
Acenaphthylene	µg/l	0.01	ISO 17025	1.4				
Acenaphthene	µg/l	0.01	ISO 17025	1.8				
Fluorene	µg/l	0.01	ISO 17025	1.2				
Phenanthrene	µg/l	0.01	ISO 17025	1.0				
Anthracene	µg/l	0.01	ISO 17025	0.45				
Fluoranthene	µg/l	0.01	ISO 17025	0.22				
Pyrene	µg/l	0.01	ISO 17025	0.21				
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01				
Chrysene	µg/l	0.01	ISO 17025	< 0.01				
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01				
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01				
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01				
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01				
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01				
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01				

Total PAH

Total EPA-16 PAHs	µg/l	0.2	NONE	6.2				
-------------------	------	-----	------	-----	--	--	--	--

Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	1.1	ISO 17025	6.2				
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08				
Chromium (hexavalent)	µg/l	5	ISO 17025	U/S				
Chromium (dissolved)	µg/l	0.4	ISO 17025	0.6				
Copper (dissolved)	µg/l	0.7	ISO 17025	27				
Lead (dissolved)	µg/l	1	ISO 17025	5.0				
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5				
Nickel (dissolved)	µg/l	0.3	ISO 17025	1.5				
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0				
Zinc (dissolved)	µg/l	0.4	ISO 17025	8.8				



Analytical Report Number: 19-74385

Project / Site name: Manchester Life

Lab Sample Number				1375084				
Sample Reference				TP110				
Sample Number				None Supplied				
Depth (m)				0.80				
Date Sampled				20/11/2019				
Time Taken				None Supplied				
Analytical Parameter (Leachate Analysis)				Units	Limit of detection	Accreditation Status		

Monoaromatics & Oxygenates

Benzene	µg/l	1	ISO 17025	< 1.0				
Toluene	µg/l	1	ISO 17025	< 1.0				
Ethylbenzene	µg/l	1	ISO 17025	< 1.0				
p & m-xylene	µg/l	1	ISO 17025	< 1.0				
o-xylene	µg/l	1	ISO 17025	< 1.0				
MTBE (Methyl Tertiary Butyl Ether)	µg/l	10	NONE	< 10				

Petroleum Hydrocarbons

TPH1 (C10 - C40)	µg/l	10	NONE	< 10				
------------------	------	----	------	------	--	--	--	--

TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0				
TPH-CWG - Aliphatic >C6 - C8	µg/l	1	ISO 17025	< 1.0				
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0				
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10				

TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0				
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0				
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	< 1.0				
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	< 10				



Analytical Report Number : 19-74385

Project / Site name: Manchester Life

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
BS EN 12457-1 (2:1) Leachate Prep	2:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-1.	L043-PL	W	NONE
BTEX and MTBE in leachates (Monoaromatics)	Determination of BTEX and MTBE in leachates by headspace GC-MS.	In-house method based on USEPA8260	L0738-PL	W	ISO 17025
Hexavalent chromium in leachate	Determination of hexavalent chromium in leachate by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	ISO 17025
Metals by ICP-OES in leachate	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Monohydric phenols in leachate - LOW LEVEL 1 ug/l	Determination of phenols in leachate by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
pH at 20oC in leachate	Determination of pH in leachate by electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	ISO 17025
Speciated EPA-16 PAHs in leachate	Determination of PAH compounds in leachate by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L1028-PL	W	NONE
Total cyanide in leachate - 1µg/l	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L080-PL	W	ISO 17025
TPH1 (Leachates)	Determination of dichloromethane extractable hydrocarbons in leachate by GC-MS.	In-house method	L070-PL	W	NONE

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

APPENDIX VII

ORIGIN OF TIER I GENERIC ASSESSMENT CRITERIA

Land at Jersey Street, Ancoats

Phase II Geoenvironmental Site Assessment

January 2020

CONSTITUENT	ORIGIN OF RISK ASSESSMENT VALUE
Arsenic	2014 LQM/CIEH S4ULs
Cadmium	2014 LQM/CIEH S4ULs
Chromium	2014 LQM/CIEH S4ULs
Lead	2014 LQM/CIEH S4ULs
Mercury	2014 LQM/CIEH S4ULs – methylmercury
Nickel	2014 LQM/CIEH S4ULs
Selenium	2014 LQM/CIEH S4ULs
Copper	2014 LQM/CIEH S4ULs
Zinc	2014 LQM/CIEH S4ULs
Cyanide – Total	2014 LQM/CIEH S4ULs
Phenols – Total	2014 LQM/CIEH S4ULs
Naphthalene	General assessment criteria (GAC) developed by CIEH/LQM Suitable 4 Use Levels with supporting data from SR3, SR7 and existing Tox report where applicable. 1% SOM.
Acenaphthylene	
Acenaphthene	
Fluorene	
Phenanthrene	
Anthracene	
Fluoranthene	
Pyrene	
Benzo(a)Anthracene	
Chrysene	
Benzo(b/k)Fluoranthene ⁽ⁱⁱⁱ⁾	
Benzo(a)Pyrene	
Indeno(123-cd)Pyrene	
Dibenzo(a,h)Anthracene	
Benzo(ghi)Perylene	
TPH C₅-C₆ (aliphatic)	
TPH C₆-C₈ (aliphatic)	
TPH C₈-C₁₀ (aliphatic)	
TPH C₁₀-C₁₂ (aliphatic)	
TPH C₁₂-C₁₆ (aromatic)	
TPH C₁₆-C₂₁ (aromatic)	
TPH C₂₁-C₃₅ (aromatic)	



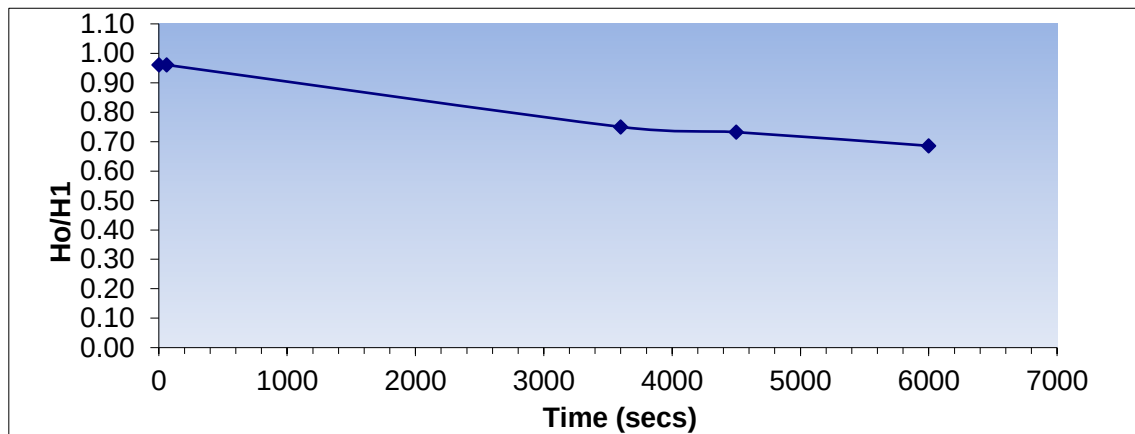
APPENDIX VIII FALLING HEAD PERMEABILITY TEST CERTIFICATES

Falling Head Test

Borehole: **WS101** Test No: **1**

Contract No:	13-729	Casing Diameter: (m)	0.05
Contract Title:	Manchester Life Phase 3	Height of Casing:	0
Date of Test:	17/12/2019	Depth of Borehole: (m)	2.80

Recorded Time			Total Time (secs)	Depth (m)		H/Ho
Hours	Minutes	Seconds				
0	0		0	0.11	0	0.9607
0	1		60	0.11	60	0.9607
0	60		3600	0.7	3600	0.7500
0	75		4500	0.75	4500	0.7321
0	100		6000	0.88	6000	0.6857



General Approach

$$k = \frac{A}{F(t_2 - t_1)} \log_e \frac{H_1}{H_2}$$

$$H_1 = 0.9607$$

$$H_2 = 0.7321$$

k = permeability of soil

F = Intake Factor (figures 6 & 7, BS5930:1999)

H₁ = variable head measured at time t₁ after commencement of test

H₂ = variable head measured at time t₂ after commencement of test

A = Cross sectional area of borehole casing or standpipe as appropriate.

