GEO-ENVIRONMENTAL CONSULTING ENGINEERS

bEk Enviro Ltd
Suite One | No 3 Mitton Road Business Park
Mitton Road | Whalley | Lancashire | BB7 9YE
01254 377622
mbuckley@bekenviro.co.uk | bekenviro.co.uk

SITE INVESTIGATION & GROUND ASSESSMENT



LAND AT 328 TO 336 STOCKPORT ROAD, LONGSIGHT

REPORT REF: BEK-18469-2 (Rev B) August 2019

Report Prepared for

CS Derby Ltd
3 Hollins House
331 Hale Road
Hale Barns
Altrincham
Cheshire
WA15 8TS

Project Quality Assurance Information Sheet

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Land at 328 to 336 Stockport Road, Longsight, Manchester

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Prepared For	**CS Derby Ltd** 3 Hollins House 331 Hale Road Hale Barns Altrincham Cheshire, WA15 8TS
Prepared By	**BEK ENVIRO LIMITED** Suite One No 3 Mitton Road Business Park Mitton Road Whalley Lancashire, BB7 9YE
Author	**David Emmott** BSc (Hons) MSc MIEnvSc
Checked By	**Michael Buckley** BSc (Hons) MSc MIEnvSci CEnv
Contact	mbuckley@bekenviro.co.uk www.bekenviro.co.uk Office: 01254 377622 Mobile: 07906 753583

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TABLE OF CONTENTS

1.	**INTRODUCTION**
1.1	Appointment
1.2	Background Information
1.3	Proposed Development
1.4	Objective & Scope of Work
1.5	Limitations
2.	**PRELIMINARY RISK ASSESSMENT**
2.1	Site Location & History
2.2	Environmental Setting
2.3	Preliminary Conceptual Site Model
3.	**SITE INVESTIGATION**
3.1	General
3.2	Boreholes
3.3	Trial Pits
3.4	Borehole Installations
3.5	Laboratory Testing
3.6	Ground Conditions
3.7	In-Situ Testing
3.8	Environmental Monitoring
3.9	Soakaway Testing
4.	**QUANTITATIVE RISK ASSESSMENT**
4.1	Potentially Significant Pollutant Linkages
4.2	Risk Assessment: Human Health Risks from Exposure to Contaminated Soil
4.3	Risk Assessment: Human Health Risks from Exposure to Hazardous Gases
4.4	Risk Assessment: Controlled Waters
4.5	Risk Assessment: Buildings
4.6	Risk Assessment: Conclusions
5.	**GEOTECHNICAL ASSESSMENT**
6.	**RECOMMENDATIONS**

APPENDICES	
Appendix A	Window Sample Records
Appendix B	Cable Percussion Records
Appendix C	Rotary Record
Appendix D	Trial Pit Records
Appendix E	Chemical Test Results
Appendix F	Geotechnical Test Results
Appendix G	Infiltration Test Results
Appendix H	Gas Monitoring Results
Appendix I	Photographs
Appendix J	Drawings

DRAWINGS	
BEK Drawing No 18469-4	Site Investigation Location Plan
Leach Rhodes Walker drawing No 7891 (Rev D) 'Proposed Ground Floor'	

1. INTRODUCTION

1.1 Appointment

1.1.1 BEK Enviro Limited (BEK) has been commissioned by CS Derby Limited to carry out a site investigation at an area of land located at 330-336 Stockport Road, Longsight, Manchester (hereafter referred to as 'the site'). The investigation will inform a full geo-environmental assessment to quantify the potential risks from contamination and ground gas and to provide an assessment of the ground conditions to facilitate foundation design.

1.1.2 This investigation has been undertaken on the specific instruction of CS Derby Limited. Beneficiaries of this report to include: the Client's Fund (TBC); the contractor (TBC) and professional consultants and specialist design subcontractors undertaking design services in connection with the project.

1.2 Background Information

1.2.1 The site is located at 330-336 Stockport Road on the intersection with Plymouth Grove West, Longsight, and is approximately 3 km south-east of Manchester. Access to the site is from a locked gate off Stockport Road.

1.2.2 The site is formed by a roughly rectangular shaped plot of land of approximately 3,000 m^2 (0.3 hectares) and contains a highly modified three storey building, currently vacant and dilapidated. Access to the building is via a single storey warehouse extension. Access to the building is via a single door at the front of the building or roller shutter door to the side of the two storey warehouse extension. The ground floor is concrete throughout the main building and within the extensions.

1.3 Proposed Development

1.3.1 The majority of the site is covered by a large three storey building, with extensions to the rear and side, that is derelict and in a poor state of repair. The rest of the site is covered by either tarmac or concrete.

1.3.2 This report has been prepared to assess ground conditions in connection with design and construction of a 6 storey apartment block. The proposed layout of the site is shown on Leach Rhodes Walker drawing No 7891 (Rev D) 'Proposed Ground Floor' a copy of which is presented in Appendix J.

1.3.3 It is noted that there are no gardens and only minimal landscaped areas proposed as part of the development as shown on the drawing. It has been assumed that all existing buildings at the site will be demolished and surfacing at the site will be removed.

1.4 Objective & Scope of Work

1.4.1 The objective of the site investigation was to characterise the shallow ground conditions to facilitate a quantitative risk assessment with respect to contamination and ground gas to be carried out.

1.4.2 In addition, the site investigation will facilitate a geotechnical assessment which will be used to determine foundation design.

1.4.3 The investigation has been carried out in accordance with the recommendations detailed in the Preliminary Risk Assessment (PRA) prepared by BEK (Report Ref: BEK-18469-1 (Rev B), dated February 2019) as well as consideration to the location and loads associated with the proposed new build. As the existing building was in place at the time of the investigation, access to all areas of the site was limited.

1.4.4 This report has been prepared to provide a summary of the site details and ground conditions encountered as well as the findings and assessments undertaken.

1.4.5 The PRA should be read in conjunction with this report.

1.5 Limitations

1.5.1 The conclusions and recommendations presented in this report are the result of our professional interpretation of the information currently available. BEK reserve the right to amend the conclusions and recommendations if further information becomes available.

1.5.2 However, it should be noted that information herein has been derived from the following reports, acquired as part of the preparation of the PRA:

- Groundsure – Historic Maps: Scale 1:1,056 (Ref: CMAPS-CM-749917-29721-181018HIS)
- Groundsure – Historic Maps: Scale 1:10,000 (Ref: CMAPS-CM-749917-29721-181018HIS
- Groundsure – GeoInsight Report – Ref: CMAPS-CM-749917-29721-181018GEO
- Groundsure – EnviroInsight Report – Ref: CMAPS-CM-749917-29721-181018EDR

1.5.3 BEK takes no responsibility for the accuracy of information provided in the above reports/maps. Notwithstanding the above, the information has been written/prepared by professional environmental consultants with a duty of care to provide relevant and accurate information.

1.5.3 The comments given in this report and the opinions expressed are based on ground conditions encountered during site works and the results of tests made in the field and in the laboratory. However, there may be conditions pertaining to the site that have not been disclosed by the investigations and therefore could not be taken into account.

2. PRELIMINARY RISK ASSESSMENT

2.0.1 This section provides an overview of the findings and recommendations presented in the PRA.

2.1 Site Location & History

Site Location/Description

2.1.1 The site is located at 330-336 Stockport Road on the intersection with Plymouth Grove West, Longsight, and is approximately 3 km south-east of Manchester City Centre. Access to the site is via a locked gate off Stockport Road and a second locked access gate is located via Plymouth Grove West in the north-west of the site.

2.1.2 The site is comprised of a three storey Victorian building with a more recently built brick warehouse two storey building to the rear, and a single storey brick built extension to the front. The building is currently vacant and dilapidated.

2.1.3 To the front of the building is a concreted area and to the side is the main yard which is tarmacked car parking area in a poor state of repair with a large stockpile of cut vegetation in the centre of the tarmac area. There is a row of mature trees adjacent to the car park which separates a rear yard that extends the length of the site.

2.1.4 The rear yard area contains demolition material which has been partially populated by weeds and brambles with a stockpile of cut vegetation in the north of this area.

2.1.5 The site is bounded by a brick building in a very poor state of repair to the north with Plymouth Grove West beyond; to the east is Stockport Road and beyond that the former Daisy Mill which is now utilised as offices and commercial business. The closest residential properties are located immediately adjacent to the south of the site on Plymouth Avenue. There is a church and a residential care home to the west of the site. Plymouth Grove Primary School is further west and St Luke's Primary School is to the north. Stockport Road (A6) forms the eastern boundary of the site.

Site History

2.1.6 Based on the available historical maps the site was occupied by seven large Victorian terraced houses from circa 1891-2000. Four houses were demolished circa 1980 and the remaining three were converted into a restaurant, kitchen and factory store which was partially extended from circa 1980-1984. The site is shown to be in its current configuration from circa 2000.

2.1.7 There is evidence of settlement in the carpark area to the south-east of the existing building, indicating that the basements of the demolished buildings haven't been filled properly.

2.1.8 Based on a review of the historical maps, the following potential existing or historical sources of contamination have been identified associated with the site:

- Made Ground associated with infilling of the basement/cellar in around the 1980s
- Made Ground associated with the sub-base materials underlying the main and rear yards, the building and extensions
- Demolition waste materials spread across the rear yard, including suspected ACMs
- ACMs around the main yard and within vegetation
- ACMs within the building roof, undercloaking board, wall tiles, distribution boards, storage heaters etc.

2.1.9 Based on the historical review of the area surrounding the site, there were no potential existing or historical potential sources of contamination surrounding the site.

2.2 Environmental Setting

Geology

2.2.1 The British Geological Survey (BGS) map for the area indicates that the site is underlain by Devensian Till (Diamicton). Reference to the BGS online historical borehole records database indicates the presence of clay material to 12.19 m below ground level.

2.2.2 The underlying solid geology comprises Chester Pebble Beds Formation Sandstone which typically comprises 'coarse to fine-grained and form beds and lenses of deposits reflecting the channels, floodplains and levees of a river or estuary (if in a coastal setting).' The permeability of the underlying bedrock is stated as being moderate to high.

Mining and Ground Stability

2.2.3 Information in the GeoInsight Report indicates that the site is located within the specified search distance of an identified mining area. Reference to the Coal Authority Interactive Mapping Tool indicates that whilst the site lies within a Coal Mining Reporting Area, it is not located in a Development High Risk Area. There are no mine entries, coal outcrops, fissures abandoned mines, or past shallow coal mine working areas within 1 km of the site.

2.2.4 In view of the above, the site is not considered to be at risk from ground instability as a result of shallow mine workings.

Hydrogeology

2.2.5 The superficial deposits is classified by the Environment Agency as 'Secondary Undifferentiated' and the underlying bedrock is designated as a 'Principal Aquifer'.

2.2.6 The site is not located within a Groundwater Source Protection Zone (SPZ) and there are no groundwater abstractions recorded within 500 m of the site.

Hydrology

2.2.7 The EnviroInsight Report indicates there are no surface water features on site or within 250 m of the site.

2.2.8 There are no pollution incidences, water abstractions or discharge consents recorded within 250 m of the site.

2.2.9 According to the Environment Agency records the site is not in an area liable to flooding from rivers.

Contaminated Land

2.2.10 There are no historic/current landfill or waste management facilities located within 250 m of the site and there are no Environment Agency recorded pollution incidents located within 250 m of the site.

2.2.11 The EnviroInisght Report has listed one historical Local Authority Pollution Prevention and Control (LAPPC) activity located within 250 m of the study site as shown within the table below:

Location	Address	Process	Permit Type	Enforcements
140 m South-East	Mercury Filling Station, 353 Stockport Road	Petrol Station	B	No Enforcement Notified

Table 1: Part A(2), Part B or IPPC Authorised Activities within 250 m

2.2.12 The EnviroInsight Report states that historical potentially contaminative uses within 100 m of the site include 'Unspecified Works', 'Industrial School' and 'Unspecified Commercial/industrial'. These uses were for the period 1905 to 1978 and relate either to the former Daisy Mill to the north of the site, or a former school to the south-east of the site. Review of available information relating to historical incidents registers, tank databases etc. does not indicate that these surrounding historical uses have impacted the site.

2.2.13 Groundsure has accessed the historical tank database (from historical OS maps) and identified no references to tanks within 250 m of the site. Reference to the historical energy database identified an electricity substation approximately 80 m to the south-west, and between 126 and 141 m to the north-east. Based on the distance from the site, these historical features are not considered to have caused impact to the site.

2.2.14 Review of historical OS maps identifies potentially infilled land located 44 m to the north-east, 136 m north-east and 139 m west relating to ponds identified on OS Maps in 1851. Based on the distance from site, and historical nature of the infilling activity, these features are not considered to represent a risk of migratory gas to the site. Furthermore, there are no records of active petrol stations within 250 m if the site.

Environmentally Sensitive Sites

2.2.15 The site is not affected by any of the ecological systems identified as a statutory receptor in the DETR Circular 01/2006, the site is not located within a nitrate vulnerable zone and the closest designated site is over 3 km to the south-east (Highfield Country Local Nature Reserve).

Radon

2.2.16 The site is not located in an area where radon protection measures are required.

2.3 Preliminary Conceptual Site Model

2.3.1 This section identifies the potential contaminants of concern, sources, pathways and receptors that may be associated with the site based on its known history and the current condition and with respect to the redevelopment of the site for residential use. The preliminary conceptual model is summarised in the following table:

Link	Source	Hazard	Transport Mechanism	Pathway	Medium of Exposure	Receptor	Risk Summary*
1	Made Ground/Waste Materials/ACMs	Direct contact /ingestion of soil or dust	Direct contact with contaminated soil/ACMs	Dermal contact/ingestion of soil at surface	Soil/ACMs	Humans (on-site/off-site), domestic pets	Low - Medium
2	Made Ground/Waste Materials/ACMs	Particulate inhalation	Wind blown particulates	Inhalation of particulates	Air	Humans (on-site/off-site), domestic pets	High
3	Made Ground	Vapour Inhalation	Volatalisation of organic compounds through unsaturated zone of soil leading to inhalation	Inhalation of Gases	Air	Humans (on-site/ off-site, domestic pets)	Low - Medium
4	Made Ground	Damage to structure/services	Direct contact of contaminants with building structures/services	Direct contact	Soil/Water	Services	Low - Medium
5	Made Ground	Pollution of underlying groundwater	Dissolution or suspension of contaminants into underlying aquifers	Dissolution or Suspension	Water	Principal aquifer	Low

Table 2: Preliminary Conceptual Model

***Relative Risk Screening and Prioritisation for further Investigation & or Assessment**

High	Higher probability of occurrence and identification of primary sources of contamination with respect to most sensitive receptors.
Medium	Pollutant linkage generally dependent on the presence of other primary pollutant linkages and/or where pollutant linkage generally associated with less sensitive receptors.
Low	Lower probability of occurrence based on requirement for significant migration pathway or where pollutant linkage requires the presence of source contaminants at concentration likely to be much higher than other identified pollutant linkages.

3. SITE INVESTIGATION

3.1 General

3.1.1 This section provides a summary of the site investigation works undertaken by BEK during July and August 2019.

3.1.2 The site investigation has been designed to provide indicative information for the ground conditions across the site and to provide a quantitative assessment of potential risks associated with contamination and ground gas and to provide information with respect to foundation design.

3.1.3 All exploratory locations were set out by the site engineer and the exploratory locations are illustrated on BEK Drawing No 18469-4, a copy of which is presented in Appendix J. It should be noted that access to the site was limited due to location of the existing building and uneven ground.

3.2 Boreholes

Window Sample Boreholes

3.2.1 Five window sample boreholes were drilled using a window sample borehole rig to a maximum depth of 5.45 m. The borehole locations were set out by the site engineer in order to establish representative conditions at the site. In-situ testing (SPTs) were carried out within the boreholes.

3.2.2 Gas/groundwater monitoring probes were installed in two of the five boreholes, the details of which are presented on the borehole records.

3.2.3 Copies of the Window Sample borehole records are presented in Appendix A.

Cable & Percussive Boreholes

3.2.4 Three cable percussive boreholes were drilled across the site to a maximum depth of 20.45 m. Progressive in-situ testing (SPTs) were carried out within the boreholes during drilling. Gas/groundwater monitoring probes were installed in one of the three cable & percussive boreholes.

3.2.5 Copies of the Cable Percussion borehole records are presented in Appendix B.

Rotary Openholes Boreholes

3.2.6 One rotary openhole borehole was drilled within the footprint of the proposed building to a depth of 20 m. The drilling used a water flush at each location.

3.2.7 A Copy of the Rotary borehole record is presented in Appendix C.

3.3 Trial Pits

3.3.1 A total of 5 trial pits were excavated across the site using a CAT 302 7D to a maximum depth of 2.3 m.

3.3.2 The ground conditions were recorded by an engineer from BEK and copies of the trial pit records are presented in Appendix D. The trial pit locations are illustrated on BEK Drawing No 18469-4 presented in Appendix J and a series of photographs showing the trial pits is presented in Appendix I.

3.3.3 Copies of the Trial Pit records are presented in Appendix D.

3.4 Borehole Installations

3.4.1 Gas monitoring wells were installed in 3 boreholes (Window Sample No WS4, WS5 and Cable Percussive No CP1) to a depth of 5 m.

3.4.2 All gas/groundwater monitoring boreholes are located within the footprint of the new building. The monitoring well installation details are presented on the relevant borehole record.

3.5 Laboratory Testing

Soil Chemical Testing

3.5.1 Following a review of the ground conditions, BEK selected 8 made ground samples for chemical testing based on the recommendations set out in the Preliminary Risk Assessment and ground conditions encountered during the investigation.

3.5.2 The samples were delivered to the UKAS laboratory of Envirolab and were tested for the standard soil suite which includes: Arsenic (Total), Cadmium (Total), Copper (Total), Lead (Total), Nickel (Total), Zinc (Total), Chromium (Total), Selenium (Total), Mercury (Total), Boron (Soluble), Hexavalent Chromium, Cyanide (Total), pH, 16 EPA Poly-Aromatic Hydrocarbons (PAH), Total Phenols, Total Sulphate, Sulphate 2:1 extract and Soil Organic Matter. In addition, samples were tested for the presence of asbestos.

3.5.3 Copies of the chemical test results are presented in Appendix E.

3.5.4 In addition to the above, 3 made ground samples have been tested for Waste Acceptance Criteria (WAC) to facilitate waste classification for off-site disposal. Based on the testing carried out, the made ground would be classified as non-hazardous waste.

3.5.5 Copies of the WAC test results are presented in Appendix E.

Geotechnical Testing

3.5.6 Following a review of the ground conditions encountered, samples were selected for geotechnical testing.

3.5.7 The selected samples were submitted to the UKAS accredited laboratory of TestConsult. Testing carried out consisted of 3 x natural clay samples for Plasticity Index testing and 3 x natural clay samples for Undrained Triaxial Compression.

