

ENVIRONMENT

Wilson Bowden Developments Ltd
Plot P, Kingsway Business Park
Rochdale
Phase 2 Geo-Environmental Assessment

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Rochdale
Phase 2 Geo-Environmental Assessment

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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY	
Site Address	The site is located on a collection of fields immediately south of Kingsway Business Park Tram Stop in Rochdale, postcode OL16 4JN.
Site Setting	The proposed development is anticipated to comprise a commercial and/or warehouse building with associated infrastructure.
Published Ground Conditions	Information published by the BGS indicates that the site is directly underlain by Glaciofluvial Deposits (Sand and Gravel) in the western part of the site and Glacial Till in the eastern part, these are underlain by Pennine Lower Coal Measures bedrock. The bedrock is inferred as faulted to the southwest and northeast of the site at 52m and 130m respectively (NW-SE trending).
Site Investigation	Intrusive ground investigation works were undertaken between 1 st and 5 th August 2022 and comprised the advancement of five cable percussive boreholes to a maximum depth of 15.00m bgl with completion of SPTs and installations of gas and groundwater monitoring wells; and twenty machine excavated trial pits (TP101 to TP121 inclusive) to a maximum depth of 4.50m bgl.
Ground Conditions Encountered	The ground conditions encountered generally confirmed the published geology discussed in the Phase 1 report and comprised Topsoil and Made Ground directly underlain by Glaciofluvial Deposits, locally underlain by Glacial Till, particularly in the eastern part, with both underlain by Pennine Lower Coal Measures bedrock. Peat and organic soils were observed in soils above the Till in the eastern area of the site associated with areas of former/existing low-lying waterlogged ground and ponds.
Geotechnical Appraisal	Given the ground conditions encountered, ground improvement will be required for the support of shallow foundations and the floor slab, utilising vibro-stone columns (VSC). Alternatively, ground improvement comprising rigid inclusions (RIs), with a load transfer platform is considered feasible. Any organic soils/Peat beneath the building footprint will need to be delineated, chased out, removed and replaced with suitable engineered fill. The excavated organic soils/Peat could potentially be reused within non-structural areas of the development. Compaction testing indicates soils are generally wet of optimum at natural moisture contents and would require dewatering (via chemical modification) for adequate compaction as engineered fill. The design sulphate and ACEC class for below ground concrete at the site is DS-1 and AC-1. For new pavement at the site, modification of the formation soils (e.g. by lime or cement) will be required to achieve the required design CBR value. Based on the ground conditions encountered together with the variable and shallow groundwater issues in the area, soakaway drainage is unlikely to be a viable solution. Groundwater is likely to vary seasonally at the site. The ground investigation will have likely captured a lowered groundwater situation, with some areas of the site displaying evidence of historical waterlogging (reeds, peat build up). If groundwater levels rise following extended periods of wet weather, groundwater control may be required during construction ground works.
Environmental Appraisal	High total Organic Carbon (TOC) content in the Made Ground was recorded and organic Superficial deposits associated with surface ponding were also identified, predominantly in the east of the site. Peat was recorded in two locations within the Superficial deposits. Characteristic Gas Situation 1 (CS1) prevails on site within monitored boreholes, however, CS3 gas protection measures are recommended on structures

	constructed over natural soils with high organic content, as encountered at the site. No soil samples tested had contaminant concentrations that exceeded the screening criteria for risks to human health for a commercial end-use. Asbestos was not detected in the five Made Ground samples tested. Minor exceedances for leachable copper, lead, nickel and zinc were recorded. BWB consider these exceedances to not be significant given the distance to sensitive surface water receptors. Minor exceedances for cadmium, copper, nickel, zinc, and ammonium were recorded in groundwater samples. Due to the proposed development on the site comprising large areas with hardstanding and buildings which will limit further infiltration and leaching, BWB do not consider that controlled waters will be exposed to an unacceptable risk as a result of the proposed development.
Waste Assessment	Soil samples have been characterised against hazardous waste criteria using Hazwasteonline. The results of the waste classification indicates that the soils analysed are likely to be classified as non-hazardous.
Recommendations	A Remediation Strategy should be completed for the site prior to development to provide remediation and mitigation requirements and provide verification requirements of any gas protection measures required. Should organic materials be removed from site, therefore removing the ground gas source, a Design Statement should be completed. Additional ground investigation should be undertaken in the eastern part of the site to delineate the shallow organic soils in order to assess the feasibility for removal from the proposed building footprint. To assist with the design of ground improvement by VSCs or RIs, additional investigation via cone penetration testing is recommended, focussing on the proposed building footprint. Access to the farmer's field in the far eastern section of site was not possible at the time of the investigation due to the presence of livestock. Prior to development, ground conditions within this area of the site should be confirmed by further investigation to ensure consistency of ground conditions characterised in the remainder of the site, as described in this report.
This summary should be read in conjunction with BWB's full report (ref. KYP-BWB-ZZ-XX-RP-YE-0002_Ph2-P2) and reflects an assessment of the Site based on information received by BWB at the time of production.	

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1. INTRODUCTION

Instruction

- 1.1 BWB Consulting (BWB) was instructed by Wilson Bowden Developments Ltd (the Client) to carry out a Phase 2 Geo-Environmental Assessment for a site referred to as Plot P, Kingsway Business Park, Rochdale. Details of the project brief are included in BWB proposal reference 2100939 dated December 2021.

Proposed Development

- 1.2 The proposed development is shown on the architect's masterplan in **Appendix 1**. An extract from the masterplan is shown in Figure 1.1. The development is anticipated to comprise a commercial warehouse with associated infrastructure and parking.

Figure 1.1: Proposed Development



1.3

Previous Reports

1.4 The following geo-environmental reports have previously been completed for the site:

- 'Phase 1 Geo-Environmental Assessment' by BWB Consulting Ltd for Wilson Bowden Developments Ltd, reference KYP-BWB-ZZ-XX-RP-YE-0001_Ph1, dated July 2022.

Objectives

1.5 The objectives of the report are to assess:

- The prevailing ground and groundwater conditions across the site;
- The potential presence and extent of contamination in shallow soil and groundwater beneath the site;
- The significance and magnitude of the observed contamination through comparison of analytical data with appropriate published environmental screening criteria;
- The strength properties of the soil beneath the site to enable foundation design;
- The ability to rework the soils for earthworks required to achieve the development platform;
- Any precautions required with respect to attack on buried concrete;
- The drainage properties of the underlying strata; and
- The ground gas regime beneath the site.

1.6 The above objectives will allow the preliminary Conceptual Site Model presented in the Phase 1 report to be verified and updated. The report has been completed in accordance with BS10175:2011(+A2:2017) 'Investigation of Potentially Contaminated Sites, Code of Practice' and EA Guidance on Risk Management of Land Contamination <https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm>.

1.7 This report presents the information obtained from a desk study and the supplementary ground investigations and contains relevant factual information from the previous investigations undertaken by others. The report, together with the associated Figures and Appendices, provides a Ground Investigation Report (GIR), as defined in BS EN 1997-1:2004 and BS EN 1997-2:2007

Scope of Works

1.8 The ground investigation scope of works was completed on 05/08/2022 and comprised the following

- Non-intrusive survey of exploratory hole locations for underground utilities;
- 17 no. machine excavated trial pits;
- 5 no. cable percussive boreholes;
- 4 no. gas and groundwater monitoring visits;

- Chemical analysis of soil samples; and
- Geotechnical testing of recovered soil samples.

2. THE SITE

Site Location

- 2.1 The site is located at Plot P, Kingsway Business Park, in Rochdale, centred at National Grid reference 391907 412651, nearest postcode OL16 4JN. The approximate location of the site is shown below in Figure 2.1.

Figure 2.1: Site Location Plan



Site Description

- 2.2 A full site description and site photographs are included within the BWB Phase 1 Geo-Environmental Assessment (Ref: KYP-BWB-ZZ-XX-RP-YE-0001_Ph1) dated July 2022.
- 2.3 The site comprises of an irregularly shaped parcel of grassed land to the east of Rochdale centre, covering approximately 2.6 hectares. The site is undulating, with ground levels typically around 149m above Ordnance Datum.

-
- 2.4 Site use is currently agricultural, and cows were being pastured in the field to the east of the site during the ground investigation.
- 2.5 The Oldham to Rochdale tram line is located adjoining the northern boundary of the site, with residential development beyond and to the north. The Kingsway Loop Road (Michael Faraday Avenue) bounds the site to the south. The land to the east and west of the site currently comprises undeveloped grassed fields with ponds and waterlogged areas.
- 2.6 Stanney Brook is present around 150m to the south and west of the site boundary. Beyond the Brook is a series of engineered ponds, and immediately adjacent to these ponds the Rochdale Canal is present around 380m to the west of site.

3. PUBLISHED GROUND CONDITIONS

Published Geology

- 3.1 British Geological Survey (BGS) mapping for the site indicates that the site is directly underlain by Glaciofluvial Deposits (Sand and Gravel) to the west and Glacial Till to the east. These Superficial deposits are underlain by Pennine Lower Coal Measures bedrock (with seams last worked in 1915 at 97m to 107m bgl). The bedrock is inferred as faulted to the southwest and northeast of the site at 52m and 130m respectively (NW-SE trending). The BGS Lexicon database describes the bedrock as interbedded mudstone, siltstone and sandstone containing thicker coal seams towards the upper boundary.
- 3.2 The closest BGS borehole to the site is SD91SW-156, approximately 380 m west. The borehole recorded 1.4m of Made Ground, comprising of 200mm of topsoil over dark brown sandy topsoil with a small amount of gravel content. This is underlain by 4.6m of medium dense, brown silty fine to medium sand becoming loose at 5.2m to the borehole's termination at 6.0m bgl (below ground level). The Glacial Till on site are not present at this borehole location, but the Glaciofluvial Deposits and underlying Lower Coal Measures bedrock, which are present on site, are included in this record.

Hydrogeology

- 3.3 The underlying ground conditions have been classified by the Environment Agency (EA) as follows:
- Glacial Till (in the east): Secondary Undifferentiated Aquifer;
 - Glaciofluvial Deposits (in the west): Secondary A Aquifer; and
 - Pennine Lower Coal Measures Bedrock: Secondary A Aquifer.

Hydrology

- 3.4 There are three bodies of standing water located within the site boundary, that are wider than 5m. These are expected to be waterlogged areas / ponds caused by perched water on top of low permeability Superficial deposits (cohesive Till) in low-lying areas.
- 3.5 The following bodies of water are present within 400m of the site:
- Stanney Brook is present around 150m to the west of the site boundary;
 - A series of engineered ponds around 250m to the west; and
 - Rochdale Canal is present around 380m to the west.
- 3.6 There is a high risk of surface water flooding on site, primarily related to the observed on site surface water bodies, and within 50m.
- 3.7 There is risk of a maximum flood depth of 0.3m to 1m from surface water flooding on site for a 1 in 30-year event according to Environment Agency mapping. There is a low to moderate risk of groundwater flooding on site.

4. PRELIMINARY ENVIRONMENTAL RISK ASSESSMENT

Introduction

- 4.1 The risk posed by any contaminants in soil or groundwater will depend on the nature of the hazard, the probability of exposure, the pathway by which exposure occurs, and the likely effects on the receptors. A contaminant is defined as a substance that has the potential to cause harm, while a risk is considered to exist if such a substance is present in sufficient concentration to cause harm and a pathway exists for a receptor to be exposed to the substance.
- 4.2 The following sections discuss all the identified potential on and off-site sources, pathways and receptors in the context of the proposed development and plausible pollutant linkages which may represent a risk to identified receptors such as human health and/or controlled waters from the data gained from the desk study. At this stage the assessment is qualitative and aimed to determine all pollutant linkages, irrespective of significance or allowing for uncertainty.
- 4.3 Three impact potentials exist for any given site; these are:
- The site impacting upon itself;
 - The site impacting on its surroundings; and
 - The surroundings impacting on the site.
- 4.4 All three impacts need to be considered in a risk assessment.
- 4.5 A Source, Pathway, Receptor analysis has been undertaken for the site based on the information provided in the preceding sections. This is presented as Table 5 and further information about the risk classification scheme is included within Appendix 5.
- 4.6 Sources (S); These are potential or known sources of contamination that may relate to a former land use or present site feature or process (e.g. fuel storage tanks).
- 4.7 Pathways (P); A pathway is defined as a mechanism or route by which a contaminant comes into contact with, or otherwise affects a receptor. Pathways by which the identified receptors may be impacted upon in the context of the proposed development.
- 4.8 Receptors (R); Receptors are defined as people, living organisms, ecological systems, controlled waters, atmosphere, structures and utilities that could be adversely affected by contaminant(s).
- 4.9 Under the Construction Design Management (CDM) Regulations 2015, construction and maintenance contractors must undertake their own risk assessments and mitigation to protect their staff, other human receptors and the environment from potential contamination. By law potential risks to human health and the environment from construction activities must appropriately identified and all necessary steps taken to eliminate/manage that risk. Therefore, construction / maintenance workers are excluded as a receptor in the CSM.

4.10 A tabulated version of the Preliminary CSM produced within the desk study is presented in Tables Table 4:1, Table 4:2 and Table 4:3.

Table 4:1: Potential Sources of Contamination

Location	Potential Source	Contaminants of Potential Concern (CoPC)
On-site	MADE GROUND associated with previous infrastructure developments such as RAILWAY SIDINGS and ROAD DEVELOPMENT	- Heavy metals - Inorganics, such as cyanides, sulphates and nitrates - Arsenic - Methane, carbon dioxide
	Former/current SURFACE WATER/POND features on site.	- Organic material - Methane, carbon dioxide
	Contamination associated with AGRICULTURAL activities	- Semi-volatile organic compounds (SVOCs) including phenols and polycyclic aromatic hydrocarbons (PAHs) - Inorganics, such as cyanides, sulphates and nitrates - Methane, carbon dioxide
	Gas accumulation in DEEP MINING WORKS	Methane, carbon dioxide
Off-site	Contamination associated with neighbouring activities including RAILWAY CUTTING and QUARRIES	- Heavy metals - Semi-volatile organic compounds (SVOCs) including phenols and polycyclic aromatic hydrocarbons (PAHs) - Petroleum hydrocarbons - Inorganics, such as cyanides, sulphates and nitrates - pH

Table 4:2: Relevant Potential Pathways and Receptors

Receptors	Pathways
Human Health: - Future site users (commercial) - Neighbouring public (residential/commercial) - Intrusive maintenance workers	- Dermal contact with soil or dust - Incidental ingestion of soil and/or dust - Inhalation of dust and/or fibres - Inhalation of vapours - Migration and accumulation of ground gas in enclosed spaces leading to inhalation or explosion
Controlled Waters: - Groundwater (Secondary A Aquifers) - Surface water (Rochdale Canal, Stanney Brook)	- Leaching of soil contaminants - Vertical and lateral migration - Surface run-off
Ecology: Flora and Fauna	- Lateral migration - Uptake and accumulation
Property: - Underground utilities - Building structures	- Direct Contact - Accumulation and explosion of gas

Table 4.3: Preliminary Conceptual Site Model

Source	Pathway	Receptor	Con	Prob	Risk
On-site sources as detailed in Table 4.1.	Dermal contact with, and incidental ingestion of soil and/or dust. Inhalation of dust and/or fibres.	Future site users (commercial)	Md	UI	L
		Intrusive maintenance workers	Md	Lw	M/L
	Inhalation of vapours.	Future site users (commercial)	Md	UI	L
		Neighbouring public	Md	UI	L
		Intrusive maintenance workers	Md	Lw	M/L
	Migration and accumulation of ground gases in enclosed spaces leading to asphyxiation (carbon dioxide) or explosion (methane).	Future site users (commercial)	Md	Lw	M/L
	Leaching and permeation through soil profile.	Groundwater: Underlying Secondary Superficial & Bedrock Aquifers	Md	UI	L
	Vertical and lateral migration of contaminants.		Md	UI	L
	Surface run-off.	Stanney Brook Rochdale Canal	Md	UI	L
	Direct contact.	Water utility pipes	Md	Lw	M/L
		Buried structures/ foundations.	Mi	Lw	L
Off-site sources as detailed in Table 4.1.	Dermal contact with, and incidental ingestion of soil and/or dust.	Future site users (commercial)	Md	UI	L
		Future site users (commercial)	Md	UI	L

Source	Pathway	Receptor	Con	Prob	Risk
	Leaching and permeation through soil profile.	Groundwater: Underlying Secondary Superficial & Bedrock Aquifers	Md	UI	L
	Vertical and lateral migration of contaminants.		Md	UI	L
VH = Very High, H = High, M = Moderate, M/L = Moderate/Low, L = Low, VL = Very Low					
KEY: Sv = Severe, Md = Medium, Mi = Mild, Mr = Minor, Hi = High, Li = Likely, Lw = Low Likelihood, UI = Unlikely					

5. PHASE II GEO-ENVIRONMENTAL AND GEOTECHNICAL GROUND INVESTIGATION

- 5.1 Intrusive ground investigation works were undertaken by BWB between 1st and 5th August 2022 and comprised the following works:
- Clearance of investigation locations by a specialist buried services' tracing company;
 - Collection of coordinates and elevations of exploratory hole locations;
 - The advancement of 5 cable percussive boreholes (BH01 to BH05 inclusive) to a maximum depth of 15.00m bgl with completion of SPTs and installations of gas and groundwater monitoring wells;
 - The advancement of 20 machine excavated trial pits (TP101 to TP121 inclusive) to a maximum depth of 4.50m bgl;
 - Collection of environmental soil and groundwater water samples for chemical analysis at a UKAS and MCERTS accredited laboratory;
 - Collection of large and small disturbed and undisturbed soil samples for geotechnical testing at a UKAS accredited laboratory; and
 - 4 proposed post investigation ground gas and groundwater level monitoring visits.
- 5.2 An exploratory hole location plan is presented as Drawing 1. BWB exploratory hole records are presented as **Appendix 2**, the SPT calibration certificate is presented in **Appendix 3**, and the post-investigation gas and groundwater monitoring data is presented as **Appendix 4**.
- 5.3 The site investigation works were carried out in general accordance with BS5930:2015 'Code of Practice for Site Investigations' and BS10175:2011 'Investigation of Potentially Contaminated Sites'.

Chemical Sampling Strategy

- 5.4 There was a non-targeted sampling strategy, considering the anticipated site-wide Made Ground (of limited thickness) and the natural shallow soils including areas of natural organic material.
- 5.5 Samples of Made Ground and natural soils were taken and subjected to testing to inform preliminary assessments of the potential for re-use of soils for fill and/or landscaping.
- 5.6 Cable percussive boreholes included single groundwater and gas installations to monitor and characterise the underlying groundwater regime within the Glaciofluvial Deposits.

Table 5:1: Response Zones

Location	Response zone	Stratum
Borehole BH01	Between 2.0m and 5.0m	Glaciofluvial Deposits (Sand)
Borehole BH02	Between 3.0m and 15.0m	Glaciofluvial Deposits (Sand)
Borehole BH03	Between 1.5m and 3.5m	Glaciofluvial Deposits (Sand/Clay)
Borehole BH04	Between 5.0m and 15.0m	Glaciofluvial Deposits (Clay)
Borehole BH05	Between 1.0m and 3.8m	Glaciofluvial Deposits (Sand)

Chemical Analytical Strategy

Soil Strategy

5.7 Selected soil samples collected from exploratory hole locations were sent to i2 Analytical Ltd Services (UKAS and MCERTS accredited) for chemical analysis. The following chemical analytical testing was undertaken:

- 8 no. soil samples were tested for a soil suite (BWB Standard Suite) comprising arsenic, barium, beryllium, water soluble boron, cadmium, chromium, hexavalent chromium, copper, lead, mercury, nickel, selenium, vanadium, zinc, water soluble sulphate (2:1 extract), total phenols, total cyanide, free cyanide, complex cyanide, fraction of organic carbon, pH, Polycyclic Aromatic Hydrocarbons (PAHs) (United States Environment Protection Agency priority 16 compounds) and Total Petroleum Hydrocarbons (TPH) C6-C40;
- 5 no. soil samples underwent asbestos screening; and
- 3 no/ soil samples were tested for a suite of common leachable contaminants, namely arsenic, barium, beryllium, water soluble boron, cadmium, chromium, copper, lead, mercury, nickel, selenium, vanadium, zinc, water soluble sulphate (2:1 extract), sulphate, total cyanide and pH.

5.8 The results of the soil chemical testing are presented as **Appendix 5**.

Groundwater Strategy

5.9 Groundwater samples obtained using a bailer following the removal of 3 times the well volume of water, or the well is to be bailed dry and allowed to recharge. The groundwater samples were sent to i2 Analytical (UKAS and MCERTS accredited) for the following suite of groundwater chemical testing:

- 4 no. of water samples are to be tested for arsenic, barium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, vanadium, zinc, conductivity, soluble sulphate, ammoniacal nitrogen, total phenols, total cyanide, pH, total organic carbon, PAHs (US EPA priority 16 compounds).

5.10 The results of the water chemical testing are presented as **Appendix 6**.

Geotechnical Strategy

5.11 The cable percussive borehole locations were positioned around the site, in consideration of the proposed building footprint to assess underlying ground conditions for geotechnical purposes. The trial pits were positioned to assess ground conditions, strength properties and characteristics across the full site.

5.12 In situ soil strength testing comprising SPTs were undertaken within the cable percussive boreholes. SPT 'N' values are included on the exploratory hole logs in **Appendix 2**.