$$t_1 = 60$$

$$t_2 = 4500$$

$$F = 3.41$$

$$A = 0.00196349 \text{ m}^2$$

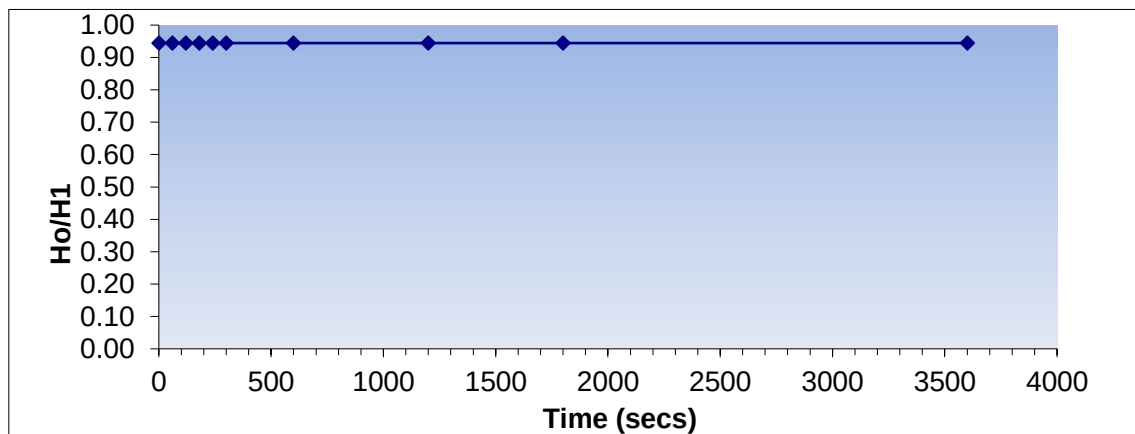
Coefficient of Permeability, k = 4.63E-07 m/s

Falling Head Test

Borehole: **WS107** Test No: **1**

Contract No:	13-724	Casing Diameter: (m)	0.05
Contract Title:	Manchester Life Phase 3	Height of Casing:	0
Date of Test:	17/12/2019	Depth of Borehole: (m)	1.80

Recorded Time			Total Time (secs)	Depth (m)		H/Ho
Hours	Minutes	Seconds				
0	0		0	0.1	0	0.9444
0	1		60	0.1	60	0.9444
0	2		120	0.1	120	0.9444
0	3		180	0.1	180	0.9444
0	4		240	0.1	240	0.9444
0	5		300	0.1	300	0.9444
0	10		600	0.1	600	0.9444
0	20		1200	0.1	1200	0.9444
0	30		1800	0.1	1800	0.9444
0	60		3600	0.1	3600	0.9444



General Approach

$$k = \frac{A}{F(t_2 - t_1)} \log_e \frac{H_1}{H_2}$$

$$H_1 = 0.944$$

$$H_2 = 0.944$$

k = permeability of soil

F = Intake Factor (figures 6 & 7, BS5930:1999)

H₁ = variable head measured at time t₁ after commencement of test

H₂ = variable head measured at time t₂ after commencement of test

A = Cross sectional area of borehole casing or standpipe as appropriate.

$$t_1 = 60$$

$$t_2 = 1800$$

$$F = 3.69$$

$$A = 0.00196349 \text{ m}^2$$

Coefficient of Permeability, k = 8.31E-07 m/s

APPENDIX IX GEOTECHNICAL LABORATORY TESTING RESULTS



LABORATORY REPORT



4043

Contract Number: PSL20/0752

Report Date: 19 February 2020
Client's Reference: 13-729
Client Name: E3P
Heliport Business Park
Liverpool Road
Eccles
Manchester
M30 7RU

For the attention of: Ella Moss

Contract Title: Manchester Life
Date Received: 6/2/2020
Date Commenced: 6/2/2020
Date Completed: 19/2/2020

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. 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 other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson
(Director)

A Watkins
(Director)

R Berriman
(Quality Manager)

L Knight
(Senior Technician)


S Eyre
(Senior Technician)

R Cowles
(Senior Technician)

5 – 7 Hexthorpe Road, Hexthorpe,
Doncaster DN4 0AR
tel: +44 (0)844 815 6641
fax: +44 (0)844 815 6642
e-mail: rgunson@prosoils.co.uk
awatkins@prosoils.co.uk

Page 1 of

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

[illegible]

4043

PSL
Professional Soils Laboratory

Manchester Life

Contract No:

PSL20/0752

Client Ref:

13-729

PARTICLE SIZE DISTRIBUTION TEST

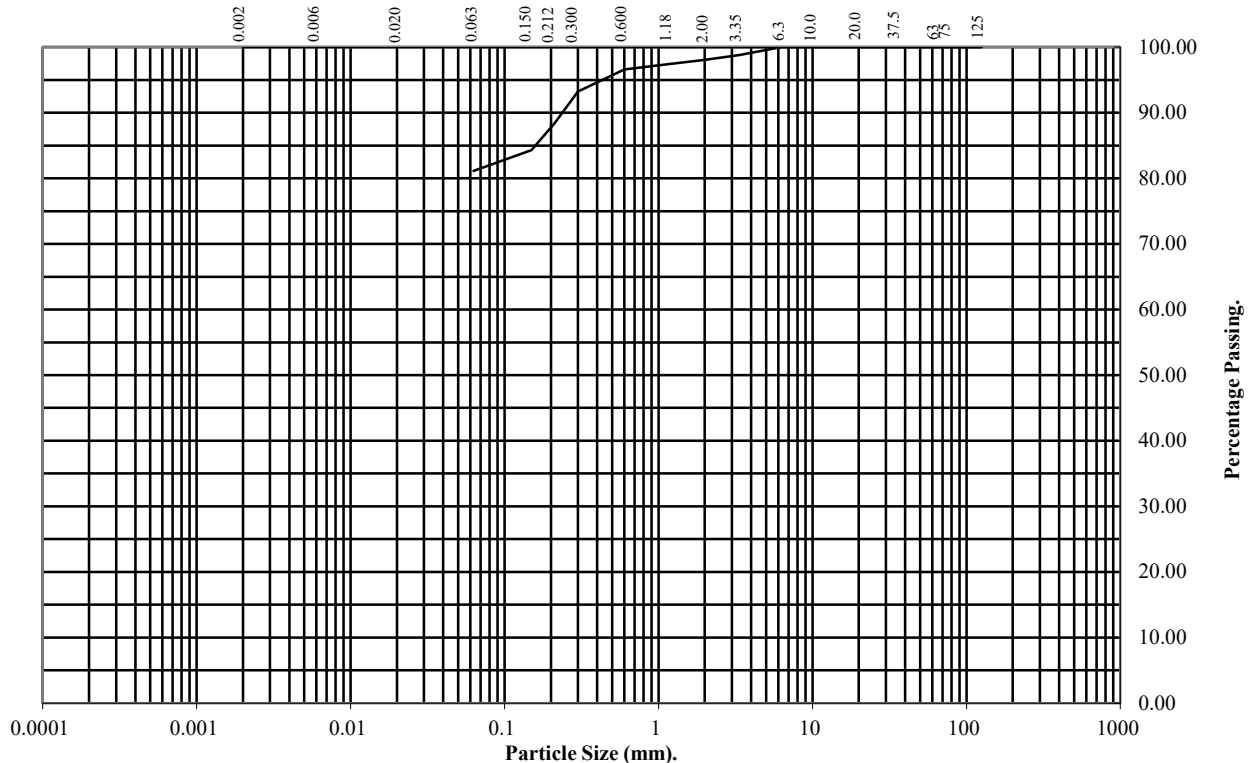
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: SA105 Top Depth (m): 6.00

Sample Number: Base Depth(m): 6.60

Sample Type: U



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	98
1.18	97
0.6	97
0.3	93
0.212	88
0.15	84
0.063	81

Soil Fraction	Total Percentage
Cobbles	0
Gravel	2
Sand	17
Silt/Clay	81

Remarks:

See Summary of Soil Descriptions



Manchester Life

Contract No:
PSL20/0752
Client Ref:
13-729

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

Hole Number: SA106

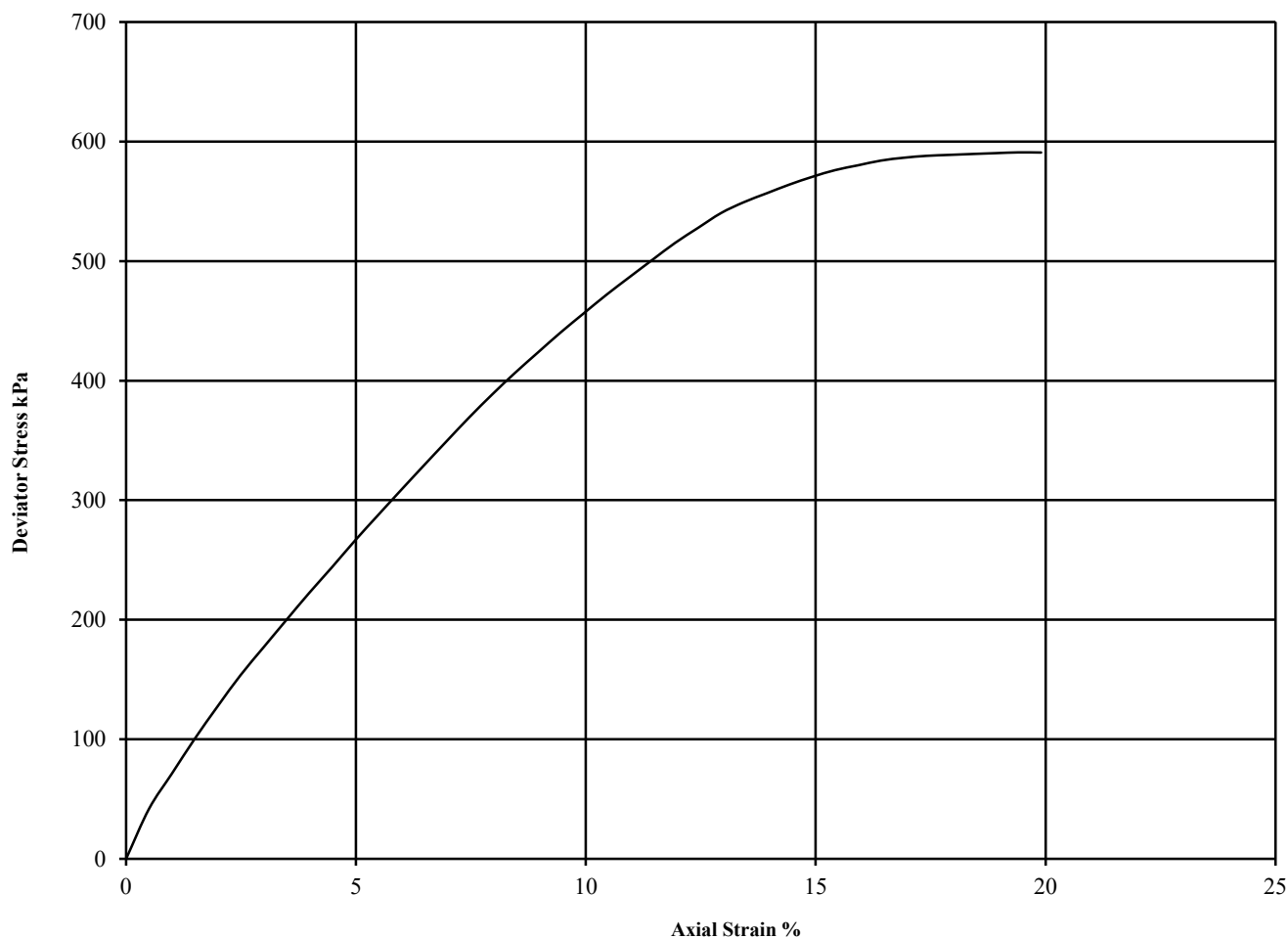
Top Depth (m): 9.00

Sample Number:

Base Depth (m): 9.60

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)	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 0.33	
				θ_3	$(\theta_1 - \theta_3)_f$	$\frac{1}{2}(\theta_1 - \theta_3)_f$							
1	9.7	2.28	2.08	186	591	295	19.4	Intermediate				See summary of soil descriptions	



4043

PSL

Professional Soils Laboratory

Manchester Life

Contract No:

PSL20/0752

Client Ref:

13-729

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

Hole Number: SA104

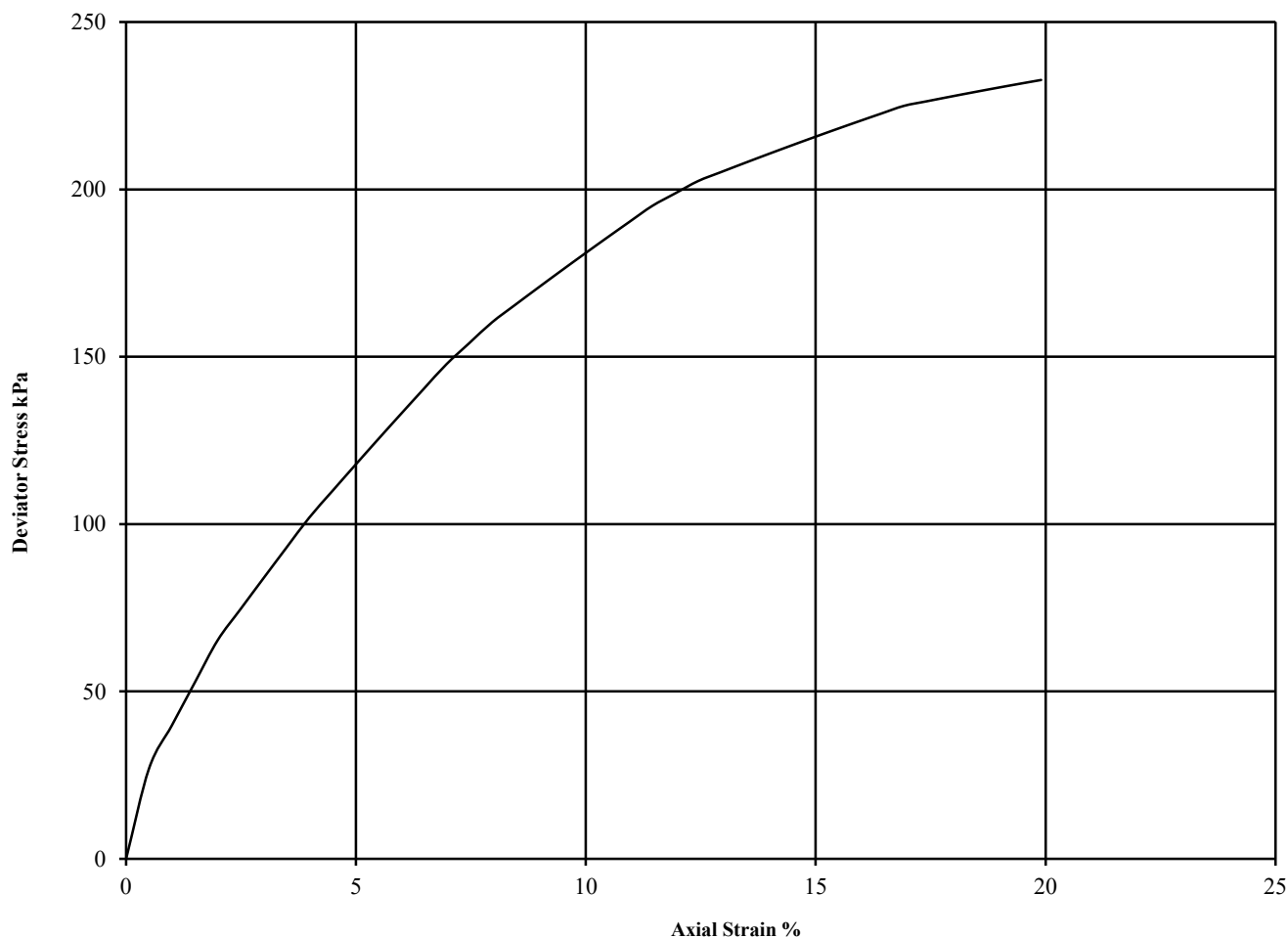
Top Depth (m): 6.00

Sample Number:

Base Depth (m): 6.60

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)	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,
1	18	2.12	1.80	126	233	116	19.9	Intermediate	Correction applied 0.33
									See summary of soil descriptions



4043

PSL

Professional Soils Laboratory

Manchester Life

Contract No:

PSL20/0752

Client Ref:

13-729

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

Hole Number:

SA102

Top Depth (m):