3.5.8 Copies of the geotechnical test results are presented in Appendix F.

3.6 Ground Conditions

3.6.1 The site investigation encountered laterally continuous made ground to a maximum depth of 2.3 m (Borehole CP3). The made ground generally comprised of 5 separate subtypes:

- Made ground subtype 1: Tarmac or concrete encountered across the site.
- Made ground subtype 2: Grey/yellow fine to coarse sub-angular limestone gravel (Subbase located beneath the tarmac)
- Made ground subtype 3: Soft to firm dark brown/black sandy gravelly clay with gravel of brick. This subtype also had roots, rubber, plastic and wood. This subtype was encountered across the majority of the site.
- Made ground subtype 4: Brick fill with frequent whole bricks and gravel of brick. Encountered within the footprint of the existing building
- Made ground subtype 5: Soft to firm dark brown/black sandy gravelly clay with gravel of brick with ash and clinker.

3.6.2 The deepest overall depth of made ground within a single exploratory location was encountered within Cable & Percussive No CP3 (2.3 m depth) with the shallowest depth of made ground (0.7 m) encountered within Window Sample No WS5. It is noted that the base of the made ground within Trial Pit TP2 and TP4 was not encountered with pits terminated at 2.2 m and 1.9 m respectively.

3.6.3 It is possible that the made ground is associated with the infilling a former basements associated with the former buildings on site. However, thick made ground of similar description is noted on site in areas outside the location of the former buildings.

3.6.4 The underlying natural strata beneath the made ground generally comprised of 'Firm to stiff dark brown mottled slightly sandy gravelly clay. Gravel is sub-angular to sub-rounded'. Clay was encountered within all exploratory locations excavated on site with clay identified to a maximum depth of 20.45 m within Cable & Percussive No CP3.

3.6.5 The Cable Percussion boreholes were drilled to depths of 15m (CP1), 16 m (CP2) and 20.5m (CP3). Each borehole was terminated at a depth where drilling became difficult and SPT values of N >50 were encountered. This is considered to be the weathered surface of the bedrock.

3.6.6 The rotary boreholes drilled near the centre of the site (adjacent to CP3) encountered sandstone bedrock at 15.5 m bgl.

3.6.7 Groundwater was not encountered within any of the trial pits excavated on site, however groundwater has been identified within all three boreholes at site as part of the groundwater monitoring regime.

3.7 In-Situ Strength Testing

3.7.1 SPTs were carried out in all boreholes progressively as drilling progressed. The SPT results are presented on the drilling records (Appendix A & B) and are summarised below:

Borehole CP1 Depth (m)	N Value	Borehole CP2 Depth (m)	N Value	Borehole CP2 Depth (m)	N Value
1.2 - 1.65	8	1.2 - 1.65	8	1.2 - 1.65	17
2 - 2.45	5	2 - 2.45	11	2 - 2.45	15
3 – 3.45	19	3 – 3.45	17	3 – 3.45	15
4 – 4.45	24	4 – 4.45	18	4 – 4.45	14
5 – 5.45	9	5 – 5.45	19	5 – 5.45	18
6 – 6.45	9	6 – 6.45	16	6 – 6.45	18
7 – 7.45	17	7 – 7.45	13	7 – 7.45	14
8 – 8.45	19	8 – 8.45	17	8 – 8.45	19
9 – 9.45	15	9 – 9.45	20	9 – 9.45	22
10 – 10.45	16	10 – 10.45	23	10 – 10.45	25
11 – 11.45	30	11 – 11.45	37	11 – 11.45	27
12 – 12.45	37	12 – 12.45	>50	12 – 12.45	26
13 – 13.45	>50	13 – 13.45	>50	13 – 13.45	>50
14 – 14.45	>50	14 – 14.45	50	14 – 14.45	31
15 – 15.45	>50	15 – 15.45	>50	15 – 15.45	50
				16 – 16.45	42
				17 – 17.45	49
				18 – 18.45	>50
				19 – 19.45	>50
				20 – 20.45	>50

Table 3: Summary of SPTs results for Cable Percussion Boreholes

Borehole WS2	N Value	Borehole WS3	N Value	Borehole WS4	N Value	Borehole WS5	N Value
1 – 1.45	3	1 – 1.45	4	1 – 1.45	3	1 – 1.45	7
2 – 2.45	12	2 – 2.45	6	2 – 2.45	13	2 – 2.45	17
3 – 3.45	28	3 – 3.45	17	3 – 3.45	32	3 – 3.45	32
4 – 4.45	43			4 – 4.45	26	4 – 4.45	31
				5 – 5.45	25	1 – 1.45	32

Table 4: *Summary of SPT Results for Window Sample Boreholes*

3.8 Environmental Monitoring

3.8.1 The boreholes installations have been monitored on 6 occasions over a 3 month period for gas flow rates and gas (carbon dioxide, methane and oxygen) concentrations as well as groundwater levels.

3.8.2 The gas monitoring results are discussed further in Section 4.6.

3.8.3 A summary of the groundwater monitoring results are presented in Table 5 below:

Location	Recorded Water Level (m bgl)	Depth to Base (m bgl)
CP1	3.27 – 3.38	4.80 – 4.90
WS4	0.91 – 1.07	4.90 – 4.95
WS5	0.61 – 0.74	4.72 – 4.81

Table 5: *Summary of Water Levels in Boreholes*

3.8.4 It can be seen from the above table that shallow water is present at different depths in each of the boreholes.

3.8.5 Based on the available information and the relatively flat, level site, the water depth encountered in the boreholes is variable and it is likely to reflect water perched on top/within the low permeable Boulder Clay at the site.

3.8.6 Note that seasonal variations in water levels cannot be accounted for over the short monitoring period.

3.9 Soakaway Testing

3.9.1 The site investigation works included soakaways tests to determine soil infiltration rates at the above site using the BRE 365 methodology (2016) to assess the viability of disposal of surface water from the site via infiltration.

3.9.2 Percolation testing was undertaken in accordance with the requirements set out in BRE 365 (2016). Two test pits were excavated at the site and two infiltration test were undertaken. The tests were undertaken on 23 July 2019 with dry, clear conditions. The test locations are presented on BEK Drawing No 18469-4, a copy of which is presented in Appendix J.

3.9.3 In accordance with BRE 365 'the trial pit should be 0.3 to 1 m wide and 1 to 3 m long. It should have vertical sides trimmed square and, if necessary for stability, should be filled with granular material. Fill the pit and allow it to drain three times to near empty; each time record the water level and time filling. Calculate the soil infiltration rate from the time taken for the water level to fall from 75% to 25% effective storage depth in the pit, using the lowest *f* value of the three test results for design.'

3.9.4 The trial pits were excavated using a CAT 302 7D excavator to a maximum depth of 1.9 m with the sides trimmed square. Water was discharged into pit using a tractor and water bowser. A selection of photographs of the test pits and infiltration tests are included within Appendix I.

3.9.5 The test pit dimensions are as follows:

Test Pit No.	Length (m)	Width (m)	Depth (m)	Area (m^3)
SA1	1.80	0.85	1.90	2.91
SA2	1.60	0.85	1.85	2.52

Table 7: Test Pit Dimensions

3.9.6 A total of two infiltration tests (one within each trial pit) were undertaken at the site. The locations of the infiltration tests are included within Appendix G of this report.

3.9.7 The ground conditions at the site generally comprised of sandy and clayey made ground overlying sandy clay. Water was discharged into each pit and the time taken for the water to infiltration into the soil was recorded as shown within the table below:

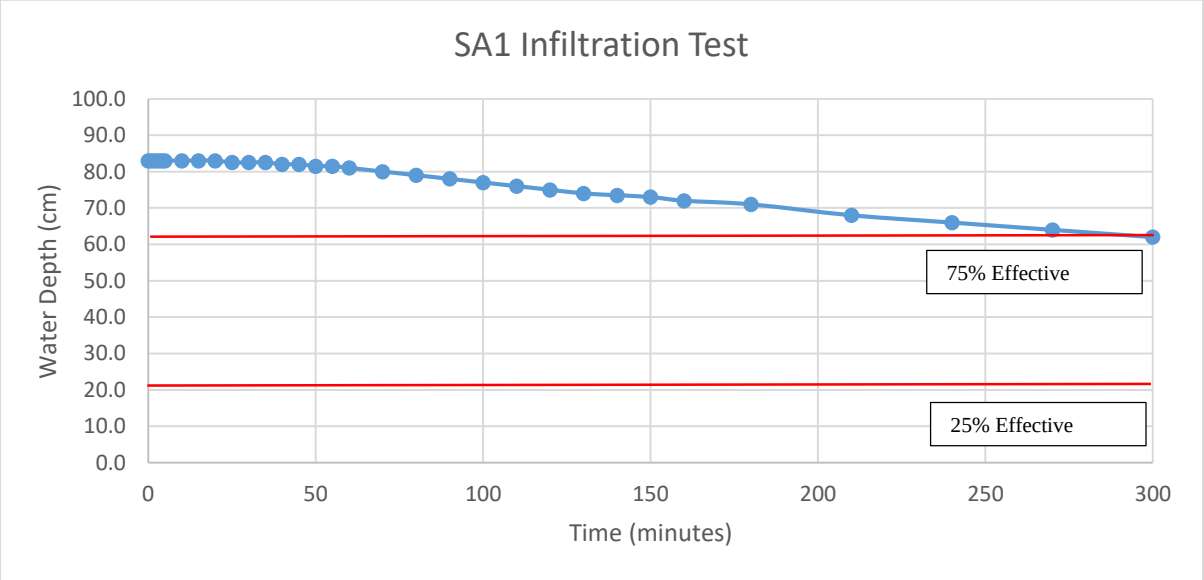
Percolation Test Results - Soakaway Test 1

3.9.8 Depth of water from base of pit at start of test: 0.83 m

3.9.9 A summary of the percolation test is shown within the table below:

Time (minutes)	Depth of Water (cm)	Notes
0	83.0	Start of Test
5	83.0	
10	83.0	
15	83.0	
30	82.5	
60	81.0	
90	78.0	
150	73.0	
240	66.0	
300	62.0	End of test

Table 8: *SA1 Infiltration Test*



3.9.10 It can be seen from the above table that the water did not reach 25% effective depth after 5 hours of the test. Furthermore, 3 tests are required to be undertaken with the slowest infiltration rate used for design purposes therefore the test is considered to have failed.

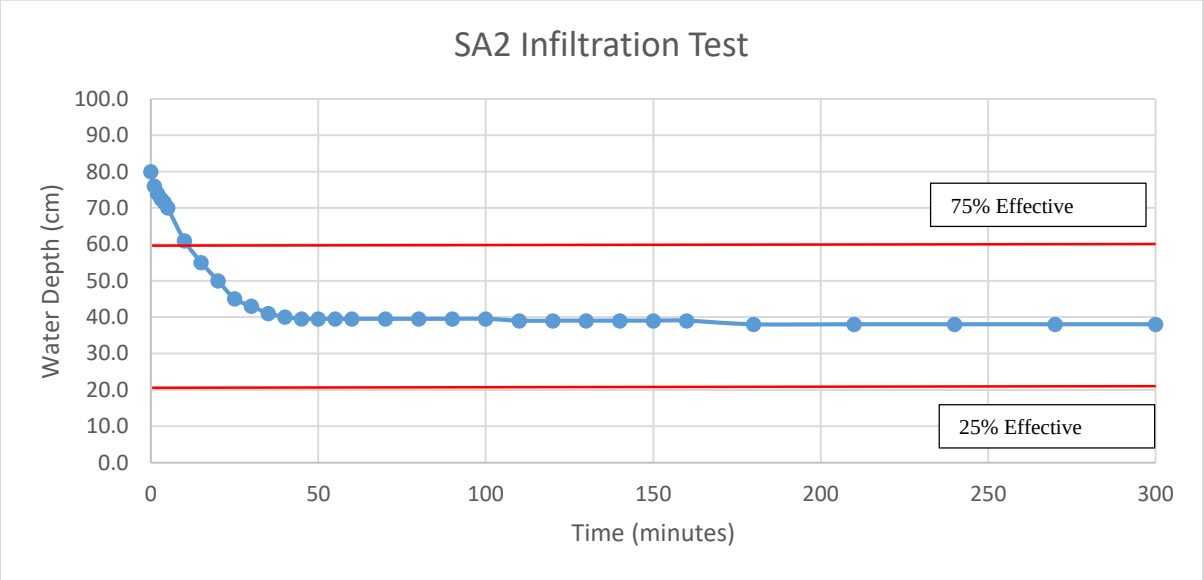
Percolation Test Results - Soakaway Test 2

3.9.11 Depth of water from base of pit at start of test: 0.80 m

3.9.12 A summary of the percolation test is shown within the table below:

Time (minutes)	Depth of Water (cm)	Notes
0	80.0	Start of Test
5	70.0	
10	61.0	
15	55.0	
30	43.0	
60	39.5	
90	39.5	
150	39.0	
240	38.0	
300	38.0	End of test

Table 9: *SA2 Percolation Test*



3.9.13 It can be seen from the above table that the water did not reach 25% effective depth after 5 hours of the test. There was rapid infiltration at the start of the test due to the sandy nature of the made ground however after approximately 40 mins the infiltration rate slowed due to the presence of clay towards the base of the infiltration test pit.

3.9.14 Furthermore, 3 tests are required to be undertaken with the slowest infiltration rate used for design purposes therefore the test is considered to have failed.

Conclusion

3.9.15 Two infiltration test trial pits were excavated at the site at Stockport Road, Longsight and two infiltration tests in accordance with BRE 365 (2016) were undertaken by BEK Enviro on 23rd July 2019.

3.9.16 After 5 hours of the tests, the tests had failed to reach 25% effective depth therefore the tests were deemed to have failed and discharge of surface water from the site via infiltration methods is not considered to be viable at the site at Stockport Road, Longsight.

4. QUANTITATIVE RISK ASSESSMENT

4.1 Potentially Significant Pollutant Linkages

4.1.1 Potentially significant pollutant linkages have been identified in the PRA as listed below:

(i) Human Health – risks associated with contamination in the made ground and/or natural strata: risk via ingestion (soil), inhalation (dust or vapour) or direct contact.

(ii) Human Health – risks associated with indoor inhalation of ground gas

(iii) Controlled Waters - risks associated with contamination in the made ground and/or natural strata affecting the quality of underlying aquifers. Risk are associated with dissolution of contamination into perched water/leachate and vertical migration to the bedrock Principal Aquifer.

(iv) Property (including services and flora) – risks associated contamination affecting concrete, service pipes and flora.

(v) Property – risks associated with potentially explosive gases entering buildings

4.2 Risk Assessment: Human Health Risks from Exposure to Contaminated Soil

4.2.1 The risks to human health have been assessed by inspection of shallow soils for the presence of elevated contaminants based on the expected contaminant findings detailed in the conceptual model and completion of a quantitative risk assessment.

4.2.2 The soil contamination concentrations have initially been compared to a range of generic assessment criteria that have been prepared to allow the assessment of contamination relative to uncontaminated and/or background levels.

4.2.3 These include the use of the Land Quality Management and Chartered Institute of Environmental Health assessment criteria (S4ULs), the Category 4 Screening Levels (C4SLs). These assessment criteria have been derived using the CLEA model and fully justified input parameters.

4.2.4 The following table summarises the chemical test results for the samples tested and lists the relevant assessment criteria and the samples with a concentration in excess of the assessment criteria. Note that only determinands with a concentration above the laboratory limit of detection are presented in the table below:

Determinand	Range of Concentrations (mg/kg)	Assessment Criteria	Samples Fail
Arsenic	4 – 28	40[1]	---
Cadmium	0.7 – 3.9	85[1]	---
Chromium	13 – 29	910[1]	---
Copper	9 – 89	7100[1]	---
Lead	32 – 1290	330[2]	TP1 (0.6 m) and TP3 (0.7 m)
Nickel	9 – 37	180[1]	---
Selenium	<1 – 2	430[1]	---
Water Soluble Boron	<1.0 – 1.1	11000[1]	---
Zinc	39 – 370	430[1]	---
Naphthalene	<0.03 - 0.53	13[1]	---
Acenaphthylene	<0.01 – 2.00	6000[1]	---
Acenaphthene	<0.01 – 23	6000[1]	---
Fluorene	<0.01 – 19.4	4500[1]	---
Phenanthrene	<0.03 – 139	1500[1]	---
Anthracene	<0.02 – 35.6	3700[1]	---
Fluoranthene	<0.08 - 194	1600[1]	---
Pyrene	<0.07 – 151	3800[1]	---
Benzo(a)anthracene	<0.04 – 66.5	15[1]	WS3 (0.3 m), WS5 (0.3 m)
Chrysene	<0.06 – 57.5	32[1]	WS3 (0.3 m), WS5 (0.3 m)
Benzo(a)pyrene	<0.04 – 45.1	5.3[2]	WS3 (0.3 m), WS5 (0.3 m)
Indeno(123cd)pyrene	<0.03 – 26.5	46[1]	---
Dibenzo(ah)anthracene	<0.04 – 5.12	0.32[1]	TP1 (0.6 m), WS3 (0.3 m) and WS5 (0.3 m)
Benzo(ghi)perylene	<0.05 – 21.5	360[1]	---
Benzo(b)fluoranthene	<0.05 – 57.3	4[1]	TP1 (0.6 m), WS3 (0.3 m) and WS5 (0.3 m)
Benzo(k)fluoranthene	<0.07 – 20.7	110[1]	---
Asbestos ID	0 of 8 samples	N.A.D	---

Table 10: Summary of Elevated Contaminants of Concern in Soils

1 CIEH/LQM Derived Assessment Criteria (S4ULs based on 6% SOM)
2 Category 4 Screening Levels
N.A.D No Asbestos Detected

4.2.5 I It can be seen from the above table that elevated concentrations of lead and PAH compounds (benzo(a)anthracene, chrysene, benzo(a)pyrene, dibenzo(ah)anthracene and benzo(b)fluoranthene) were present at shallow depth within the made ground samples recovered at the site.

4.2.6 None of the samples tested proved positive for the presence of asbestos.

Further Assessment – Heavy Metals and PAH Compounds

4.2.7 Further assessment of the elevated concentrations of heavy metals and PAH compounds shows that the contamination is relatively widespread across the site within made ground subtype 3 described as 'soft to firm dark brown/black sandy gravelly clay with gravel of brick'.

4.3 Risk Assessment: Human Health Risks from Exposure to Hazardous Gases

Assessment of Data

4.3.1 Guidance on the investigation and assessment of risk posed by hazardous ground gases is provided in CIRIA 665. This guidance provides up-to-date advice and consolidates good practice on investigation, the collection of relevant data, and monitoring programs for a risk based approach to gas contaminated land.

4.3.2 CIRIA 665 provides guidance on the assessing risks posed by hazardous ground gases to buildings. The guidance provides details on the scope of the gas monitoring program to be undertaken depending on the gassing potential of the source and the sensitivity of the end use.

Gas Monitoring

4.3.3 An engineer from BEK has monitored the boreholes on 6 occasions between 23 July 2019 and 23 October 2019 in order to assess the potential for the for the generation and migration of potentially hazardous gases arising from on site and off site sources.

4.3.4 Based on ground conditions encountered and an initial review of the monitoring results, this monitoring program is considered to be sufficient to characterise the ground gas regime at the site.