5.13 Selected large and small disturbed and undisturbed samples were collected from the investigation locations and sent to the geotechnical project laboratory (i2 Analytical Ltd Services), which is UKAS accredited. The following geotechnical testing was undertaken;

- 14 samples tested for moisture content;
- 14 samples tested for Atterberg (liquid and plastic) limits;
- 6 samples tested for particle size distribution by sieve and pipette;
- 7 samples tested for BRE Suite comprising aqueous sulphate and pH;
- 6 CBR tests were undertaken on recompacted samples (2.5kg rammer);
- 11 particle density by glass jar;
- 5 samples underwent (2.5kg rammer) compaction testing; and
- 5 sample underwent (4.5kg rammer) compaction testing
- 2 Samples underwent a one dimensional triaxial test
- 5 Samples underwent a quick undrained triaxial test

5.14 The results of the geotechnical testing are included as **Appendix 7**.

Limitations and Uncertainty

- 5.15 Access to the farmer's field in the east of site was not possible at the time of the investigation due to the presence of livestock. Proposed exploratory holes originally planned in this area were therefore relocated and used to increase coverage in the area to the immediate west of the standing water bodies and delineate the organic soils that had been encountered.

6. GROUND CONDITIONS ENCOUNTERED

Geological Summary

- 6.1 The ground conditions recorded generally confirmed the published geology discussed in the Phase 1 report, i.e., the site is directly underlain by Glaciofluvial Deposits in the western part of the site and Glacial Till in the eastern part, with both underlain by Pennine Lower Coal Measures bedrock. However, the Glaciofluvial Deposits were found to be much more extensive than indicated from BGS records, and extended over most of the site, overlying Glacial Till in the eastern section. It should be noted that differentiation between the Glaciofluvial Deposits and Glacial Till was not easy from the ground conditions encountered, as presented on the exploratory hole records.
- 6.2 The recorded ground conditions are summarised in **Table 6.1** below. Uncorrected SPT results collected from the borehole locations are presented on the exploratory hole records presented in **Appendix 2**.

Table 6.1 : Summary of Ground Conditions

Stratum	Top Depth (m)		Base Depth (m)		Thickness (m)		SPT N Value	
	Min	Max	Min	Max	Min	Max	Min	Max
Topsoil	Ground Level		0.20	1.00	0.20	1.00	-	-
Made Ground	0.00	1.00	0.40	1.70	0.30	1.80	-	-
Peat	0.00	0.90	0.50	1.00	0.10	0.50	-	-
Glaciofluvial Deposits	0.20	15.00	0.80	>15.45	0.20	>10.0 5	5	50
Glacial Till	1.50	11.80	1.90	>15.16	0.40	>3.36	44	50
Pennine Lower Coal Measures	2.50	3.50	Not Proven		Not Proven			

Geological Descriptions

Topsoil

- 6.3 Topsoil was encountered in most exploratory holes excluding TP101, TP105, TP106, TP107, TP112, TP113, TP116, TP121 & BH04.
- 6.4 Topsoil was recorded with thicknesses of between 0.2m and 1.0m. Topsoil composition was variable, typically comprising dark brown slightly clayey to clayey sand with varying rootlet content and comprising very soft dark brown silty sandy clay at TP119. The topsoil is topped by grass across much of the site, with areas of reeds and bullrushes in the seasonally wet areas in the north-eastern section.

- 6.5 The depths of topsoil over the site may vary from that encountered at the locations investigated within the scope of this investigation, which should be considered when making estimates of topsoil quantities on the site.

Made Ground

- 6.6 Made Ground was encountered in 10 no. exploratory holes (TP101, TP105, TP106, TP107, TP108, TP111, TP112, TP113, TP116, TP119). It was recorded with thicknesses of between 0.5m and 1.8m.
- 6.7 Made Ground encountered was variable in composition. It typically comprised a black or brown clayey, gravelly sand, or sandy gravelly clay, with some cobbles. Gravel and cobbles comprised various natural and artificial inclusions (clinker, brick, sandstone, mudstone, wood, concrete). High organic content and rootlets were observed in waterlogged areas (e.g., TP107, TP108).
- 6.8 Made Ground was not encountered in any of the boreholes, so no SPT N₆₀ values were taken in this stratum.

Peat

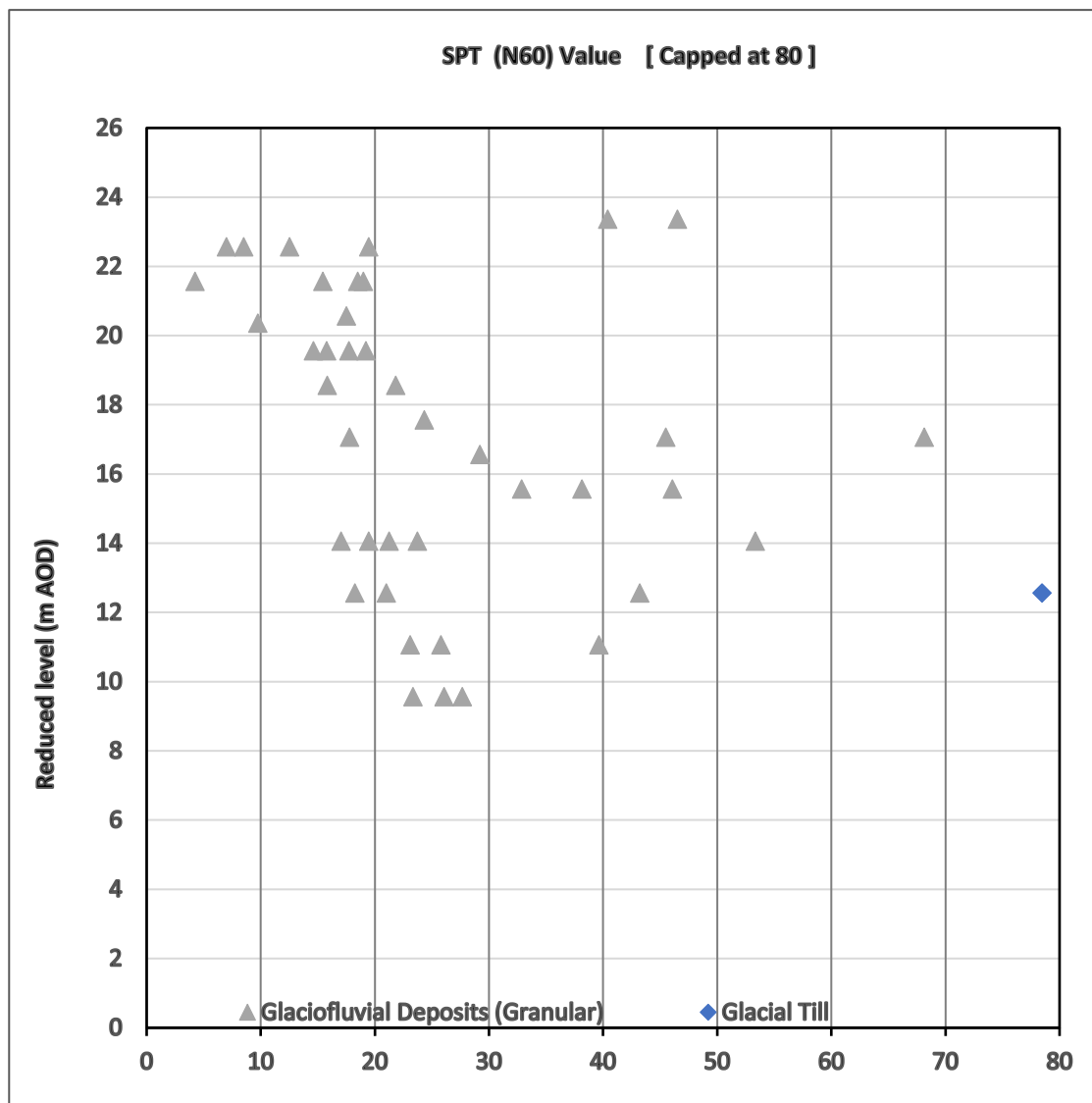
- 6.9 Peat was encountered either at surface or below Topsoil in holes TP120 and at TP121 in the north-eastern site section and was recorded with thicknesses of between 0.1m (TP120) and 1.0m (TP121). Peat was described as very soft and black or dark brown in colour. Visible plant material was encountered within the peat between 0.5m and 1.0m in TP121.
- 6.10 Peat is inferred to be associated with the areas of standing water and waterlogged soils observed on site.
- 6.11 No SPT N₆₀ values were taken within the Peat, only being found in the trial pit locations.

Glaciofluvial Deposits

- 6.12 Soils inferred to be Glaciofluvial Deposits were encountered in all exploratory holes below Topsoil, Made Ground and/or Peat, with thicknesses of between 0.16m and (at least) 12.20m. These deposits were highly variable and comprised interbedded cohesive and granular horizons. Granular horizons typically comprised orange, brown or grey clayey, silty, gravelly sand with occasional cobbles. Cobbles and gravel comprise sandstone and mudstone. Cohesive horizons comprised silty, sandy gravelly clays with occasional cobbles. The proportion of the component particle sizes were also highly variable.
- 6.13 21 no. of the 26 no. exploratory hole positions terminated within the Glaciofluvial Deposits including 4 no. of the 5 no. borehole positions. BH01 encountered the base of the Glaciofluvial Deposits at 11.8m depth (135.48mAOD). Trial pits (TP110, TP111, TP117, TP118) encountered the base of the stratum at depths of approximately 1.5 to 3.0m bgl, i.e. levels of between 146.41mAOD and 147.04mAOD.

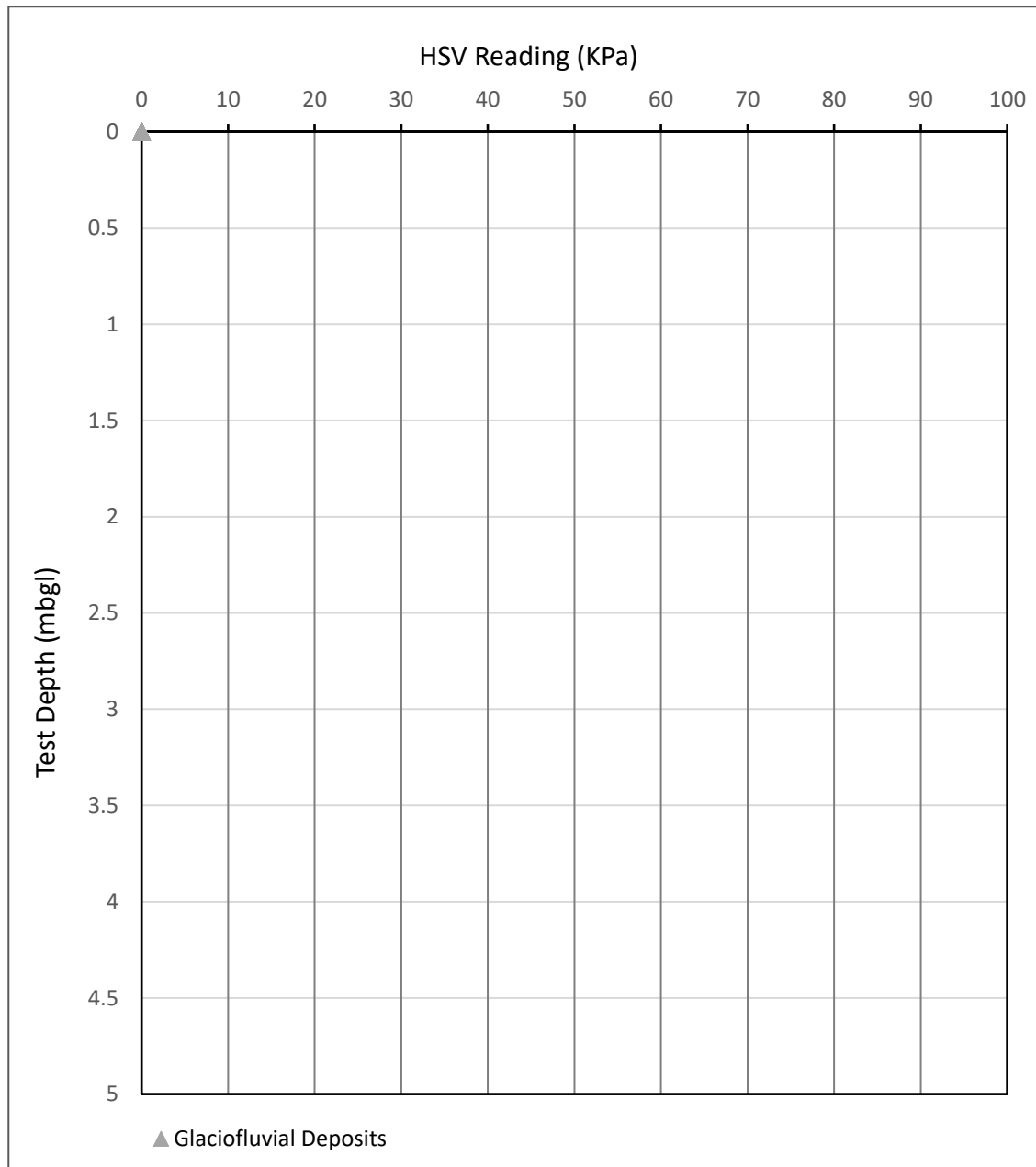
6.14 SPT N60 values within the Glaciofluvial Deposits were recorded ranging from 11 to refusal (in excess of 50 blow per 300mm) for the cohesive soils, and within the granular soils, SPT N60 values of between 3 and 40 were recorded. An SPT N60 versus depth plot is presented as Figure 6.1. While N60 values generally increased with depth, the data is broadly scattered.

Figure 6.1: SPT 'N₆₀' Values vs. Reduced Level.



6.15

Figure 6.2: Hand Shear Vane (HSV) vs. Depth (m bgl).



6.16 14 no. samples from within the Glaciofluvial Deposits were tested for Atterberg Limits and indicate a range of low to intermediate plasticity clays and low plasticity silt. Plasticity Index (PI) results range from 11% to 26%.

6.17 Particle size distribution test results for Glaciofluvial Deposits are summarised below.

Table 6:2 : PSD Results Summary

Stratum	Location	Depth (m)	Cobble Content (%)	Gravel Content (%)	Sand Content (%)	Clay/ Silt Content (%)	Earthworks Classification
Glaciofluvial Deposits	TP105	2.50	0	1	93	7	1A/1B
Glaciofluvial Deposits	TP107	2.30	0	2	76	22	2A/2B
Glaciofluvial Deposits	TP114	1.60	0	0	38	62	2A/2B
Glaciofluvial Deposits	BH03	2.00-2.45	0	0	69	31	2A/2B
Glaciofluvial Deposits	BH04	1.20-1.65	16	43	22	19	2C
Glaciofluvial Deposits	BH05	1.10	0	3	55	42	2A/2B

Glacial Till

- 6.18 Soils inferred to be Glacial Till were encountered in 3 no. exploratory holes (BH01, TP117 and TP118 - the latter two being located in the southern corner of the site) at depths of between 1.5m and 11.8m bgl, generally beneath Glaciofluvial Deposits. The base was not proven in any of these holes. The thicknesses penetrated varied between 0.40m and 3.36m.
- 6.19 The Glacial Till, as interpreted generally comprising stiff and very stiff brown and grey variably sandy/gravelly clay. It should be noted, however than similar soils were encountered in other exploratory holes that have been interpreted as Glaciofluvial Deposits, due to underlying granular horizons (e.g. Bh04 below 3.40m bgl, BH05 below 3.80m bgl, and also trial pits TP108, TP109, and TP114).
- 6.20 SPT N60 values within the Glacial Till were recorded in the range of 44 and refusal (in excess of 50 blow per 300mm). An SPT N60 versus depth plot is presented as Figure 6:1.

Pennine Lower Coal Measures

- 6.21 Strata inferred to be of the Pennine Lower Coal Measures were encountered in 2 exploratory holes, TP110 and TP111 close to the central section of the site. These strata were encountered beneath the Glaciofluvial Deposits at depths of about 3.00m bgl (146.41m and 146.64m AOD). The base and full thickness was not proven with both holes being terminated within about 1m below the top of the lithology.
- 6.22 These strata were described as stiff grey, locally sandy clay with gravel to cobbles of mudstone.
- 6.23 No SPT N60 values were taken within the inferred Pennine Lower Coal Measures, as these strata were only encountered in the two defined trial pit locations.

- 6.24 These strata are similar in description to the Glacial Till, and it is possible these could be Till rather than intact weathered mudstone.

Hydrogeology

- 6.25 Groundwater was encountered during drilling in BH04 and in several machine excavated trial pits. The depths of groundwater strikes varied from 3.0m bgl to 13.5m bgl within the Glaciofluvial Deposits in BH04 and 1.7m bgl (TP109) and 3.6m bgl (TP113) also within the Glaciofluvial Deposits. During monitoring, all borehole installations were found contain groundwater with levels varying in depth from 2.04m to 3.13m bgl in shallow installations and 9.34m to 11.34m bgl in deeper installations.
- 6.26 Groundwater levels varied from 144.15m AOD (BH01) to 147.09m AOD (BH03) in the shallow installations and from 137.75m AOD (BH02) to 139.22m AOD (BH04) in the deeper installations.

Hydrology

- 6.27 There are two surface water features on site. One of which is associated with the adjacent farmland and is believed to have been constructed for use, as a cattle drinking source. No monitoring sampling or testing of the surface water was undertaken as part of the ground investigation.
- 6.28 No contamination observations were noted during the groundwater sampling visit or subsequent gas and groundwater monitoring period.

7. GEOTECHNICAL ASSESSMENT

Introduction

- 7.1 The proposed development for Plot P is indicated to be a single commercial building with associated parking, loading bays and external forecourt areas. The building is likely to be a steel portal framed structure.
- 7.2 The generalised ground conditions across the development plot consist of Topsoil/ Made Ground overlying Glaciofluvial Deposits comprising interbedded clays, silts and sands, becoming stiffer/denser with depth. Glacial Till and possibly weathered Pennine Lower Coal Measures were encountered locally beneath the Glaciofluvial Deposits. Generally, Made Ground was present close to Michael Faraday Avenue, and in other localised zones at the site.
- 7.3 The shallow ground conditions are not laterally consistent, with a range and variation of Glaciofluvial Deposits, Glacial Till, and weathered Pennine Lower Coal Measures.

Ground Model

- 7.4 For the purpose of this foundation appraisal, groundwater is considered to be at 2-3m bgl (reduced levels of about 144.2 – 147.1m AOD). This is based on groundwater strikes encountered and levels recorded within the Glaciofluvial Deposits during the groundwater monitoring. BWB's experience of the local area indicates that groundwater is very seasonal and may be at shallower depths after periods of extended inclement weather.
- 7.5 Based on the ground conditions discussed in Section 6, a geotechnical ground model, indicating various geotechnical parameters, has been developed. This model provides the basis for geotechnical analysis undertaken within this report. There is principally one main lithological unit at the site, the Glaciofluvial Deposits, which can be sub-divided into two types that have been identified in shallow soils beneath the site: granular layers and cohesive layers. For the purpose of the following foundation appraisal the following conditions have been adopted:
- Made Ground (from 0.20m to 1.40m deep);
 - Glaciofluvial Deposits – Sands (base depth between 0.80 and 3.20); underlain by
 - Glaciofluvial Deposits – Clays (base not proved).

Foundation Solutions

Simple Foundations Strip or Pads

- 7.6 Anticipated loads have not been provided for this development, however typical loading requirements for a commercial warehouse development of this nature are of the order of 150kPa, indicating that shallow strip or pad foundations are not likely be suitable for this development without ground improvement.

- 7.7 Within the Glaciofluvial Deposits, bearing capacity calculations based on in situ hand shear vanes, laboratory triaxial testing and an empirical correlation between SPT N values and undrained shear strength as of Stroud 1976, reference in CIRIA143, suggest an allowable bearing capacity that would be less than the anticipated loading requirements.
- 7.8 Therefore, shallow spread foundations transferring loads onto the (untreated) underlying Glaciofluvial Deposits are unlikely to be suitable for the building, as there would be a risk of excessive and unpredictable total and differential settlements.
- 7.9 If shallow foundations are adopted, ground improvement is likely to be required and viable, subject to removal of soft spots and unsuitable strata.

Ground Improvement Techniques

- 7.10 Ground improvement should be feasible utilising vibro-stone columns (VSC) to support shallow (pad) spread foundations and a ground bearing floor slab. Alternatively, the option of ground improvement techniques comprising the installation of rigid inclusions (RIs), with a load transfer platform is also considered feasible, although likely to be more costly.
- 7.11 For a VCC solution, any organic soils/Peat encountered beneath the building footprint (as encountered in TP116, TP120 and TP121) should be chased out, removed and replaced with suitable engineered fill. The excavated organic soils/Peat could potentially be reused within non-structural areas of the development such as in landscaping zones. For a RI solution, it may be possible to leave such organic soils in situ, from a geotechnical perspective, although this would have implications on ground gas regime and protection requirements.
- 7.12 Assuming vibro stone columns or rigid inclusions are adopted, settlement under the slab and foundations is expected to be limited to 25mm under typically expected loads. This will need to be subject to detailed assessment by the foundation and ground improvement designers when loads are confirmed.
- 7.13 Designs may need to allow for mitigation of differential settlement, between the main structure and external areas; this may need to include for articulation of threshold elements/structures and or dock levellers.
- 7.14 A specialist ground improvement contractor should be consulted in order to confirm the viability of ground improvement and to advise which technique would be best/most cost effective for this site.

Ground Floor Slabs

- 7.15 Loading requirements of the ground floor slab are expected to be lower than beneath pad or strip foundations, approximately 50KPa. Nevertheless, in order to mitigate risks of excessive total/differential settlement, in situ ground improvement as described above, should also be undertaken beneath the ground floor slab.

- 7.16 As above, all peat and organic soils, as encountered in TP116, TP120 and TP121, should be removed from beneath ground floor slabs and replaced with suitable engineered fill. Such organic soils may be reused on site as topsoil or in landscaping, subject to acceptability testing.