6.00

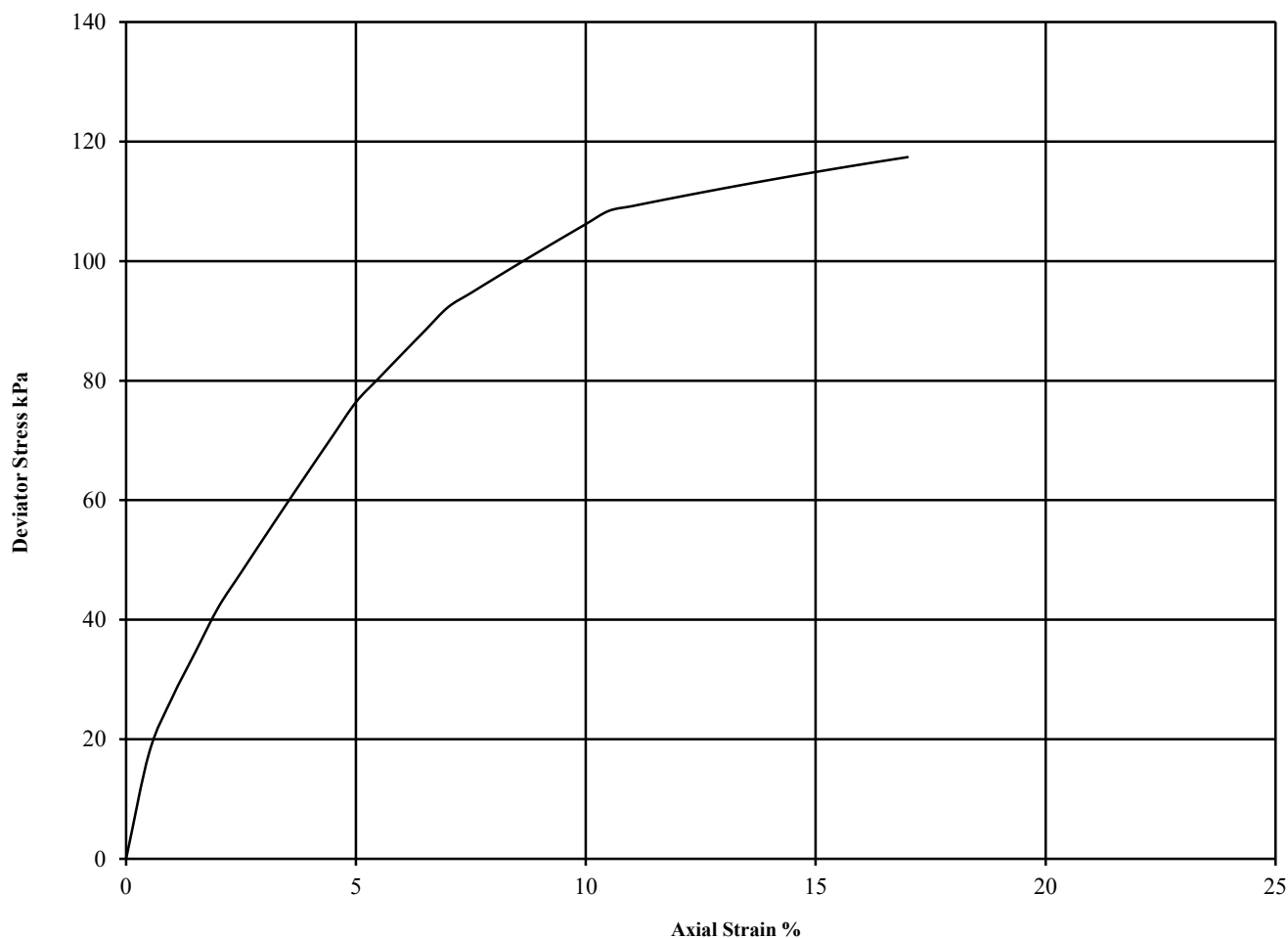
Sample Number:

Base Depth (m):

6.70

Sample Type

U



Diameter (mm):		38	Height (mm):		76	Test:	UU Single Stage		Remarks:
Specimen	Moisture Content (%)	Bulk Density (Mg/m3)	Dry Density (Mg/m3)	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 0.74 38mm due to insufficient material
1	28	1.92	1.51	126	117	59	17.0	Plastic	



4043

PSL

Professional Soils Laboratory

Manchester Life

Contract No:

PSL20/0752

Client Ref:

13-729

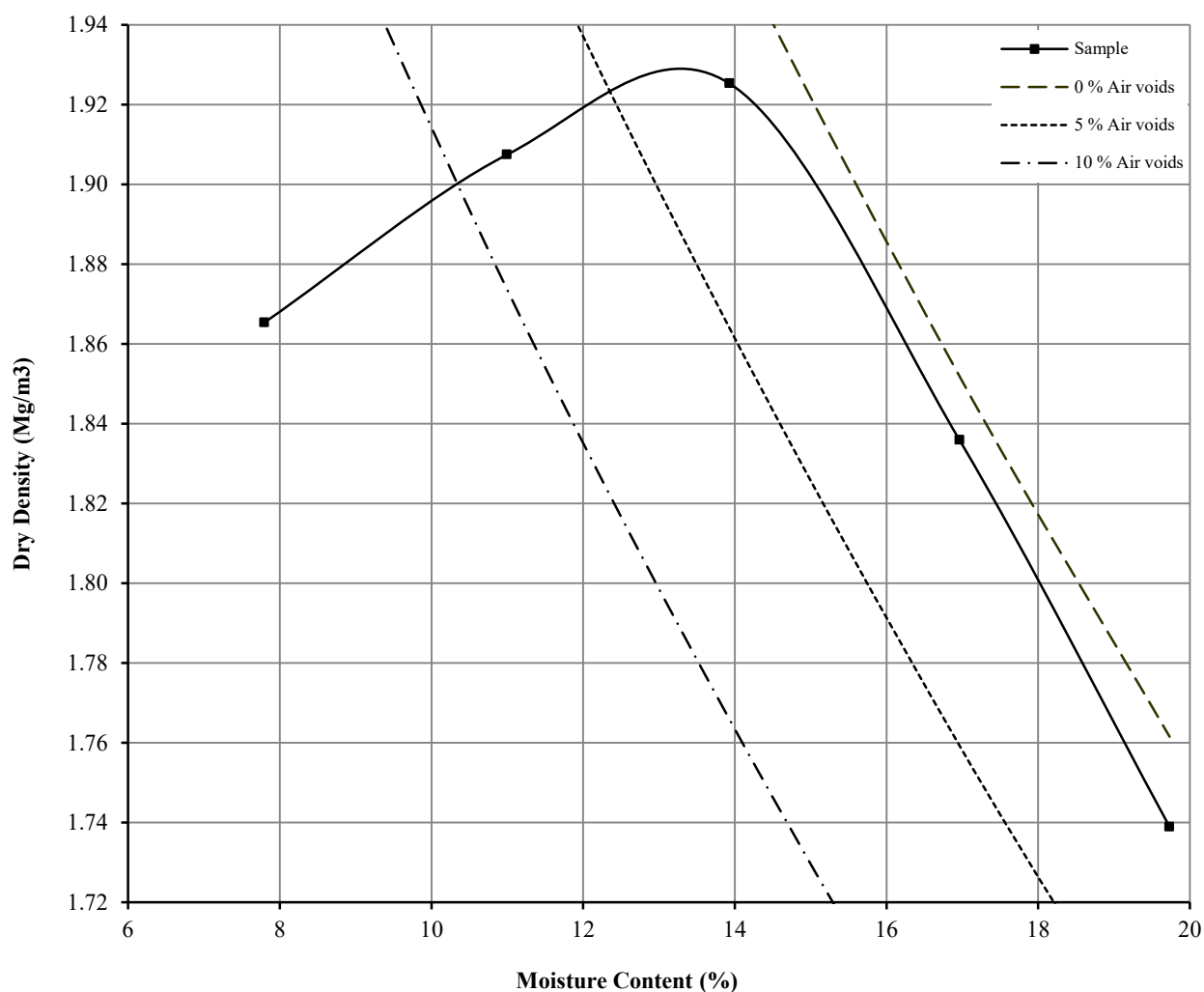
DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : Clause 3.5 : 1990

Hole Number: SA105 Top Depth (m) : 6.00

Sample Number: Base Depth (m) : 6.60

Sample Type: U



Initial Moisture Content:	17	Method of Compaction:	4.5kg	Separate Samples
Particle Density (Mg/m ³):	2.7	Assumed	Material Retained on 37.5 mm Test Sieve (%):	0
Maximum Dry Density (Mg/m ³):	1.93		Material Retained on 20.0 mm Test Sieve (%):	0
Optimum Moisture Content (%):	14			
Remarks				
See summary of soil descriptions.				



Manchester Life

Contract
PSL20/0752
Client Ref
13-729



LABORATORY REPORT



4043

Contract Number: PSL19/7572

Report Date: 13 January 2020
Client's Reference: 13-729
Client Name: E3P
Heliport Business Park
Liverpool Road
Eccles
Manchester
M30 7RU

For the attention of: Ella Moss

Contract Title: Manchester Life
Date Received: 11/12/2019
Date Commenced: 11/12/2019
Date Completed: 13/1/2020

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. 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 other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson
(Director)

L Knight
(Senior Technician)

A Watkins
(Director)

S Eyre
(Senior Technician)

R Berriman
(Quality Manager)

S Royle
(Laboratory Manager)

5 – 7 Hexthorpe Road, Hexthorpe,
Doncaster DN4 0AR
tel: +44 (0)844 815 6641
fax: +44 (0)844 815 6642
e-mail: rgunson@prosoils.co.uk
awatkins@prosoils.co.uk

Page 1 of

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
WS112		D	2.80		Brown slightly gravelly sandy CLAY.
WS111		D	2.00	2.45	Brown slightly gravelly sandy CLAY.
WS108		D	1.00	1.45	Brown slightly gravelly slightly sandy CLAY.
WS101		D	2.00	2.45	Brown slightly gravelly sandy CLAY.
WS110		D	2.00	2.45	Brown slightly gravelly sandy CLAY.
WS106		D	2.00	2.45	Brown slightly gravelly sandy CLAY.
WS107		D	1.00	1.45	Brown slightly gravelly sandy CLAY.
WS106		Liner	2.50	3.00	Firm brown slightly gravelly sandy CLAY.
WS109		Liner	4.50	5.00	Firm brown slightly gravelly sandy CLAY.
WS112		Liner	3.50	4.00	Stiff brown slightly gravelly sandy CLAY.
WS110		Liner	3.50	4.00	Stiff brown slightly gravelly slightly sandy CLAY.
TP111		BB	1.20		Dark brown very sandy clayey silty gravel with cobbles.