4.3.5 The monitoring visits were carried out at atmospheric pressures ranging between 998 mb and 1033 mb. The visits undertaken during low/falling pressures are considered to represent a worst case scenario for the generation and release of ground gas.

4.3.6 Each borehole was monitoring for the following parameters:

- Gas Flow Rates (l/hr)
- Gas Concentrations (methane, carbon dioxide, oxygen) (v/v)
- Water Level
- Barometric Pressure

4.3.7 A calibrated GFM436 Gas Data Analyser has been used to measure the above. The gas monitoring results are presented in Appendix H.

Gas Risk Assessment

4.3.8 The gas risk assessment has been undertaken in accordance with CIRIA 665 'Assessing Risks Posed by Hazardous Ground Gases to Buildings'. The method of assessment requires the calculation of the Gas Screening Value (GSV) for both carbon dioxide and methane.

4.3.9 The gas concentrations and borehole flow rates are used to calculate the GSV to provide a litres of gas per hour. This equals the maximum borehole flow rate (l/hr) x maximum gas concentration (v/v).

4.3.10 The gas monitoring results and the calculated GSVs are presented in the following table:

Monitoring Location	Range of Concentrations (% v/v)			Max Steady Flow Rate (l/hr)	Gas Screening Value (GSV) (based on maximum values) (l/hr)	
	Carbon Dioxide	Methane	Oxygen		Carbon Dioxide	Methane
CP1	0 – 1.2	0.0	20.2 – 20.6	0	0	0
WS4	0.6 – 4.8	0.0	13.5 – 14.4	0	0	0
WS5	0.3 – 1.5	0.0	17.5 – 18.5	0.3	0.0045	0

Table 11: *Summary of Assessment of the BEK Gas Monitoring Data*

4.3.11 Gas Screening Values (GSVs) for all of the boreholes were zero with respect to methane and carbon dioxide and potential risks associated with ground gas at these locations is considered to be very low/negligible.

4.3.12 It can be seen from the test results that that peak negative flow rates of -25.6 and 24.1 l/hr were recorded within Borehole No WS4 and WS5 on one occasions (negligible on all other monitoring occasions). These flow rates are considering to be due to reduced air pressure within the boreholes due to changes in ground water levels and will not impact on the gas risk assessment. The peak flow rates all returned to steady flow rates of zero during monitoring. In accordance with British Standard BS8576, steady flow rates should be used.

4.3.13 The carbon dioxide and methane concentrations were all below the typical maximum values presented in CIRIA 665.

4.3.14 Based on the gas risk assessment herein, there are no potential risks from ground gas at the site.

4.4 Risk Assessment: Controlled Waters

4.4.1 Potential risks to the quality of groundwater have been identified in the ground conceptual model.

4.4.2 The PRA identified potential risks to the underlying bedrock aquifer through the vertical migration of leachable contaminants to the bedrock receptor.

4.4.3 The superficial strata comprises of regionally continuous Boulder Clay. Any water perched/held within the deposits are not considered to represent a sensitive receptor.

4.4.4 The underlying bedrock is classified as a Principal Aquifer. Hydraulic continuity between any perched water trapped above the Boulder Clay and the deep aquifer is highly unlikely and the potential risks to deep groundwater quality are considered to be negligible.

4.4.5 The site is not located within a source protection zone (SPZ) and there are no groundwater abstractions located within the 250 m of the site.

4.5 Risk Assessment: Buildings

4.5.1 Risks to buildings include the assessment of the aggressive nature of the shallow ground with respect to concrete, the risks to the degradation of water pipes and flora due to contamination.

Risk to Concrete

4.5.2 To assess the potential risks to concrete, BEK has compared the previous site investigation data to assessment criteria presented in the BRE Special Digest 1: Concrete in Aggressive Ground.

4.5.3 The sulphate concentrations (water soluble 2:1) in the shallow ground range between <0.01 – 0.38 g/l which are below the BRE 2:1 water/soil extract concentration of 0.5 g/l for Class DS-1 concrete.

4.5.4 Based on the results herein and assuming a static groundwater system, the concrete classification suitable for the site would be DS-1 AC-1s.

Risks to Services

4.5.5 Potable water supply pipes can be at risk from degradation if the shallow ground consists of specific organic contamination. Guidance published by UKWIR includes a methodology for the site investigation and risk assessment to determine pipe specification.

4.5.6 For brownfield sites, site investigation may be required along the intended route of the water pipeline and samples recovered from specific depths and tested for specific contaminants of concern.

4.5.7 On the basis of the ground conditions encountered, risks to water supply pipelines are considered to be low, however it is recommended that consultation is undertaken with the water service supplier to confirm this.

4.6 Risk Assessment: Conclusions

4.6.1 The site investigation encountered made ground across the site varying in depth from 0.7 m (Window Sample No WS5) to 2.3 m (Cable & Percussive No CP3). The predominant made ground subtype was described as 'soft to firm dark brown/black sandy gravelly clay with brick'. It is possible that the made ground is associated with the infilling a former basements associated with the former buildings on site. However, thick made ground of similar description is noted on site in areas outside the location of the former buildings.

4.6.2 The natural strata beneath the made ground generally comprised of sandy gravelly clay that generally becomes stiffer with depth. A layer of dense gravelly sand was identified within Cable Percussive No CP3 at a depth of 12.8 to 14.75 m below ground level.

4.6.3 Made ground samples recovered from site investigation have been tested for a wide range of contaminants in accordance with the recommendations outlined within the PRA and based on the observations made during the site investigation. The chemical test results have been compared to relevant generic assessment criteria to identify potential contaminants of concern.

4.6.4 Based on the contamination assessment herein and with respect to the redevelopment of the site for residential use without gardens, the made ground contains elevated concentrations of lead and several PAH compounds (benzo(a)anthracene), chrysene, benzo(a)pyrene, dibenzo(ah)anthracene and benzo(b)fluoranthene).

4.6.5 The potential risks to human health are summarised in the table below:

Receptor	Contaminants of Concern	Strata	Significant Pathway	Secondary Pathway
Human Health	Lead	Made Ground	Ingestion of soil and indoor dust	
	PAH Compounds (except naphthalene)			

Table 12: Summary of Active Risk Pathways

4.6.6 Potential risks to service pipes are considered to be low but advice should be sought from the water supply provider.

4.6.7 Risks to concrete are considered to be low and a concrete classification of DS-1 AC-1s will be suitable.

4.6.8 No risks to the environment or to controlled waters have been identified.

5. GEOTECHNICAL ASSESSMENT

5.1 The proposed development is for the construction of a large apartment block of between 3 and 6 storeys in elevation. Should the development use change from this profile, re-assessment will be required to consider the likely loads imposed by the specific development.

5.2 Three Cable percussive boreholes, five window sample boreholes, one rotary borehole and four trial pits have been excavated/drilled across the accessible area of the site, and the logs for these are provided in Appendices A to D. Ground conditions are discussed further in Section 3.5.

5.3 From the Cable Percussion borehole logs it can be seen that the site is overlaid with made ground varying in thickness from 0.8 m (CP2) to 2.3m (CP3). Beneath the made ground are clay soils that are soft becoming firm then stiff.

5.4 Bearing capacities, based upon SPT values taken at 2.5 m, were found to be approximately 50 kN/m^2 in Cable Percussion No CP1, 110kN/m^2 in Cable Percussion No CP2 and 150 kN/m^2 in Cable Percussion No CP3. Bearing capacities in Cable Percussion No CP1 improve to be in excess of 150 kN/^{2} at a depth of 3.5m.

5.5 The Cable Percussion were drilled to depths of 15m (CP1), 16 m (CP2) and 20.5m (CP3). Each borehole was terminated at a depth where drilling became difficult and SPT values of N >50 were encountered. This is considered to be the weathered surface of the bedrock.

5.6 From the window sample borehole logs, it can be seen that the site is overlaid with made ground varying between 0.6 m (termination of Window Sample No WS1) and 2.1 m (Window Samples No WS3). Beneath the made ground are clay soils that are soft becoming firm then stiff.

5.7 Bearing capacities, based upon SPT values taken at 2.5 m, were found to be approximately 120 kN/m^2 in Window Sample No WS2, 600 kN/m^2 in Window Sample No WS3, 130 kN/m^2 in Window Sample No WS4 and over 150 kN/m^2 in Window Sample No WS5. Bearing capacities in Window Sample No WS3 improve to be in excess of 150 kN/^{2} at a depth of 3.5 m. Window Samples boreholes were drilled to a maximum depth of 5.45m (WS4 & WS5).

5.8 From the trial pit logs, it can be seen that the site is overlaid by made ground varying between 1.3m (Trial Pit No TP3) and over 2.2m (Trial Pit No TP2). Trial Pit No TP2 indicates a layer of clay between 0.5 m and 1.4 m, however, as this is underlain with made ground, this must also be made ground. Beneath the made ground is firm clay (Trial Pit No TP1 and TP3). The trial pits were excavated to a maximum depths of 2.3m (TP1 & 3).

5.9 Groundwater was not encountered within any of the trial pit excavations or boreholes.

5.10 Bedrock was encountered within the rotary borehole at a depth of 15.5 m below existing ground level which is broadly consistent with the suspected bedrock depth encountered in the Cable Percussion boreholes.

5.11 Clay samples were taken from each cable percussive borehole. Atterberg tests were undertaken in the laboratory conditions to determine the plasticity index of the clay. The modified plasticity index for each sample was calculated in accordance with NHBC guidance and summarised in Table 9 below.

Sample	Plastic Limit Test Results					
	Location	Depth (m)	Plasticity Index (P.I.)	Retained 425 Sieve	Passing 425 Sieve	Modified P.I. (%)
1	CP-1	1.4m	**20**	30	70	**14.0**
2	CP-2	7.0m	**16**	5	95	**15.2**
3	CP-3	2.5m	**20**	4.8	95.2	**19.0**
		Average:	**15**		**Average:**	**16.1**

Table 13: Plasticity Results

5.12 The plasticity results are reasonably consistent and therefore the soil can be clearly categorised to be of low volume change potential, requiring a minimum foundation formation depth of 0.75 m below existing or proposed ground level, whichever is the lower, in areas where clay soils are present. Plasticity will, therefore; not likely be the most critical element where formation depths of the foundations will be determined.

5.13 Triaxial tests were also undertaken on the clay samples recovered from the cable percussive boreholes. The tests results are summarised in Table 10 below:

Sample	Location	Depth (m)	C_u Value (kN/m^2)	Bearing (kN/m^2)
1	CP-1	7.5	89	**150**
2	CP-2	10.5	107	**210**
3	CP-3	6.5	120	**130**
		Average:	**105**	**163**

Table 14: Triaxial Test Results

5.14 The results indicate that the clays at depth are stiff to very stiff. Bearing capacities of over 150 kN/m^2 can be expected at this depth.

Assessment and Conclusions

5.15 The overlying fill materials and soft clay lays indicate that suitable bearing materials are not expected to be found at depths of less than 2.0 to 2.5 m. The underlying clays at an average depth below ground of 2.5 m have generally been found to be stiff, with a bearing capacity of around 150 kN/m^2. In some areas the 150 kN/m^2 bearing capacity is not found until a depth of 3.5 m has been reached.

5.16 The development will involve the construction of a single apartment block of between three and six storeys in height. The structural form of this building is not known, however, should a robust masonry structure be adopted, foundation line loads to structural walls will exceed 200 kN/m. Timber framing may reduce loads to round 130 kN/m, however, should a steel frame structure be adopted, the concentrated point loading at frame base locations will be well over 1000 kN.

5.17 Based upon the likely loadings associated with the building, pad and strip foundations may be adopted, however, these are likely to be large and will require significant excavation and concrete and therefore may be uneconomical. The adoption of pile and ground beams should be considered.

5.18 As the site is overlaid with made ground of varying depths, potential settlements indicate that ground bearing slabs are not suitable without ground treatment. The use of vibro-compaction, vibro-replacement or dynamic compaction are likely to be costly and is likely to lead to damage of adjacent structures.

5.19 Should a pile and ground beam system be adopted for the proposed building, it is recommended that the ground floor slabs are suspended to ensure that there is no differential movement between the walls and slab.

5.20 Trees are located on the site and the foundation designer must consider the potential effects of the existing trees, in respect of determination of protection to foundations. Formation must be designed to comply with LABC requirements and NHBC Ch.4.2 guidance.

5.21 All foundation designs must be reviewed and designed by a suitably qualified design engineer. The above advice is based upon the ground condition information obtained during the survey. The design engineer must satisfy themselves that the information meets with their design requirements.

6. CONCLUSIONS & RECOMMENDATIONS

6.1 This report provides an assessment of the ground conditions based on the assessment of available site investigation information and quantifies the potential risks associated with contamination with consideration to the proposed change of use to residential without homegrown produce.

Contamination Assessment

6.2 Representative made ground samples recovered from site investigation have been tested for a wide range of contaminants of concern and the results have been assessed as part of a quantitative risk assessment using appropriate assessment criteria derived for residential without homegrown produce.

6.3 The contamination assessment has identified concentrations of lead and various PAH compounds (benzo(a)anthracene), chrysene, benzo(a)pyrene, dibenzo(ah)anthracene and benzo(b)fluoranthene) within the made ground which pose a potential risk to human health.

6.4 The potential risks associated with human health will be mitigated against by the hardstanding roads/car parking surfacing surrounding the proposed development. The hardstanding road surfaces will form a physical barrier, breaking the pathway between the end user and the source of contamination preventing ingestion of soil and dust.

6.5 In addition to the above, BEK recommends the following:

- All groundworkers adopt standard PPE when on site and remain vigilant during ground excavations for the presence (or suspected presence) of contamination. If visual or olfactory evidence of contamination is encountered then works should cease and specialist advice sought.

- Consideration to be given to the requirements of the water supply provider. They are likely to require the UKWIR risk assessment to be completed to determine the specification for the water pipes. BEK recommends that the water supply provider is contacted and enquiries made. If barrier pipe is required, then the installation should be independently validated.

- Any material recovered from the site should be disposed of in accordance with appropriate legislation and regulations, including the Duty of Care Regulations.

Geotechnical Assessment

6.6 Based upon the likely loadings associated with the building, pad and strip foundations may be adopted, however, these are likely to be large and will require significant excavation and concrete and therefore may be uneconomic. The adoption of pile and ground beams should be considered.

6.7 As the site is overlaid with made ground of varying depths, potential settlements indicate that ground bearing slabs are not suitable without ground treatment. The use of vibro-compaction, vibro-replacement or dynamic compaction are likely to be costly and is likely to lead to damage of adjacent structures.

6.8 Should a pile and ground beam system be adopted for the proposed building, it is recommended that the ground floor slabs are suspended to ensure that there is no differential movement between the walls and slab.

6.9 Trees are located on the site and the foundation designer must consider the potential effects of the existing trees, in respect of determination of protection to foundations. Formation must be designed to comply with LABC requirements and NHBC Ch.4.2 guidance.

6.10 All foundation designs must be reviewed and designed by a suitably qualified design engineer. The above advice is based upon the ground condition information obtained during the survey. The design engineer must satisfy themselves that the information meets with their design requirements.

Soakaways

6.11 Results from the infiltration tests indicate that ground conditions are not suitable for SUDs systems of drainage.

Waste Soil Management

6.12 Careful management of soils during the excavation works will ensure optimum utilisation of soil resources.

6.13 Excavated soils which require off-site disposal are anticipated to be classified in accordance with the following document: Guidance on the Disposal of "Contaminated Soils" Version 3 (April 2001); produced by the Environment Agency. On the basis it is considered likely that soils from the majority of the site would classify as "Non-hazardous"/"Inert" for disposal; however this is subject to confirmation of the potential landfill use.

6.14 In all cases where excess soils require off-site disposal, the materials needs to be managed under the appropriate legislation and consideration given to any remedial techniques that could be used to improve the soil.

6.15 If waste soils are to be re-used on site then this should be carried out in accordance with a Material Management Plan as part of compliance with the CL:AIRE Definition of Waste:Code of Practice or through Environment Permit Exemptions (if appropriate).

APPENDIX A

Window Sample Records

GEO-ENVIRONMENTAL CONSULTANTS

GEO-ENVIROMENTAL CONSULTING ENGINEERS

PROJECT NUMBER 18469
PROJECT NAME Stockport Rd, Longsight
CLIENT CS Derby Ltd

DATE 12th July 2019
DRILLING METHOD Window Sample Borehole
BOREHOLE NO WS1
SHEET 1/5

COMPLETION | **CASING** uPVC | **SCREEN** uPVC Factory Slotted

COMMENTS Obstruction at 0.6 m. Unable to break through

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Graphic Log	Material Description	Additional Observations	Elevation (m)
0.2						Concrete over brick with concrete and brick gravel (Made Ground)		0.2
0.4								0.4
0.6						Termination Depth at: 0.6 m		0.6
0.8								0.8
1								1
1.2								1.2
1.4								1.4
1.6								1.6
1.8								1.8
2								2
2.2								2.2
2.4								2.4
2.6								2.6
2.8								2.8

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GEO-ENVIRONMENTAL CONSULTANTS

GEO-ENVIROMENTAL CONSULTING ENGINEERS

PROJECT NUMBER 18469
PROJECT NAME Stockport Rd, Longsight
CLIENT CS Derby Ltd

DATE 12th July 2019
DRILLING METHOD Window Sample Borehole
BOREHOLE NO WS2
SHEET 2/5

COMPLETION | **CASING** uPVC | **SCREEN** uPVC Factory Slotted

COMMENTS

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Graphic Log	Material Description	Additional Observations	Elevation (m)
0	0.4	D = 0.4 m				Concrete		0
0.5	0.8	D = 0.8 m				Soft to firm dark brown/black sandy gravelly clay with gravel of brick (Made Ground)		0.5
1	1 - 1.45	SPT (C) N=3	0,0/0,1,1,1			Soft brown sandy gravelly clay. Gravel is sub-angular to sub-rounded		1
1.5								1.5
2	2 - 2.45	SPT (C) N=12	2,2/3,2,3,4			Stiff brown mottled slightly sandy gravelly clay. Gravel is sub-angular to sub-rounded		2
2.5								2.5
3	3 - 3.45	SPT (C) N=28	3,4/6,7,7,8			Very stiff to hard brown mottled slightly sandy gravelly clay. Gravel is sub-angular to sub-rounded		3
3.5								3.5
4	4 - 4.45	SPT (C) N=43	4,6/8,9,10,10					4
4.5						Termination Depth at: 4.45 m		4.5
5								5
5.5								5.5
6								6
6.5								6.5

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GEO-ENVIRONMENTAL CONSULTANTS

GEO-ENVIROMENTAL CONSULTING ENGINEERS

PROJECT NUMBER 18469
PROJECT NAME Stockport Rd, Longsight
CLIENT CS Derby Ltd

DATE 12th July 2019
DRILLING METHOD Window Sample Borehole
BOREHOLE NO WS3
SHEET 3/5