Piled Foundations

- 7.17 A piled foundation solution could be adopted for the support of the proposed building. A specialist piling contractor should be consulted to further assess the most economical and suitable piling solution.

Roads and Pavements

- 7.18 Laboratory recompacted CBR testing undertaken for samples recovered has indicated variable values for the underlying Glaciofluvial Deposits ranging from 0.1% (sandy clay in TP121 at 1.20m) to 17% (sandy clay in TP104 at 0.5m), with values generally less than 3.0% and often less than 1.0%.
- 7.19 Plasticity Index testing undertaken on near-surface cohesive soil samples (upper 1-2m below ground level) are in the range of 7% to 26% (mean value 16%). CBR values of about 3% are indicated based on these PI values with reference to Table C1 of TRRL 1132 (Structural Design of Bituminous Roads) according to guidance in National Highways document CD225, Design for New Pavement Foundations).
- 7.20 Minimum design CBR values for pavement foundations is typically 3% and if pavements are required on the natural soils at the site, modification of these formation soils (e.g. by lime or cement) will be required to achieve the minimum design CBR value. An improved CBR of minimum 5% would likely be possible in modified formation soils.
- 7.21 The design of chemical modification to provide a suitable thickness of subgrade should take account of potentially high organic matter content and high water contents in the underlying soils. Ground improvement techniques and thickness of improved in situ ground should be designed to limit settlement under pavements to 25mm after the accommodation of the sub-base, base and surface courses. This should be subject to detailed design.
- 7.22 It is recommended that in situ CBR tests at formation level should be carried out to confirm the strength of sub grade and finalise the required pavement construction thickness.

Drainage

- 7.23 No soakaway drainage tests have been undertaken at the site. Additional soil infiltration tests would be required to inform whether traditional soakaways would be suitable, if required. However, based on the ground conditions encountered together with the variable and shallow groundwater issues in the area, soakaway drainage is unlikely to be a viable solution.

Ease of Excavation

- 7.24 Conventional plant equipment is expected to be suitable for excavations at the site.

Stability of Excavation

- 7.25 Excavations displayed generally good stability across the site, with all trial pits achieving target depth. However, granular Glaciofluvial Deposits are present. If groundwater levels rise at Plot P following periods of wet weather, running sands could present an issue within excavations and the use of temporary shoring may need to be considered. The potential for stability issues will be reduced if works are undertaken in the drier summer months.
- 7.26 Excavations may become unstable if left open for any significant periods. Where personnel entry is required for inspection; excavations should be sufficiently enlarged, and an assessment of safe temporary angles should be made. Alternatively, temporary shoring should be provided.

Legislation on Personnel Entry to Excavations

- 7.27 It is recommended that no excavations should be entered without appropriate support and a full risk assessment should be completed prior to entry. Mitigation measures to protect from accumulating ground gases should be implemented.

Groundwater

- 7.28 Groundwater is likely to vary greatly seasonally at the site. The ground investigation, undertaken in August (after a particularly dry spring/summer), will have likely captured a lowered groundwater situation at the site, with various areas of the site displaying evidence of historical waterlogging (e.g. reeds, peat build up).
- 7.29 If groundwater levels rise following extended periods of wet weather, groundwater control may be required during construction ground works, and standard pumping equipment is likely to be suitable. The local water authority should be consulted to assess whether a temporary drainage consent is required, for discharging to the local drainage network.

Chemical Attack on Buried Concrete

- 7.30 At the site, water soluble sulphate concentrations in soils ranged from 0.0052 g/l to 0.29 g/l with soil pH values ranging from 7.3 to 8.4. Total sulphur concentrations ranged from 0.01% to 0.149%.
- 7.31 In accordance with the recommendations of BRE Special Digest 1, 'Concrete in Aggressive Ground' 2005, the conditions of soils at the site would therefore be classed as Design Sulphate Class DS-1 and ACEC Class AC-1 for soils, when considering the most appropriate type of concrete to be used at the site in order to resist chemical attack from sulphate.

Earthworks

- 7.32 Small scale earthworks will be required to create a suitable, level development platform across the plot. Based on the results obtained, near-surface soil materials are likely to conform to Highway Works Class 1A/1B or, more commonly, 2A/2B/2C general fill.
- 7.33 The results of the compaction testing indicate Optimum Moisture Contents generally in the range of 14 – 16% (2.5kg rammer) and 13 – 16% (4.5 kg/rammer) with one exception of 29% (2.5kg rammer) that appears to be an outlier. This correlates with Maximum Dry Density values of 1.78 – 1.82 Mg/m³ (2.5 kg rammer) and 1.59 – 1.88 Mg/m³ (4.5 kg rammer) again with the exceptional outlier of 1.28 Mg/m³. Natural moisture content value were found to range from 4.6% to 24%, but with most results greater than 18%.
- 7.34 From these results the near-surface soils likely to be re-used in earthworks are significantly wet of their Optimum Moisture Contents, and hence would require dewatering (probably via chemical modification) to achieve adequate compaction as engineered fill.
- 7.35 The suitability of earthworks materials has been assessed on the basis of the testing carried out as part of this investigation. The materials encountered on site may vary from those analysed; furthermore, inclement weather, winter working or seasonal variations in groundwater may result in materials being unsuitable for incorporation within the works without modification by lime, cement or other methods. In particular, cohesive soils are very susceptible to 'wet weather working' and BWB strongly recommends that consideration should be given to lime and/or cement stabilisation of these materials if the earthworks are undertaken during inclement weather or the winter period.
- 7.36 Stockpiled materials often deteriorate due to water infiltration, and they may become unsuitable for incorporation in the works; further testing and re-assessment should be made prior to the finalisation and implementation of the earthworks design.

8. GROUND GAS ASSESSMENT

Introduction

- 8.1 Ground gas assessment has been undertaken to assess the risks associated with ground gases and volatile vapours to the proposed new building and occupants. The results obtained have been assessed in line with relevant guidance (notably CIRIA C665).
- 8.2 Based on the desk study and the ground investigation undertaken, the following potential sources of hazardous ground gas have been identified:
- Made Ground across the site; and
 - Underlying locally organic soils.
- 8.3 Based on the potential sources identified, CIRIA C665 guidance indicates that for a site with (low/moderate) gas generation potential and a (low) sensitivity development (the proposed commercial land use), a typical monitoring programme may comprise four visits over a period of 2-3 months.
- 8.4 BWB have undertaken three visits (to date) over a period of two months and therefore this assessment is considered to be preliminary. An additional monitoring event is yet to be undertaken.

Methodology

- 8.5 The assessment of potential ground gas generation is based on the observation of trends and changes in gas evolution by the direct measurement of ground gases from gas wells. The works included measurement of methane, carbon dioxide, oxygen, hydrogen sulphide, carbon monoxide, gas flows and barometric pressure. A PID survey was undertaken to measure volatile organic compounds within the borehole response zones.

Results

- 8.6 The minimum and maximum steady state concentrations recorded for borehole flow, oxygen, carbon dioxide and methane are summarised below in **Table 8.1**. The full ground gas monitoring results are presented in **Appendix 4**.

Table 8.1 : Summary of Recorded Ground Gas Results

Borehole ID	Targeted Geology	Steady Flow (l/hr)		Carbon Dioxide (%v/v)		Methane (%v/v)	
		min.	max.	min.	max.	min.	max.
BH01	GF	<0.1	<0.1	<0.1	0.1	<0.1	<0.1
BH02	GF	<0.1	<0.1	<0.1	0.7	<0.1	<0.1
BH03	GF	<0.1	<0.1	<0.1	3.4	<0.1	1.8
BH04	GF	<0.1	<0.1	0.1	0.1	<0.1	<0.1
BH05	GF	<0.1	<0.1	0.7	1.0	<0.1	<0.1

8.7 The atmospheric pressures were recorded as follows:

- Round 1 – 1017mB during the site visit rising from 1009mB over the preceding 12 hours;
- Round 2 – 1015mB during the site visit rising from 1005mB over the preceding 12 hours;
- Round 3 - 991mB during the site visit remaining static over the preceding 12 hours;
- Round 4 – 1015mB during the site visit falling slightly from 1017mB over the preceding 12 hours.

8.8 On this basis, the monitoring events are considered unlikely to have captured the worst-case gassing scenario at the site as generally, ground gas emissions tend to increase when atmospheric pressure falls rapidly. Low pressure was however recorded during the third monitoring round.

8.9 Hydrogen sulphide and carbon monoxide concentrations were generally not recorded above the limit of detection of the equipment during the monitoring visits with the exception of carbon monoxide in BH01 (Round 3) at 2.2ppm.

8.10 PID concentrations were not recorded above <0.1ppm (the limit of detection of the equipment).

Risk Assessment

8.11 CIRIA Report 665 “Assessing Risks Posed by Hazardous Ground Gases to Buildings” presents current best practice on the assessment of ground gases for commercial and residential buildings (with the exception of low-rise traditional housing). The report presents a risk-based approach based on gas screening levels which depend on both the concentration and emission rate of gas from the ground. Gas screening levels are calculated as follows:

$$\text{Gas screening value (l/hr)} = \frac{\text{gas concentration (\%)} \times \text{measured borehole flow rate (l/h)}}{100}$$

8.12 Gas screening values should be calculated on a borehole basis in the first instance. Consideration of worst case i.e., highest flow and highest concentrations should only be considered if the CSM warrants it.

8.13 Maximum gas screening levels of 0.0034 were recorded giving a classification of 1. Gas protection measures would not be required. Methane concentrations above 1% have been recorded in BH103 (1.8%) on one occasion and so consideration should be given to raising the gas classification to 2 (BS8485:2015 (+A1 2019)).

8.14 Total Organic Carbon (TOC) content of the Made Ground was recorded between 1.5% and 5.1% (TP113 0.3m) and at 9% in organic rich Glaciofluvial Deposits (TP116 0.9m).

8.15 Sulphur and organic odours were recorded in TP114 (1.7-3.0m bgl), TP115 (1.2-3.4m bgl), TP116 (0.8-1.0m bgl) and TP120 (0.0-0.9m bgl). Peat was recorded in TP120 (0.9-1.0mbgl) and TP121 (0.0-1.0m bgl) with organic rich material extending to 2.3m bgl in TP121.

- 8.16 CL:AIRE RB17 (November 2012) and Table D.1 included within BS8485:2015 (+A1 2019) recommends a Characteristic Situation 2, for TOC (%) between ≤ 1.0 and $\leq 1.5\%$ and Characteristic Situation 3, for TOC (%) between ≤ 1.5 and $\leq 4.0\%$ recorded in Made Ground with thicknesses of less than 3.0m that has been in place for less than 20 years.
- 8.17 CL:AIRE RB17 (November 2012) Appendix A , Table A.1 recommends CS3 gas protection for natural soils with high organic content.

Recommendations

- 8.18 Gas protection measures should be installed in accordance with BS848: 2015. Based on a Type D development and CS3 classification a gas protection score of 2.5 will need to be achieved. Type C uses within the larger building (offices etc) would require a gas protection score of 3.0 to be achieved. **Table 8.2** provides suggested combinations of floor slab, ventilation and membrane that can achieve a suitable level of protection.

Table 8.2: Gas Protection Matrix

Building Type	Points score Required	Structural Slab	Ventilation	Membrane
C	3.0	1.0-1.5	1.5-2.5	2
D	2.5	1.0-1.5	1.5-2.5	2

- 8.19 Additional ground investigation should be undertaken in the east of the site to target shallow organic material to delineate their extent relative to the proposed building footprint and to assess their gas production potential. The results of this may lower the gas classification for the site.
- 8.20 Should organic soils be removed from beneath the proposed building, then the gas regime should also be re-assessed.

9. CONTAMINANT DISTRIBUTION

Soils

- 9.1 Contamination data have been compared to generic site assessment criteria (GSAC) for a commercial end use. The soil chemical laboratory results are presented as **Appendix 5** and details of the derivation of the GSACs are presented in **Appendix 8**. The criteria include reference to the LQM/CIEH S4ULs for Human Health Risk Assessment Copyright Land Quality Management Limited reproduced with permission; publication number S4UL3271.
- 9.2 No soil samples tested exceeded the respective LQM/CIEH S4UL, for a commercial end use, screening criteria for risks to human health. Asbestos was not recorded in the five Made Ground samples tested.
- 9.3 No visual or olfactory observations of contamination were noted during the ground investigation.
- 9.4 Organic and sulphur odours recorded are attributed to decaying organic materials associated with waterlogged and former pond areas of the site, predominantly in the eastern section.

Surface Water

- 9.5 No surface water samples were recovered or tested as part of the investigation.

10. HUMAN HEALTH RISK ASSESSMENT

10.1 Soil contaminant data have been compared against Generic Site Assessment Criteria (GSAC) developed by BWB using the CLEA model 1.06 and the updated CLEA framework (2009) for assessing risk from soil contamination to human health. The results of the soil chemical laboratory analysis are provided within **Appendix 5**. Details of the derivation of the GSACs and a table summarising the results presented are presented in **Appendix 8**.

10.2 The GSACs have been developed with the following assumptions which have been changed from the CLEA default parameter set. Soil type is a sandy loam with an organic matter content of 1% for the natural strata and 2.5% for the Made Ground. This is considered to be more representative of natural strata and shallow Made Ground found on site than the CLEA default of 6% organic matter (excluding areas of Peat and visible high organic matter). The building type for a commercial development is assumed to be a post 1970s office which is representative of new commercial buildings.

Pathways

10.3 Contamination data have been compared to generic site assessment criteria (GSAC) for a commercial end use (i.e. using all pathways for that end use) based on an organic matter content of 1% and 2.5%. Details of the derivation of the GSACs are presented in **Appendix 8**.

10.4 The site is to be developed for commercial end use and therefore the key receptor is considered to be an adult female worker and GSACs for a commercial industrial end use have been adopted.

10.5 Exposure pathways considered in this assessment are presented in **Table 10.1**.

Table 10.1 : Commercial Exposure Pathways

Source	Shallow Soils		Deep Soils
Pathway	Commercial / Industrial with managed landscaped areas	Commercial / Industrial with Hard standing areas	Commercial / Industrial
Ingestion of Soil	✓	✗	✗
Ingestion of site derived household dust	✓	✗	✗
Ingestion of contaminated vegetables	✗	✗	✗
Ingestion of soil attached to vegetables	✗	✗	✗
Dermal contact with Soil	✓	✗	✗
Dermal contact with site derived household dust	✓	✗	✗
Inhalation of fugitive soil dust	✓	✗	✗
Inhalation of fugitive site derived household dust	✓	✗	✗

Source	Shallow Soils		Deep Soils
Inhalation of vapours outside	✓	✓	✓
Inhalation of vapours inside	✓	✓	✓

10.6 CLAIRE report "Guidance on Comparing Soil Contamination Data with a Critical Concentration" sets out a structured approach for the statistical assessment of contaminant data with respect to risks to human health. A flow chart showing the approach is presented as **Appendix 8**. The CLEA assessment is made in four stages:

- Stage 1 – The site is split into what are known as Averaging Areas, these are those sections of the site as determined by the assessor as being of a similar nature, this can be defined by strata, contaminant impact, location, development zones, etc.
- Stage 2 – The dataset is reviewed using graphical, visual and statistical tools whereby all the samples (per contaminant) are combined to establish whether or not the highest values recorded are representative or not of the Averaging Area as a whole. This is known as the Outlier Test. A sample that is considered as representative of the whole is referred to as an 'inlier' and one which is considered unrepresentative as an 'outlier'.
- Stage 3 – The samples are assessed using graphical, visual and statistical tools to determine whether the dataset is normally distributed. A statistical calculation is then used to determine the upper confidence level (UCL) of the mean to determine whether or not the Averaging Area, as a whole meets the critical concentration. The UCL value is considered against the appropriate generic or site-specific screening value as to whether or not a risk exists.
- Stage 4 – The outliers in Stage 2 are compared directly against the critical concentration. Thus, indicating whether those removed samples represent an Anomalous Zone (or hotspot).

Sources

10.7 No significant sources of soil contamination have been identified on site.

11. CONTROLLED WATERS RISK ASSESSMENT

11.1 Soil leachability has been undertaken for a number of metals on samples from the Made Ground. The soil leachability results are presented within **Appendix 5**.

- The controlled waters assessment considers the potential impact of on-site contamination to pertinent controlled waters receptors identified at the site including:
- Secondary A Aquifer beneath the site within the glaciofluvial superficial deposits;
- Secondary A Aquifer in the surrounding area within the Pennine Lower Coal Measures bedrock;
- Surface water (Rochdale Canal, Stanney Brook)

Pathways

11.2 Controlled water risk assessment has been undertaken through assessment of leachable concentrations of contaminants in soil referring to exposure pathways considered and referencing **Table 16**.

Table 11:1 : Controlled Water Exposure Pathways

Controlled Waters Exposure Pathway	Receptor
Leaching of soil contamination into recharge infiltration	✓
Vertical migration of impacted pore water through unsaturated zone into underlying aquifer	✓
Horizontal migration of groundwater through aquifer to offsite receptors	✓

Soil Leachability

11.3 The soil leachate concentrations have been compared to the UK Drinking Water Standards (UK DWS) to assess the risk to the underlying aquifers. None of the samples screened exceeded the UK DWS.

11.4 In addition, the leachate results were also screened against the Environmental Quality Standards (EQS) for freshwater to assess the risk to surface waters. A summary of the results is presented in **Table 11:2** below.

Table 11:2: Summary of Leachate Exceedances – EQS

Leachable Contaminant	Exceedance Concentration Range (µg/l)	Location (& Depth (m bgl))	EQS (µg/l)
Copper	6.3-31	TP104 0.3m, TP113 0.3m, TP101 0.3m	1
Lead	3.0-5.2	TP104 0.3m, TP113 0.3m, TP101 0.3m	1.2
Nickel	4.6-7.3	TP113 0.3m, TP101 0.3m	4
Zinc	11-17	TP113 0.3m, TP101 0.3m	10.9

11.5 BWB consider these exceedances to not be significant given the distance to sensitive surface water receptors.

11.6 Leachate summary worksheets are presented as **Appendix 9**.

Groundwater

11.7 The groundwater results have been compared to the EQS freshwater criteria to assess the risk to surface water features and UK DWS for the underlying aquifers. The exceedances following a direct comparison to the screening criteria are detailed in Error! Reference source not found. **Table 11.3** and **Table 11.4** and Error! Reference source not found. Groundwater summary worksheets are presented as **Appendix 10**.

Table 11.3: Summary of Water Sample Exceedances - EQS

Contaminant	Exceedance Concentration Range (µg/l)	Location	EQS (µg/l)
Cadmium	0.15-0.23	BH02 & BH05	0.08
Copper	1.7 - 12	All	1
Nickel	4.4 – 8.6	All	4
Zinc	42	BH02	10.9
Ammonia	25 - 72	All	15

Table 11.4: Summary of Water Sample Exceedances - DWS

Contaminant	Exceedance Concentration Range (µg/l)	Location	DWS (µg/l)
Ammonia	25 - 72	All	15

Risk Assessment

11.8 Total TPH and PAH were not recorded above the laboratories lowest level of detection, in all samples collected.

11.9 Low levels of metals and inorganics have been recorded in the groundwater and leachate samples, with a symmetry between the two sets of results. BWB consider it possible that the shallow soils on site could be impacting upon the groundwater quality. However, the levels of exceedances are not considered significant to the recorded levels of contaminants in samples.

11.10 Due to the proposed development on the site comprising large areas with hardstanding and buildings which will limit further infiltration and leaching, BWB do not consider that nearby controlled waters (Stanley Brook 150m to the south) will be exposed to an unacceptable risk as a result of the proposed development.

12. ENVIRONMENTAL RISK ASSESSMENT

Introduction

- 12.1 An updated assessment of pollutant linkages has been undertaken following completion of a ground investigation at the Site. The preliminary risk assessment presented in **Section 4** has been updated in light of the findings of the ground investigation and the revised conceptual site model developed, as presented in **Table 12:1**.

Sources

- Total Organic Carbon (TOC) content of the Made Ground was recorded between 1.5% and 5.1% (TP113 0.3m) and at 9% in organic rich Glaciofluvial Deposits (TP116 0.9m present);
- Marginally elevated leachable heavy metals have been recorded in the shallow Made Ground above EQS assessment criteria.

Pathways

- Inhalation of fibres and particle dust.
- Dermal contact.
- Vertical migration of contaminants in the soil leachate.
- Lateral migration of contaminants within the groundwater; and
- Accumulation leading to explosion and asphyxiation within the new developments.