4043

PSL

Professional Soils Laboratory

Manchester Life

Contract No:

PSL19/7572

Client Ref:

13-729

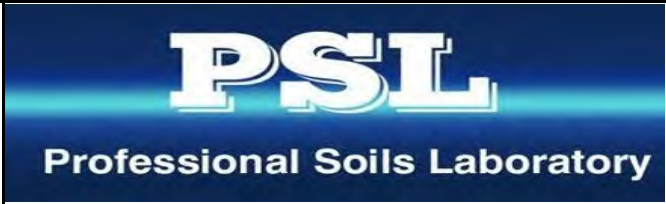
SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

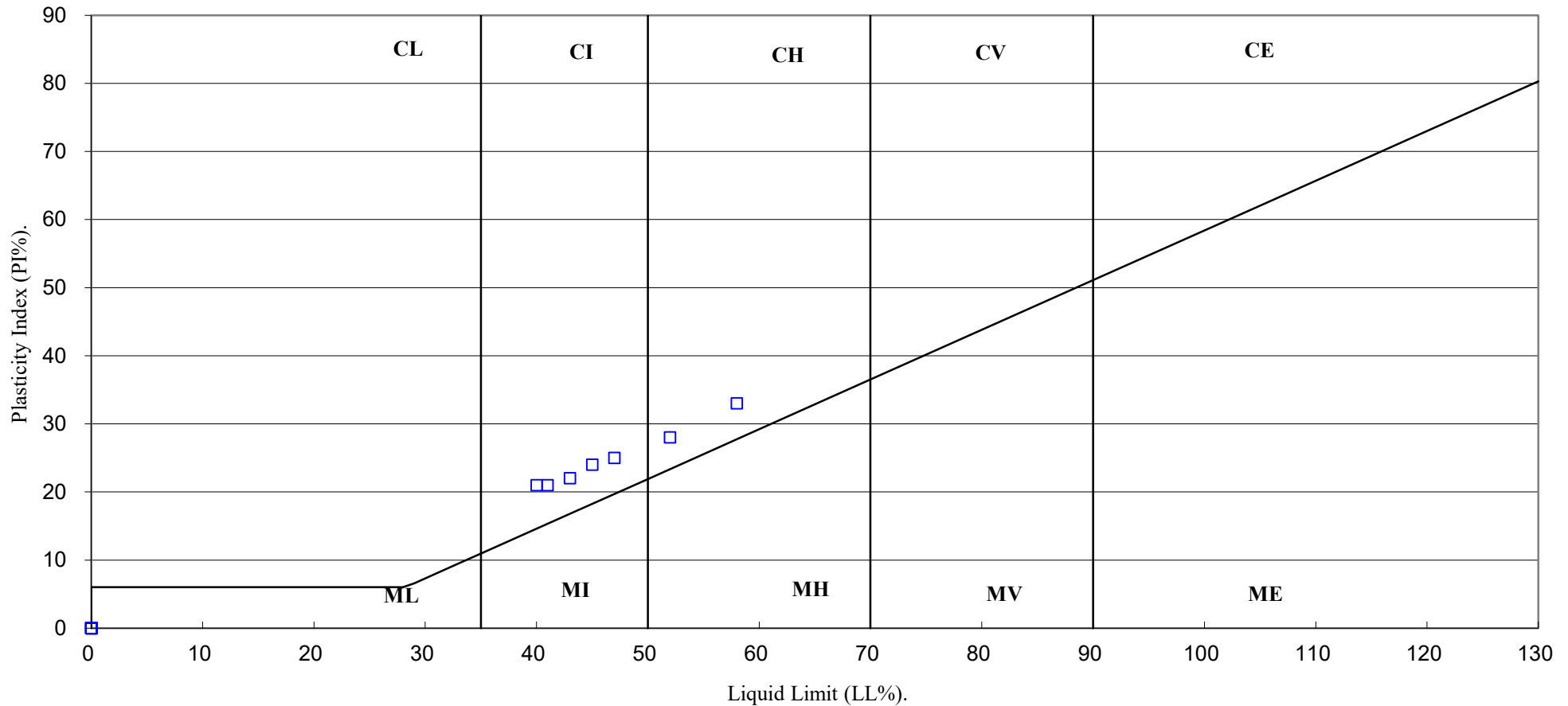
Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content % Clause 3.2	Linear Shrinkage % Clause 6.5	Particle Density Mg/m ³ Clause 8.2	Liquid Limit % Clause 4.3/4	Plastic Limit % Clause 5.3	Plasticity Index % Clause 5.4	Passing .425mm %	Remarks
WS112		D	2.80		18			43	21	22	98	Intermediate plasticity CI.
WS111		D	2.00	2.45	16			41	20	21	91	Intermediate plasticity CI.
WS108		D	1.00	1.45	23			58	25	33	95	High plasticity CH.
WS101		D	2.00	2.45	19			45	21	24	97	Intermediate plasticity CI.
WS110		D	2.00	2.45	16			40	19	21	92	Intermediate plasticity CI.
WS106		D	2.00	2.45	29			47	22	25	97	Intermediate plasticity CI.
WS107		D	1.00	1.45	22			52	24	28	95	High plasticity CH.

SYMBOLS : NP : Non Plastic

* : Liquid Limit and Plastic Limit Wet Sieved.

		Manchester Life	Contract No:
			PSL19/7572
			Client Ref:
			13-729

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



4043

PSL
Professional Soils Laboratory

Manchester Life

Contract No:

PSL19/7572

Client Ref:

13-729

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

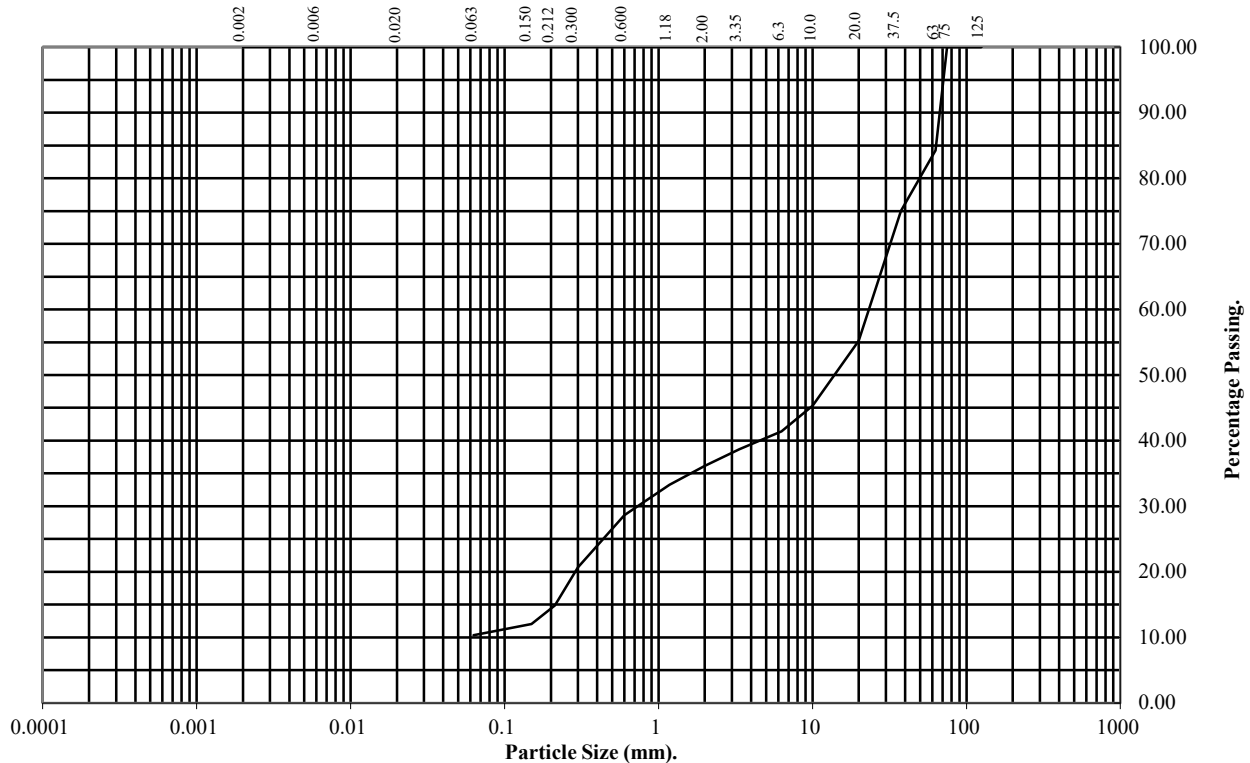
Hole Number: TP111

Top Depth (m): 1.20

Sample Number:

Base Depth(m):

Sample Type: BB



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	84
37.5	75
20	55
10	45
6.3	41
3.35	39
2	36
1.18	33
0.6	29
0.3	21
0.212	15
0.15	12
0.063	10

Soil Fraction	Total Percentage
Cobbles	16
Gravel	48
Sand	26
Silt/Clay	10

Remarks:

See Summary of Soil Descriptions



Manchester Life

Contract No:
PSL19/7572
Client Ref:
13-729

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

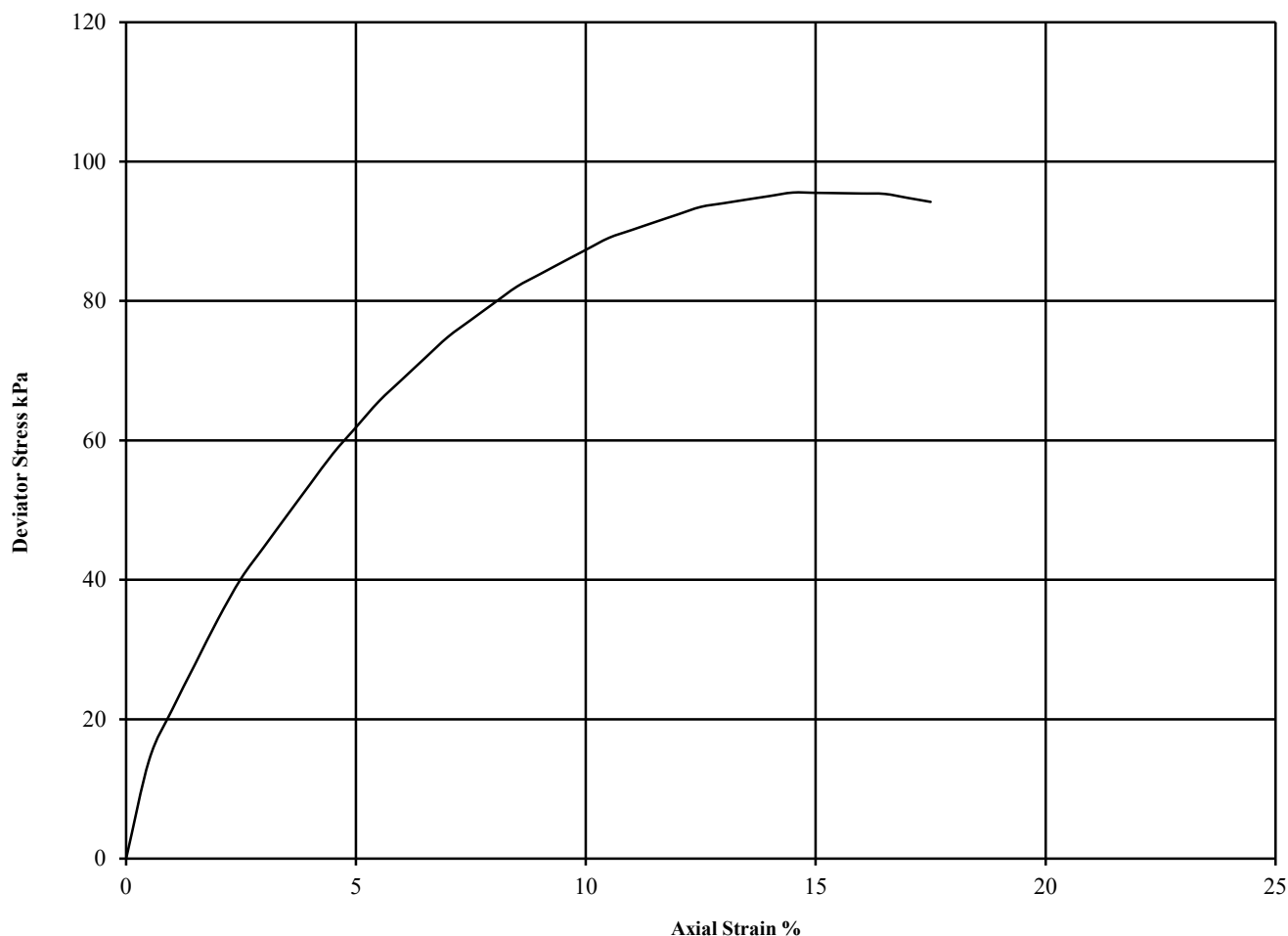
Hole Number: WS106

Top Depth (m): 2.50

Sample Number:

Base Depth (m): 3.00

Sample Type Liner



Diameter (mm):		74		Height (mm):		148		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 0.46		See summary of soil descriptions
				θ_3	$(\theta_1 - \theta_3)_f$	$\frac{1}{2}(\theta_1 - \theta_3)_f$					
1	24	1.99	1.61	55	96	48	14.5	Plastic			



4043

PSL

Professional Soils Laboratory

Manchester Life

Contract No:

PSL19/7572

Client Ref:

13-729

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

Hole Number: WS109

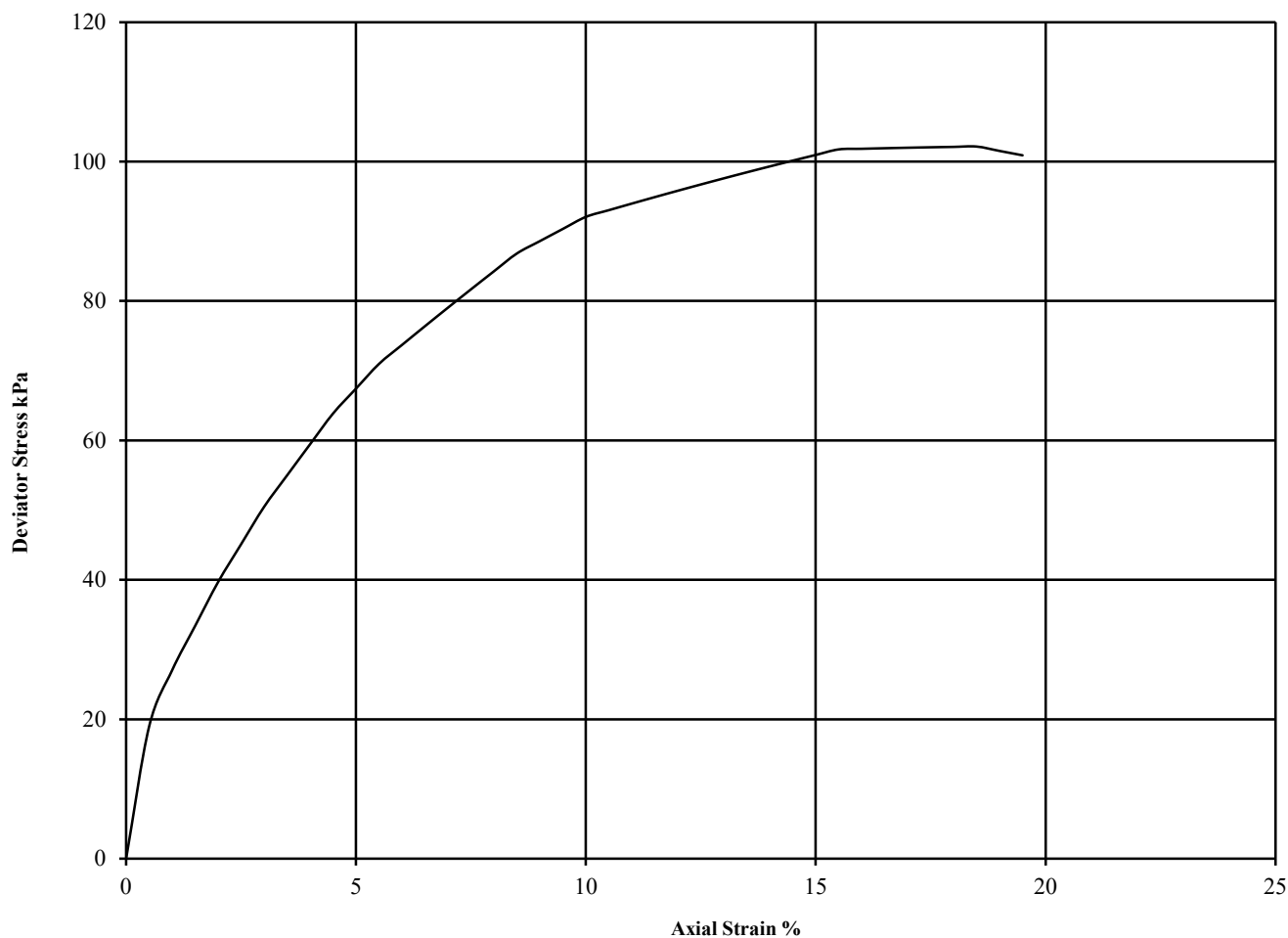
Top Depth (m): 4.50

Sample Number:

Base Depth (m): 5.00

Sample Type

Liner



Diameter (mm):		52	Height (mm):		104	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 0.59 See summary of soil descriptions
				θ_3	$(\theta_1 - \theta_3)_f$	$\frac{1}{2}(\theta_1 - \theta_3)_f$			
1	21	2.13	1.75	95	102	51	18.5	Plastic	



4043

PSL

Professional Soils Laboratory

Manchester Life

Contract No:

PSL19/7572

Client Ref:

13-729

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

Hole Number: WS110

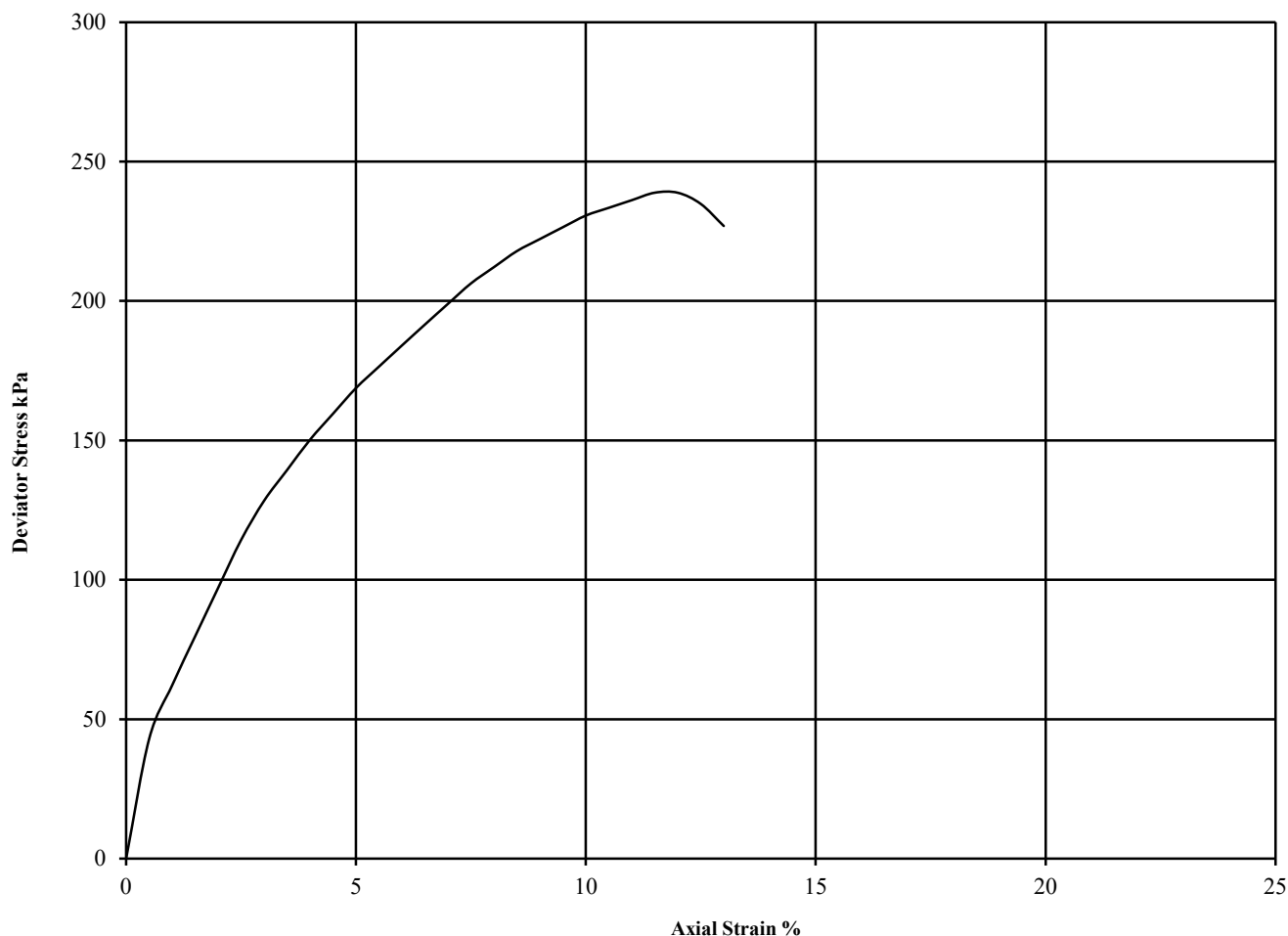
Top Depth (m): 3.50

Sample Number:

Base Depth (m): 4.00

Sample Type

Liner



Diameter (mm):		52		Height (mm):		104		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 0.64 See summary of soil descriptions		
1	25	2.04	1.64	θ_3 75	$(\theta_1 - \theta_3)_f$ 239	$\frac{1}{2}(\theta_1 - \theta_3)_f$ 119	11.5	Brittle			



4043

PSL

Professional Soils Laboratory

Manchester Life

Contract No:

PSL19/7572

Client Ref:

13-729

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

Hole Number: WS112

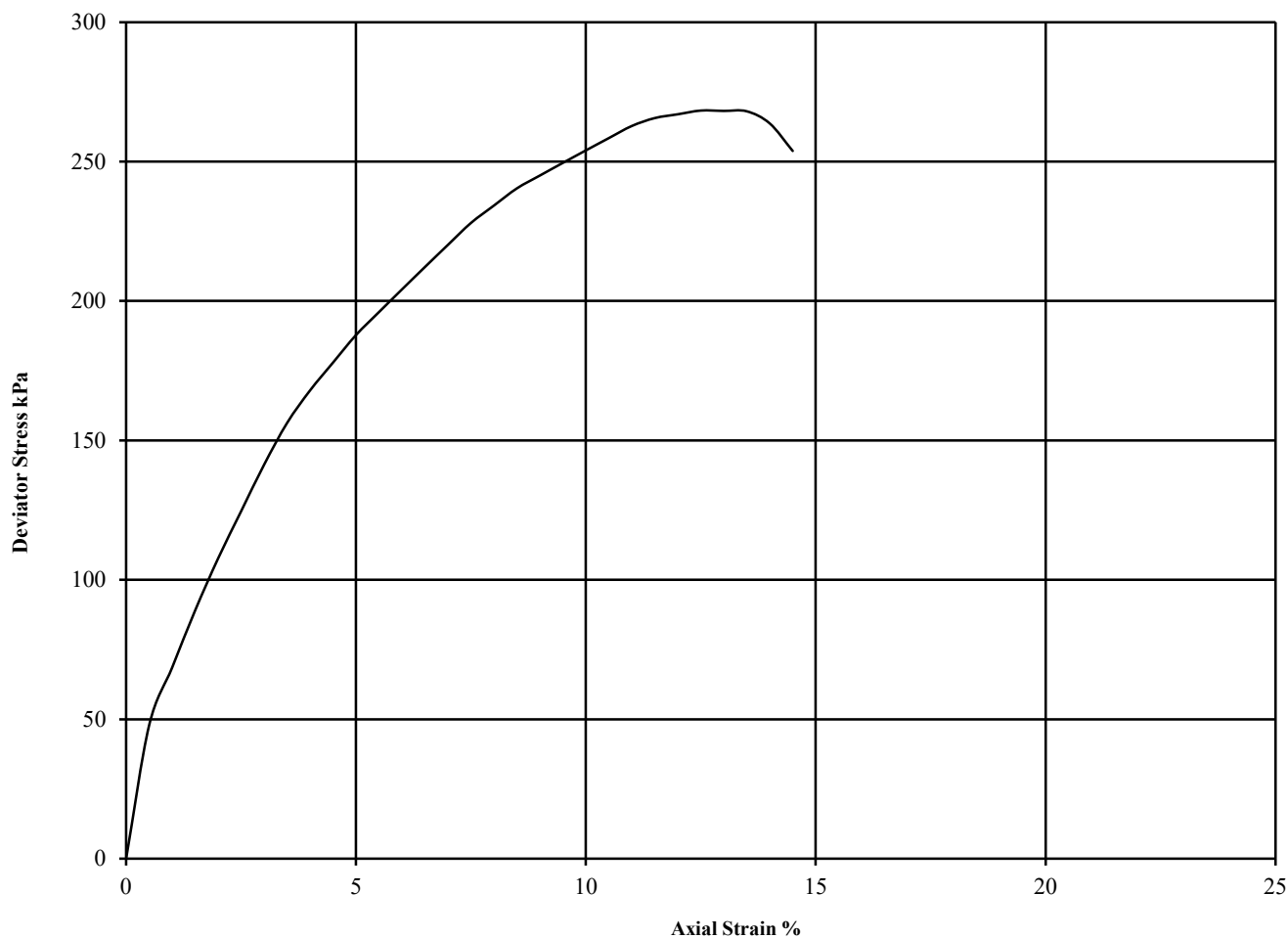
Top Depth (m): 3.50

Sample Number:

Base Depth (m): 4.00

Sample Type

Liner



Diameter (mm):		52	Height (mm):		104	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 0.64 See summary of soil descriptions
1	17	2.15	1.84	θ_3 75	$(\theta_1 - \theta_3)_f$ 268	$\frac{1}{2}(\theta_1 - \theta_3)_f$ 134	12.5	Brittle	



4043

PSL

Professional Soils Laboratory

Manchester Life

Contract No:

PSL19/7572

Client Ref:

13-729

ONE DIMENSIONAL CONSOLIDATION TEST

BS 1377: Part 5: 1990: Clause 3

Hole Number: WS106

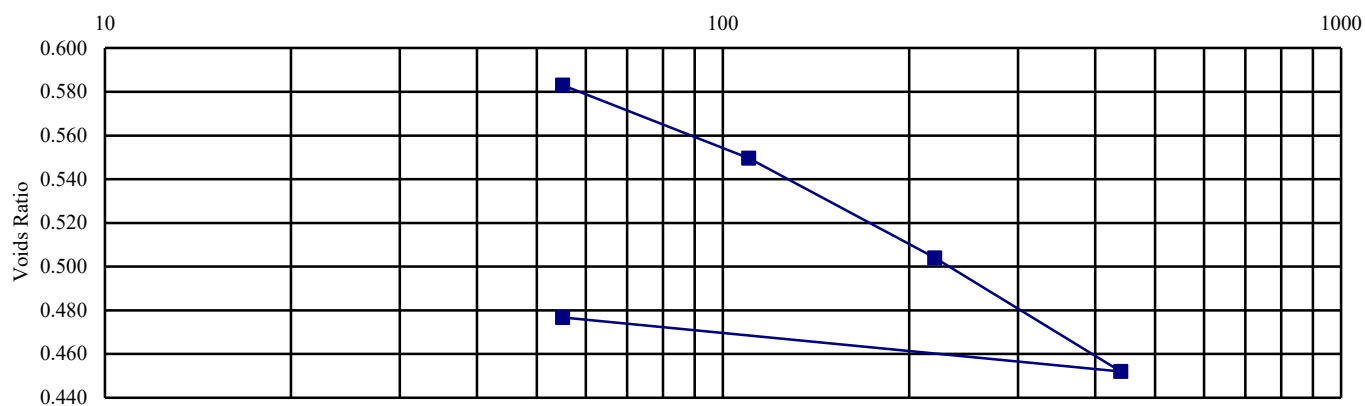
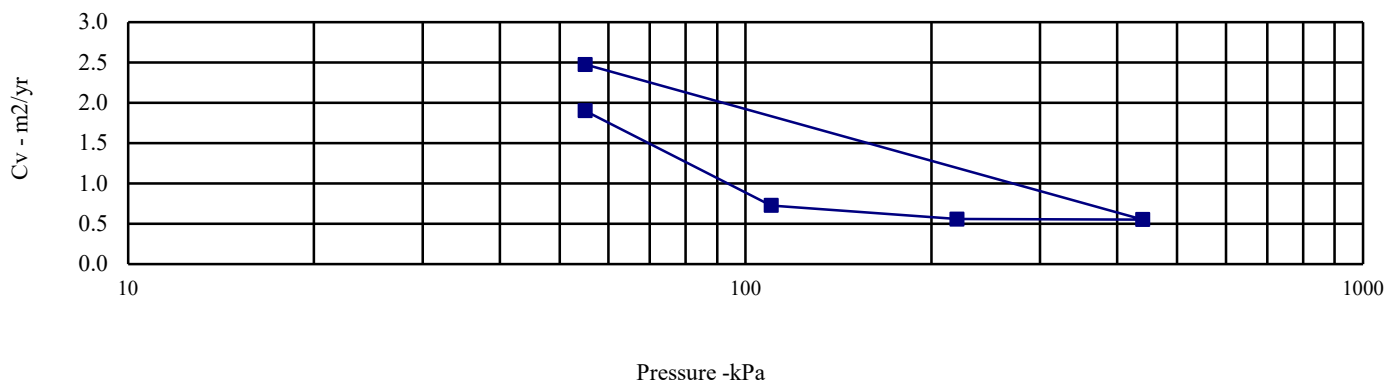
Top Depth (m): 2.50

Sample Number:

Base Depth (m) : 3.00

Sample Type: Liner

Initial Conditions		Pressure Range		Mv	Cv	Specimen location	
Moisture Content (%):	24	kPa		m2/MN	m2/yr	within tube:	Top
Bulk Density (Mg/m3):	1.99	0	55	0.797	1.901	Method used to	
Dry Density (Mg/m3):	1.60	55	110	0.385	0.726	determine CV:	T90
Voids Ratio:	0.656	110	220	0.267	0.557	Nominal temperature	
Degree of saturation:	98.4	220	440	0.157	0.551	during test ' C:	20
Height (mm):	19.818	440	55	0.044	2.475	Remarks:	
Diameter (mm)	50.02					See summary of soil descriptions	
Particle Density (Mg/m3):	2.65						
Assumed							



Manchester Life

Contract No:
PSL19/7572
Client Ref:
13-729

ONE DIMENSIONAL CONSOLIDATION TEST

BS 1377: Part 5: 1990: Clause 3

Hole Number: WS112

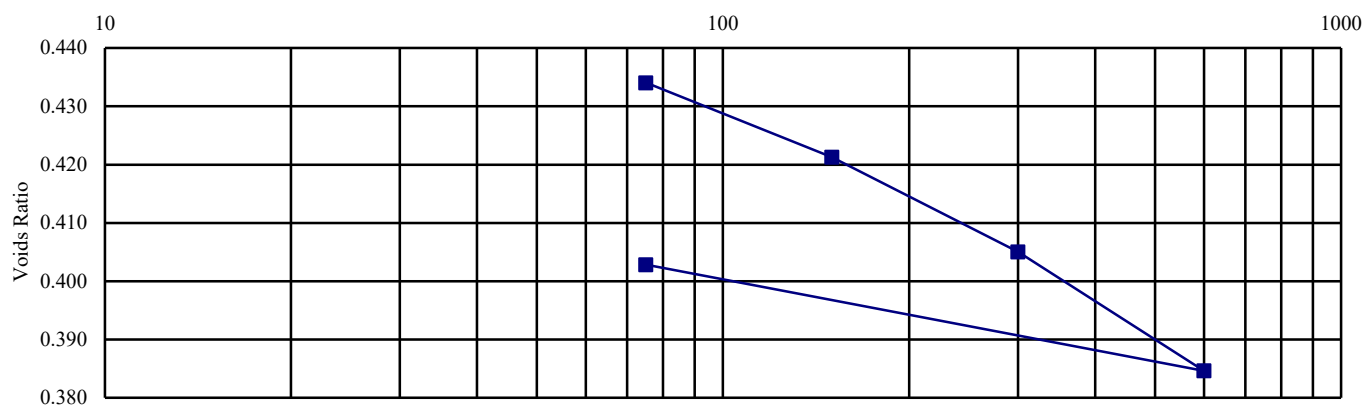
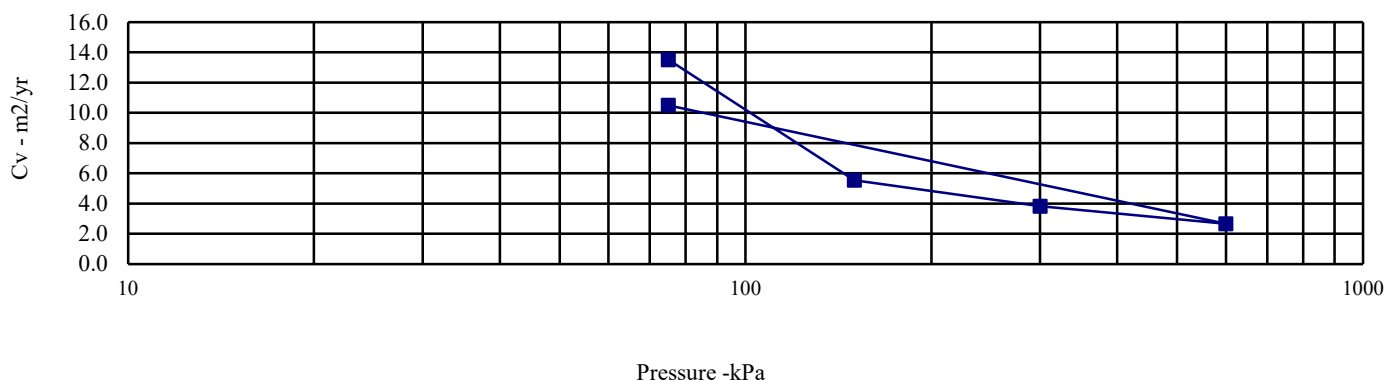
Top Depth (m): 3.50

Sample Number:

Base Depth (m) : 4.00

Sample Type: Liner

Initial Conditions		Pressure Range		Mv	Cv	Specimen location	
Moisture Content (%):	17	kPa		m2/MN	m2/yr	within tube:	Top
Bulk Density (Mg/m3):	2.14	0	75	0.177	13.511	Method used to	
Dry Density (Mg/m3):	1.82	75	150	0.119	5.543	determine CV:	T90
Voids Ratio:	0.453	150	300	0.076	3.821	Nominal temperature	
Degree of saturation:	100.5	300	600	0.048	2.655	during test ' C:	20
Height (mm):	19.79	600	75	0.025	10.493	Remarks:	See summary of soil descriptions
Diameter (mm)	50.018						
Particle Density (Mg/m3):	2.65						
Assumed							



Manchester Life

Contract No:
PSL19/7572
Client Ref:
13-729