COMPLETION | **CASING** uPVC | **SCREEN** uPVC Factory Slotted

COMMENTS

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Graphic Log	Material Description	Additional Observations	Elevation (m)
0	0.3	D = 0.3 m				Tarmac (Made Ground)		0
						Grey/yellow sandy fine to coarse sub-angular limestone gravel (Made Ground)		
0.5	0.7	D = 0.7 m						0.5
						Soft to firm dark brown sandy gravelly clay with gravel of brick (Made Ground)		
1	1 - 1.45	SPT (C) N=4	0,0/0,0,2,2					1
1.5								1.5
2	2 - 2.45	SPT (C) N=6	1,1/1,1,2,2			Medium stiff brown very sandy silty gravelly clay. Gravel is sub-angular to sub-rounded		2
						Stiff brown mottled slightly sandy gravelly clay. Gravel is sub-angular to sub-rounded		
2.5								2.5
3	3 - 3.45	SPT (C) N=17	2,2/3,4,5,5					3
3.5						Termination Depth at: 3.45 m		3.5
4								4
4.5								4.5
5								5
5.5								5.5
6								6
6.5								6.5

produced by ESlog.ESdat.net on 16 Jul 2019

GEO-ENVIRONMENTAL CONSULTANTS

GEO-ENVIROMENTAL CONSULTING ENGINEERS

PROJECT NUMBER 18469
PROJECT NAME Stockport Rd, Longsight
CLIENT CS Derby Ltd

DATE 12th July 2019
DRILLING METHOD Window Sample Borehole
BOREHOLE NO WS4
SHEET 4/5

COMPLETION | **CASING** uPVC | **SCREEN** uPVC Factory Slotted

COMMENTS

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Well Instal.	Graphic Log	Material Description	Additional Observations	Elevation (m)
0	0.3	D = 0.3 m			A		Tarmac (Made Ground)		0
	0.5	D = 0.5 m					Grey/yellow sandy fine to coarse sub-angular limestone gravel (Made Ground)		
0.5							Soft to firm dark brown sandy gravelly clay with gravel of brick (Made Ground)		0.5
1	1 - 1.45	SPT (C) N=3	0,0/0,1,1,1				Soft dark brown/grey sandy gravelly clay. Gravel is sub-angular to sub-rounded		1
1.5							Soft to stiff brown mottled slightly sandy gravelly clay. Gravel is sub-angular to sub-rounded		1.5
2	2 - 2.45	SPT (C) N=13	1,2/3,4,3,4				Stiff brown mottled slightly sandy gravelly clay. Gravel is sub-angular to sub-rounded		2
2.5									2.5
3	3 - 3.45	SPT (C) N=32	3,5/7,7,9,9						3
3.5									3.5
4	4 - 4.45	SPT (C) N=26	4,4/5,7,7,7						4
4.5									4.5
5	5 - 5.45	SPT (C) N=25	3,5/5,6,7,7						5
5.5							Termination Depth at: 5.45 m		5.5

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GEO-ENVIRONMENTAL CONSULTANTS

GEO-ENVIROMENTAL CONSULTING ENGINEERS

PROJECT NUMBER 18469
PROJECT NAME Stockport Rd, Longsight
CLIENT CS Derby Ltd

DATE 12th July 2019
DRILLING METHOD Window Sample Borehole
BOREHOLE NO WS5
SHEET 5/5

COMPLETION | **CASING** uPVC | **SCREEN** uPVC Factory Slotted

COMMENTS

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Well Instal.	Graphic Log	Material Description	Additional Observations	Elevation (m)
0	0.3	D = 0.3 m					Tarmac (Made Ground)		0
							Grey/yellow sandy fine to coarse sub-angular limestone gravel (Made Ground)		
0.5	0.7	D = 0.7 m					Soft to firm dark brown sandy gravelly clay with gravel of brick with ash and clinker (Made Ground)		0.5
							Soft to firm dark brown sandy gravelly clay with gravel of brick (Made Ground)		
1	1 - 1.45	SPT (C) N=7	1,1/1,2,2,2				Medium stiff dark brown/grey sandy gravelly clay. Gravel is sub-angular to sub-rounded		1
1.5							Stiff brown mottled slightly sandy gravelly clay. Gravel is sub-angular to sub-rounded		1.5
2	2 - 2.45	SPT (C) N=17	1,3/3,4,4,6				Stiff to very stiff brown mottled slightly sandy gravelly clay. Gravel is sub-angular to sub-rounded		2
2.5									2.5
3	3 - 3.45	SPT (C) N=32	6,6/7,7,9,9						3
3.5									3.5
4	4 - 4.45	SPT (C) N=31	4,6/6,7,9,9						4
4.5									4.5
5	5 - 5.45	SPT (C) N=32	4,6/7,7,9,9						5
5.5							Termination Depth at: 5.45 m		5.5

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APPENDIX B

Cable Percussion Boreholes

GEO-ENVIRONMENTAL CONSULTANTS

GEO-ENVIROMENTAL CONSULTING ENGINEERS

PROJECT NUMBER 18469
PROJECT NAME Stockport Rd, Longsight
CLIENT CS Derby Ltd

DATE 18 July 2019
DRILLING METHOD Cable Percussive Borehole
BOREHOLE NO CP1
SHEET 1/3

COMPLETION

COMMENTS Obstruction (possible bedrock) at 15 m

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Well Instal.	Graphic Log	Material Description	Elevation (m)
	0.2 m	D = 0.2 m					Concrete (Made Ground)	
1		SPT (S) N=8					Grey/yellow fine to coarse sub-angular limestone gravel (Made Ground)	1
	1.2 - 1.65 m	B = 1.4 - 2.0 m	1,1/2,2,2,2				Stiff dark brown sandy gravelly clay with brick (Made Ground)	
2	2 - 2.45 m	SPT (S) N=5	1,1/1,1,1,2				Stiff to hard dark brown mottled sandy gravelly clay with rare coal. Gravel is sub-angular to sub-rounded	2
3	3 - 3.45 m	SPT (S) N=19	2,4/5,5,4,5					3
4	4 - 4.45 m	SPT (S) N=24	2,4/5,5,7,7					4
5	5 - 5.45 m	SPT (S) N=9	2,2/2,3,2,2					5
6	6 - 6.45 m	SPT (S) N=9	1,2/2,2,2,3					6
7	7 - 7.45 m	SPT (S) N=17	2,3/4,4,5,4					7
	7.5 - 8.0 m	B = 7.5 - 8.0 m						
8	8 - 8.45 m	SPT (S) N=19	3,3/3,5,5,6					8
9	9 - 9.45 m	SPT (S) N=15	3,3/4,3,4,4					9
10	10 - 10.45 m	SPT (S) N=16	3,3/3,4,4,5					10
11	11 - 11.45 m	SPT (S) N=30	6,6/8,7,7,8					11
12	12 - 12.45 m	SPT (S) N=37	7,7/8,8,9,12					12
13	13 - 13.45 m	SPT (S) N=50, no movement 55 mm left	7,15/13,13,24					13
14	14 - 14.45 m	SPT (S) N=50, no movement 30 mm left	7,12/14,14,14,8					14
15	15 - 15.45 m	SPT (S) N=50, no movement 20 mm left	7,18/26,24 no return					15
16							Termination depth at: 15.00 m	16
17								17
18								18
19								19
20								20

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GEO-ENVIRONMENTAL CONSULTANTS

GEO-ENVIROMENTAL CONSULTING ENGINEERS

PROJECT NUMBER 18469
PROJECT NAME Stockport Rd, Longsight
CLIENT CS Derby Ltd

DATE 15 July 2019
DRILLING METHOD Cable Prercussive Borehole
BOREHOLE NO CP2
SHEET 2/3

COMPLETION

COMMENTS

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Well Instal.	Graphic Log	Material Description	Elevation (m)
1		D = 0.2 m D = 1.0 m	1,1/2,2,2,2 no return				Tarmac (Made Ground) Soft to firm dark brown/black sandy gravelly clay with gravel of brick (Made Ground)	1
	1.2 - 1.65 m	SPT (S) N=8						
2	2 - 2.45 m	SPT (S) N=11	1,1/2,3,3,3				Medium stiff grey/brown very sandy silty gravelly clay. Gravel is sub-angular to sub-rounded	2
3	3 - 3.45 m	SPT (S) N=17	2,3/4,4,4,5				Stiff to very stiff brown mottled sandy gravelly clay. Gravel is sub-angular to sub-rounded	3
4	4 - 4.45 m	SPT (S) N=18	2,3/4,4,5,5					4
5	5 - 5.45 m	SPT (S) N=19	2,3/4,5,5,5					5
6	6 - 6.45 m	SPT (S) N=16	2,3/4,4,4,4					6
7	7 - 7.45 m	SPT (S) N=13 B = 7-7.5 m	2,2/2,2,5,4					7
8	8 - 8.45 m	SPT (S) N=17	2,3/4,4,5,4					8
9	9 - 9.45 m	SPT (S) N=20	2,4/5,5,5,5					9
10	10 - 10.45 m	SPT (S) N=23	2,4/4,6,6,7				Very stiff to hard dark brown mottled sandy gravelly clay with sandstone gravel and sand lenses	10
11	10.5 - 11.0 m	B = 10.5-11.0 m						11
	11 - 11.45 m	SPT (S) N=37	4,6/9,9,10,9					
12	12 - 12.45 m	SPT (S) N=50 no movement, 70 mm left	4,7/11,13,14,12					12
13	13 - 13.45 m	SPT (S) N=50 no movement, 45 mm left	6,16/33,17					13
14	14 - 14.45 m	SPT (S) N=50	7,7/10,13,13,14					14
15	15 - 15.45 m	SPT (S) N=50 no movement, 65 mm left	6,10/10,14,14,12					15
16							Termination depth at: 16 m	16
17								17
18								18
19								19
20								20

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GEO-ENVIRONMENTAL CONSULTANTS

GEO-ENVIROMENTAL CONSULTING ENGINEERS

PROJECT NUMBER 18469
PROJECT NAME Stockport Rd, Longsight
CLIENT CS Derby Ltd

DATE 16 July 2019
DRILLING METHOD Cable Percussive Borehole
BOREHOLE NO CP3
SHEET 3/3

COMPLETION

COMMENTS

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Well Instal.	Graphic Log	Material Description	Elevation (m)
1		B = 0.1 - 0.5 m D = 1.0 m					Concrete (Made Ground) Stiff dark brown/black sandy gravelly clay with gravel of brick (Made Ground)	1
	1.2 - 1.65 m	SPT (S) N=17	2,3/5,4,4,4					
2	2 - 2.45 m	SPT (S) N=15	2,5/3,5,4,3					2
3	3 - 3.45 m	B = 2.5 - 3.0 m SPT (S) N=15	1,2/3,4,4,4				Stiff brown sandy gravelly clay with sub-angular to sub-rounded sandstone gravel	3
4	4 - 4.45 m	SPT (S) N=14	2,3/3,4,3,4					4
5	5 - 5.45 m	SPT (S) N=18	2,3/4,4,5,5					5
6	6 - 6.45 m	SPT (S) N=18	2,3/4,5,5,4					6
7	7 - 7.45 m	B = 6.5 - 7.0 m SPT (S) N=14	2,2/3,3,4,4					7
8	8 - 8.45 m	SPT (S) N=19	3,4/4,5,5,5					8
9	9 - 9.45 m	SPT (S) N=22	4,4/4,5,6,7					9
10	10 - 10.45 m	SPT (S) N=25	3,4/6,6,7,6				Stiff brown mottled sandy gravelly clay. Gravel is sub-angular to sub-rounded	10
11	10.5 - 11.0 m 11 - 11.45 m	B = 10.5 - 11.0 m SPT (S) N=27	3,3/5,6,7,9					11
12	12 - 12.45 m	SPT (S) N=26	4,7/5,6,6,9					12
13	13 - 13.45 m	SPT (S) N=50 no movement, 70 mm left	3,15/16,17,17				Dense fine to coarse brown sand with gravel	13
14	14 - 14.45 m	SPT (S) N=31	5,6/7,7,8,9					14
15	15 - 15.45 m	SPT (S) N=50	5,11/10,10,15,15				Very stiff to hard dark brown mottled slightly sandy gravelly clay with red/brown sandstone gravel	15
16	16 - 16.45 m	SPT (S) N=42	5,8/9,10,10,13					16
17	17 - 17.45 m	SPT (S) N=49	6,9/9,12,13,15					17
18	18 - 18.45 m	SPT (S) N=50 no movement, 60 mm left	7,7/8,10,14,18					18
19	18.5 - 19.0 m 19 - 19.45 m	B = 18.5 - 19.0 m	8,8/10,12,14,14					19
20	20 - 20.45 m	SPT (S) N=50 no movement, 60 mm left	7,9/12,14,14,10					20
21		SPT (S) N=50 no movement, 40 mm left					Termination depth at: 20.45 m	21
22								22

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GEO-ENVIRONMENTAL CONSULTING ENGINEERS

APPENDIX C

Rotary Record

Drillquest Unit 13, Pemberton Business Centre Wigan, WN5 8AA			**Site** Stockport Road, Manchester	**Borehole No.** **1**
Boring Method Rotary Open Hole Water Flush	**Diameter** 100mm		**Client** BEK Enviro	**Job No** 1001
	Dates w/e 23/05/2019		**Engineer**	**Sheet** 1

Depth m	Samples/Tests	Field Records	Level (m)	Depth (m thickness)	Description
				0.00	
				3.00	Overburden
				7.00	Clay / sand / gravel
				15.50	Clay
				22.00	Sandstone

Remarks

Core 1 from 22m - 23.50 only Clay / sand / gravel in Barrell
Core 2 from 23m - 24.50 Nothing in Barrell

Logged By	**Ground Level (mAOD)**	**Location**
PVQ		As per your marked position

GEO-ENVIRONMENTAL CONSULTING ENGINEERS

APPENDIX D

Trial Pit Records

GEO-ENVIRONMENTAL CONSULTANTS

GEO-ENVIROMENTAL CONSULTING ENGINEERS

PROJECT NUMBER 18469
PROJ. NAME Land at Stockport Rd, Longsight
CLIENT CS Derby Ltd

DATE Friday 12th July 2019
EXCAVATION METHOD Trial Pit
TRIAL PIT NO 1
SHEET 1/1

COMPLETION

COMMENTS Trial Pit Dry

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Graphic Log	Material Description	Additional Observations	Elevation (m)
0						Tarmac over grey/yellow sandy fine to coarse sub-angular limestone gravel (Made Ground)		0
0.2						Soft to firm dark brown sandy gravelly clay with roots, brick, rubber, plastic and wood (Made Ground)		0.2
0.4								0.4
0.6	0.6	D=0.6 m						0.6
0.8								0.8
1								1
1.2								1.2
1.4								1.4
1.6								1.6
1.8						Firm to stiff dark brown mottled sandy gravelly clay. Gravel is sub-angular to sub-rounded		1.8
2								2
2.2								2.2
2.4						Termination Depth at: 2.3 m		2.4
2.6								2.6
2.8								2.8

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GEO-ENVIRONMENTAL CONSULTANTS

GEO-ENVIROMENTAL CONSULTING ENGINEERS

PROJECT NUMBER 18469
PROJ. NAME Land at Stockport Rd, Longsight
CLIENT CS Derby Ltd

DATE Friday 12th July 2019
EXCAVATION METHOD Trial Pit
TRIAL PIT NO 2
SHEET 1/1

COMPLETION

COMMENTS Trial Pit Dry

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Graphic Log	Material Description	Additional Observations	Elevation (m)
0.2	0.3	D=0.3 m				Tarmac over grey/yellow sandy fine to coarse sub-angular limestone gravel (Made Ground)		0.2
0.4						Soft dark brown/black very sandy gravelly clay with whole brick and gravel of brick (Made Ground)		0.4
0.6						Firm to stiff brown mottled sandy gravelly clay. Gravel is sub-angular to sub-rounded (Suspected reworked clay)		0.6
0.8								0.8
1								1
1.2								1.2
1.4								1.4
1.6	1.6	D=1.6 m				Firm to stiff dark brown very sandy gravelly clay with whole brick, metal piping, wood and gravel of brick (Made Ground)		1.6
1.8								1.8
2								2
2.2						Termination Depth at: 2.2 m		2.2
2.4								2.4
2.6								2.6
2.8								2.8

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GEO-ENVIRONMENTAL CONSULTANTS

GEO-ENVIROMENTAL CONSULTING ENGINEERS

PROJECT NUMBER 18469
PROJ. NAME Land at Stockport Rd, Longsight
CLIENT CS Derby Ltd

DATE Friday 12th July 2019
EXCAVATION METHOD Trial Pit
TRIAL PIT NO 3
SHEET 1/1

COMPLETION

COMMENTS Trial Pit Dry

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Graphic Log	Material Description	Additional Observations	Elevation (m)
0.2						Tarmac over grey/yellow sandy fine to coarse sub-angular limestone gravel (Made Ground)		0.2
0.4						Soft to firm dark brown sandy gravelly clay with roots, brick, plastic and wood. Gravel of brick (Made Ground)		0.4
0.6	0.7	D=0.7 m						0.6
0.8								0.8
1								1
1.2								1.2
1.4						Firm to stiff dark brown mottled slightly sandy gravelly clay. Gravel is sub-angular to sub-rounded		1.4
1.6								1.6
1.8								1.8
2								2
2.2								2.2
2.4						Termination Depth at: 2.3 m		2.4
2.6								2.6
2.8								2.8

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GEO-ENVIRONMENTAL CONSULTANTS

GEO-ENVIROMENTAL CONSULTING ENGINEERS

PROJECT NUMBER 18469
PROJ. NAME Land at Stockport Rd, Longsight
CLIENT CS Derby Ltd

DATE Tuesday 23rd July 2019
EXCAVATION METHOD Trial Pit
TRIAL PIT NO 4
SHEET 1/1

COMPLETION

COMMENTS Trial Pit Dry

Depth (m)	Depth (m)	Samples/ Test	Field Records	Water	Graphic Log	Material Description	Additional Observations	Elevation (m)
0						Light grey/white concrete (Made Ground)		0
0.2						Grey concrete (Made Ground)		0.2
0.4						Brick fill with frequent whole bricks and gravel of brick (Made Ground)		0.4
0.6	0.6	D=0.6 m						0.6
0.8						Grey concrete (Made Ground)		0.8
1	0.9	D=0.9 m				Soft to firm dark brown sandy gravelly clay with much brick and rare flagstones. Gravel of brick (Made Ground)		1
1.2								1.2
1.4								1.4
1.6								1.6
1.8								1.8
2						Termination Depth at: 1.9 m		2
2.2								2.2
2.4								2.4
2.6								2.6
2.8								2.8

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APPENDIX E

Chemical Test Results

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 19/06989
Issue Number: 1 **Date:** 31 July, 2019

Client:
BEK Enviro Ltd
Suite One
No 3 Mitton Road Business Park
Mitton Road
Whalley
Lancashire
BB7 9YE

Project Manager: Mick Buckley
Project Name: Stockport Rd, Longsight
Project Ref: N/A
Order No: 3555-18469
Date Samples Received: 18/07/19
Date Instructions Received: 23/07/19
Date Analysis Completed: 31/07/19

Prepared by:

Melanie Marshall
Laboratory Coordinator

Approved by:

Danielle Brierley
Client Manager

Envirolab Job Number: 19/06989

Client Project Name: Stockport Rd, Longsight

Client Project Ref: N/A

Lab Sample ID	19/06989/1	19/06989/2	19/06989/3	19/06989/4	19/06989/5	19/06989/6	19/06989/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP1	TP2	TP3	WS2	WS3	WS5	CP1			
Depth to Top	0.60	0.30	0.70	0.40	0.30	0.30	0.20			
Depth To Bottom										
Date Sampled	19-Jul-19	19-Jul-19	19-Jul-19	19-Jul-19	19-Jul-19	19-Jul-19	19-Jul-19			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Solid			
Sample Matrix Code	4AB	5A	4AB	5A	4AB	4AB	7			
% Stones >10mm$_A$	17.4	<0.1	15.0	7.9	37.3	16.7	<0.1	% w/w	0.1	A-T-044
pH$_D$$^{M\#}$	8.81	8.53	8.36	8.59	8.72	8.35	12.74	pH	0.01	A-T-031s
Sulphate (water sol 2:1)$_D$$^{M\#}$	<0.01	0.10	0.38	0.05	0.11	0.07	<0.01	g/l	0.01	A-T-026s
Sulphate (acid soluble)$_D$$^{M\#}$	420	500	2200	360	810	840	2600	mg/kg	200	A-T-028s
Cyanide (total)$_A$$^{M\#}$	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC$_A$	0.7	0.6	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	0.2	A-T-050s
Organic matter$_D$$^{M\#}$	4.9	1.6	4.7	1.6	3.7	7.6	9.8	% w/w	0.1	A-T-032 OM
Arsenic$_D$$^{M\#}$	12	4	9	5	6	28	5	mg/kg	1	A-T-024s
Boron (water soluble)$_D$$^{M\#}$	<1.0	1.1	<1.0	<1.0	<1.0	<1.0	<1.0	mg/kg	1	A-T-027s
Cadmium$_D$$^{M\#}$	1.7	1.0	0.9	0.8	0.9	3.9	0.8	mg/kg	0.5	A-T-024s
Copper$_D$$^{M\#}$	89	24	32	16	19	60	9	mg/kg	1	A-T-024s
Chromium$_D$$^{M\#}$	19	24	23	20	14	15	13	mg/kg	1	A-T-024s
Chromium (hexavalent)$_D$	<1	<1	<1	<1	<1	<1	<1	mg/kg	1	A-T-040s
Lead$_D$$^{M\#}$	352	32	1290	47	250	143	36	mg/kg	1	A-T-024s
Mercury$_D$	0.64	<0.17	0.87	<0.17	0.65	0.37	1.32	mg/kg	0.17	A-T-024s
Nickel$_D$$^{M\#}$	22	29	12	18	11	32	9	mg/kg	1	A-T-024s
Selenium$_D$$^{M\#}$	<1	1	2	<1	1	2	2	mg/kg	1	A-T-024s
Zinc$_D$$^{M\#}$	166	60	211	39	63	370	53	mg/kg	5	A-T-024s

Envirolab Job Number: 19/06989

Client Project Name: Stockport Rd, Longsight

Client Project Ref: N/A

Lab Sample ID	19/06989/1	19/06989/2	19/06989/3	19/06989/4	19/06989/5	19/06989/6	19/06989/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP1	TP2	TP3	WS2	WS3	WS5	CP1			
Depth to Top	0.60	0.30	0.70	0.40	0.30	0.30	0.20			
Depth To Bottom										
Date Sampled	19-Jul-19	19-Jul-19	19-Jul-19	19-Jul-19	19-Jul-19	19-Jul-19	19-Jul-19			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Solid			
Sample Matrix Code	4AB	5A	4AB	5A	4AB	4AB	7			
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_D$#	NAD	NAD	NAD	NAD	NAD	NAD	NAD			A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A	N/A	N/A	N/A	N/A	N/A			

Envirolab Job Number: 19/06989

Client Project Name: Stockport Rd, Longsight

Client Project Ref: N/A

Lab Sample ID	19/06989/1	19/06989/2	19/06989/3	19/06989/4	19/06989/5	19/06989/6	19/06989/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP1	TP2	TP3	WS2	WS3	WS5	CP1			
Depth to Top	0.60	0.30	0.70	0.40	0.30	0.30	0.20			
Depth To Bottom										
Date Sampled	19-Jul-19	19-Jul-19	19-Jul-19	19-Jul-19	19-Jul-19	19-Jul-19	19-Jul-19			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Solid			
Sample Matrix Code	4AB	5A	4AB	5A	4AB	4AB	7			
PAH-16MS										
Acenaphthene$_A^{M\#}$	0.43	0.02	0.13	<0.01	23	8.06	<0.01	mg/kg	0.01	A-T-019s
Acenaphthylene$_A^{M\#}$	0.05	<0.01	0.05	<0.01	0.59	2.00	<0.01	mg/kg	0.01	A-T-019s
Anthracene$_A^{M\#}$	2.32	0.03	0.45	<0.02	35.6	12.7	<0.02	mg/kg	0.02	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	6.02	0.24	1.63	<0.04	66.5	36.7	0.04	mg/kg	0.04	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	4.50	0.30	1.46	<0.04	45.1	22.6	<0.04	mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	5.52	0.37	1.82	<0.05	57.3	26.5	<0.05	mg/kg	0.05	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	1.66	0.16	0.75	<0.05	21.5	11.6	<0.05	mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	2.19	0.16	0.71	<0.07	20.7	10.2	<0.07	mg/kg	0.07	A-T-019s
Chrysene$_A^{M\#}$	5.11	0.30	1.49	<0.06	57.5	45.8	<0.06	mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	0.38	<0.04	0.14	<0.04	5.12	2.57	<0.04	mg/kg	0.04	A-T-019s
Fluoranthene$_A^{M\#}$	14.8	0.29	3.93	<0.08	194	92.9	<0.08	mg/kg	0.08	A-T-019s
Fluorene$_A^{M\#}$	0.40	0.02	0.12	<0.01	19.4	6.45	<0.01	mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	2.07	0.18	0.89	<0.03	26.5	13.6	<0.03	mg/kg	0.03	A-T-019s
Naphthalene $_A^{M\#}$	0.06	<0.03	<0.03	<0.03	0.39	0.53	<0.03	mg/kg	0.03	A-T-019s
Phenanthrene$_A^{M\#}$	4.82	0.15	1.54	<0.03	139	68	0.04	mg/kg	0.03	A-T-019s
Pyrene$_A^{M\#}$	13	0.33	3.32	<0.07	151	86.9	<0.07	mg/kg	0.07	A-T-019s
Total PAH-16MS$_A^{M\#}$	63.3	2.55	18.4	<0.08	863	447	0.08	mg/kg	0.01	A-T-019s

REPORT NOTES

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Soil chemical analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

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

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client: BEK Enviro Ltd, Suite One , No 3 Mitton Road Business Park , Mitton Road , Whalley , Lancashire , BB7 9YE

Project: Stockport Rd, Longsight

Clients Project No: N/A

Project No: 19/06989

Date Received: 23/07/2019 (am)

Cool Box Temperatures (°C): 20.9, 11.2

Lab Sample ID	19/06989/7
Client Sample No	
Client Sample ID/Depth	CP1 0.20m
Date Sampled	19/07/19
Deviation Code	
D1 (no SVOC)	✓

Key
D1 (no SVOC) *Glass container not provided for SVOC*

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

envirolab
Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 19/07059
Issue Number: 1 **Date:** 02 August, 2019

Client:
BEK Enviro Ltd
Suite One
No 3 Mitton Road Business Park
Mitton Road
Whalley
Lancashire
BB7 9YE

Project Manager: Mick Buckley
Project Name: Stockport Rd, Longsight
Project Ref: N/A
Order No: 3563-18469
Date Samples Received: 24/07/19
Date Instructions Received: 25/07/19
Date Analysis Completed: 02/08/19

Prepared by:

Melanie Marshall
Laboratory Coordinator

Approved by:

Danielle Brierley
Client Manager

Envirolab Job Number: 19/07059

Client Project Name: Stockport Rd, Longsight

Client Project Ref: N/A

Lab Sample ID	19/07059/1							Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP4									
Depth to Top	0.90									
Depth To Bottom										
Date Sampled	23-Jul-19									
Sample Type	Soil									
Sample Matrix Code	5A									
% Stones >10mm$_A$	<0.1							% w/w	0.1	A-T-044
pH$_D$$^{M\#}$	7.62							pH	0.01	A-T-031s
Sulphate (water sol 2:1)$_D$$^{M\#}$	0.19							g/l	0.01	A-T-026s
Sulphate (acid soluble)$_D$$^{M\#}$	620							mg/kg	200	A-T-028s
Cyanide (total)$_A$$^{M\#}$	<1							mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC$_A$	<0.2							mg/kg	0.2	A-T-050s
Organic matter$_D$$^{M\#}$	4.4							% w/w	0.1	A-T-032 OM
Arsenic$_D$$^{M\#}$	11							mg/kg	1	A-T-024s
Boron (water soluble)$_D$$^{M\#}$	1.1							mg/kg	1	A-T-027s
Cadmium$_D$$^{M\#}$	0.7							mg/kg	0.5	A-T-024s
Copper$_D$$^{M\#}$	45							mg/kg	1	A-T-024s
Chromium$_D$$^{M\#}$	29							mg/kg	1	A-T-024s
Chromium (hexavalent)$_D$	<1							mg/kg	1	A-T-040s
Lead$_D$$^{M\#}$	158							mg/kg	1	A-T-024s
Mercury$_D$	2.27							mg/kg	0.17	A-T-024s
Nickel$_D$$^{M\#}$	37							mg/kg	1	A-T-024s
Selenium$_D$$^{M\#}$	<1							mg/kg	1	A-T-024s
Zinc$_D$$^{M\#}$	87							mg/kg	5	A-T-024s

Envirolab Job Number: 19/07059

Client Project Name: Stockport Rd, Longsight

Client Project Ref: N/A

Lab Sample ID	19/07059/1							Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP4									
Depth to Top	0.90									
Depth To Bottom										
Date Sampled	23-Jul-19									
Sample Type	Soil									
Sample Matrix Code	5A									
PAH-16MS										
Acenaphthene$_A^{M\#}$	0.15							mg/kg	0.01	A-T-019s
Acenaphthylene$_A^{M\#}$	0.08							mg/kg	0.01	A-T-019s
Anthracene$_A^{M\#}$	0.45							mg/kg	0.02	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	2.36							mg/kg	0.04	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	1.98							mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	2.33							mg/kg	0.05	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	1.02							mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	0.81							mg/kg	0.07	A-T-019s
Chrysene$_A^{M\#}$	2.45							mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	0.31							mg/kg	0.04	A-T-019s
Fluoranthene$_A^{M\#}$	4.31							mg/kg	0.08	A-T-019s
Fluorene$_A^{M\#}$	0.16							mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	1.17							mg/kg	0.03	A-T-019s
Naphthalene $_A^{M\#}$	0.17							mg/kg	0.03	A-T-019s
Phenanthrene$_A^{M\#}$	2.10							mg/kg	0.03	A-T-019s
Pyrene$_A^{M\#}$	4.44							mg/kg	0.07	A-T-019s
Total PAH-16MS$_A^{M\#}$	24.3							mg/kg	0.01	A-T-019s

REPORT NOTES

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Soil chemical analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:
Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:
Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

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

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

Key:
IS indicates Insufficient Sample for analysis.
US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client: BEK Enviro Ltd, Suite One , No 3 Mitton Road Business Park , Mitton Road , Whalley , Lancashire , BB7 9YE

Project: Stockport Rd, Longsight

Clients Project No: N/A

Project No: 19/07059

Date Received: 25/07/2019 (am)

Cool Box Temperatures (°C): 21.6

NO DEVIATIONS IDENTIFIED

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

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Units 7 & 8 Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

FINAL ANALYTICAL TEST REPORT
SUPPLEMENT TO TEST REPORT 19/07059/1

Amendments: Request for Additional Analysis

Envirolab Job Number: 19/07059
Issue Number: 2 **Date:** 08 August, 2019

Client:
BEK Enviro Ltd
Suite One
No 3 Mitton Road Business Park
Mitton Road
Whalley
Lancashire
BB7 9YE

Project Manager: Mick Buckley
Project Name: Stockport Rd, Longsight
Project Ref: N/A
Order No: 3563-18469
Date Samples Received: 24/07/19
Date Instructions Received: 25/07/19
Date Analysis Completed: 08/08/19

Prepared by:

Melanie Marshall
Laboratory Coordinator

Approved by:

Richard Wong
Client Manager

Envirolab Job Number: 19/07059

Client Project Name: Stockport Rd, Longsight

Client Project Ref: N/A

Lab Sample ID	19/07059/1							Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP4									
Depth to Top	0.90									
Depth To Bottom										
Date Sampled	23-Jul-19									
Sample Type	Soil									
Sample Matrix Code	5A									
% Stones >10mm$_A$	<0.1							% w/w	0.1	A-T-044
pH$_D$$^{M\#}$	7.62							pH	0.01	A-T-031s
Sulphate (water sol 2:1)$_D$$^{M\#}$	0.19							g/l	0.01	A-T-026s
Sulphate (acid soluble)$_D$$^{M\#}$	620							mg/kg	200	A-T-028s
Cyanide (total)$_A$$^{M\#}$	<1							mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC$_A$	<0.2							mg/kg	0.2	A-T-050s
Organic matter$_D$$^{M\#}$	4.4							% w/w	0.1	A-T-032 OM
Arsenic$_D$$^{M\#}$	11							mg/kg	1	A-T-024s
Boron (water soluble)$_D$$^{M\#}$	1.1							mg/kg	1	A-T-027s
Cadmium$_D$$^{M\#}$	0.7							mg/kg	0.5	A-T-024s
Copper$_D$$^{M\#}$	45							mg/kg	1	A-T-024s
Chromium$_D$$^{M\#}$	29							mg/kg	1	A-T-024s
Chromium (hexavalent)$_D$	<1							mg/kg	1	A-T-040s
Lead$_D$$^{M\#}$	158							mg/kg	1	A-T-024s
Mercury$_D$	2.27							mg/kg	0.17	A-T-024s
Nickel$_D$$^{M\#}$	37							mg/kg	1	A-T-024s
Selenium$_D$$^{M\#}$	<1							mg/kg	1	A-T-024s
Zinc$_D$$^{M\#}$	87							mg/kg	5	A-T-024s

Envirolab Job Number: 19/07059

Client Project Name: Stockport Rd, Longsight

Client Project Ref: N/A

Lab Sample ID	**19/07059/1**							**Units**	**Limit of Detection**	**Method ref**
Client Sample No										
Client Sample ID	**TP4**									
Depth to Top	**0.90**									
Depth To Bottom										
Date Sampled	**23-Jul-19**									
Sample Type	**Soil**									
Sample Matrix Code	**5A**									
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_D$$^{\#}$	**NAD**									**A-T-045**
Asbestos ACM - Suitable for Water Absorption Test?	**N/A**									

Envirolab Job Number: 19/07059

Client Project Name: Stockport Rd, Longsight

Client Project Ref: N/A

Lab Sample ID	19/07059/1							Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	TP4									
Depth to Top	0.90									
Depth To Bottom										
Date Sampled	23-Jul-19									
Sample Type	Soil									
Sample Matrix Code	5A									
PAH-16MS										
Acenaphthene$_A^{M\#}$	0.15							mg/kg	0.01	A-T-019s
Acenaphthylene$_A^{M\#}$	0.08							mg/kg	0.01	A-T-019s
Anthracene$_A^{M\#}$	0.45							mg/kg	0.02	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	2.36							mg/kg	0.04	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	1.98							mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	2.33							mg/kg	0.05	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	1.02							mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	0.81							mg/kg	0.07	A-T-019s
Chrysene$_A^{M\#}$	2.45							mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	0.31							mg/kg	0.04	A-T-019s
Fluoranthene$_A^{M\#}$	4.31							mg/kg	0.08	A-T-019s
Fluorene$_A^{M\#}$	0.16							mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	1.17							mg/kg	0.03	A-T-019s
Naphthalene $_A^{M\#}$	0.17							mg/kg	0.03	A-T-019s
Phenanthrene$_A^{M\#}$	2.10							mg/kg	0.03	A-T-019s
Pyrene$_A^{M\#}$	4.44							mg/kg	0.07	A-T-019s
Total PAH-16MS$_A^{M\#}$	24.3							mg/kg	0.01	A-T-019s

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The Client Sample No, Client Sample ID, Depth to Top, Depth to Bottom and Date Sampled were all provided by the client.

Soil chemical analysis:
All results are reported as dry weight (<40°C).
For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.
For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any “A” subscripts
All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

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

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

Predominant Matrix Codes:
1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.
Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.
Secondary Matrix Codes:
A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal, E = contains roots/twigs.

Key:
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US indicates Unsuitable Sample for analysis.
NDP indicates No Determination Possible.
NAD indicates No Asbestos Detected.
N/A indicates Not Applicable.
Superscript # indicates method accredited to ISO 17025.
Superscript "M" indicates method accredited to MCERTS.
Subscript "A" indicates analysis performed on the sample as received.
Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client: BEK Enviro Ltd, Suite One , No 3 Mitton Road Business Park , Mitton Road , Whalley , Lancashire , BB7 9YE

Project: Stockport Rd, Longsight

Clients Project No: N/A

Project No: 19/07059

Date Received: 25/07/2019 (am)

Cool Box Temperatures (°C): 21.6

NO DEVIATIONS IDENTIFIED

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.

envirolab
Units 7 & 8, Sandpits Business Park
Mottram Road, Hyde, Cheshire, SK14 3AR

Final Test Report

Envirolab Job Number:	19/06988		
Issue Number:	1	Date:	31-Jul-19

Client:

BEK Enviro Ltd
Suite One
No 3 Mitton Road Business Park
Mitton Road
Whalley
Lancashire, BB7 9YE

Project Manager:	Mick Buckley
Project Name:	Stockport Rd, Longsight
Project Ref:	Not specified
Order No:	3556-18469
Date Samples Received:	23-Jul-19
Date Instructions Received:	23-Jul-19
Date Analysis Completed:	31-Jul-19

Notes - Soil analysis

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

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

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

Notes - General

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

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

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

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

For complex, multi-compound analysis, quality control results do not always fall within chart limits for every compound and we have criteria for reporting in these situations.

If results are in italic font they are associated with such quality control failures and may be unreliable.

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

Predominant Matrix Codes: 1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample

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

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

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

Please contact us if you need any further information.