Receptors

- Future site users.
- Construction and groundworkers.
- Underlying Secondary Undifferentiated Aquifer & Secondary A Aquifers.
- Stanley Brook 150m to the south and west of the site

Table 12:1 : Preliminary Conceptual Site Model

Source	Pathway	Receptor	Con	Prob	Risk	Potential Mitigation/Investigation Requirements
MADE GROUND Former/current SURFACE WATER/POND features on site (organic materials) Contamination associated with AGRICULTURAL activities Gas accumulation in DEEP MINING WORKS	Migration and accumulation of ground gases in enclosed spaces leading to asphyxiation (carbon dioxide) or explosion (methane).	Future site users (commercial) Construction and groundworkers	Sv	Lw	M	Made Ground is expected across the site, with organic material related to surface water pond features present in the north west and east of the site. High TOC indicates a potential risk from ground gases. Given the elevated TOC of organic soils on site it is considered appropriate to adopt a CS3 classification for the development area. Migration of hazardous ground is not considered to be occurring given the low concentrations being recorded on site. Installing protection measures as described above is considered sufficient to protect end site users from any previously unidentified hazardous gas migration.
	Leaching and permeation through soil profile.	Groundwater: Underlying Secondary Superficial & Bedrock Aquifers	Md	UI	L	The leachate and groundwater concentrations are considered low. Given that the site is principally underlain by cohesive deposits, it is considered unlikely that the low leachate and groundwater concentrations would migrate towards the aquifer or nearby surface water bodies at elevated concentrations. The development is likely to be predominantly covered by buildings and hard standing surface cover, therefore limiting any potential for mobilisation of contaminants within the Made Ground. Therefore, BWB considers that leachable contaminants and contaminants within groundwater do not represent a plausible risk to controlled waters. The recommendations of DEFRA and EA guidance document 'Pollution prevention for businesses' should be considered during construction.
	Vertical and lateral migration of contaminants in groundwater.		Md	UI	L	
	Surface run-off.	Stanney Brook Rochdale Canal	Md	UI	L	
	Vertical and lateral migration of contaminants in groundwater.		Md	UI	L	

VH = Very High, H = High, M = Moderate, M/L = Moderate/Low, L = Low, VL = Very Low

KEY: Sv = Severe, Md = Medium, Mi = Mild, Mr = Minor, Hi = High, Li = Likely, Lw = Low Likelihood, UI = Unlikely

Pollutant Linkage Assessment Summary

When considered in the context of the conceptual site model and the historical activities that have taken place, the proposed development is considered to pose a **MODERATE** risk to human health. It is considered that the main driver for the risk rating for human health is Migration and accumulation of ground gases related to potential Made Ground and organic rich soils on the site.

Source	Pathway	Receptor	Con	Prob	Risk	Potential Mitigation/Investigation Requirements
The risk posed to controlled waters is predominantly considered to be LOW due to the limited contaminative sources identified on site.						

13. ENVIRONMENT LIABILITY ASSESSMENT AND DEVELOPMENT IMPLICATIONS

Statutory Liability

- 13.1 Based on the information available regarding the site, the potential for Statutory Authority action based on "*pollution of controlled water*" or "*significant harm*" as defined by Part IIA of the Environmental Protection Act 1990 is considered to be **LOW** based on to lack of significant contaminant sources on site.

Third Party Liability

- 13.2 Based on the information contained in this report, it is the opinion of BWB that the potential for legal action by surrounding landowners, based on the potential for contamination to migrate off-site, is considered to be **LOW** when considering the nature of the surrounding land use.

Public Relations

- 13.3 The likelihood of public relations being tarnished due to contamination issues at the site is considered to be **LOW**.

Development Implications

- 13.4 Further consideration into drainage design will be required as soakaway testing was not completed as part of this assessment.

Development Implications

- 13.5 It is recommended that the requirement for earthworks and potential for re-use of or disposal of waste is established at an early stage in the project.

14. WASTE MANAGEMENT

Waste Classification

- 14.1 Soil samples have been characterised against hazardous waste criteria using Hazwasteonline. The results of the waste classification are presented in **Appendix 11**. The assessment indicates that the soils analysed are likely to be classified as non-hazardous. The waste classification assessment only applies to those soils that have been tested. If other soils are to be disposed of off-site then further analysis may be required.
- 14.2 Asbestos has not been found at the site. The presence of visible asbestos containing materials in waste or at concentrations exceeding 0.1% by weight will classify the waste as mixed and require disposal as hazardous waste irrespective of the chemical properties of the waste.
- 14.3 Should any soils require disposal off site an assessment of waste classification of the soils for disposal should be made by a competent person. Further chemical analysis may be required to fully characterise waste soils for disposal to landfill or re-use off site. WAC analysis may be required for disposal of soils as inert or hazardous.

Waste Acceptance Criteria

- 14.4 WAC testing was not completed. Should disposal of soils off-site be required, further classification and WAC testing of waste soils should be undertaken.

15. CONCLUSIONS AND RECOMMENDATIONS

Conclusions

- 15.1 The proposed development for Plot P is indicated to be a single commercial building with associated parking, loading bays and external forecourt areas. This is likely to be a steel portal framed structure.
- 15.2 The generalised ground conditions across the development plot consist of Topsoil/ Made Ground overlying Glaciofluvial Deposits comprising interbedded clays, silts and sands, becoming stiffer/denser with depth. Glacial Till and possibly weathered Pennine Lower Coal Measures were encountered locally beneath the Glaciofluvial Deposits. Generally, Made Ground was present close to Michael Faraday Avenue, and in other localised zones at the site. Differentiation between the Glaciofluvial Deposits and Glacial Till was not easy from the ground conditions encountered, as presented on the exploratory hole records.

Environmental

- 15.3 Total Organic Carbon (TOC) content of the Made Ground was recorded between 1.5% and 5.1% (TP113 0.3m) and at 9% in organic rich Glaciofluvial Deposits (TP116 0.9m). Sulphur and organic odours were recorded in TP114 (1.7-3.0m bgl), TP115 (1.2-3.4m bgl), TP116 (0.8-1.0m bgl) and TP120 (0.0-0.9m bgl). Peat was recorded in TP120 (0.9-1.0mbgl) and TP121 (0.0-1.0m bgl).
- 15.4 CS3 gas protection are recommended for natural soils with high organic content (CL:AIRE RB17 (November 2012) Appendix A , Table A.1).
- 15.5 No soil samples tested exceeded the respective LQM/CIEH S4UL, for a commercial end use, screening criteria for risks to human health. Asbestos was not recorded in the five Made Ground samples tested.
- 15.6 The soil leachate concentrations have been compared to the UK Drinking Water Standards (UK DWS) to assess the risk to the underlying aquifers. None of the samples screened exceeded the UK DWS. Leachate results were also screened against the Environmental Quality Standards (EQS) for freshwater to assess the risk to surface waters. Minor exceedances for copper, lead, nickel and zinc were recorded. BWB consider these exceedances to not be significant given the distance to sensitive surface water receptors.
- 15.7 Low levels of metals and inorganics have been recorded in the groundwater above UK DWS and EQS screening criteria. BWB consider it possible that the shallow soils on site could be impacting upon the groundwater quality. However, the levels of exceedances are not considered significant to the recorded levels of contaminants in samples.
- 15.8** Due to the proposed development on the site comprising large areas with hardstanding and buildings which will limit further infiltration and leaching, BWB do not consider that controlled waters will be exposed to an unacceptable risk as a result of the proposed development.

Geotechnical

- 15.9 Shallow spread foundations transferring loads onto the (untreated) underlying Glaciofluvial Deposits are unlikely to be suitable for the building, as there would be a risk of excessive and unpredictable total and differential settlements.
- 15.10 Ground improvement will be required, utilising vibro-stone columns (VSC) to support shallow (pad) spread foundations and a ground bearing floor slab. Alternatively, ground improvement comprising installation of rigid inclusions (RIs), with a load transfer platform is considered feasible.
- 15.11 Any organic soils/Peat beneath the building footprint will need to be delineated, chased out, removed and replaced with suitable engineered fill. The excavated organic soils/Peat could potentially be reused within non-structural areas of the development.
- 15.12 Grading and Atterberg Limit tests for the near-surface Glaciofluvial Deposits indicated that excavated site-won materials would generally classify as either Class 1A/1B and Class 2A/2B or 2C in accordance with 'Table 6/2 of the SHW, Series 600'. Compaction testing indicates soils are generally wet of optimum at natural moisture contents and would require dewatering (via chemical modification) for adequate compaction as engineered fill.
- 15.13 The design sulphate and ACEC class for below ground concrete at the site is DS-1 and AC-1.
- 15.14 Laboratory testing indicates a range of CBR values for the design of new pavements, with most results giving values of less than 3.0% and often less than 1%. Minimum design CBR values for pavement foundations is typically 3% and for pavements on the natural soils at the site, modification of the formation soils (e.g. by lime or cement) will be required to achieve the required design CBR value.
- 15.15 Based on the ground conditions encountered together with the variable and shallow groundwater issues in the area, soakaway drainage is unlikely to be a viable solution.
- 15.16 Groundwater is likely to vary greatly seasonally at the site. The ground investigation, undertaken in August (after a particularly dry spring/summer), will have likely captured a lowered groundwater situation at the site, with some areas of the site displaying evidence of historical waterlogging (reeds, peat build up).
- 15.17 If groundwater levels rise following extended periods of wet weather, groundwater pumping may be required during construction ground works.

Recommendations

Environmental

- 15.18 Additional ground investigation should be undertaken in the eastern part of the site to target and delineate shallow organic soils to assess their gas production potential. This may lower the gas classification for the site.

-
- 15.19 A Remediation Strategy should be completed for the site prior to development to provide remediation and mitigation requirements, identify those soils on site likely to require disposal, set remediation targets if required and provide verification requirements of any gas protection measures required.
- 15.20 Should it be feasible to excavate and remove the organic soils from the eastern of the site, then the gas regime should be re-assessed. A Design Statement should then be produced.

Geotechnical

- 15.21 As above, additional ground investigation should be undertaken in the eastern part of the site to delineate the shallow organic soils in order to assess the feasibility for removal from the proposed building footprint.
- 15.22 To assist with the design of ground improvement by VSCs or RIs, additional investigation via cone penetration testing is recommended, focussing on the proposed building footprint.
- 15.23 Access to the farmer's field in the far eastern section of site was not possible at the time of the investigation due to the presence of livestock. Exploratory holes were relocated to increase coverage to the immediate west of standing water bodies. Prior to development, ground conditions within this area of the site should be confirmed by further investigation to ensure consistency of ground conditions characterised in the remainder of the site, as described in this report.

16. REFERENCES

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16. Environment Agency 2008, Human health toxicological assessment of contaminants in soil Science Report – SC050021/SR2
17. Environment Agency 2009, CLEA Software (Version 1.05) Handbook Better Regulation Science Programme Science report: SC050021/SR4
18. Environment Agency 2008, A review of body weight and height data used within the Contaminated Land Exposure Assessment model (CLEA) Project SC050021/ Technical Review 1

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20. Health and Safety Executive (HSE) 'Protection of workers and the general public during the Development of Contaminated Land (1991).

DRAWINGS

Drawing 1: Site Layout



NOTES			
1. DO NOT SCALE THIS DRAWING. ALL DIMENSIONS MUST BE CHECKED/ VERIFIED ON SITE. IF IN DOUBT ASK.			
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND SPECIALISTS DRAWINGS AND SPECIFICATIONS.			
3.ALL DIMENSIONS IN MILLIMETRES UNLESS NOTED OTHERWISE. ALL LEVELS IN METERES UNLESS NOTED OTHERWISE.			
4. ANY DISCREPANCIES NOTED ON SITE ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.			
LEGEND			
Borehole Trial Pit			
BWB			
Building, Infrastructure and Environmental Consultancy			
5th Floor, Waterfront House, Station Street, Nottingham, NG2 3DQ T 0115 924 1100 F 0115 950 3966 W bwbconsulting.com			
Client: Wilson Bowden Developments Ltd			
Project Title: Plot P Kingsway Business Park, Rochdale			
Drawing Title: Proposed Exploratory Hole Location Plan			
Scale: Not to Scale	Date: Jul-22	Drawn: M.Harper	Authorised:
Drawing Status: Draft			
Drawing No: 210939/PEHLP/EN/001			Revision: -

APPENDICES

Appendix 1: Masterplan



AMPI - Site Plan

Appendix 2: Exploratory Hole Logs

Scale 1:50 Sheet 1 of 2



A CAF GROUP COMPANY

BOREHOLE LOG

Scale 1:50

Sheet 2 of 2

[illegible]

BOREHOLE LOG

Scale 1:50

Sheet 1 of 2

LOCATION ID		Project Name: Plot P, Kingsway Business Park						Ground Level (m AOD): 149.09						
BH02		Project Number: 210939						Eastings: 391832.89						
		Client: Wilson Bowden Developments Ltd						Northings: 412660.50						
Hole Type: CP		Rig: Dando 2000			Start & End Date: 04/08/2022 - 05/08/2022			Engineer: TF		Checker: MH				
Boring		Strata					Samples			In-Situ Tests				
Strike	Well	Level (m AOD) & [Thickness (m)]	Description			Legend	Depth (m bgl)	Type (Ublows)	From (m)	To (m)	Type	Depth (m)	Result	Casing Depth & (Water Level)
		1.00	Grass over dark brown slightly clayey fine SAND with high rootlet content. (Topsoil)					B1	0.10	1.00				
		148.09 [0.90]	Firm orange mottled grey sandy CLAY.()				1.00	D1	1.00	1.00				
								U1 (55)	1.20	1.65				
								D2	1.70	1.70				
		147.19 [3.50]	Medium dense orange slightly clayey SAND()				1.90	B2	2.00	2.45	SPT	2.00	N=16 (3,3/3,4,4,5)	
											SPT	3.00	N=15 (2,2/3,4,4,4)	
								D3	3.70	3.70				
								B3	4.00	4.45	SPT	4.00	N=14 (2,3/3,3,4,4)	
								D4	5.00	5.45	SPT	5.00	N=14 (2,2/3,3,4,4)	
		143.69 [9.60] [10.05]	Reddish brown slightly clayey slightly gravelly SAND. Gravel is subangular, fine to medium of sandstone and mudstone()				5.40							
			Medium dense becoming dense reddish brown slightly clayey slightly gravelly SAND. Gravel is subangular, fine to medium of sandstone and mudstone()					B4	6.00	6.45	SPT	6.00	N=17 (2,3/4,4,4,5)	
								D5	7.00	7.00				
								B5	7.50	7.95	SPT	7.50	N=35 (5,7/7,9,9,10)	
											SPT	9.00	N=35 (4,7/8,8,9,10)	
Chiseling		Remarks												
From (m bgl)	To (m bgl)	Time (hh:mm)	Reason for Termination:											
			Designated depth reached											
Groundwater Remarks:			No groundwater encountered.											
Water Added		Other Remarks:												
From (m bgl)	To (m bgl)	Volume (l)	Cleared of buried services. Handpit dug to 1.20mbgl. Installed with monitoring standpipe upon completion.											



A CAF GROUP COMPANY

BOREHOLE LOG

Scale 1:50

Sheet 2 of 2

LOCATION ID		Project Name: Plot P, Kingsway Business Park						Ground Level (m AOD):		149.09			
BH02		Project Number: 210939						Eastings:		391832.89			
		Client: Wilson Bowden Developments Ltd						Northings:		412660.50			
Hole Type: CP		Rig: Dando 2000			Start & End Date: 04/08/2022 - 05/08/2022			Engineer: TF		Checker: MH			
Boring		Strata						Samples		In-Situ Tests			
Strike	Well	Level (m AOD) & [Thickness (m)]	Description	Legend	Depth (m bgl)	Type (U/blows)	From (m)	To (m)	Type	Depth (m)	Result	Casing Depth & (Water Level)	
			Medium dense becoming dense reddish brown slightly clayey slightly gravelly SAND. Gravel is subangular, fine to medium of sandstone and mudstone()			D6	10.00	10.00					
						86	10.50	10.95	SPT	10.50	N=40 (6,8/9,10,10,11)		
						D7	11.50	11.50					
						87	12.00	12.45	SPT	12.00	N=32 (3,5/7,8,9,8)		
									SPT	13.50	N=29 (3,5/6,7,8,8)		
		134.09			15.00	D8	13.80	13.80					
						D9	14.50	14.50					
									SPT	15.00	N=20 (2,3/4,4,5,7)		
		133.64	Hole Terminated at 15.45m bgl.		15.45								
Remarks													
Chiseling													
From (m bgl)	To (m bgl)	Time (hh:mm)											
			Reason for Termination:										
			Designated depth reached										
Water Added			Groundwater Remarks:										
From (m bgl)	To (m bgl)	Volume (l)	No groundwater encountered.										
			Other Remarks:										
			Cleared of buried services. Handpit dug to 1.20mbgl. Installed with monitoring standpipe upon completion.										
A CAP GROUP COMPANY													

BOREHOLE LOG

LOCATION ID		Project Name: Plot P, Kingsway Business Park					Ground Level (m AOD): 149.47						
BH03		Project Number: 210939					Eastings: 391896.60						
		Client: Wilson Bowden Developments Ltd					Northings: 412630.48						
Hole Type: CP		Rig: Dando 2000			Start & End Date: 01/08/2022 - 02/08/2022			Engineer: TF		Checker: MH			
Boring		Strata					Samples			In-Situ Tests			
Strike	Well	Level (m AOD) & [Thickness (m)]	Description	Legend	Depth (m bgl)	Type (U/blows)	From (m)	To (m)	Type	Depth (m)	Result	Casing Depth & (Water Level)	
		(0.80)	Grass over dark brown slightly clayey fine SAND with high rootlet content. (Topsoil)			B1	0.40	0.80					
		148.67 (0.60)	Firm orange mottled brown sandy slightly gravelly CLAY. Gravel is subangular, fine to medium of mudstone.()		0.80	D1	1.00	1.00					
						U1 (60)	1.20	1.65					
		148.07 (1.80)	Loose brown clayey SAND()		1.40	D2	1.70	1.70					
						B2 B3	2.00 2.00	2.45	SPT	2.00	N=5 (2,2/1,2,1,1)		
									SPT	3.00	N=3 (1,0/1,0,1,1)		
		146.27 (5.10)	Soft to firm brown slightly sandy slightly gravelly CLAY. Gravel is subangular, fine to medium of mudstone.()		3.20	D3	3.50	3.50					
						U2 (85)	4.00	4.50					
						D4	4.50	4.50					
						B4	5.00	5.45	SPT	5.00	N=11 (1,2/2,2,3,4)		
						U3 (80)	6.00	6.45					
						D5	6.50	6.50					
						D6	7.00	7.00					
						B5	7.50	7.95	SPT	7.50	N=47 (7,12/12,12,12,11)		
		141.17 (6.70) (7.15)	Reddish brown clayey SAND.() Medium dense reddish brown clayey SAND.()		8.30	D7	8.30	8.30					
						B6	9.00	9.45	SPT	9.00	N=26 (4,4/5,6,7,8)		
Chiseling			Remarks										
From (m bgl)	To (m bgl)	Time (hh:mm)	Reason for Termination:										
			Designated depth reached										
Groundwater Remarks:													
Water Added			No groundwater encountered.										
From (m bgl)	To (m bgl)	Volume (l)	Other Remarks:										
			Cleared of buried services. Handpit dug to 1.20mbgl. Installed with monitoring standpipe upon completion.										
													

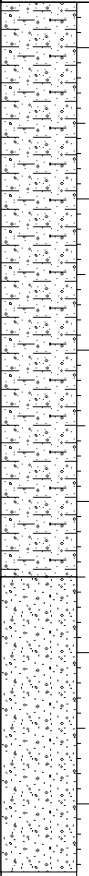
BOREHOLE LOG

LOCATION ID BH03		Project Name: Plot P, Kingsway Business Park						Ground Level (m AOD): 149.47					
		Project Number: 210939						Eastings: 391896.60					
		Client: Wilson Bowden Developments Ltd						Northings: 412630.48					
Hole Type: CP		Rig: Dando 2000			Start & End Date: 01/08/2022 - 02/08/2022			Engineer: TF		Checker: MH			
Boring		Strata					Samples			In-Situ Tests			
Strike	Well	Level (m AOD) & Thickness (m)	Description	Legend	Depth (m bgl)	Type (blows)	From (m)	To (m)	Type	Depth (m)	Result	Casing Depth & (Water Level)	
			Medium dense reddish brown clayey SAND.()			D8	10.00	10.00					
									SPT	10.50	N=16 (2,3/4,3,4,5)		
						D9	11.50	11.50					
									SPT	12.00	N=14 (2,2/3,3,4,4)		
						D10	13.00	13.00					
									SPT	13.50	N=17 (2,3/4,5,4,4)		
		134.47			15.00	B7	15.00	15.45	SPT	15.00	N=17 (3,3/4,4,4,5)		
		134.02	Hole Terminated at 15.45m bgl.										
				Remarks									
Chiseling													
From (m bgl)	To (m bgl)												Time (hh:mm)
		Reason for Termination: Designated depth reached											
		Groundwater Remarks: No groundwater encountered.											
Water Added													
From (m bgl)	To (m bgl)												Volume (l)
			Other Remarks: Cleared of buried services. Handpit dug to 1.20mbgl. Installed with monitoring standpipe upon completion.										
													

BOREHOLE LOG

LOCATION ID		Project Name: Plot P, Kingsway Business Park					Ground Level (m AOD): 148.77						
BH04		Project Number: 210939					Eastings: 391963.46						
		Client: Wilson Bowden Developments Ltd					Northings: 412682.65						
Hole Type: CP		Rig: Dando 2000			Start & End Date: 04/08/2022			Engineer: TF		Checker: MH			
Boring		Strata					Samples			In-Situ Tests			
Strike	Well	Level (m AOD) & [Thickness (m)]	Description	Legend	Depth (m bgl)	Type (U/blows)	From (m)	To (m)	Type	Depth (m)	Result	Casing Depth & (Water Level)	
		[2.60]	Grass over medium dense to dense dark brown slightly clayey fine SAND with high rootlet content.()										
						B1	0.70	1.20					
						B2	1.20	1.65	SPT	1.20	N=30 (4,7/9,7,7,7)		
						B3	2.00	2.45	SPT	2.00	N=8 (1,2/2,2,2,2)		
		146.17 [0.20]	Firm brown slightly sandy CLAY.()		2.60	D1	2.60	2.60					
		145.97 [0.60]	Firm to stiff brown sandy CLAY.()		2.80	D2	2.80	2.80					
						B4	3.00	3.45	SPT	3.00	N=12 (3,3/3,3,3,3)		
		145.37 [10.10]	Stiff brown slightly sandy slightly gravelly CLAY. Gravel is subangular , fine to medium of mudstone.()		3.40								
						U1 (65)	4.00	4.45					
						D3	4.50	4.50					
						B5	5.00	5.45	SPT	5.00	N=12 (2,2/2,3,3,4)		
						U2 (88)	6.00	6.45					
						D4	6.50	6.50					
						D5	7.00	7.00					
						B6	7.50	7.95	SPT	7.50	N=11 (2,2/2,3,3,3)		
				D6	8.80	8.80							
				U3 (75)	9.00	9.45							
				D7	9.50	9.50							
Chiseling		Remarks											
From (m bgl)	To (m bgl)	Time (hh:mm)	Reason for Termination:										
			Designated depth reached										
Groundwater Remarks:			Groundwater AT 3.00mbgl, rising to 2.50mbgl and at 13.50mbgl, rising to 10.00mbgl										
Water Added			Other Remarks:										
From (m bgl)	To (m bgl)	Volume (l)	Cleared of buried services. Handpit dug to 1.20mbgl. Installed with monitoring standpipe upon completion.										