Prepared by:

MMarshall

Melanie Marshall
Laboratory Coordinator

Approved by:

Richard Wong
Client Manager

envirolab

Landfill WAC analysis must not be used for hazardous waste classification purposes. This analysis is only applicable for landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Sample Details						Landfill Waste Acceptance Criteria Limits		
Lab Sample ID	Method	ISO17025	MCERTS	19/06988/1				
Client Sample Number						Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
Client Sample ID				CP1				
Depth to Top				0.2				
Depth to Bottom								
Date Sampled				19/07/2019				
Sample Type				Soil				
Sample Matrix Code				4ABE				
Solid Waste Analysis								
pH (pH Units)$_D$	A-T-031	N	N			-	>6	-
ANC to pH 4 (mol/kg)$_D$	A-T-ANC	N	N			-	to be evaluated	to be evaluated
ANC to pH 6 (mol/kg)$_D$	A-T-ANC	N	N			-	to be evaluated	to be evaluated
Loss on Ignition (%)$_D$	A-T-030	N	N			-	-	10
Total Organic Carbon (%)$_D$	A-T-032	N	N	**1.62**		3	5	6
PAH Sum of 17 (mg/kg) $_A$	A-T-019	N	N	**32.7**		100	-	-
Mineral Oil (mg/kg)$_A$	A-T-007	N	N	**324**		500	-	-
Sum of 7 PCBs (mg/kg)$_A$	A-T-004	N	N	**<0.007**		1	-	-
Sum of BTEX (mg/kg)$_A$	A-T-022	N	N	**<0.01**		6	-	-
Eluate Analysis				**10:1**	**10:1**	**Limit values for compliance leaching test using**		
				mg/l	**mg/kg**	**BS EN 12457-2 at L/S 10 l/kg (mg/kg)**		
Arsenic	A-T-025	N	N	0.002	**0.020**	0.5	2	25
Barium	A-T-025	N	N	0.157	**1.570**	20	100	300
Cadmium	A-T-025	N	N	<0.001	**<0.01**	0.04	1	5
Chromium	A-T-025	N	N	0.043	**0.430**	0.5	10	70
Copper	A-T-025	N	N	0.128	**1.280**	2	50	100
Mercury	A-T-025	N	N	<0.0005	**<0.005**	0.01	0.2	2
Molybdenum	A-T-025	N	N	0.018	**0.180**	0.5	10	30
Nickel	A-T-025	N	N	0.013	**0.130**	0.4	10	40
Lead	A-T-025	N	N	0.007	**0.070**	0.5	10	50
Antimony	A-T-025	N	N	0.002	**0.020**	0.06	0.7	5
Selenium	A-T-025	N	N	0.001	**0.010**	0.1	0.5	7
Zinc	A-T-025	N	N	0.004	**0.040**	4	50	200
Chloride	A-T-026	N	N	5	**48**	800	15000	25000
Fluoride	A-T-026	N	N	<0.10	**<1**	10	150	500
Sulphate as SO_4	A-T-026	N	N	11	**115**	1000	20000	50000
Total Dissolved Solids	A-T-035	N	N	748	**7480**	4000	60000	100000
Phenol Index	A-T-050	N	N	0.16	**1.60**	1	-	-
Dissolved Organic Carbon	A-T-032	N	N	24.40	**244**	500	800	1000
Leach Test Information								
pH (pH Units)	A-T-031	N	N	12.5				
Conductivity (µS/cm)	A-T-037	N	N	1496				
Mass Sample (kg)				0.207				
Dry Matter (%)	A-T-044	N	N	84.7				

Stated acceptance limits are for guidance only and Envirolab cannot be held responsible for any discrepancies with current legislation

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Landfill WAC analysis must not be used for hazardous waste classification purposes. This analysis is only applicable for landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Sample Details						Landfill Waste Acceptance Criteria Limits		
Lab Sample ID	Method	ISO17025	MCERTS	19/06988/2				
Client Sample Number						Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
Client Sample ID				TP1				
Depth to Top				0.6				
Depth to Bottom								
Date Sampled				19/07/2019				
Sample Type				Soil				
Sample Matrix Code				4AB				
Solid Waste Analysis								
pH (pH Units)$_D$	A-T-031	N	N			-	>6	-
ANC to pH 4 (mol/kg)$_D$	A-T-ANC	N	N			-	to be evaluated	to be evaluated
ANC to pH 6 (mol/kg)$_D$	A-T-ANC	N	N			-	to be evaluated	to be evaluated
Loss on Ignition (%)$_D$	A-T-030	N	N			-	-	10
Total Organic Carbon (%)$_D$	A-T-032	N	N	**2.19**		3	5	6
PAH Sum of 17 (mg/kg) $_A$	A-T-019	N	N	**28.1**		100	-	-
Mineral Oil (mg/kg)$_A$	A-T-007	N	N	**177**		500	-	-
Sum of 7 PCBs (mg/kg)$_A$	A-T-004	N	N	**<0.007**		1	-	-
Sum of BTEX (mg/kg)$_A$	A-T-022	N	N	**<0.01**		6	-	-
Eluate Analysis				**10:1**	**10:1**	**Limit values for compliance leaching test using**		
				mg/l	**mg/kg**	**BS EN 12457-2 at L/S 10 l/kg (mg/kg)**		
Arsenic	A-T-025	N	N	0.001	**0.010**	0.5	2	25
Barium	A-T-025	N	N	0.185	**1.850**	20	100	300
Cadmium	A-T-025	N	N	<0.001	**<0.01**	0.04	1	5
Chromium	A-T-025	N	N	0.038	**0.380**	0.5	10	70
Copper	A-T-025	N	N	0.129	**1.290**	2	50	100
Mercury	A-T-025	N	N	<0.0005	**<0.005**	0.01	0.2	2
Molybdenum	A-T-025	N	N	0.015	**0.150**	0.5	10	30
Nickel	A-T-025	N	N	0.012	**0.120**	0.4	10	40
Lead	A-T-025	N	N	0.008	**0.080**	0.5	10	50
Antimony	A-T-025	N	N	0.001	**0.010**	0.06	0.7	5
Selenium	A-T-025	N	N	<0.001	**<0.01**	0.1	0.5	7
Zinc	A-T-025	N	N	0.006	**0.060**	4	50	200
Chloride	A-T-026	N	N	5	**52**	800	15000	25000
Fluoride	A-T-026	N	N	<0.10	**<1**	10	150	500
Sulphate as SO_4	A-T-026	N	N	10	**100**	1000	20000	50000
Total Dissolved Solids	A-T-035	N	N	914	**9140**	4000	60000	100000
Phenol Index	A-T-050	N	N	0.14	**1.40**	1	-	-
Dissolved Organic Carbon	A-T-032	N	N	20.70	**207**	500	800	1000
Leach Test Information								
pH (pH Units)	A-T-031	N	N	12.6				
Conductivity (µS/cm)	A-T-037	N	N	1828				
Mass Sample (kg)				0.206				
Dry Matter (%)	A-T-044	N	N	85.1				

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Landfill WAC analysis must not be used for hazardous waste classification purposes. This analysis is only applicable for landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Sample Details						Landfill Waste Acceptance Criteria Limits		
Lab Sample ID	Method	ISO17025	MCERTS	19/06988/3				
Client Sample Number						Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
Client Sample ID				WS3				
Depth to Top				0.3				
Depth to Bottom								
Date Sampled				19/07/2019				
Sample Type				Soil				
Sample Matrix Code				4AB				
Solid Waste Analysis								
pH (pH Units)$_D$	A-T-031	N	N			-	>6	-
ANC to pH 4 (mol/kg)$_D$	A-T-ANC	N	N			-	to be evaluated	to be evaluated
ANC to pH 6 (mol/kg)$_D$	A-T-ANC	N	N			-	to be evaluated	to be evaluated
Loss on Ignition (%)$_D$	A-T-030	N	N			-	-	10
Total Organic Carbon (%)$_D$	A-T-032	N	N	**2.1**		3	5	6
PAH Sum of 17 (mg/kg) $_A$	A-T-019	N	N	**20.9**		100	-	-
Mineral Oil (mg/kg)$_A$	A-T-007	N	N	**183**		500	-	-
Sum of 7 PCBs (mg/kg)$_A$	A-T-004	N	N	**<0.007**		1	-	-
Sum of BTEX (mg/kg)$_A$	A-T-022	N	N	**<0.01**		6	-	-
Eluate Analysis				**10:1**	**10:1**	**Limit values for compliance leaching test using**		
				mg/l	**mg/kg**	**BS EN 12457-2 at L/S 10 l/kg (mg/kg)**		
Arsenic	A-T-025	N	N	0.002	**0.020**	0.5	2	25
Barium	A-T-025	N	N	0.133	**1.330**	20	100	300
Cadmium	A-T-025	N	N	<0.001	**<0.01**	0.04	1	5
Chromium	A-T-025	N	N	0.037	**0.370**	0.5	10	70
Copper	A-T-025	N	N	0.155	**1.550**	2	50	100
Mercury	A-T-025	N	N	<0.0005	**<0.005**	0.01	0.2	2
Molybdenum	A-T-025	N	N	0.016	**0.160**	0.5	10	30
Nickel	A-T-025	N	N	0.011	**0.110**	0.4	10	40
Lead	A-T-025	N	N	0.007	**0.070**	0.5	10	50
Antimony	A-T-025	N	N	0.002	**0.020**	0.06	0.7	5
Selenium	A-T-025	N	N	0.002	**0.020**	0.1	0.5	7
Zinc	A-T-025	N	N	0.003	**0.030**	4	50	200
Chloride	A-T-026	N	N	5	**53**	800	15000	25000
Fluoride	A-T-026	N	N	<0.10	**<1**	10	150	500
Sulphate as SO_4	A-T-026	N	N	13	**127**	1000	20000	50000
Total Dissolved Solids	A-T-035	N	N	770	**7700**	4000	60000	100000
Phenol Index	A-T-050	N	N	0.14	**1.40**	1	-	-
Dissolved Organic Carbon	A-T-032	N	N	21.40	**214**	500	800	1000
Leach Test Information								
pH (pH Units)	A-T-031	N	N	12.6				
Conductivity (µS/cm)	A-T-037	N	N	1539				
Mass Sample (kg)				0.206				
Dry Matter (%)	A-T-044	N	N	84.8				

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APPENDIX F

Geotechnical Test Results

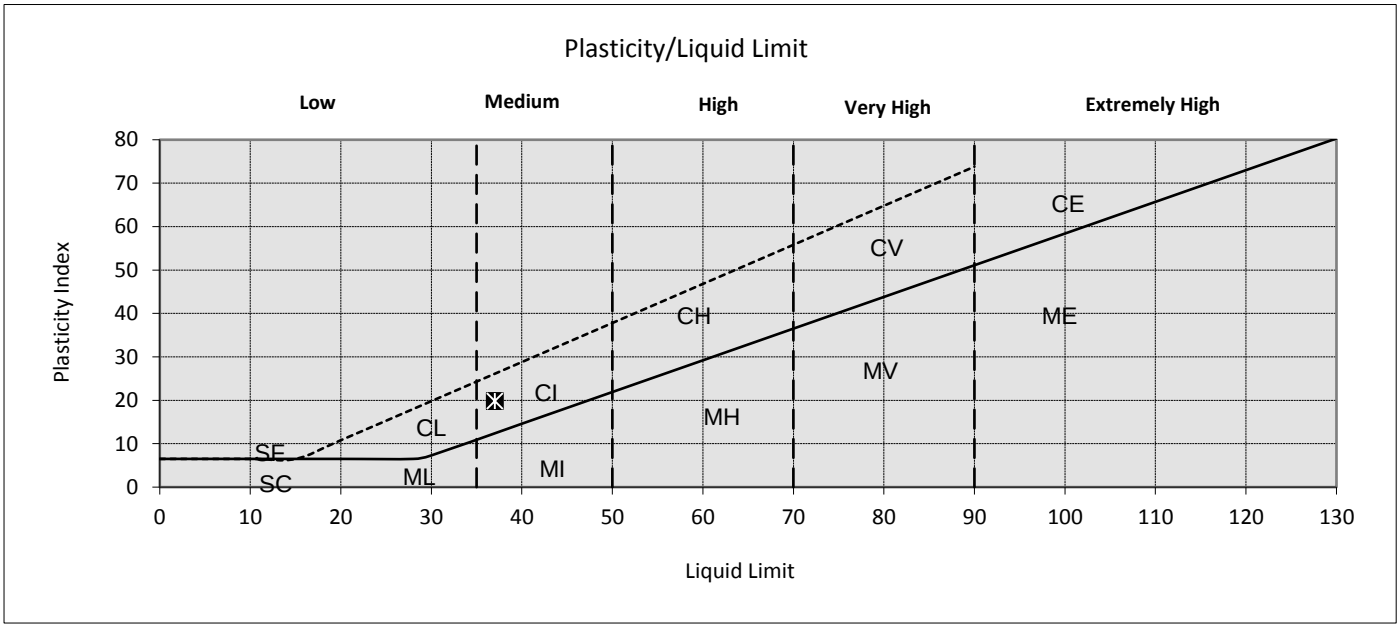
James Fisher Testing Services Ltd
Ruby House, 40A Hardwick Grange
Warrington, WA1 4RF
Tel: 01925286880

James Fisher Testing Services

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

Site Ref.:	Stockport Rd, Longsight	**Job No.:**	34790
		Lab Ref No.:	34790/28
Client:	Bek Enviro Ltd	**Sample Ref.:**	CP1 1.4m
		Date Received:	25/07/2019
		Date Tested:	02/08/2019
Originator:	**Mick Buckley**	**Date Reported:**	06/08/2019

Sampling Certificate	**Yes**
Sampled By	**Client**
Sample Type	**Bulk**
Sample Preparation Method	**As Received**
MATERIAL	**Made Ground, CLAY and Gravel Fill**
Retained 425 micron (%)	**30**
Natural Moisture Content (%)	**20**
Liquid Limit (single point)(%)	**37**
Plastic Limit (%)	**17**
Plasticity Index	**20**



K.Monks

Approved Signature
James Fisher Testing Services Ltd
Karl Monks, Lab Team Leader

James Fisher Testing Services Limited, a company registered in England and Wales with registration number: 01182561

Registered office: Fisher House, PO Box 4, Barrow-in-Furness, Cumbria, LA14 1HR

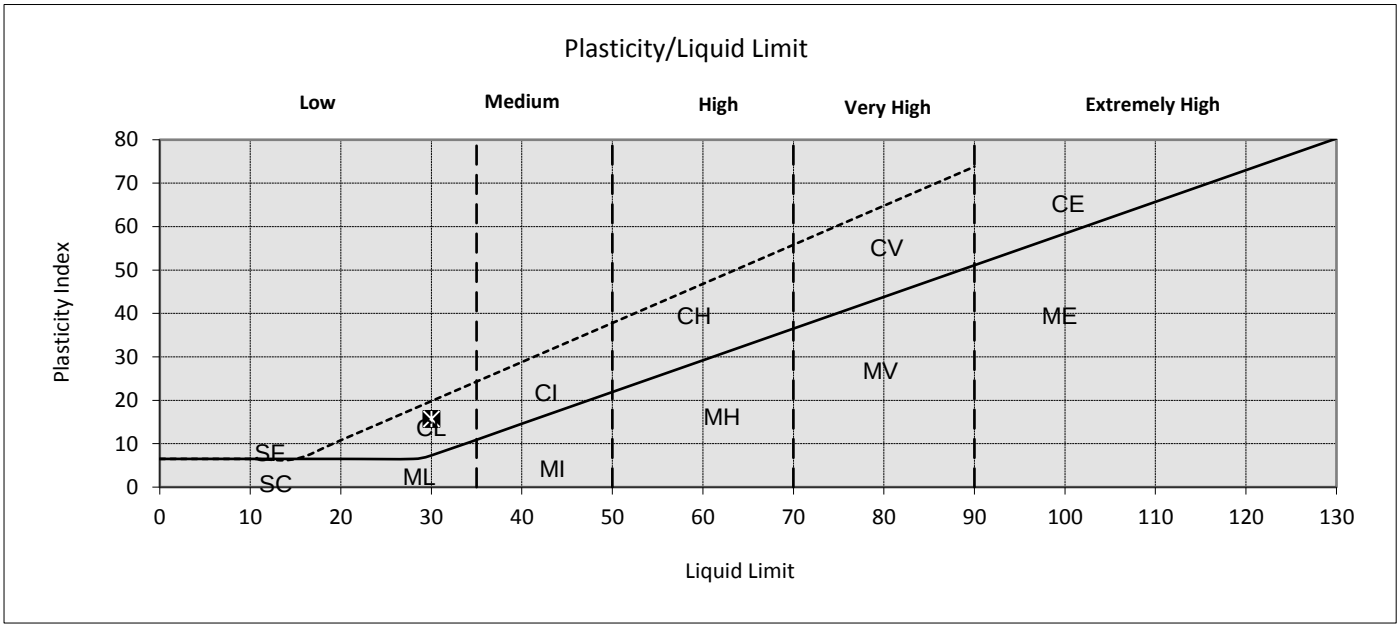
James Fisher Testing Services Ltd
Ruby House, 40A Hardwick Grange
Warrington, WA1 4RF
Tel: 01925286880

James Fisher Testing Services

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

Site Ref.:	Stockport Rd, Longsight	**Job No.:**	34790
		Lab Ref No.:	34790/28
Client:	Bek Enviro Ltd	**Sample Ref.:**	CP2 7.0-7.5m
		Date Received:	25/07/2019
		Date Tested:	02/08/2019
Originator:	**Mick Buckley**	**Date Reported:**	06/08/2019

Sampling Certificate	**Yes**
Sampled By	**Client**
Sample Type	**Bulk**
Sample Preparation Method	**As Received**
MATERIAL	**Stiff Brown Sl.Sandy Sl.Gravelly CLAY**
Retained 425 micron (%)	**5.0**
Natural Moisture Content (%)	**15**
Liquid Limit (single point)(%)	**30**
Plastic Limit (%)	**15**
Plasticity Index	**16**



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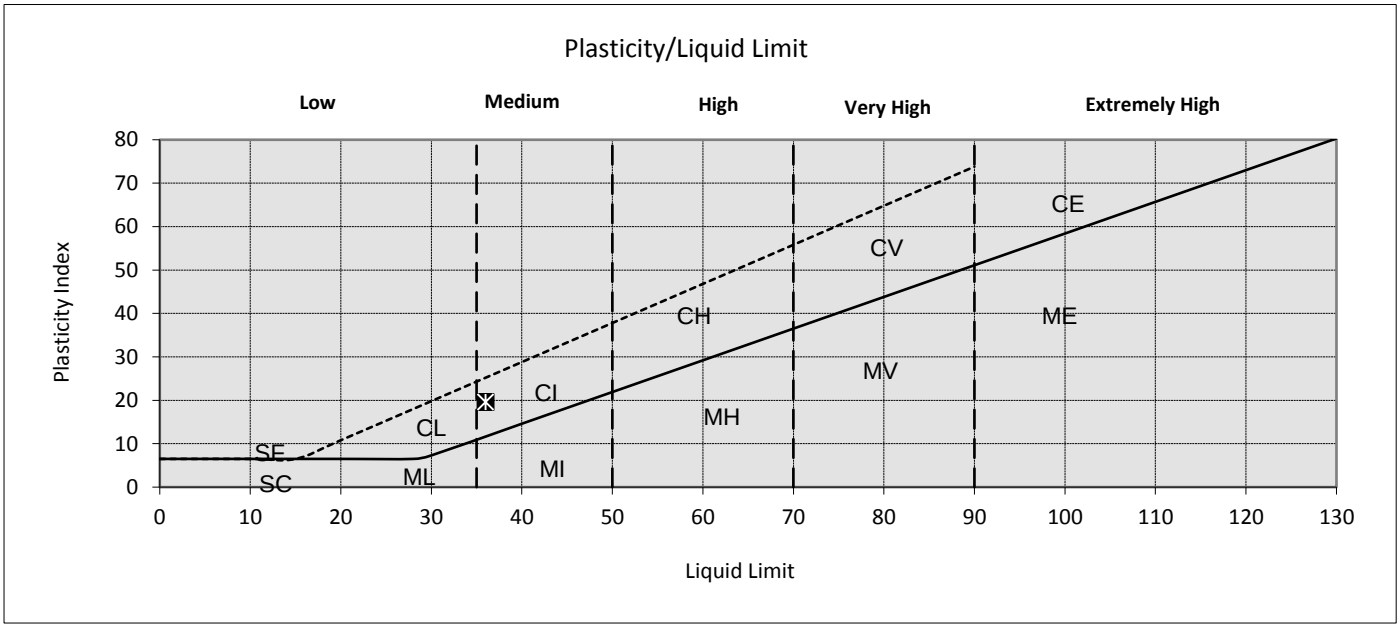
Tel: 01925286880

James Fisher Testing Services

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

Site Ref.:	Stockport Rd, Longsight	**Job No.:**	34790
		Lab Ref No.:	34790/28
Client:	Bek Enviro Ltd	**Sample Ref.:**	CP3 2.5-3m
		Date Received:	25/07/2019
		Date Tested:	02/08/2019
Originator:	**Mick Buckley**	**Date Reported:**	06/08/2019

Sampling Certificate	**Yes**
Sampled By	**Client**
Sample Type	**Bulk**
Sample Preparation Method	**As Received**
MATERIAL	**Stiff Brown Mottled Sl.Gravelly CLAY**
Retained 425 micron (%)	**4.8**
Natural Moisture Content (%)	**19**
Liquid Limit (single point)(%)	**36**
Plastic Limit (%)	**17**
Plasticity Index	**20**



K.Monks

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James Fisher Testing Services Limited
Ruby House, 40A Hardwick Grange
Warrington,WA1 4RF
Tel: 01925 286 880

James Fisher Testing Services

LABORATORY TEST REPORT
UNDRAINED TRIAXIAL COMPRESSION
BS 1377 : Part 7 : 1990 Clause 7

Project:	Stockport Rd, Longsight	**Job No:**	34790
Client:	Bek Enviro	**Lab Ref No:**	34790/28
		Date Received:	25/07/2019
		Date Tested:	02/08/2019
		Date Reported:	06/08/2019
Originator:	Mick Buckley	**Sample Ref:**	CP1 7.5-8m

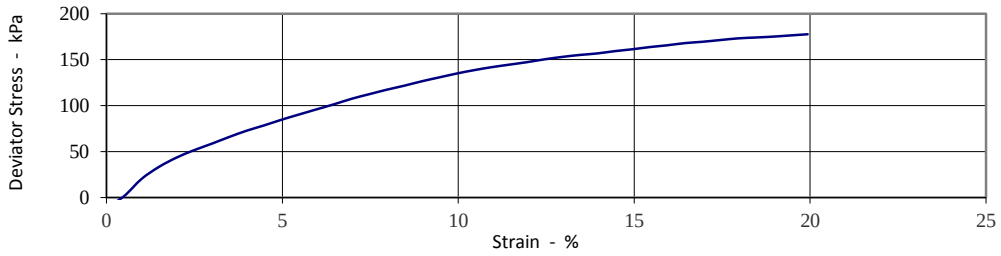
Sample Details

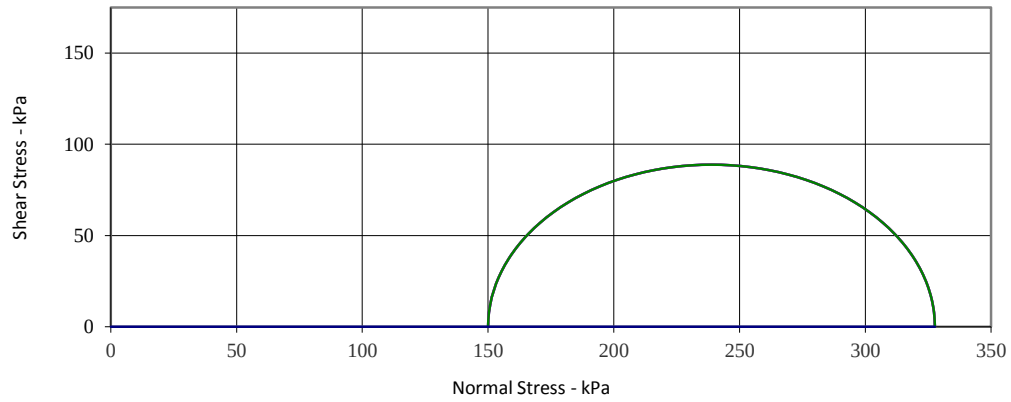
Description		Stiff Brown Sl.Sandy Sl.Gravelly CLAY
Sample Condition		Undisturbed
Height	mm	200.7
Diameter	mm	101.6
Moisture Content	%	16
Bulk Density	Mg/m³	2.20
Dry Density	Mg/m³	1.90

Test Details

Membrane Thickness	mm	0.30
Membrane Correction	kPa	1.12
Rate of Axial Displacement	%/min	1.99
Cell Pressure	kPa	150
Strain at Failure	%	19.9
Maximum Deviator Stress	kPa	178
Shear Strength	kPa	**89**
Mode of Failure		Intermediate

Shear Strength Parameters	
C	**89 kPa**
Phi	**0.0 °**





K.Monks

Approved Signature
James Fisher Testing Services Limited
Karl Monks, Lab Team Leader

James Fisher Testing Services Limited, a company registered in England and Wales with registration number: 01182561
Registered office: Fisher House, PO Box 4, Barrow-in-Furness, Cumbria, LA14 1HR

UKAS TESTING 0955

James Fisher Testing Services Limited
Ruby House, 40A Hardwick Grange
Warrington,WA1 4RF
Tel: 01925 286 880

James Fisher Testing Services

LABORATORY TEST REPORT
UNDRAINED TRIAXIAL COMPRESSION
BS 1377 : Part 7 : 1990 Clause 7

Project:	Stockport Rd, Longsight	**Job No:**	34790
Client:	Bek Enviro	**Lab Ref No:**	34790/28
		Date Received:	25/07/2019
		Date Tested:	02/08/2019
		Date Reported:	06/08/2019
Originator:	Mick Buckley	**Sample Ref:**	CP2 10.5-11m

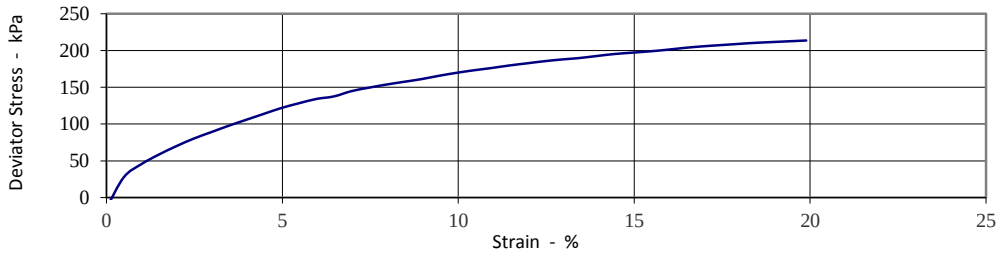
Sample Details

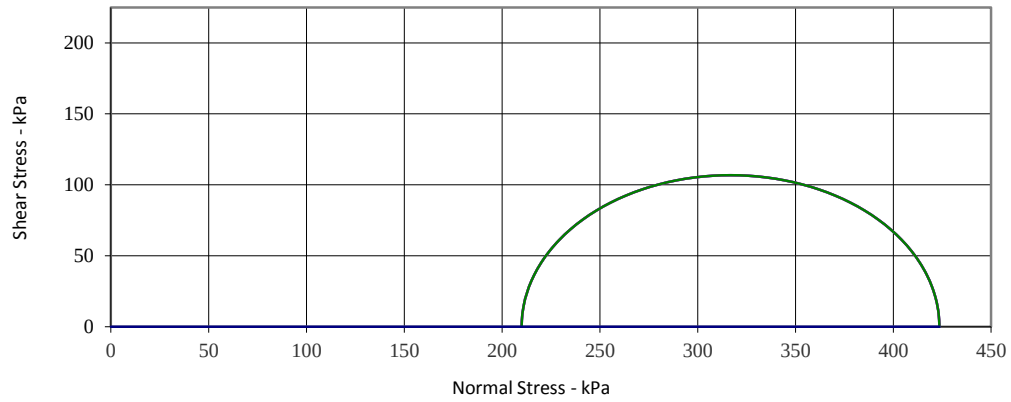
Description		Firm-Stiff Brown Sl.Gravelly CLAY
Sample Condition		Undisturbed
Height	mm	201.1
Diameter	mm	101.6
Moisture Content	%	16
Bulk Density	Mg/m³	2.17
Dry Density	Mg/m³	1.88

Test Details

Membrane Thickness	mm	0.37
Membrane Correction	kPa	1.38
Rate of Axial Displacement	%/min	1.99
Cell Pressure	kPa	210
Strain at Failure	%	19.9
Maximum Deviator Stress	kPa	214
Shear Strength	kPa	**107**
Mode of Failure		Intermediate

Shear Strength Parameters	
C	**107 kPa**
Phi	**0.0 °**





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UKAS TESTING 0955

James Fisher Testing Services Limited
Ruby House, 40A Hardwick Grange
Warrington,WA1 4RF
Tel: 01925 286 880

James Fisher Testing Services

LABORATORY TEST REPORT
UNDRAINED TRIAXIAL COMPRESSION
BS 1377 : Part 7 : 1990 Clause 7

Project:	Stockport Rd, Longsight	**Job No:**	34790
Client:	Bek Enviro	**Lab Ref No:**	34790/28
		Date Received:	25/07/2019
		Date Tested:	02/08/2019
		Date Reported:	06/08/2019
Originator:	Mick Buckley	**Sample Ref:**	CP3 6.5-7m

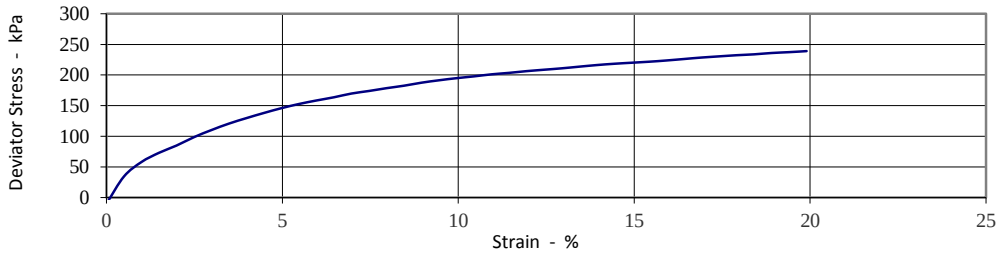
Sample Details

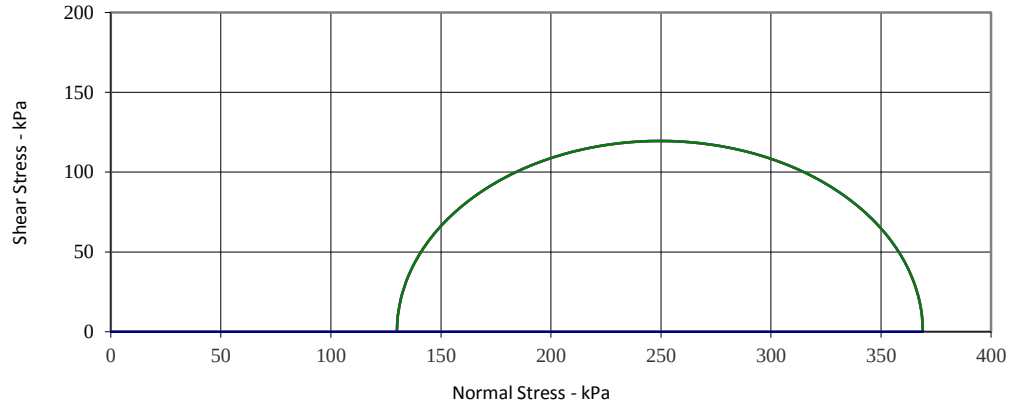
Description		Stiff Brown (ocasionally orange/brown) CLAY
Sample Condition		Undisturbed
Height	mm	201.0
Diameter	mm	101.5
Moisture Content	%	14
Bulk Density	Mg/m³	2.20
Dry Density	Mg/m³	1.92

Test Details

Membrane Thickness	mm	0.34
Membrane Correction	kPa	1.27
Rate of Axial Displacement	%/min	1.99
Cell Pressure	kPa	130
Strain at Failure	%	19.9
Maximum Deviator Stress	kPa	239
Shear Strength	kPa	**120**
Mode of Failure		Intermediate

Shear Strength Parameters	
C	**120 kPa**
Phi	**0.0 °**





K.Monks

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James Fisher Testing Services Limited
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Registered office: Fisher House, PO Box 4, Barrow-in-Furness, Cumbria, LA14 1HR

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APPENDIX G

Infiltration Test Results

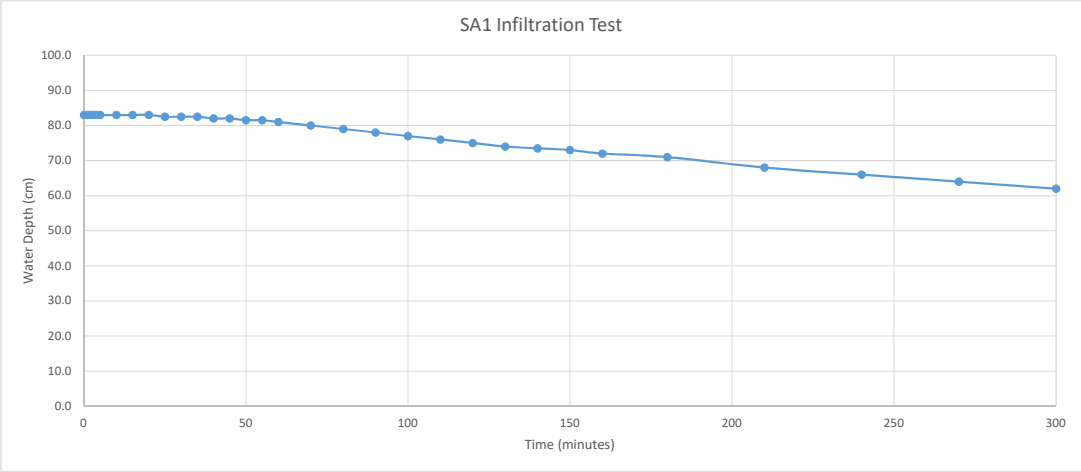
Stockport Road, Longsight - Infiltration Test - SA1

Time (minutes)	Depth (cm)
0	83.0
1	83.0
2	83.0
3	83.0
4	83.0
5	83.0
10	83.0
15	83.0
20	83.0
25	82.5
30	82.5
35	82.5
40	82.0
45	82.0
50	81.5
55	81.5
60	81.0
70	80.0
80	79.0
90	78.0
100	77.0
110	76.0
120	75.0
130	74.0
140	73.5
150	73.0
160	72.0
180	71.0
210	68.0
240	66.0
270	64.0
300	62.0

	Length (m)	Width (m)	Depth (m)	Area (m^3)
Pit Dimensions:	1.80	0.85	1.90	2.91

25% Effective Depth = 0.2075
50% Effective Depth = 0.415
75% Effective Depth = 0.6225

GEO-ENVIRONMENTAL CONSULTING ENGINEERS



Soil Infiltration Rate (f) = $\frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$

V_{p75-25} = effective storage volume of water in the trial pit between 75% and 25% effective depth
= 0.63495 m^3

a_{p50} = internal surface area of the trial pit up to 50% effective depth and including base area
= 4.90675 m^2

t_{p75-25} = time for water to fall from 75% to 25% effective depth
= 25% effective depth = 20.75
75% effective depth = 62.25

= 0 mins
= 0 seconds

Soil Infiltration Rate (f) = **#DIV/0!**
= 0 m/s
= 0 m/hour

Soil Infiltratation Rate unable to be determined as water level failed to reach 25% effective depth. Test Failed

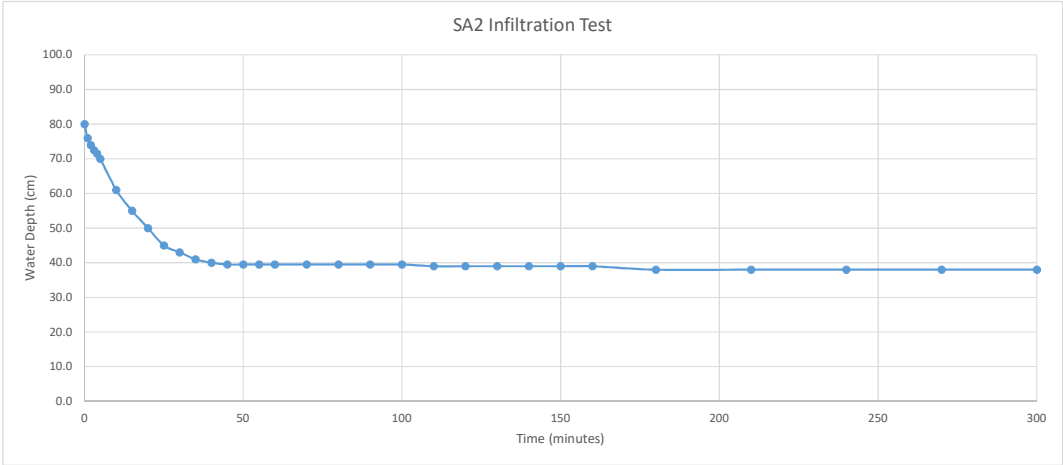
Stockport Road, Longsight - Infiltration Test - SA2

Time (minutes)	Depth (cm)
0	80.0
1	76.0
2	74.0
3	72.5
4	71.5
5	70.0
10	61.0
15	55.0
20	50.0
25	45.0
30	43.0
35	41.0
40	40.0
45	39.5
50	39.5
55	39.5
60	39.5
70	39.5
80	39.5
90	39.5
100	39.5
110	39.0
120	39.0
130	39.0
140	39.0
150	39.0
160	39.0
180	38.0
210	38.0
240	38.0
270	38.0
300	38.0

	Length (m)	Width (m)	Depth (m)	Area (m^3)
Pit Dimensions:	1.60	0.85	1.85	2.52

25% Effective Depth = 0.2
50% Effective Depth = 0.4
75% Effective Depth = 0.6

GEO-ENVIRONMENTAL CONSULTING ENGINEERS



Soil Infiltration Rate (f) = $\frac{V_{p75-25}}{a_{p50} \times t_{p75-25}}$

V_{p75-25} = effective storage volume of water in the trial pit between 75% and 25% effective depth
= 0.544 m^3

a_{p50} = internal surface area of the trial pit up to 50% effective depth and including base area
= 4.34 m^2

t_{p75-25} = time for water to fall from 75% to 25% effective depth
= 25% effective depth = 20
75% effective depth = 60