BOREHOLE LOG

LOCATION ID		Project Name: Plot P, Kingsway Business Park						Ground Level (m AOD): 148.77					
BH04		Project Number: 210939						Eastings: 391963.46					
		Client: Wilson Bowden Developments Ltd						Northings: 412682.65					
Hole Type: CP		Rig: Dando 2000			Start & End Date: 04/08/2022			Engineer: TF		Checker: MH			
Boring		Strata					Samples			In-Situ Tests			
Strike	Well	Level (m AOD) & [Thickness (m)]	Description	Legend	Depth (m bgl)	Type (U/blows)	From (m)	To (m)	Type	Depth (m)	Result	Casing Depth & (Water Level)	
			Stiff brown slightly sandy slightly gravelly CLAY. Gravel is subangular , fine to medium of mudstone.()										
						D8	10.00	10.50					
						B7	10.50	10.95	SPT	10.50	N=13 (2,2/3,3,4)		
						D9	11.00	11.00					
						U4 (78)	12.00	12.45					
						D10	12.50	12.50					
						D11	13.00	13.00					
						B8	13.50	13.95	SPT	13.50	N=14 (2,2/3,3,4,4)		
						D12	14.50	14.50					
										SPT	15.00	N=14 (2,2/3,4,3,4)	
			Hole Terminated at 15.45m bgl.										
Chiseling		Remarks											
From (m bgl)	To (m bgl)												Time (hh:mm)
			Reason for Termination: Designated depth reached										
Groundwater Remarks:			Groundwater AT 3.00mbgl, rising to 2.50mbgl and at 13.50mbgl, rising to 10.00mbgl										
Water Added		Other Remarks: Cleared of buried services. Handpit dug to 1.20mbgl. Installed with monitoring standpipe upon completion.											
From (m bgl)	To (m bgl)												Volume (l)



BOREHOLE LOG

LOCATION ID		Project Name: Plot P, Kingsway Business Park					Ground Level (m AOD): 148.77						
BH05		Project Number: 210939					Eastings: 391940.56						
		Client: Wilson Bowden Developments Ltd					Northings: 412578.73						
Hole Type: CP		Rig: Dando 2000			Start & End Date: 03/08/2022			Engineer: TF		Checker: MH			
Boring		Strata					Samples			In-Situ Tests			
Strike	Well	Level (m AOD) & [Thickness (m)]	Description	Legend	Depth (m bgl)	Type (U/blows)	From (m)	To (m)	Type	Depth (m)	Result	Casing Depth & (Water Level)	
		(0.50)	Grass over dark brown clayey SAND. (Topsoil)			B1 E51	0.10 0.20	0.50 0.20					
		148.27 [3.30]	Loose light grey silty SAND()		0.50	B2	0.50	1.00					
						D1 B3	1.10 1.20	1.10 1.65	SPT	1.20	N=24 (2,3/4,5,7,8)		
									SPT	2.00	N=5 (3,2/2,1,1,1)		
						D2	2.50	2.50					
						B4	3.00	3.45	SPT	3.00	N=9 (1,1/2,3,2,2)		
		144.97 [11.20]	Soft to firm brown slightly sandy slightly gravelly CLAY. Gravel is subangular, fine to medium of mudstone.()		3.80	U1 (78)	4.00	4.45					
						D3	4.50	4.50					
						B5	5.00	5.45	SPT	5.00	N=14 (2,2/3,3,4,4)		
						U2 (84)	6.00	6.45					
						D4	6.50	6.50					
						D5	7.00	7.00					
						B6	7.50	7.95	SPT	7.50	N=14 (3,3/3,3,4,4)		
						D6	8.50	8.50					
						U3 (68)	9.00	9.45					
						D7	9.50	9.50					
						D8	9.70	9.70					
Remarks													
Chiseling			Reason for Termination: Designated depth reached										
From (m bgl)	To (m bgl)	Time (hh:mm)											
Groundwater Remarks: No groundwater encountered.			Other Remarks: Cleared of buried services. Handpit dug to 1.20mbgl. Installed with monitoring standpipe upon completion.										
Water Added													
From (m bgl)	To (m bgl)	Volume (l)											



BOREHOLE LOG

Scale 1:50

Sheet 2 of 2

LOCATION ID BH05		Project Name: Plot P, Kingsway Business Park						Ground Level (m AOD): 148.77						
		Project Number: 210939						Eastings: 391940.56						
		Client: Wilson Bowden Developments Ltd						Northings: 412578.73						
Hole Type: CP		Rig: Dando 2000			Start & End Date: 03/08/2022			Engineer: TF		Checker: MH				
Boring		Strata						Samples			In-Situ Tests			
Strike	Well	Level (m AOD) & [Thickness (m)]	Description			Legend	Depth (m bgl)	Type (blows)	From (m)	To (m)	Type	Depth (m)	Result	Casing Depth & (Water Level)
			Soft to firm brown slightly sandy slightly gravelly CLAY. Gravel is subangular, fine to medium of mudstone.()											
								B7	10.50	10.95	SPT	10.50	N=19 (3,3/4,4,5,6)	
								D9	11.50	11.50				
								U4 (73)	12.00	12.45				
								D10	12.50	12.50				
								D11	12.80	12.80				
								B8	13.50	13.95	SPT	13.50	N=13 (2,2/3,3,4,3)	
								D12	14.50	14.50				
		133.77	Hole Terminated at 15.00m bgl.				15.00	U5 (81)	15.00	15.45				
								D13	15.50	15.50				

TRIAL PIT LOG

Scale: 1:50Sheet 1 of 1

LOCATION ID:		Project Name: Plot P, Kingsway Business Park			2.50 1.00 Pit Dimensions (m) 0Degrees Stability: Unstable below 1.80mbgl						
TP101		Project Number: 210939									
		Client: Wilson Bowden Developments Ltd									
		Plant: JCB 3CX	Start & End Date: 01/08/2022								
Ground Level (m AOD): 148.94		Eastings & Northings: 391840E 412729N			Engineer: TF		Checker: MH				
Strata						Samples			In-Situ Tests		
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend	Depth (m bgl)	Type	From (m)	To (m)	Type	Depth (m)	Result
		1.80m	Grass over black gravelly SAND with low cobble content. Gravel is subangular to subrounded, fine to coarse of clinker, brick, sandstone and wood. Cobbles are subangular of slag. (Made Ground)			ES1	0.30	0.30			
		147.14				B1	1.00	1.00			
						ES2	1.50	1.50			
		1.70m	Light brown slightly clayey SAND.()		1.80	D1	2.00	2.00			
						B2	3.00	3.00			
		145.44	Hole Terminated at 3.50m bgl.		3.50	D2	3.50	3.50			
Remarks											
Reason for Termination: Sides Collapsing											
Groundwater Notes: No groundwater encountered.											
Other Remarks: Cleared of services, backfilled with arisings											
											

TRIAL PIT LOG

Scale: 1:50Sheet 1 of 1

LOCATION ID:	Project Name: Plot P, Kingsway Business Park			2.40 1.00 Pit Dimensions (m) 0Degrees Stability: Unstable at groundwater contact							
TP102	Project Number: 210939										
	Client: Wilson Bowden Developments Ltd										
	Plant: JCB 3CX	Start & End Date: 03/08/2022									
Ground Level (m AOD): 147.22		Eastings & Northings: 391868E 412717N		Engineer: OS		Checker: MH					
Strata						Samples		In-Situ Tests			
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend	Depth (m bgl)	Type	From (m)	To (m)	Type	Depth (m)	Result
▼		0.30m	Dark brown sightly clayey fine to medium SAND with rootlet content. (Topsoil)		0.30	ES	0.20				
		146.92	Blackish brown slightly gravelly slightly clayey fine to medium SAND with high cobble content. Gravel is subangular, coarse of sandstone. Cobbles are subangular to subrounded of sandstone.()			ES	0.60				
		0.70m									
		146.22	Orangey light grey slightly silty fine to medium SAND.()		1.00						
		0.60m	Orange silty fine to medium SAND.()			B	1.30				
		145.62			ES	1.30					
0.90m											
144.72	Orange slightly gravelly fine to coarse SAND. Gravel is subangular to subrounded, fine to medium of coal and sandstone.()		2.50								
0.70m						B	2.80				
						D	2.80				
		144.02	Hole Terminated at 3.20m bgl.		3.20						
Remarks											
Reason for Termination: Sides Collapsing											
Groundwater Notes: Seepage at 2.70mbgl											
Other Remarks: Cleared of services, black plastic sheet at 0.10mmgl, backfilled with arisings											
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TRIAL PIT LOG

Scale: 1:50Sheet 1 of 1

LOCATION ID:	Project Name: Plot P, Kingsway Business Park			2.40 1.20 Pit Dimensions (m) 0Degrees Stability: Unstable below 2.00mbgl							
TP103	Project Number: 210939										
	Client: Wilson Bowden Developments Ltd										
	Plant: JCB 3CX	Start & End Date: 01/08/2022									
Ground Level (m AOD): 149.08		Eastings & Northings: 391823E 412714N		Engineer: TF		Checker: MH					
Strata						Samples			In-Situ Tests		
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend	Depth (m bgl)	Type	From (m)	To (m)	Type	Depth (m)	Result
▼		0.40m	Grass over dark brown clayey SAND with high rootlet content (Topsoil)		0.40	ES1	0.30	0.30	HSV	1.00	(58, 75, 56)kPa
		148.68	Black and brown clayey gravelly SAND with low boulder content. Gravel is subangular to subrounded, fine to coarse of sandstone. Boulders are subangular of sandstone.()			D1	0.50	0.50			
		0.50m				ES2	0.50	0.50			
		148.18				B1	0.80	0.80			
		1.10m				D2	1.00	1.00			
		147.08	Firm light grey mottled orangish brown sandy slightly gravelly CLAY. Gravel is subangular to subrounded, fine to medium of coal and sandstone.()	0.90	B2	1.80	1.80				
		2.00m			D3	2.50	2.50				
		145.08	Light orangish brown slightly clayey slightly gravelly SAND. Gravel is subrounded, medium to coarse of sandstone.()	2.00	4.00	B3	4.00	4.00			
			Hole Terminated at 4.00m bgl.								
Remarks											
Reason for Termination: Sides Collapsing											
Groundwater Notes: No Groundwater Encountered											
Other Remarks: Cleared of services, backfilled with arisings											
BWB A CAF GROUP COMPANY											

TRIAL PIT LOG

Scale: 1:50Sheet 1 of 1

LOCATION ID:	Project Name: Plot P, Kingsway Business Park		2.30 1.10 Pit Dimensions (m) 0Degrees			
TP104	Project Number: 210939					
	Client: Wilson Bowden Developments Ltd					
	Plant: JCB 3CX	Start & End Date: 01/08/2022				
Ground Level (m AOD): 149.01		Eastings & Northings: 391854E 412690N		Stability: Unstable below 0.80mbgl	Engineer: TF	Checker: MH

Strata					Samples			In-Situ Tests			
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend	Depth (m bgl)	Type	From (m)	To (m)	Type	Depth (m)	Result
Groundwater Strike	Backfill	0.20m	Grass over dark brown clayey SAND with high rootlet content (Topsoil)	Legend	0.20	ES1	0.10	0.10			
		148.81	Stiff orangish brown mottled light grey sandy gravelly CLAY with high rootlet content.()			ES2	0.30	0.30			
		0.60m			B1	0.50	0.50				
		148.21			D1	0.70	0.70				
					Orange clayey slightly gravelly SAND Gravel is subangular to subrounded, fine to coarse of sandstone.()	B2	1.00	1.00			
D2	1.50		1.50								
3.00m			B3	2.80		2.80					
			D3	3.50	3.50						
			Hole Terminated at 3.80m bgl.								
		145.21			3.80						

Remarks

Reason for Termination:

Sides Collapsing

Groundwater Notes:

No Groundwater Encountered

Other Remarks:

Cleared of services, backfilled with arisings

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TRIAL PIT LOG

Scale: 1:50

Sheet 1 of 1

LOCATION ID:		Project Name: Plot P, Kingsway Business Park		2.50 1.20 Pit Dimensions (m) 0 Degrees Stability: Stable	
TP105		Project Number: 210939			
		Client: Wilson Bowden Developments Ltd			
		Plant: JCB 3CX	Start & End Date: 02/08/2022		
Ground Level (m AOD): 148.54		Eastings & Northings: 391810E 412660N		Engineer: TF	Checker: MH

Strata					Samples			In-Situ Tests			
Groundwa ter Strike	Backfill	Level (m AOD)	Description	Legend	Depth (m bgl)	Type	From (m)	To (m)	Type	Depth (m)	Result
		0.80m	Grass over brown clayey gravely SAND, with low cobble content. Gravel is subangular to subrounded, fine to coarse of sandstone and brick. Cobbles are subangular to subrounded of sandstone. (Made Ground)		0.80	ES1	0.20	0.20	HSV	1.00	(58, 47, 54)kPa
		147.74	Firm light grey mottled orange silty sandy gravely CLAY with medium cobble content. Gravel is subangular to subrounded, fine to coarse of sandstone. Cobbles are subrounded of sandstone.()		0.80	D1 ES2	1.00 1.00	1.00 1.00			
		1.40m				B1	1.50	1.50			
		146.34				D2	2.00	2.00			
		2.30m				B2	2.50	2.50			
		144.04	Hole Terminated at 4.50m bgl.		4.50	B3	4.50	4.50			

Remarks

Reason for Termination:

Undercutting below machine

Groundwater Notes:

No Groundwater Encountered

Other Remarks:

Cleared of services, backfilled with arisings



TRIAL PIT LOG

Scale: 1:50Sheet 1 of 1

LOCATION ID:		Project Name: Plot P, Kingsway Business Park			2.10 1.20 Pit Dimensions (m) 0Degrees Stability: Unstable below 1.70mbgl						
TP106		Project Number: 210939									
		Client: Wilson Bowden Developments Ltd									
		Plant: JCB 3CX	Start & End Date: 02/08/2022								
Ground Level (m AOD): 149.37		Eastings & Northings: 391857E 412660N			Engineer: TF		Checker: MH				
StrataSamplesIn-Situ Tests											
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend	Depth (m bgl)	Type	From (m)	To (m)	Type	Depth (m)	Result
▼		0.50m	Grass over dark brown slightly clayey gravelly SAND. Gravel is subangular to subrounded, fine to coarse of sandstone and brick.		0.50	ES1	0.20	0.20	HSV	1.50	(70, 100, 40)kPa
		148.87	(Made Ground)			ES2	0.60	0.60			
		1.20m	Stiff grey mottled brown sandy CLAY.()			D1	1.00	1.00			
		147.67	Light brownish orange SAND.()			B1	1.50	1.50			
		D2				2.00	2.00				
2.30m	Hole Terminated at 4.00m bgl.	B2	3.00	3.00							
145.37		D3	4.00	4.00							
Remarks											
Reason for Termination: Sides Collapsing Groundwater Notes: No Groundwater Encountered Other Remarks: Cleared of services, backfilled with arisings											
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TRIAL PIT LOG

Scale: 1:50Sheet 1 of 1

LOCATION ID:	Project Name: Plot P, Kingsway Business Park			2.40 1.00 Pit Dimensions (m) 0Degrees Stability: Unstable below 1.90mbgl							
TP107	Project Number: 210939										
	Client: Wilson Bowden Developments Ltd										
	Plant: JCB 3CX	Start & End Date: 04/08/2022									
Ground Level (m AOD): 148.62		Eastings & Northings: 391918E 412706N		Engineer: TF		Checker: MH					
Strata						Samples		In-Situ Tests			
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend	Depth (m bgl)	Type	From (m)	To (m)	Type	Depth (m)	Result
▼		0.50m	Reeds over dark brown sandy gravelly CLAY. Gravel is subangular to rounded, fine to coarse of sandstone and brick. High rootlet content. (Made Ground)		0.50	ES1	0.20	0.20	HSV	1.00	(60, 65, 75)kPa
		148.12	Firm orangish brown sandy gravelly CLAY. Gravel is subangular, fine to coarse of sandstone.()			ES2	0.40	0.40			
		1.40m				D1	0.90	0.90			
						B1	1.40	1.40			
						D2	1.70	1.70			
		146.72	Orangish brown slightly clayey slightly gravelly SAND. Gravel is subangular to rounded, fine to coarse of sandstone.()	1.90				HSV	1.80	(40, 35, 40)kPa	
		1.10m				B2	2.30	2.30			
		145.62	Hole Terminated at 3.00m bgl.		3.00	D3	3.00	3.00			
Remarks											
Reason for Termination: Sides Collapsing											
Groundwater Notes: Seepage from 2.60mbgl											
Other Remarks: Cleared of services, backfilled with arisings											
BWB A CAF GROUP COMPANY											

TRIAL PIT LOG

Scale: 1:50Sheet 1 of 1

LOCATION ID:	Project Name: Plot P, Kingsway Business Park			2.60 1.00 Pit Dimensions (m) 0Degrees Stability: Stable							
TP108	Project Number: 210939										
	Client: Wilson Bowden Developments Ltd										
	Plant: 8 Tonne excavator	Start & End Date: 04/08/2022									
Ground Level (m AOD): 149.04		Eastings & Northings: 391952E 412699N		Engineer: TF		Checker: MH					
Strata						Samples			In-Situ Tests		
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend	Depth (m bgl)	Type	From (m)	To (m)	Type	Depth (m)	Result
▼		0.30m	Reeds over dark brown clayey gravelly SAND. Gravel is subangular to subrounded, fine to coarse of sandstone.		0.30	ES1	0.20	0.20			
		148.74	(Topsoil)			ES2	0.50	0.50			
		1.10m	Dark brown clayey sandy GRAVEL. Gravel is subangular to subrounded, fine to coarse of sandstone and brick. Rare subangular cobbles of sandstone.			B1	0.80	0.80			
			(Made Ground)								
		147.64	Firm grey mottled brown CLAY.()			D1	1.50	1.50			
		ES3	1.60	1.60							
		1.40m			B2	2.20	2.20				
		146.24	Hole Terminated at 2.80m bgl.		2.80	D2	2.70	2.70	HSV	2.60	(46, 46, 52)kPa
Remarks											
Reason for Termination: Backfilled with Ballast from side of pit											
Groundwater Notes: Dry											
Other Remarks: Cleared of services, backfilled with arisings											
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TRIAL PIT LOG

Scale: 1:50Sheet 1 of 1

LOCATION ID:	Project Name: Plot P, Kingsway Business Park		2.20 1.10 Pit Dimensions (m) 0Degrees		
TP109	Project Number: 210939				
	Client: Wilson Bowden Developments Ltd				
	Plant: 8 Tonne excavator	Start & End Date: 04/08/2022			
Ground Level (m AOD): 148.73		Eastings & Northings: 391956E 412668N		Engineer: TF	Checker: MH

Strata					Samples			In-Situ Tests			
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend	Depth (m bgl)	Type	From (m)	To (m)	Type	Depth (m)	Result
		0.20m	Reeds over dark brown clayey SAND with high rootlet content. (Topsoil)		0.20	ES1	0.10	0.10		1.00	(30, 40, 31)kPa
		148.53	Light grey sandy SILT()		0.40	D1	0.40	0.40			
		0.60m			0.40	ES2	0.40	0.40			
		147.93	Soft orange mottled grey slightly silty slightly sandy slightly gravelly CLAY with low cobble content. Gravel is subangular to subrounded, fine to coarse of sandstone. Cobbles are subrounded of sandstone.()		0.80	D2	1.00	1.00			
		0.80m			1.60	B1	2.00	2.00			
147.13	Stiff brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded, fine to coarse of sandstone and mudstone.()	3.40	D3	2.80	2.80	2.00	(32, 40, 50)kPa				
1.80m			B2	3.40	3.40						
		145.33	Hole Terminated at 3.40m bgl.								

Remarks

Reason for Termination:

Material too stiff to dig

Groundwater Notes:

Seepage from 1.70mbgl

Other Remarks:

Cleared of services, backfilled with arisings

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TRIAL PIT LOG

Scale: 1:50Sheet 1 of 1

LOCATION ID: TP110

Project Name: Plot P, Kingsway Business Park

Project Number: 210939

Client: Wilson Bowden Developments Ltd

Plant: JCB 3CX

Start & End Date: 03/08/2022

2.50

1.00

Pit Dimensions (m)

0 Degrees

Stability: Pit stable

Ground Level (m AOD): 149.41

Eastings & Northings: 391920E 412667N

Engineer: OS

Checker: MH

Strata					Samples			In-Situ Tests				
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend	Depth (m bgl)	Type	From (m)	To (m)	Type	Depth (m)	Result	
		0.20m	Dark brown slightly clayey fine to medium SAND with rootlet content. (Topsoil)		0.20	ES B ES	0.30 0.50 0.50			1.10	(30, 25, 25)kPa	
		149.21			0.40							
		0.20m										
		149.01	Brown slightly gravelly fine to medium SAND. Gravel is subangular to suubounded, fine to coarse of sandstone.()									
		0.50m	Black gravelly fine to coarse SAND. Gravel is subangular to subrounded, fine to coarse of sandstone.()									
		148.51	Firm light grey slightly sandy CLAY.()									
		0.80m										
		147.71	Firm grey slightly sandy CLAY.()									
		1.30m										
		146.41	Stiff grey CLAY with low cobble content. Cobble is angular to subangular of mudstone.()									
0.30m												
146.11	Weathered MUDSTONE recovered as stiff grey slightly gravelly clay. Gravel is subangular to subrounded, fine to coarse of mudstone.()											
0.50m												
145.61		Hole Terminated at 3.80m bgl.										

Remarks

Reason for Termination:

Limit of machine reached

Groundwater Notes:

Seepage at 1.40mbgl

Other Remarks:

Cleared of services, backfilled with arisings

TRIAL PIT LOG

Scale: 1:50Sheet 1 of 1

LOCATION ID: TP111

Project Name: Plot P, Kingsway Business Park

Project Number: 210939

Client: Wilson Bowden Developments Ltd

Plant: JCB 3CX

Start & End Date: 03/08/2022

Ground Level (m AOD): 149.64

Eastings & Northings: 391895E 412669N

2.50

1.00

Pit Dimensions (m)

0 Degrees

Stability: Unstable below 2m

Engineer: OS

Checker: MH

Strata					Samples			In-Situ Tests			
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend	Depth (m bgl)	Type	From (m)	To (m)	Type	Depth (m)	Result
		0.20m	Dark brown slightly clayey fine to medium SAND with rootlet content. (Topsoil)		0.20	ES	0.10				
		149.44				ES	0.30				
		0.30m	Blackish brown slightly gravelly SAND. Gravel is subangular to subrounded, fine to coarse of brick and sandstone. (Made Ground)		0.50						
		149.14				B	0.80		HSV	0.70	(76, 72, 72)kPa
		0.80m	Firm light grey slightly silty CLAY.()			D	0.80				
						ES	0.80				
		148.34	Orange slightly gravelly slightly clayey fine to medium SAND with low cobble content. Gravel is subangular to subrounded, fine to coarse of sandstone. Cobble is subangular of sandstone.()		1.30	B	1.50				
						D	1.50				
		1.70m									
		146.64	Stiff grey slightly sandy CLAY.()		3.00						
		0.50m				D	3.40				
		146.14	Weathered MUDSTONE recovered as stiff slightly gravelly clay. Gravel is subangular to subrounded, fine to coarse of mudstone.()		3.50	B	3.50				
		0.50m									
		145.64	Hole Terminated at 4.00m bgl.		4.00						

Remarks

Reason for Termination:

Limit of machine reached

Groundwater Notes:

No groundwater encountered.

Other Remarks:

Cleared of services, backfilled with arisings

TRIAL PIT LOG

Scale: 1:50Sheet 1 of 1

LOCATION ID:	Project Name: Plot P, Kingsway Business Park		2.40 1.10 Pit Dimensions (m) 0Degrees								
TP112	Project Number: 210939										
	Client: Wilson Bowden Developments Ltd										
	Plant: 8 Tonne excavator	Start & End Date: 02/08/2022									
Ground Level (m AOD): 148.85		Eastings & Northings: 391864E 412625N		Engineer: TF	Checker: MH						
Strata Samples In-Situ Tests											
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend	Depth (m bgl)	Type	From (m)	To (m)	Type	Depth (m)	Result
		1.00m	Grass over firm dark brown sandy gravelly CLAY with moderate cobble content. Gravel is subangular to subrounded, fine to coarse of brick and sandstone. Cobbles are subangular of brick, sandstone and concrete. (Made Ground)			ES1 B1 ES2	0.30 0.50 0.70	0.30 0.50 0.70			
		147.85	Dark brown clayey gravelly SAND. Gravel is subangular to subrounded, fine to coarse of brick and sandstone (Made Ground)		1.00	ES4	1.50	1.50	HSV	1.50	(55, 50, 80)kPa
		147.15	Soft light grey sandy SILT with lenses of firm orange mottled light grey CLAY.()		1.70	ES3	1.80	1.80			
		146.65	Soft to firm grey mottled orangish brown slightly sandy CLAY.()		2.20	D1	2.00	2.00			
		146.15	Orange clayey SAND.()		2.70	B2 D2	2.40 2.60	2.40 2.60	HSV	2.50	(54, 70, 52)kPa
		1.50m				B3 D3	3.00 3.20	3.00 3.20			
		144.65	Brownish red clayey slightly gravelly SAND. Gravel is rounded to subrounded, fine to coarse of sandstone.()		4.20	D4	4.00	4.00			
		144.35	Hole Terminated at 4.50m bgl.		4.50	B4	4.50	4.50			
Remarks											
Reason for Termination: Target Depth Reached											
Groundwater Notes: No groundwater encountered.											
Other Remarks: Cleared of services, backfilled with arisings											
BWB A CAF GROUP COMPANY											

TRIAL PIT LOG										Scale: 1:50		Sheet 1 of 1	
LOCATION ID:		Project Name: Plot P, Kingsway Business Park								2.50 1.00 Pit Dimensions (m) 0 Degrees Stability: Unstable below 1.2m			
TP113		Project Number: 210939											
		Client: Wilson Bowden Developments Ltd											
		Plant: JCB 3CX		Start & End Date: 03/08/2022									
Ground Level (m AOD): 149.30		Eastings & Northings: 391896E 412619N								Engineer: OS		Checker: MH	
Strata						Samples			In-Situ Tests				
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend	Depth (m bgl)	Type	From (m)	To (m)	Type	Depth (m)	Result		
		0.40m	Dark brown slightly clayey slightly gravelly fine SAND. Gravel is subangular to subrounded, fine to coarse of brick and sandstone.		0.40	ES	0.30						
		148.90	(Made Ground)										
		0.40m	Firm grey slightly gravelly CLAY. Gravel is subangular to subrounded, fine to coarse of brick and sandstone.()		0.60	B	0.60		HSV	0.60	(62, 74, 58)kPa		
		148.50	Light grey slightly gravelly clayey SILT. Gravel is subangular to subrounded, fine to medium of coal.()		0.80	ES	0.60						
		1.00m			1.00	D	1.00						
		147.50	Reddish orange silty fine to medium SAND.()		1.80								
		1.70m				B	3.00						
		145.80	Firm grey slightly sandy CLAY.()		3.50	D	3.60		HSV	3.60	(51, 55, 52)kPa		
		0.70m											
		145.10	Hole Terminated at 4.20m bgl.		4.20								
Remarks													
Reason for Termination: Limit of machine reached													
Groundwater Notes: Seepage at 3.60mbgl													
Other Remarks: Cleared of services, backfilled with arisings													

Sheet 1 of 1

Checker: MH

Strata						Samples			In-Situ Tests			
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend	Depth (m bgl)	Type	From (m)	To (m)	Type	Depth (m)	Result	
		0.40m	Dark brown slightly clayey slightly gravelly fine SAND. Gravel is subangular to subrounded, fine to coarse of brick and sandstone. (Made Ground)		0.40	ES	0.30		HSV	0.60	(62, 74, 58)kPa	
		148.90										
		0.40m				Firm grey slightly gravelly CLAY. Gravel is subangular to subrounded, fine to coarse of brick and sandstone.()						0.60
		148.50										
		0.40m	Light grey slightly gravelly clayey SILT. Gravel is subangular to subrounded, fine to medium of coal.()		0.80	D	1.00					
		148.50										
		1.00m										
		147.50	Reddish orange silty fine to medium SAND.()		1.80							
		1.70m										
145.80	Firm grey slightly sandy CLAY.()		3.50	D	3.60		HSV	3.60	(51, 55, 52)kPa			
0.70m												
145.10	Hole Terminated at 4.20m bgl.			4.20								

Reason for Termination: Limit of machine reached Groundwater Notes: Seepage at 3.60mbgl Other Remarks: Cleared of services, backfilled with arisings	
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TRIAL PIT LOG

Scale: 1:50Sheet 1 of 1

LOCATION ID:		Project Name: Plot P, Kingsway Business Park			2.50 1.00 Pit Dimensions (m) 0Degrees Stability: Pit stable							
TP114		Project Number: 210939										
		Client: Wilson Bowden Developments Ltd										
		Plant: JCB 3CX	Start & End Date: 03/08/2022									
Ground Level (m AOD): 148.83		Eastings & Northings: 391943E 412622N			Engineer: OS		Checker: MH					
Strata						Samples			In-Situ Tests			
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend	Depth (m bgl)	Type	From (m)	To (m)	Type	Depth (m)	Result	
▼		0.40m	Dark brown slightly clayey SAND with rootlet content (Topsoil)		0.40	ES	0.30					
		148.43	greyish orange slightly gravelly fine to medium SAND. Gravel is subangular to subrounded, fine to coarse of sandstone.()		0.30m		B	0.60				
		148.13				D	0.60					
			Soft light grey sandy SILT.()		0.70	ES	0.60					
		1.00m										
		147.13	Soft reddish grey slightly gravelly sandy SILT with lenses of clay. Gravel is subangular to subrounded, fine to medium of coal. Odour of hydrogen sulfide present.()		1.70	B	1.60		HSV	1.60	(24, 26, 30)kPa	
						D	1.80					
		1.30m				ES	1.80					
						B	2.30					
		145.83	Stiff grey slightly sandy slightly gravelly CLAY with low cobble content. Gravel is subangular to subrounded, medium to coarse of mudstone. Cobble is subrounded of mudstone.()		3.00							
							D	3.20		HSV	3.20	(94, 86, 94)kPa
		1.00m					ES	3.20				
						B	3.40					
		144.83	Hole Terminated at 4.00m bgl.		4.00	D	4.00		HSV	3.90	(104, 88, 84)kPa	
Remarks												
Reason for Termination: Limit of machine reached												
Groundwater Notes: Seepage at 2.40mbgl												
Other Remarks: Cleared of services, backfilled with arisings												
BWB A CAF GROUP COMPANY												

TRIAL PIT LOG

Scale: 1:50Sheet 1 of 1

LOCATION ID:	Project Name: Plot P, Kingsway Business Park		2.40 1.00 Pit Dimensions (m) 0Degrees								
TP115	Project Number: 210939										
	Client: Wilson Bowden Developments Ltd										
	Plant: JCB 3CX	Start & End Date: 03/08/2022									
Ground Level (m AOD): 148.83		Eastings & Northings: 391948E 412595N		Stability: Pit stable	Engineer: OS	Checker: MH					
Strata					Samples		In-Situ Tests				
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend	Depth (m bgl)	Type	From (m)	To (m)	Type	Depth (m)	Result
		0.40m	Dark brown slightly clayey fine SAND with rootlet content. (Topsoil)			ES	0.30				
		148.43			0.40	D	0.50				
		0.25m	Orangey brown slightly clayey fine to medium SAND.()			ES	0.50				
		148.18			0.65						
		0.55m	Orangey light grey clayey SAND.()			B	1.00				
		147.63			1.20						
			Soft reddish grey slightly gravelly sandy SILT with lenses of clay. Gravel is subangular to subrounded, fine to medium of coal. Sulphuric odour present()			ES	1.50				
		2.20m				B	2.50				
		145.43	Hole Terminated at 3.40m bgl.		3.40						
Remarks											
Reason for Termination: Limit of machine reached											
Groundwater Notes: No groundwater encountered.											
Other Remarks: Cleared of services, backfilled with arisings											
BWB A CAF GROUP COMPANY											

TRIAL PIT LOG

Scale: 1:50Sheet 1 of 1

LOCATION ID:		Project Name: Plot P, Kingsway Business Park		2.40 1.00 Pit Dimensions (m) 0Degrees Stability: Unstable below 3.40mbgl							
TP116		Project Number: 210939									
		Client: Wilson Bowden Developments Ltd									
		Plant: JCB 3CX	Start & End Date: 02/08/2022								
Ground Level (m AOD): 149.47		Eastings & Northings: 391908E 412585N		Engineer: TF		Checker: MH					
Strata						Samples			In-Situ Tests		
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend	Depth (m bgl)	Type	From (m)	To (m)	Type	Depth (m)	Result
		0.60m	Grass over dark brown clayey slightly gravelly SAND with high rootlet content and low cobble content. Gravel is subangular to subrounded, fine to coarse of brick.Cobbles are subangular of brick.			ES1	0.30	0.30			
		148.87	(Made Ground)			D1	0.70	0.70			
		0.20m	Light brown clayey slightly gravelly SAND. Gravel is subangular, fine to coarse of brick.			ES2	0.70	0.70			
		148.67	(Made Ground)			ES3	0.90	0.90			
		0.20m	Firm dark brown sandy CLAY with high plant material content and organic odour.()			D2	1.20	1.20			
		148.47	Soft to firm light grey sandy SILT with lenses of firm grey mottled brown clay()			B1	1.50	1.50			
		1.10m				D5	1.80	1.80			
		147.37	Light brown slightly clayey SAND with lenses of subangular fine gravel.()			D3	2.00	2.00			
		1.30m				B2	3.00	3.00			
		146.07	Greyish brown very silty SAND with lenses of subangular, fine black gravel.()			D4	3.50	3.50			
0.60m		B3	4.00	4.00							
145.47	Hole Terminated at 4.00m bgl.										
Remarks											
Reason for Termination: Sides Collapsing											
Groundwater Notes: Seepage at 3.40mbgl											
Other Remarks: Cleared of services, backfilled with arisings											

TRIAL PIT LOG

Scale: 1:50Sheet 1 of 1

LOCATION ID:	Project Name: Plot P, Kingsway Business Park		1.80 1.00 Pit Dimensions (m) 0 Degrees								
TP117	Project Number: 210939										
	Client: Wilson Bowden Developments Ltd										
	Plant: 8 Tonne excavator	Start & End Date: 04/08/2022									
Ground Level (m AOD): 148.54		Eastings & Northings: 391954E 412533N		Stability: Stable	Engineer: TF	Checker: MH					
Strata					Samples			In-Situ Tests			
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend	Depth (m bgl)	Type	From (m)	To (m)	Type	Depth (m)	Result
		0.50m	Grass over dark brown clayey SAND with high rootlet content (Topsoil)		0.50	ES1	0.20	0.20			
		148.04	Soft to firm greyish very sandy CLAY. (.)			ES2	0.70	0.70	HSV	0.80	(44, 43, 48)kPa
		1.00m				D1	1.00	1.00			
		147.04	Stiff sandy gravelly CLAY. Gravel is subangular to subrounded, fine to coarse of mudstone.(.)		1.50	B1	1.40	1.40	HSV	1.50	(45, 40, 59)kPa
		0.40m									
		146.64	Hole Terminated at 1.90m bgl.		1.90	D2	1.90	1.90	HSV	1.90	(130, 124, 118)kPa
Remarks											
Reason for Termination: Material too stiff to dig											
Groundwater Notes: No groundwater encountered.											
Other Remarks: Cleared of services, backfilled with arisings											

TRIAL PIT LOG										Scale: 1:50		Sheet 1 of 1	
LOCATION ID:		Project Name: Plot P, Kingsway Business Park						1.80 1.20 Pit Dimensions (m) 0 Degrees Stability: Stable					
TP118		Project Number: 210939											
		Client: Wilson Bowden Developments Ltd											
		Plant: 8 Tonne excavator		Start & End Date: 04/08/2022									
Ground Level (m AOD): 148.54		Eastings & Northings: 391972E 412511N						Engineer: TF		Checker: MH			
Strata						Samples			In-Situ Tests				
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend	Depth (m bgl)	Type	From (m)	To (m)	Type	Depth (m)	Result		
		0.40m	Reeds over dark brown clayey SAND. (Topsoil)		0.40	ES1	0.30	0.30					
		148.14	Firm brown slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded, fine to coarse of sandstone and mudstone. ()			ES2	0.50	0.50					
						D1	0.60	0.60					
		1.20m				B1	1.00	1.00					
		146.94	Stiff brown mottled dark grey sandy gravelly CLAY. Gravel is subangular, fine to coarse of mudstone. Rare subangular cobbles of sandstone.()		1.60	B2	1.70	1.70					
		0.90m											
		146.04	Hole Terminated at 2.50m bgl.		2.50	D2	2.50	2.50					
Remarks													
Reason for Termination:													
Material too stiff to dig													
Groundwater Notes:													
No groundwater encountered.													
Other Remarks:													
Cleared of services, backfilled with arisings													
BWB A CAP GROUP COMPANY													

Sheet 1 of 1

Checker: MH

[illegible]

Reason for Termination: Material too stiff to dig Groundwater Notes: No groundwater encountered. Other Remarks: Cleared of services, backfilled with arisings	
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TRIAL PIT LOG

Scale: 1:50Sheet 1 of 1

LOCATION ID:	Project Name: Plot P, Kingsway Business Park		1.60 1.30 Pit Dimensions (m) 0Degrees Stability: Stable										
TP119	Project Number: 210939												
	Client: Wilson Bowden Developments Ltd												
	Plant: 8 Tonne excavator	Start & End Date: 05/08/2022											
Ground Level (m AOD): 148.73		Eastings & Northings: 391918E 412707N		Engineer: TF		Checker: MH							
Strata						Samples			In-Situ Tests				
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend	Depth (m bgl)	Type	From (m)	To (m)	Type	Depth (m)	Result		
		0.40m	Bullrushes over very soft dark brown silty sandy CLAY. (Topsoil)		0.40	ES1	0.20	0.20	HSV	1.00	(58, 60, 58)kPa		
		148.33	Dark brown gravelly SAND. Gravel is subangular to subrounded, fine to coarse of brick, sandstone and mudstone. (Made Ground)				0.40	ES2				0.60	0.60
		0.40m											
		147.93											
0.60m	Firm brown slightly sandy CLAY()		0.80	D1	1.00	1.00							
147.33	Hole Terminated at 1.40m bgl.							1.40	ES3	1.00	1.00		
Remarks													
Reason for Termination: Depth of organic material proved													
Groundwater Notes: Seepage from 0.20mbgl													
Other Remarks: Cleared of services, backfilled with arisings													

TRIAL PIT LOG

Scale: 1:50

Sheet 1 of 1

Scale: 1:50

Sheet 1 of 1

Sheet 1 of 1

LOCATION ID:		Project Name: Plot P, Kingsway Business Park		2.20 1.10 Pit Dimensions (m) 0Degrees Stability: Stable	
TP120	Project Number: 210939				
	Client: Wilson Bowden Developments Ltd				
	Plant: 8 Tonne excavator	Start & End Date: 05/08/2022			
Ground Level (m AOD): 148.73		Eastings & Northings: 391979E 412671N		Engineer: TF	Checker: MH

Strata						Samples			In-Situ Tests			
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend	Depth (m bgl)	Type	From (m)	To (m)	Type	Depth (m)	Result	
		0.90m	Bullrushes over dark brown sandy CLAY with high rootlet content. Organic odour present (Topsoil)			B1	0.30	0.30				
		147.83										
		0.10m	Very soft black PEAT. (Peat)			D1	0.95	0.95				
		147.73										
		0.20m	Soft brownish grey slightly sandy silty CLAY.()			D2	1.10	1.10				
		147.53	Hole Terminated at 1.20m bgl.									