= 0 mins
= 0 seconds

Soil Infiltration Rate (f) = **#DIV/0!**
= 0 m/s
= 0 m/hour

Soil Infiltratation Rate unable to be determined as water level failed to reach 25% effective depth. Test Failed

APPENDIX H

Gas Monitoring Data

Ground Gas Monitoring Record

Borehole	Gas Flow (l/hr)	Gas Flow (l/hr)	Borehole Pressure	Methane (% v/v)		Methane (%LEL*)		Carbon Dioxide (%v/v)		Oxygen (%v/v)		H2S PPM		CO PPM		Depth to water	Depth to Base	Atmospheric Pressure	Comments
	Initial	Peak	(Pa)	Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady	(m bgl)	(m bgl)	(mB)	
CP1	0.0	0.0		0.0	0.0			0.5	0.0	19.1	20.6					3.33	4.9	1015	
WS4	0.0	0.0		0.0	0.0			4.2	4.7	14.7	13.5					1.07	4.92	1016	
WS5	0.3	0.3		0.0	0.0			0.9	1.5	20.2	17.5					0.67	4.81	1015	

Notes:
Monitoring should be for not less than 3 Minutes. However, if high concentrations of gases initially recorded, monitoring should be for up to 10 mins.
* LEL = Explosive Limit = 5%v/v
ND - Not Detected

Relevant Information at times of monitoring

Monitored by:	DE
Weather :	Dry, sunny
Equipment used:	GFM436 Gas Analyser
Visible signs of vegetation stress:	None
Boreholes sampled for laboratory analysis:	None
Other comments / observations:	None

GEO-ENVIRONMENTAL CONSULTING ENGINEERS

Contract:	**Stockport Road, Longsight**
Date:	**23/07/19**
Job No.	18469
Sheet No.	**1**

Ground Gas Monitoring Record

Borehole	Gas Flow (l/hr)	Gas Flow (l/hr)	Borehole Pressure	Methane (% v/v)		Methane (%LEL*)		Carbon Dioxide (%v/v)		Oxygen (%v/v)		H2S PPM		CO PPM		Depth to water	Depth to Base	Atmospheric Pressure	Comments
	Peak	Steady	(Pa)	Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady	(m bgl)	(m bgl)	(mB)	
CP1	0.0	0.0		0.0	0.0			0.0	0.0	20.3	20.2					3.27	4.82	1001	
WS4	-25.6	0.0		0.0	0.0			2.7	2.9	14.9	14.4					0.91	4.93	1001	
WS5	-24.1	0.0		0.0	0.0			0.7	1.0	18.7	18.5					0.61	4.78	1001	

Notes:
Monitoring should be for not less than 3 Minutes. However, if high concentrations of gases initially recorded, monitoring should be for up to 10 mins.
* LEL = Explosive Limit = 5%v/v
ND - Not Detected

Relevant Information at times of monitoring

Monitored by:	AM
Weather :	Dry, sunny
Equipment used:	GFM436 Gas Analyser
Visible signs of vegetation stress:	None
Boreholes sampled for laboratory analysis:	None
Other comments / observations:	None

GEO-ENVIRONMENTAL CONSULTING ENGINEERS

Contract:	**Stockport Road, Longsight**
Date:	**06/08/19**
Job No.	18469
Sheet No.	**2**

Ground Gas Monitoring Record

Borehole	Gas Flow (l/hr)	Gas Flow (l/hr)	Borehole Pressure	Methane (% v/v)		Methane (%LEL*)		Carbon Dioxide (%v/v)		Oxygen (%v/v)		H2S PPM		CO PPM		Depth to water	Depth to Base	Atmospheric Pressure	Comments
	Peak	Steady	(Pa)	Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady	(m bgl)	(m bgl)	(mB)	
CP1	0.1	0.0		0.0	0.0			0.2	0.2	20.1	20.1					3.37	4.8	998	
WS4	0.2	0.0		0.0	0.0			1.6	1.6	18.4	18.4					0.91	4.95	998	
WS5	0.3	0.0		0.0	0.0			0.4	0.4	19.2	19.2					0.61	4.75	998	

Notes:
Monitoring should be for not less than 3 Minutes. However, if high concentrations of gases initially recorded, monitoring should be for up to 10 mins.
* LEL = Explosive Limit = 5%v/v
ND - Not Detected

Relevant Information at times of monitoring

Monitored by:	MB
Weather :	Sunny
Equipment used:	GFM436 Gas Analyser
Visible signs of vegetation stress:	None
Boreholes sampled for laboratory analysis:	None
Other comments / observations:	None

GEO-ENVIRONMENTAL CONSULTING ENGINEERS

Contract:	**Stockport Road, Longsight**
Date:	**22/09/19**
Job No.	18469
Sheet No.	**3**

Ground Gas Monitoring Record

Borehole	Gas Flow (l/hr)	Gas Flow (l/hr)	Borehole Pressure	Methane (% v/v)		Methane (%LEL*)		Carbon Dioxide (%v/v)		Oxygen (%v/v)		H2S PPM		CO PPM		Depth to water	Depth to Base	Atmospheric Pressure	Comments
	Peak	Steady	(Pa)	Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady	(m bgl)	(m bgl)	(mB)	
CP1	0.0	0.0		0.0	0.0			0.0	0.7	20.8	19.8					0.85	4.76	1033	
WS4	0.0	0.0		0.0	0.0			0.0	1.9	19.3	17.8					0.82	4.98	1033	
WS5	0.0	0.0		0.0	0.0			0.0	0.0	20.5	20.1					0.6	4.84	1033	

Notes:
Monitoring should be for not less than 3 Minutes. However, if high concentrations of gases initially recorded, monitoring should be for up to 10 mins.
* LEL = Explosive Limit = 5%v/v
ND - Not Detected

Relevant Information at times of monitoring

Monitored by:	AM
Weather :	Dry, sunny
Equipment used:	GFM436 Gas Analyser
Visible signs of vegetation stress:	None
Boreholes sampled for laboratory analysis:	None
Other comments / observations:	None

GEO-ENVIRONMENTAL CONSULTING ENGINEERS

Contract:	**Stockport Road, Longsight**
Date:	**06/08/19**
Job No.	18469
Sheet No.	**4**

Ground Gas Monitoring Record

Borehole	Gas Flow (l/hr)	Gas Flow (l/hr)	Borehole Pressure	Methane (% v/v)		Methane (%LEL*)		Carbon Dioxide (%v/v)		Oxygen (%v/v)		H2S PPM		CO PPM		Depth to water	Depth to Base	Atmospheric Pressure	Comments
	Peak	Steady	(Pa)	Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady	(m bgl)	(m bgl)	(mB)	
CP1	0.0	0.0		0.0	0.0			1.2	1.2	20.2	20.2					3.38	4.84	1015	
WS4	0.0	0.0		0.0	0.0			0.6	0.6	19.9	19.9					0.95	4.9	1015	
WS5	0.0	0.0		0.0	0.0			0.4	0.3	20.1	20.1					0.74	4.72	1015	

Notes:
Monitoring should be for not less than 3 Minutes. However, if high concentrations of gases initially recorded, monitoring should be for up to 10 mins.
* LEL = Explosive Limit = 5%v/v
ND - Not Detected

Relevant Information at times of monitoring

Monitored by:	MB
Weather :	Clear, Recent Rain
Equipment used:	GFM436 Gas Analyser
Visible signs of vegetation stress:	None
Boreholes sampled for laboratory analysis:	None
Other comments / observations:	None

GEO-ENVIRONMENTAL CONSULTING ENGINEERS

Contract:	**Stockport Road, Longsight**
Date:	**02/10/19**
Job No.	18469
Sheet No.	**5**

Ground Gas Monitoring Record

Borehole	Gas Flow (l/hr)	Gas Flow (l/hr)	Borehole Pressure	Methane (% v/v)		Methane (%LEL*)		Carbon Dioxide (%v/v)		Oxygen (%v/v)		H2S PPM		CO PPM		Depth to water	Depth to Base	Atmospheric Pressure	Comments
	Peak	Steady	(Pa)	Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady	Initial	Steady	(m bgl)	(m bgl)	(mB)	
CP1	0.0	0.0		0.0	0.0			0.4	0.0	20.2	20.5					3.31	4.85	1007	
WS4	0.0	0.0		0.0	0.0			1.0	0.9	19.3	19.6					1.09	4.92	1008	
WS5	-0.4	0.0		0.0	0.0			2.9	4.2	16.0	14.2					0.73	4.73	1008	

Notes:
Monitoring should be for not less than 3 Minutes. However, if high concentrations of gases initially recorded, monitoring should be for up to 10 mins.
* LEL = Explosive Limit = 5%v/v
ND - Not Detected

Relevant Information at times of monitoring

Monitored by:	DE
Weather :	Dry
Equipment used:	GFM436 Gas Analyser
Visible signs of vegetation stress:	None
Boreholes sampled for laboratory analysis:	None
Other comments / observations:	None

GEO-ENVIRONMENTAL CONSULTING ENGINEERS

Contract:	**Stockport Road, Longsight**
Date:	**23/10/19**
Job No.	18469
Sheet No.	**6**

APPENDIX I

Photographs

GEO-ENVIRONMENTAL CONSULTING ENGINEERS

bEk Enviro Ltd
Suite One | No 3 Mitton Road Business Park
Mitton Road | Whalley | Lancashire | BB7 9YE
01254 377622
mbuckley@bekenviro.co.uk | bekenviro.co.uk



Photograph 1: Trial Pit 1



Photograph 2: Trial Pit 1

GEO-ENVIRONMENTAL CONSULTING ENGINEERS

bEk Enviro Ltd
Suite One | No 3 Mitton Road Business Park
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01254 377622
mbuckley@bekenviro.co.uk | bekenviro.co.uk



Photograph 3: Trial Pit 2



Photograph 4: Trial Pit 3

GEO-ENVIRONMENTAL CONSULTING ENGINEERS

bEk Enviro Ltd
Suite One | No 3 Mitton Road Business Park
Mitton Road | Whalley | Lancashire | BB7 9YE
01254 377622
mbuckley@bekenviro.co.uk | bekenviro.co.uk



Photograph 5: Trial Pit 3



Photograph 6: Infiltration Test SA1

bEk Enviro Ltd
Suite One | No 3 Mitton Road Business Park
Mitton Road | Whalley | Lancashire | BB7 9YE
01254 377622
mbuckley@bekenviro.co.uk | bekenviro.co.uk



Photograph 7: Infiltration Test SA1



Photograph 8: Infiltration Test SA2

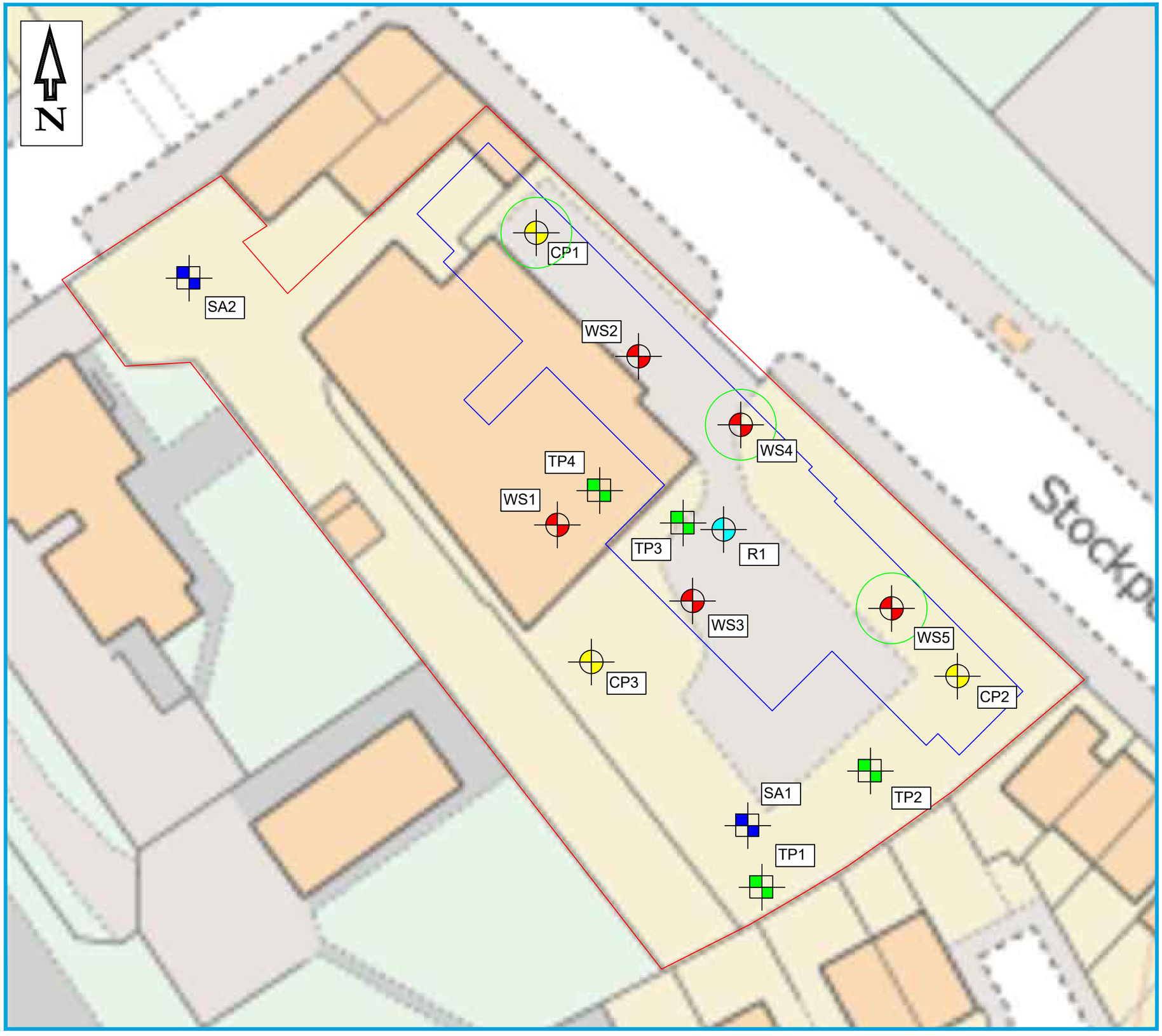
bEk Enviro Ltd
Suite One | No 3 Mitton Road Business Park
Mitton Road | Whalley | Lancashire | BB7 9YE
01254 377622
mbuckley@bekenviro.co.uk | bekenviro.co.uk



Photograph 9: Infiltration Test SA2

APPENDIX J

Drawings



LEGEND

- Cable Percussive Borehole
- Window Sample Borehole
- Rotary Borehole
- Soakaway Test
- Trial Pit

REV	DESCRIPTION	DATE	BY
A	Rotary Borehole Added	27/08/19	D.E.

GEO-ENVIRONMENTAL CONSULTING ENGINEERS
Suite One, No 3 Mitton Road Business Park, Mitton Road, Whalley, Lancashire BB7 9YE
Tel: 01254 377622 Mob: 07906753583
Email: mbuckley@bekenviro.co.uk
Web: www.bekenviro.co.uk

CLIENT.
CS DERBY LTD

JOB TITLE.
STOCKPORT ROAD,
LONGSIGHT

DRAWING TITLE.
FINAL SITE INVESTIGATION
LOCATION PLAN

SCALE @ A3.	DRAWN BY.	APPROVED BY.	DATE.
NTS	D.E.	M.B.	24/07/19

DRAWING No. 18469-4

REV. A

client	AMSTONE		
project	STOCKPORT ROAD		
project no	drawing no		rev
7891	L(00)04		D
description	PROPOSED GROUND FLOOR		
scale	1:200@ A2	date drawn	11.02.19
drawn by	KM	authorised by	CJG

file:\\192.168.1.5\projects\7891 STOCKPORT ROAD\Drawings\Working\7891 - L(00)04 - PROPOSED GROUND FLOOR.pln

purpose of issue
planning ○ building regs ○ tender ○ comment ○ approval ○ construction ○

AMSTONE

STOCKPORT ROAD

project no | drawing no | rev

7891 | L(00)04 | D

description

scale | date drawn | drawn by | authorised by

1:200@ A2 | 11.02.19 | KM | CJG

file:\\192.168.1.5\projects\7891 STOCKPORT ROAD\Drawings\Working\7891 - L(00)04 - PROPOSED GROUND FLOOR.pln

purpose of issue

planning ○ building regs ○ tender ○ comment ○ approval ○ construction ○

LeachRhodesWalker

Architects

info@lrw.co.uk | www.lrw.co.uk

50 Dearmans Place Manchester M3 5LH

Manchester +44 (0)161 833 C211 | London +44 (0)207 2012160 | Bucharest +40 (2') 650 4024

DO NOT SCALE OFF THIS DRAWING © LEACH RHODES WALKER 2001

rev	description	drwn	auth	date

Shelter

STOCKPORT ROAD

BUS STOP

+48.65 +48.54 +48.48 +48.43 +48.39

+48.45 +48.75 +48.75

PLYMOUTH GROVE WEST

+48.17

+48.03

+47.93

+47.84

+48.02

+48.75

Substation

Visitors Stands 6 Cycles

Heritage Building Surface - Refuse Collection

Secure Gate

1:20 Ramp

1:20 Ramp

Apt G/1.03 3 Bed Townhouse 51 sqm (102sqm Total)

Apt G/1.04 3 Bed Townhouse 51 sqm (102sqm Total)

Apt G/1.05 3 Bed Townhouse 51 sqm (102sqm Total)

Apt G/1.06 3 Bed Townhouse 52 sqm (104sqm Total)

Apt G/1.07 3 Bed Townhouse 51 sqm (102sqm Total)

Entrance / Lobby 43 sqm

Pod

Apt G.08 2 Bed 67 sqm

Apt G/1.01 3 Bed Townhouse 51 sqm (102sqm Total)

Apt G/1.02 3 Bed Townhouse 51 sqm (102sqm Total)

Tank Room

Comms / Elect Room

Refuse Store (21 Bins)

Refuse Storage Provision
Euroboxe: 5 / 1100L Capacity: 5 / 1m
Oyclebar: Max

Cycle Store (96 Cycles)
67 Semi Vertical, 29 Sheffield Stands, 50%Wall Fixed
Staggered

Apt G.09 2 Bed 66 sqm

Apt G.10 2 Bed 68 sqm

57 Car Spaces (Including 3 accessible, 3 tandem)

Tandem

Tandem

Tandem

342

9

Church

GEO-ENVIRONMENTAL CONSULTING ENGINEERS

smas worksafe consultant www.smasltd.com as recognised by SSIP SAFETY SCHEMES IN PROCUREMENT



GEO-ENVIRONMENTAL CONSULTING ENGINEERS

Suite One | No 3 Mitton Road Business Park | Mitton Road | Whalley | Lancashire | BB7 9YE
Office: 01254 377622 Mobile: 07906 753583 mbuckley@bekenviro.co.uk www.bekenviro.co.uk