Remarks

Reason for Termination:

Depth of organic material proved

Groundwater Notes:

Water strike at 0.80mbgl

Other Remarks:

Cleared of services, backfilled with arisings



TRIAL PIT LOG

Scale: 1:50Sheet 1 of 1

LOCATION ID:	Project Name: Plot P, Kingsway Business Park		2.60 1.20 Pit Dimensions (m) 0Degrees								
TP121	Project Number: 210939										
	Client: Wilson Bowden Developments Ltd										
	Plant: 8 Tonne excavator	Start & End Date: 05/08/2022									
Ground Level (m AOD): 148.73		Eastings & Northings: 391950E 412648N		Stability: Stable	Engineer: TF	Checker: MH					
Strata					Samples			In-Situ Tests			
Groundwater Strike	Backfill	Level (m AOD)	Description	Legend	Depth (m bgl)	Type	From (m)	To (m)	Type	Depth (m)	Result
		0.50m	Very soft black PEAT. (Peat)		0.50	ES1	0.20	0.20			
		148.23	Very soft dark brown PEAT with high plant material content. (Peat)			B1	0.40	0.40			
		0.50m				D1	0.60	0.60			
		147.73	Very soft grey silty CLAY with high plant material content.()		1.00	B2	1.20	1.20	HSV	1.10	(12, 6, 5)kPa
		1.30m		ES2		1.20	1.20				
146.43	Greyish brown clayey silty SAND.()		2.30								
0.30m											
146.13			Hole Terminated at 2.60m bgl.		2.60	D2	2.60	2.60			
Remarks											
Reason for Termination: Depth of organic material proved											
Groundwater Notes: Water strike at 0.40mbgl											
Other Remarks: Cleared of services, backfilled with arisings											

Appendix 3: SPT Calibration Certificate

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

ARCHWAY ENGINEERING UK LTD
AINLEYS INDUSTRIAL ESTATE
ELLAND
WEST YORKSHIRE
HX5 9JP

SPT Hammer Ref: PBD02
Test Date: 17/02/2022
Report Date: 17/02/2022
File Name: PBD02.spt
Test Operator: CM

Instrumented Rod Data

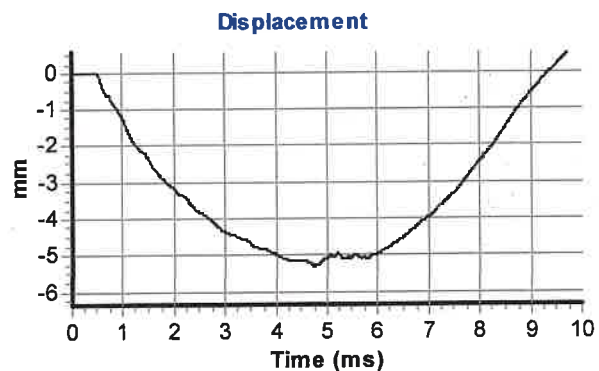
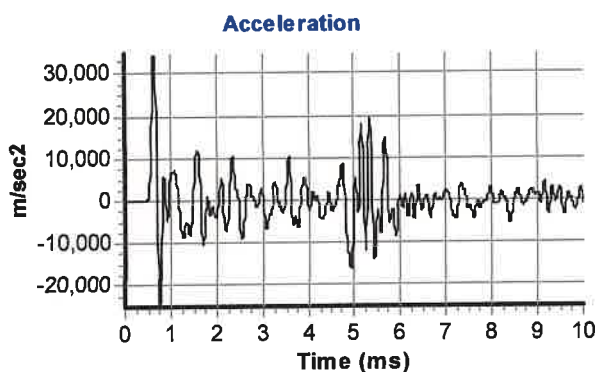
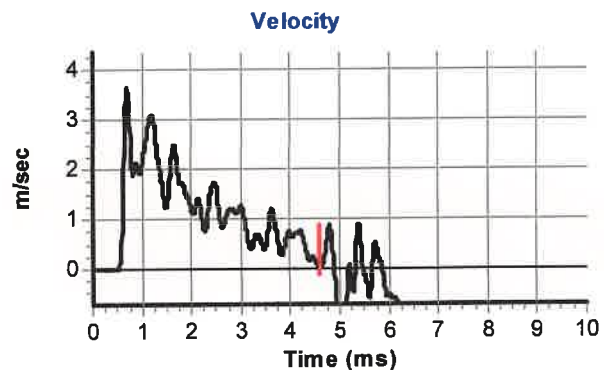
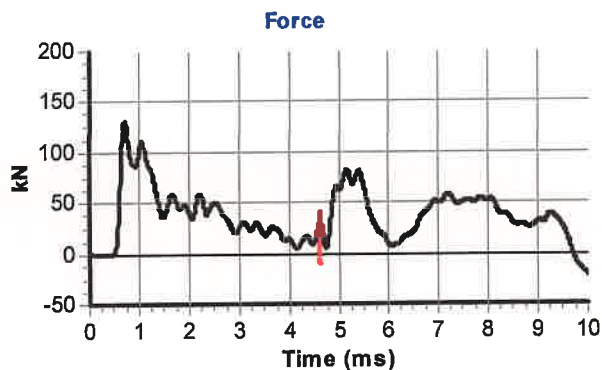
Diameter d_r (mm): 54
Wall Thickness t_r (mm): 6.0
Assumed Modulus E_a (GPa): 200
Accelerometer No.1: 7080
Accelerometer No.2: 11609

SPT Hammer Information

Hammer Mass m (kg): 63.5
Falling Height h (mm): 760
SPT String Length L (m): 10.0

Comments / Location

PB DRILLING LTD/79197



Calculations

Area of Rod A (mm^2): 905
Theoretical Energy E_{theor} (J): 473
Measured Energy E_{meas} (J): 331

Energy Ratio E_r (%): **70**

Signed: C. McCLUSKEY
Title: FITTER

The recommended calibration interval is 12 months



Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

Hammer Ref: PBD5
Test Date: 05/01/2022
Report Date:
File Name: PBD5.spt
Test Operator: B HUNTER

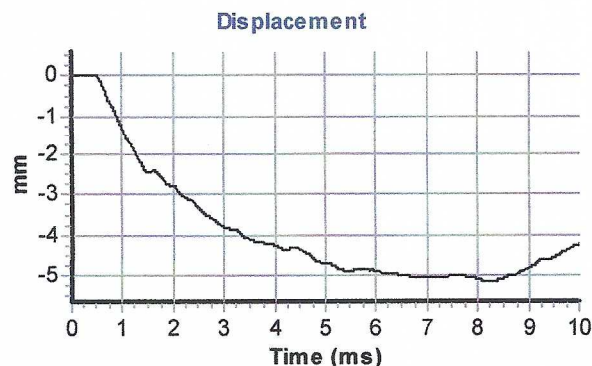
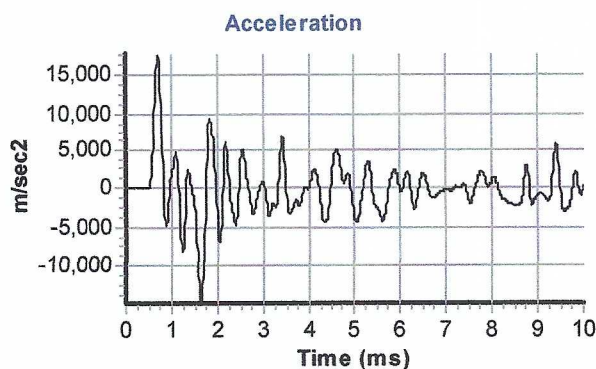
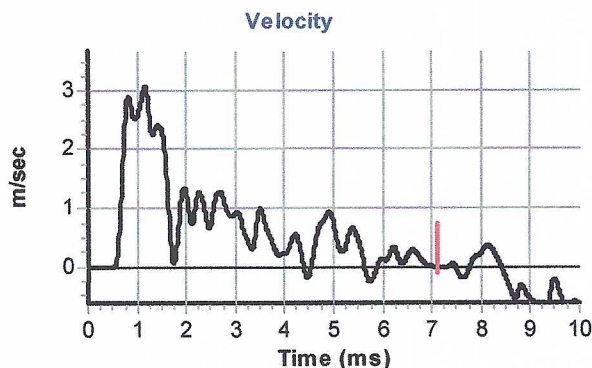
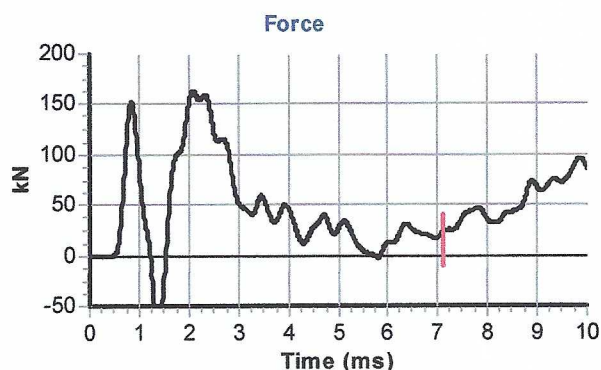
Instrumented Rod Data

Diameter d_r (mm): 54
Wall Thickness t_r (mm): 6.0
Assumed Modulus E_a (GPa): 208
Accelerometer No.1: 62901
Accelerometer No.2: 62902

Hammer Information

Hammer Mass m (kg): 63.5
Falling Height h (mm): 760
String Length L (m): 10.0

Comments / Location



Calculations

Area of Rod A (mm²): 905
Theoretical Energy E_{theor} (J): 473
Measured Energy E_{meas} (J): 309

Energy Ratio E_r (%): 65

Signed:

Title:

Operations Manager

The recommended calibration interval is 12 months

Appendix 4: Gas and Groundwater Monitoring Data

BWB

CONSULTANCY | ENVIRONMENT
INFRASTRUCTURE | BUILDINGS

Weather Conditions	Start	End
(Dry / Raining)	Dry	Dry
Wind Strength (m/s)		
Wind Direction (from)		
Temperature (°C)	14.0	14.0
Barometric Pressure (h Pa / mB)	1017.0	1017.0
App 12 Hour Pressure (h Pa / mB)	1019.0	
12 Hour Pressure Trend		
PID - Air	<0.1	<0.1
PID - Calibration Gas		

[illegible]

Site:		Plot P Kingsway Business Park
Client:		Wilson Bowden Developments
Job No.:		210939
Date:		06/09/2022
Start / End Time:		10:30 - 11:30
Engineer:		OS
Monitoring Equipment:	Gas Meter ID	
	PID ID	
	Dip Tape	
	Other	

BWB
CONSULTANCY | ENVIRONMENT
INFRASTRUCTURE | BUILDINGS

Weather Conditions	Start	End
(Dry / Raining)	Dry	Light rain
Wind Strength (m/s)		
Wind Direction (from)		
Temperature (°C)	10.0	10.0
Barometric Pressure (h Pa / mB)	1015.0	1015.0
App 12 Hour Pressure (h Pa / mB)	1018.0	
12 Hour Pressure Trend		
PID - Air	<0.1	<0.1
PID - Calibration Gas		

[illegible]

Site:		Plot P Kingsway Business Park
Client:		Wilson Bowden Developments
Job No.:		210939
Date:		29/09/2022
Start / End Time:		
Engineer:		OS
Monitoring Equipment:	Gas Meter ID	
	PID ID	
	Dip Tape	
	Other	

BWB

Weather Conditions	Start	End
(Dry / Raining)	Dry	Dry
Wind Strength (m/s)		
Wind Direction (from)		
Temperature (°C)	15.0	14.0
Barometric Pressure (h Pa / mB)	991.0	991.0
App 12 Hour Pressure (h Pa / mB)	1001.0	
12 Hour Pressure Trend		
PID - Air	<0.1	<0.1
PID - Calibration Gas		

[illegible]

BWB GAS AND GROUNDWATER MONITORING

NR = Not Recorded
Dry = No Groundwater



Weather Conditions	Start	End
(Dry / Raining)	Dry	Dry
Wind Strength (m/s)		
Wind Direction (from)		
Temperature (°C)	15.0	15.0
Barometric Pressure (h Pa / mB)	1015.0	1015.0
App 12 Hour Pressure (h Pa / mB)	1017.0	
12 Hour Pressure Trend		
PID - Air		
PID - Calibration Gas		

Site:		Plot P Kingsway Business Park	
Client:		Wilson Bowden Developments	
Job No.:		210939	
Date:		13/10/2022	
Start / End Time:			
Engineer:		OS	
Monitoring Equipment:	Gas Meter ID		
	PID ID		
	Dip Tape		
	Other		

[illegible]

Appendix 5: Soil Chemical Analysis Results

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e: Thomas.Flame@bwbconsulting.com

Analytical Report Number : 22-79454

Project / Site name:	Plot P Kingsway Business Park	Samples received on:	05/08/2022
Your job number:	210939	Samples instructed on/ Analysis started on:	19/08/2022
Your order number:	2412	Analysis completed by:	06/09/2022
Report Issue Number:	1	Report issued on:	06/09/2022
Samples Analysed:	4 leachate samples - 13 soil samples		

Izabela Wójcik
Signed:

Izabela Wójcik
Reporting Specialist
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

Analytical Report Number: 22-79454
Project / Site name: Plot P Kingsway Business Park
Your Order No: 2412

Lab Sample Number				2397561	2397562	2397563	2397564	2397565
Sample Reference				TP101	TP104	TP107	TP112	TP112
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.30	0.30	0.40	0.30	0.70
Date Sampled				01/08/2022	01/08/2022	01/08/2022	01/08/2022	01/08/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	-	-	< 0.1
Moisture Content	%	0.01	NONE	10	11	-	-	14
Total mass of sample received	kg	0.001	NONE	0.8	0.3	-	-	0.3

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	-	Not-detected	Not-detected	-
Asbestos Analyst ID	N/A	N/A	N/A	GF1	N/A	GF1	GF1	N/A

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	6.9	8	-	-	9.2
Total Cyanide	mg/kg	1	MCERTS	19	< 1.0	-	-	< 1.0
Complex Cyanide	mg/kg	1	MCERTS	19	< 1.0	-	-	< 1.0
Free Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	-	-	< 1.0
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.062	0.01	-	-	0.82
Total Sulphur	mg/kg	50	MCERTS	1100	80	-	-	1300
Organic Matter	%	0.1	MCERTS	-	-	-	-	-
Fraction Organic Carbon (FOC) Automated	N/A	0.001	MCERTS	0.023	0.0058	-	-	0.015
Fraction Organic Carbon (FOC)	N/A	0.001	MCERTS	-	-	-	-	-
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	2.3	0.6	-	-	1.5
Total Organic Carbon (TOC) - Manual	%	0.1	MCERTS	-	-	-	-	-

Total Phenols

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

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	-	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.4	< 0.05	-	-	0.33
Fluorene	mg/kg	0.05	MCERTS	0.27	< 0.05	-	-	0.3
Phenanthrene	mg/kg	0.05	MCERTS	3.5	< 0.05	-	-	2
Anthracene	mg/kg	0.05	MCERTS	0.98	< 0.05	-	-	0.54
Fluoranthene	mg/kg	0.05	MCERTS	5.7	< 0.05	-	-	2.1
Pyrene	mg/kg	0.05	MCERTS	4.9	< 0.05	-	-	2.1
Benzo(a)anthracene	mg/kg	0.05	MCERTS	4.1	< 0.05	-	-	1.2
Chrysene	mg/kg	0.05	MCERTS	2.7	< 0.05	-	-	0.99
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	3.5	< 0.05	-	-	0.89
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	1.9	< 0.05	-	-	0.53
Benzo(a)pyrene	mg/kg	0.05	MCERTS	3.6	< 0.05	-	-	0.98
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	2.2	< 0.05	-	-	0.41
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.54	< 0.05	-	-	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	2.3	< 0.05	-	-	0.51

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	36.5	< 0.80	-	-	12.8
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Analytical Report Number: 22-79454
 Project / Site name: Plot P Kingsway Business Park
 Your Order No: 2412

Lab Sample Number	2397561	2397562	2397563	2397564	2397565
Sample Reference	TP101	TP104	TP107	TP112	TP112
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.30	0.30	0.40	0.30	0.70
Date Sampled	01/08/2022	01/08/2022	01/08/2022	01/08/2022	01/08/2022
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	52	7.4	-	-	6.7
Barium (aqua regia extractable)	mg/kg	1	MCERTS	560	36	-	-	110
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	2.6	0.51	-	-	0.78
Boron (water soluble)	mg/kg	0.2	MCERTS	0.3	< 0.2	-	-	0.4
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	-	-	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	< 1.8	-	-	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	31	27	-	-	22
Copper (aqua regia extractable)	mg/kg	1	MCERTS	140	17	-	-	19
Lead (aqua regia extractable)	mg/kg	1	MCERTS	180	11	-	-	41
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	-	-	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	55	18	-	-	21
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	-	-	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	83	27	-	-	23
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	63	37	-	-	56

Monoaromatics & Oxygenates

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

Petroleum Hydrocarbons

TPH C10 - C40 EH_CU_ID_TOTAL	mg/kg	10	MCERTS	42	< 10	-	-	20
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TPH2 (C6 - C10) HS_ID_TOTAL	mg/kg	0.1	MCERTS	< 0.1	< 0.1	-	-	< 0.1
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TPH-CWG - Aliphatic >EC5 - EC6 HS_ID_AL	mg/kg	0.001	MCERTS	< 0.001	< 0.001	-	-	-
TPH-CWG - Aliphatic >EC6 - EC8 HS_ID_AL	mg/kg	0.001	MCERTS	< 0.001	< 0.001	-	-	-
TPH-CWG - Aliphatic >EC8 - EC10 HS_ID_AL	mg/kg	0.001	MCERTS	< 0.001	< 0.001	-	-	-
TPH-CWG - Aliphatic >EC10 - EC12 EH_CU_ID_AL	mg/kg	1	MCERTS	< 1.0	< 1.0	-	-	-
TPH-CWG - Aliphatic >EC12 - EC16 EH_CU_ID_AL	mg/kg	2	MCERTS	< 2.0	< 2.0	-	-	-
TPH-CWG - Aliphatic >EC16 - EC21 EH_CU_ID_AL	mg/kg	8	MCERTS	< 8.0	< 8.0	-	-	-
TPH-CWG - Aliphatic >EC21 - EC35 EH_CU_ID_AL	mg/kg	8	MCERTS	< 8.0	< 8.0	-	-	-
TPH-CWG - Aliphatic (EC5 - EC35) EH_CU+HS_ID_AL	mg/kg	10	MCERTS	< 10	< 10	-	-	-

TPH-CWG - Aromatic >EC5 - EC7 HS_ID_AR	mg/kg	0.001	MCERTS	< 0.001	< 0.001	-	-	-
TPH-CWG - Aromatic >EC7 - EC8 HS_ID_AR	mg/kg	0.001	MCERTS	< 0.001	< 0.001	-	-	-
TPH-CWG - Aromatic >EC8 - EC10 HS_ID_AR	mg/kg	0.001	MCERTS	< 0.001	< 0.001	-	-	-
TPH-CWG - Aromatic >EC10 - EC12 EH_CU_ID_AR	mg/kg	1	MCERTS	< 1.0	< 1.0	-	-	-
TPH-CWG - Aromatic >EC12 - EC16 EH_CU_ID_AR	mg/kg	2	MCERTS	< 2.0	< 2.0	-	-	-
TPH-CWG - Aromatic >EC16 - EC21 EH_CU_ID_AR	mg/kg	10	MCERTS	14	< 10	-	-	-
TPH-CWG - Aromatic >EC21 - EC35 EH_CU_ID_AR	mg/kg	10	MCERTS	24	< 10	-	-	-
TPH-CWG - Aromatic (EC5 - EC35) EH_CU+HS_ID_AR	mg/kg	10	MCERTS	38	< 10	-	-	-

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

Analytical Report Number: 22-79454

Project / Site name: Plot P Kingsway Business Park

Your Order No: 2412

Lab Sample Number				2397566	2397567	2397568	2397569	2397570
Sample Reference				TP112	TP113	TP114	TP114	TP115
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.50	0.30	0.60	1.80	0.30
Date Sampled				01/08/2022	01/08/2022	01/08/2022	01/08/2022	01/08/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	15	22	13	20	19
Total mass of sample received	kg	0.001	NONE	0.4	0.8	0.4	0.3	0.4

Asbestos in Soil	Type	N/A	ISO 17025	-	Not-detected	-	-	-
Asbestos Analyst ID	N/A	N/A	N/A	N/A	GF1	N/A	N/A	N/A

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	-	6.9	-	7.6	-
Total Cyanide	mg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
Complex Cyanide	mg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
Free Cyanide	mg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	0.32	-	0.031	-
Total Sulphur	mg/kg	50	MCERTS	-	590	-	490	-
Organic Matter	%	0.1	MCERTS	-	-	-	-	-
Fraction Organic Carbon (FOC) Automated	N/A	0.001	MCERTS	-	0.051	-	0.0045	-
Fraction Organic Carbon (FOC)	N/A	0.001	MCERTS	-	-	-	-	-
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	2.8	5.1	1	0.5	6.5
Total Organic Carbon (TOC) - Manual	%	0.1	MCERTS	-	-	-	-	-

Total Phenols

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

Naphthalene	mg/kg	0.05	MCERTS	-	< 0.05	-	< 0.05	-
Acenaphthylene	mg/kg	0.05	MCERTS	-	< 0.05	-	< 0.05	-
Acenaphthene	mg/kg	0.05	MCERTS	-	< 0.05	-	< 0.05	-
Fluorene	mg/kg	0.05	MCERTS	-	< 0.05	-	< 0.05	-
Phenanthrene	mg/kg	0.05	MCERTS	-	< 0.05	-	< 0.05	-
Anthracene	mg/kg	0.05	MCERTS	-	< 0.05	-	< 0.05	-
Fluoranthene	mg/kg	0.05	MCERTS	-	0.35	-	< 0.05	-
Pyrene	mg/kg	0.05	MCERTS	-	0.33	-	< 0.05	-
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	0.23	-	< 0.05	-
Chrysene	mg/kg	0.05	MCERTS	-	0.22	-	< 0.05	-
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	< 0.05	-	< 0.05	-
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	< 0.05	-	< 0.05	-
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	< 0.05	-	< 0.05	-
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	< 0.05	-	< 0.05	-
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	< 0.05	-	< 0.05	-
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	< 0.05	-	< 0.05	-

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	-	1.13	-	< 0.80	-
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Analytical Report Number: 22-79454
 Project / Site name: Plot P Kingsway Business Park
 Your Order No: 2412

Lab Sample Number				2397566	2397567	2397568	2397569	2397570
Sample Reference				TP112	TP113	TP114	TP114	TP115
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.50	0.30	0.60	1.80	0.30
Date Sampled				01/08/2022	01/08/2022	01/08/2022	01/08/2022	01/08/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	11	-	3.5	-
Barium (aqua regia extractable)	mg/kg	1	MCERTS	-	42	-	21	-
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	-	0.45	-	0.33	-
Boron (water soluble)	mg/kg	0.2	MCERTS	-	0.8	-	< 0.2	-
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	< 0.2	-	< 0.2	-
Chromium (hexavalent)	mg/kg	1.8	MCERTS	-	< 1.8	-	< 1.8	-
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	13	-	7.9	-
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	28	-	11	-
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-	65	-	7	-
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	< 0.3	-	< 0.3	-
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	9	-	20	-
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	< 1.0	-	< 1.0	-
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	-	18	-	8.2	-
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	37	-	26	-

Monoaromatics & Oxygenates

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

Petroleum Hydrocarbons

TPH C10 - C40 _{EH, CU, ID, TOTAL}	mg/kg	10	MCERTS	-	38	-	< 10	-
TPH2 (C6 - C10) _{HS, ID, TOTAL}	mg/kg	0.1	MCERTS	-	< 0.1	-	< 0.1	-
TPH-CWG - Aliphatic >EC5 - EC6 _{HS, ID, AL}	mg/kg	0.001	MCERTS	-	< 0.001	-	-	-
TPH-CWG - Aliphatic >EC6 - EC8 _{HS, ID, AL}	mg/kg	0.001	MCERTS	-	< 0.001	-	-	-
TPH-CWG - Aliphatic >EC8 - EC10 _{HS, ID, AL}	mg/kg	0.001	MCERTS	-	< 0.001	-	-	-
TPH-CWG - Aliphatic >EC10 - EC12 _{EH, CU, ID, AL}	mg/kg	1	MCERTS	-	< 1.0	-	-	-
TPH-CWG - Aliphatic >EC12 - EC16 _{EH, CU, ID, AL}	mg/kg	2	MCERTS	-	< 2.0	-	-	-
TPH-CWG - Aliphatic >EC16 - EC21 _{EH, CU, ID, AL}	mg/kg	8	MCERTS	-	< 8.0	-	-	-
TPH-CWG - Aliphatic >EC21 - EC35 _{EH, CU, ID, AL}	mg/kg	8	MCERTS	-	< 8.0	-	-	-
TPH-CWG - Aliphatic (EC5 - EC35) _{EH, CU+HS, ID, AL}	mg/kg	10	MCERTS	-	< 10	-	-	-
TPH-CWG - Aromatic >EC5 - EC7 _{HS, ID, AR}	mg/kg	0.001	MCERTS	-	< 0.001	-	-	-
TPH-CWG - Aromatic >EC7 - EC8 _{HS, ID, AR}	mg/kg	0.001	MCERTS	-	< 0.001	-	-	-
TPH-CWG - Aromatic >EC8 - EC10 _{HS, ID, AR}	mg/kg	0.001	MCERTS	-	< 0.001	-	-	-
TPH-CWG - Aromatic >EC10 - EC12 _{EH, CU, ID, AR}	mg/kg	1	MCERTS	-	< 1.0	-	-	-
TPH-CWG - Aromatic >EC12 - EC16 _{EH, CU, ID, AR}	mg/kg	2	MCERTS	-	< 2.0	-	-	-
TPH-CWG - Aromatic >EC16 - EC21 _{EH, CU, ID, AR}	mg/kg	10	MCERTS	-	< 10	-	-	-
TPH-CWG - Aromatic >EC21 - EC35 _{EH, CU, ID, AR}	mg/kg	10	MCERTS	-	25	-	-	-
TPH-CWG - Aromatic (EC5 - EC35) _{EH, CU+HS, ID, AR}	mg/kg	10	MCERTS	-	31	-	-	-

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

Analytical Report Number: 22-79454
Project / Site name: Plot P Kingsway Business Park
Your Order No: 2412

Lab Sample Number				2397571	2397572	2397573
Sample Reference				TP115	TP116	TP119
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				1.50	0.90	0.60
Date Sampled				01/08/2022	01/08/2022	01/08/2022
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status			
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	20	27	7.5
Total mass of sample received	kg	0.001	NONE	0.8	0.5	0.5

Asbestos in Soil	Type	N/A	ISO 17025	-	-	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	N/A	N/A	GF1

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.6	5.6	8.6
Total Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Complex Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Free Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.047	3.1	0.1
Total Sulphur	mg/kg	50	MCERTS	750	2600	760
Organic Matter	%	0.1	MCERTS	-	16	-
Fraction Organic Carbon (FOC) Automated	N/A	0.001	MCERTS	0.0047	-	0.021
Fraction Organic Carbon (FOC)	N/A	0.001	MCERTS	-	0.09	-
Total Organic Carbon (TOC) - Automated	%	0.1	MCERTS	0.5	-	2.1
Total Organic Carbon (TOC) - Manual	%	0.1	MCERTS	-	9	-

Total Phenols

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

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	0.58	0.77
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.35
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	1.2	1.5
Pyrene	mg/kg	0.05	MCERTS	< 0.05	0.99	1.4
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.61	0.86
Chrysene	mg/kg	0.05	MCERTS	< 0.05	0.54	0.77
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.72	0.99
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	0.25	0.36
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.59	0.75
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	0.3	0.37
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	0.41	0.45

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	6.14	8.56
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Analytical Report Number: 22-79454
 Project / Site name: Plot P Kingsway Business Park
 Your Order No: 2412

Lab Sample Number				2397571	2397572	2397573
Sample Reference				TP115	TP116	TP119
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				1.50	0.90	0.60
Date Sampled				01/08/2022	01/08/2022	01/08/2022
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status			
Heavy Metals / Metalloids						
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	3.8	9.4	16
Barium (aqua regia extractable)	mg/kg	1	MCERTS	25	49	220
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.33	0.45	1.1
Boron (water soluble)	mg/kg	0.2	MCERTS	< 0.2	3.8	0.4
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	1.8	MCERTS	< 1.8	3.3	< 1.8
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	9.8	13	30
Copper (aqua regia extractable)	mg/kg	1	MCERTS	9.8	23	92
Lead (aqua regia extractable)	mg/kg	1	MCERTS	6.1	56	270
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	10	10	31
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	1.1
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	9.6	14	42
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	26	52	81

Monoaromatics & Oxygenates

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

Petroleum Hydrocarbons

TPH C10 - C40 EH, CU, ID, TOTAL	mg/kg	10	MCERTS	< 10	< 10	19
TPH2 (C6 - C10) HS, ID, TOTAL	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC5 - EC6 HS, ID, AL	mg/kg	0.001	MCERTS	-	-	-
TPH-CWG - Aliphatic >EC6 - EC8 HS, ID, AL	mg/kg	0.001	MCERTS	-	-	-
TPH-CWG - Aliphatic >EC8 - EC10 HS, ID, AL	mg/kg	0.001	MCERTS	-	-	-
TPH-CWG - Aliphatic >EC10 - EC12 EH, CU, ID, AL	mg/kg	1	MCERTS	-	-	-
TPH-CWG - Aliphatic >EC12 - EC16 EH, CU, ID, AL	mg/kg	2	MCERTS	-	-	-
TPH-CWG - Aliphatic >EC16 - EC21 EH, CU, ID, AL	mg/kg	8	MCERTS	-	-	-
TPH-CWG - Aliphatic >EC21 - EC35 EH, CU, ID, AL	mg/kg	8	MCERTS	-	-	-
TPH-CWG - Aliphatic (EC5 - EC35) EH, CU+HS, ID, AL	mg/kg	10	MCERTS	-	-	-
TPH-CWG - Aromatic >EC5 - EC7 HS, ID, AR	mg/kg	0.001	MCERTS	-	-	-
TPH-CWG - Aromatic >EC7 - EC8 HS, ID, AR	mg/kg	0.001	MCERTS	-	-	-
TPH-CWG - Aromatic >EC8 - EC10 HS, ID, AR	mg/kg	0.001	MCERTS	-	-	-
TPH-CWG - Aromatic >EC10 - EC12 EH, CU, ID, AR	mg/kg	1	MCERTS	-	-	-
TPH-CWG - Aromatic >EC12 - EC16 EH, CU, ID, AR	mg/kg	2	MCERTS	-	-	-
TPH-CWG - Aromatic >EC16 - EC21 EH, CU, ID, AR	mg/kg	10	MCERTS	-	-	-
TPH-CWG - Aromatic >EC21 - EC35 EH, CU, ID, AR	mg/kg	10	MCERTS	-	-	-
TPH-CWG - Aromatic (EC5 - EC35) EH, CU+HS, ID, AR	mg/kg	10	MCERTS	-	-	-

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



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Analytical Report Number: 22-79454

Project / Site name: Plot P Kingsway Business Park

Your Order No: 2412

Lab Sample Number				2397574	2397575	2398319
Sample Reference				TP104	TP113	TP101
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				0.30	0.30	0.30
Date Sampled				01/08/2022	01/08/2022	01/08/2022
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accreditation Status			

General Inorganics

pH (automated)	pH Units	N/A	ISO 17025	6.3	7.2	5.9
Total Cyanide	µg/l	10	ISO 17025	< 10	< 10	< 10
Sulphate as SO ₄	mg/l	0.1	ISO 17025	1.4	4.1	14.4

Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	1	ISO 17025	2.7	3.6	< 1.0
Barium (dissolved)	µg/l	0.05	ISO 17025	1.6	22	94
Beryllium (dissolved)	µg/l	0.2	ISO 17025	0.3	0.3	0.3
Boron (dissolved)	µg/l	10	ISO 17025	13	20	18
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08	< 0.08	< 0.08
Chromium (dissolved)	µg/l	0.4	ISO 17025	0.6	1.4	1.1
Copper (dissolved)	µg/l	0.7	ISO 17025	6.3	31	16
Lead (dissolved)	µg/l	1	ISO 17025	3	4.7	5.2
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5	< 0.5
Nickel (dissolved)	µg/l	0.3	ISO 17025	3.5	4.6	7.3
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0	< 4.0	< 4.0
Vanadium (dissolved)	µg/l	1.7	ISO 17025	< 1.7	< 1.7	6.8
Zinc (dissolved)	µg/l	0.4	ISO 17025	8.2	11	17

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

Analytical Report Number : 22-79454

Project / Site name: Plot P Kingsway Business Park

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2397561	TP101	None Supplied	0.3	Brown loam and sand with gravel and ash.
2397562	TP104	None Supplied	0.3	Brown clay and loam with vegetation.
2397565	TP112	None Supplied	0.7	Brown clay and loam with vegetation.
2397566	TP112	None Supplied	1.5	Brown loam and clay with gravel and vegetation.
2397567	TP113	None Supplied	0.3	Brown loam and clay with gravel and vegetation.
2397568	TP114	None Supplied	0.6	Brown sand.
2397569	TP114	None Supplied	1.8	Brown clay and sand.
2397570	TP115	None Supplied	0.3	Brown loam and clay with gravel and vegetation.
2397571	TP115	None Supplied	1.5	Brown clay and sand.
2397572	TP116	None Supplied	0.9	Brown loam and clay with gravel and vegetation.
2397573	TP119	None Supplied	0.6	Brown clay and sand with gravel and vegetation.

Analytical Report Number : 22-79454

Project / Site name: Plot P Kingsway Business Park

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
BS EN 12457-1 (2:1) Leachate Prep	2:1 (as recieved, moisture adjusted) end over end extraction with water for 24 hours. Eluate filtered prior to analysis.	In-house method based on BSEN12457-1.	L043-PL	W	NONE
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Metals by ICP-OES in leachate	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Boron in leachate	Determination of boron in leachate. Sample acidified and followed by ICP-OES.	In-house method based on MEWAM	L039-PL	W	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Complex Cyanide in soil	Determination of complex cyanide by calculation.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Free cyanide in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Fraction of Organic Carbon in soil	Determination of fraction of organic carbon in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L023	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Organic matter in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L023-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
pH at 20oC in leachate (automated)	Determination of pH in leachate by electrometric measurement.	In house method.	L099B	W	ISO 17025
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE

Analytical Report Number : 22-79454

Project / Site name: Plot P Kingsway Business Park

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
TPH2 (Soil)	Determination of hydrocarbons C6-C10 by headspace GC-MS.	In-house method based on USEPA8260	L088-PL	W	MCERTS
Total cyanide in leachate	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total organic carbon (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L0738-PL	W	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS
Total organic carbon in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L023-PL	D	MCERTS
TPH Banding in Soil by FID	Determination of hexane extractable hydrocarbons in soil by GC-FID.	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	MCERTS
Sulphate in leachates	Determination of sulphate in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 1986 Methods for the Determination of Metals in Soil"	L039-PL	W	ISO 17025
Fraction Organic Carbon FOC Automated	Determination of fraction of organic carbon in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method	L009	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in NaOH and addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS

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

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

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

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography

Analytical Report Number : 22-79454

Project / Site name: Plot P Kingsway Business Park

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))				
CU	Clean-up - e.g. by Florisil®, silica gel				
1D	GC - Single coil/column gas chromatography				
2D	GC-GC - Double coil/column gas chromatography				
Total	Aliphatics & Aromatics				
AL	Aliphatics				
AR	Aromatics				
#1	EH_2D_Total but with humics mathematically subtracted				
#2	EH_2D_Total but with fatty acids mathematically subtracted				
-	Operator - understore to separate acronyms (exception for +)				
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total				

Sample Deviation Report



Analytical Report Number : 22-79454

Project / Site name: Plot P Kingsway Business Park

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis. Please note that the associated result(s) may be unreliable and should be interpreted with care.

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
TP101	None Supplied	S	2397561	c	Free cyanide in soil	L080-PL	c
TP101	None Supplied	S	2397561	c	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	c
TP101	None Supplied	S	2397561	c	Complex Cyanide in soil	L080-PL	c
TP101	None Supplied	S	2397561	c	Monohydric phenols in soil	L080-PL	c
TP101	None Supplied	S	2397561	c	Speciated EPA-16 PAHs in soil	L064-PL	c
TP101	None Supplied	S	2397561	c	TPH Banding in Soil by FID	L076-PL	c
TP101	None Supplied	S	2397561	c	TPH2 (Soil)	L088-PL	c
TP101	None Supplied	S	2397561	c	TPHCWG (Soil)	L088/76-PL	c
TP101	None Supplied	S	2397561	c	Total cyanide in soil	L080-PL	c
TP104	None Supplied	S	2397562	c	Free cyanide in soil	L080-PL	c
TP104	None Supplied	S	2397562	c	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	c
TP104	None Supplied	S	2397562	c	Complex Cyanide in soil	L080-PL	c
TP104	None Supplied	S	2397562	c	Monohydric phenols in soil	L080-PL	c
TP104	None Supplied	S	2397562	c	Speciated EPA-16 PAHs in soil	L064-PL	c
TP104	None Supplied	S	2397562	c	TPH Banding in Soil by FID	L076-PL	c
TP104	None Supplied	S	2397562	c	TPH2 (Soil)	L088-PL	c
TP104	None Supplied	S	2397562	c	TPHCWG (Soil)	L088/76-PL	c
TP104	None Supplied	S	2397562	c	Total cyanide in soil	L080-PL	c
TP112	None Supplied	S	2397565	c	Free cyanide in soil	L080-PL	c
TP112	None Supplied	S	2397565	c	Complex Cyanide in soil	L080-PL	c
TP112	None Supplied	S	2397565	c	Monohydric phenols in soil	L080-PL	c
TP112	None Supplied	S	2397565	c	Speciated EPA-16 PAHs in soil	L064-PL	c
TP112	None Supplied	S	2397565	c	TPH Banding in Soil by FID	L076-PL	c
TP112	None Supplied	S	2397565	c	TPH2 (Soil)	L088-PL	c
TP112	None Supplied	S	2397565	c	Total cyanide in soil	L080-PL	c
TP113	None Supplied	S	2397567	c	Free cyanide in soil	L080-PL	c
TP113	None Supplied	S	2397567	c	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	c
TP113	None Supplied	S	2397567	c	Complex Cyanide in soil	L080-PL	c
TP113	None Supplied	S	2397567	c	Monohydric phenols in soil	L080-PL	c
TP113	None Supplied	S	2397567	c	Speciated EPA-16 PAHs in soil	L064-PL	c
TP113	None Supplied	S	2397567	c	TPH Banding in Soil by FID	L076-PL	c
TP113	None Supplied	S	2397567	c	TPH2 (Soil)	L088-PL	c
TP113	None Supplied	S	2397567	c	TPHCWG (Soil)	L088/76-PL	c
TP113	None Supplied	S	2397567	c	Total cyanide in soil	L080-PL	c
TP114	None Supplied	S	2397569	c	Free cyanide in soil	L080-PL	c
TP114	None Supplied	S	2397569	c	Complex Cyanide in soil	L080-PL	c
TP114	None Supplied	S	2397569	c	Monohydric phenols in soil	L080-PL	c
TP114	None Supplied	S	2397569	c	Speciated EPA-16 PAHs in soil	L064-PL	c
TP114	None Supplied	S	2397569	c	TPH Banding in Soil by FID	L076-PL	c
TP114	None Supplied	S	2397569	c	TPH2 (Soil)	L088-PL	c
TP114	None Supplied	S	2397569	c	Total cyanide in soil	L080-PL	c
TP115	None Supplied	S	2397571	c	Free cyanide in soil	L080-PL	c
TP115	None Supplied	S	2397571	c	Complex Cyanide in soil	L080-PL	c
TP115	None Supplied	S	2397571	c	Monohydric phenols in soil	L080-PL	c
TP115	None Supplied	S	2397571	c	Speciated EPA-16 PAHs in soil	L064-PL	c
TP115	None Supplied	S	2397571	c	TPH Banding in Soil by FID	L076-PL	c
TP115	None Supplied	S	2397571	c	TPH2 (Soil)	L088-PL	c
TP115	None Supplied	S	2397571	c	Total cyanide in soil	L080-PL	c
TP116	None Supplied	S	2397572	bc	Free cyanide in soil	L080-PL	c
TP116	None Supplied	S	2397572	bc	Complex Cyanide in soil	L080-PL	c
TP116	None Supplied	S	2397572	bc	Monohydric phenols in soil	L080-PL	bc
TP116	None Supplied	S	2397572	bc	Speciated EPA-16 PAHs in soil	L064-PL	bc
TP116	None Supplied	S	2397572	bc	TPH Banding in Soil by FID	L076-PL	c
TP116	None Supplied	S	2397572	bc	TPH2 (Soil)	L088-PL	bc
TP116	None Supplied	S	2397572	bc	Total cyanide in soil	L080-PL	c
TP119	None Supplied	S	2397573	bc	Free cyanide in soil	L080-PL	c
TP119	None Supplied	S	2397573	bc	Complex Cyanide in soil	L080-PL	c
TP119	None Supplied	S	2397573	bc	Monohydric phenols in soil	L080-PL	c
TP119	None Supplied	S	2397573	bc	Speciated EPA-16 PAHs in soil	L064-PL	c

Sample Deviation Report



Analytical Report Number : 22-79454

Project / Site name: Plot P Kingsway Business Park

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis. Please note that the associated result(s) may be unreliable and should be interpreted with care.

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
TP101	None Supplied	S	2397561	c	Free cyanide in soil	L080-PL	c
TP119	None Supplied	S	2397573	bc	TPH Banding in Soil by FID	L076-PL	c
TP119	None Supplied	S	2397573	bc	TPH2 (Soil)	L088-PL	bc
TP119	None Supplied	S	2397573	bc	Total cyanide in soil	L080-PL	c

Appendix 6: Groundwater Analysis Results



4041

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Analytical Report Number : 22-87539

Replaces Analytical Report Number: 22-87539, issue no. 1
Additional analysis undertaken.

Project / Site name:	Plot P, Kingsway Business park	Samples received on:	30/09/2022
Your job number:	210939	Samples instructed on/ Analysis started on:	30/09/2022
Your order number:	PO 2881	Analysis completed by:	11/10/2022
Report Issue Number:	2	Report issued on:	17/10/2022
Samples Analysed:	4 water samples		

Signed:

Adam Fenwick
Technical Reviewer
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

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



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Analytical Report Number: 22-87539

Project / Site name: Plot P, Kingsway Business park

Your Order No: PO 2881

Lab Sample Number				2445272	2445273	2445274	2445275
Sample Reference				BH02	BH03	BH04	BH05
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				29/09/2022	29/09/2022	29/09/2022	29/09/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status				

General Inorganics

pH	pH Units	N/A	ISO 17025	6.3	6.4	7.2	7.1
Electrical Conductivity at 20 °C	µS/cm	10	ISO 17025	320	580	670	430
Total Cyanide	µg/l	10	ISO 17025	< 10	< 10	< 10	< 10
Sulphate as SO ₄	µg/l	45	ISO 17025	93200	65600	31600	10400
Sulphate as SO ₄	mg/l	0.045	ISO 17025	93.2	65.6	31.6	10.4
Ammoniacal Nitrogen as N	µg/l	15	ISO 17025	72	28	25	41
Dissolved Organic Carbon (DOC)	mg/l	0.1	ISO 17025	2.28	13.3	5.4	18.9

Hardness - Total	mg CaCO ₃ /l	1	ISO 17025	478	374	443	290
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Total Phenols

Total Phenols (monohydric)	µg/l	10	ISO 17025	< 10	< 10	< 10	< 10
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Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01

Total PAH

Total EPA-16 PAHs	µg/l	0.16	ISO 17025	< 0.16	< 0.16	< 0.16	< 0.16
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4041



Analytical Report Number: 22-87539

Project / Site name: Plot P, Kingsway Business park

Your Order No: PO 2881

Lab Sample Number				2445272	2445273	2445274	2445275
Sample Reference				BH02	BH03	BH04	BH05
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				29/09/2022	29/09/2022	29/09/2022	29/09/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status				

Heavy Metals / Metalloids

Boron (dissolved)	µg/l	10	ISO 17025	83	29	96	20
Calcium (dissolved)	mg/l	0.012	ISO 17025	170	140	120	110
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0	< 5.0	< 5.0
Magnesium (dissolved)	mg/l	0.005	ISO 17025	12	3.9	34	3.6

Arsenic (dissolved)	µg/l	0.15	ISO 17025	0.16	3.05	0.31	1.34
Barium (dissolved)	µg/l	0.06	ISO 17025	55	190	220	180
Beryllium (dissolved)	µg/l	0.1	ISO 17025	< 0.1	< 0.1	< 0.1	< 0.1
Cadmium (dissolved)	µg/l	0.02	ISO 17025	0.23	0.04	0.05	0.15
Chromium (dissolved)	µg/l	0.2	ISO 17025	< 0.2	1.2	< 0.2	1.4
Copper (dissolved)	µg/l	0.5	ISO 17025	1.7	3	8.6	12
Lead (dissolved)	µg/l	0.2	ISO 17025	< 0.2	0.2	< 0.2	0.5
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05	< 0.05	< 0.05	< 0.05
Nickel (dissolved)	µg/l	0.5	ISO 17025	4.4	5.8	4.8	8.6
Selenium (dissolved)	µg/l	0.6	ISO 17025	1.5	1.5	< 0.6	1
Vanadium (dissolved)	µg/l	0.2	ISO 17025	< 0.2	2.3	0.3	3.8
Zinc (dissolved)	µg/l	0.5	ISO 17025	42	9.6	6.5	4.7

Petroleum Hydrocarbons

TPH1 (C10 - C40) EH_1D_TOTAL_MS	µg/l	10	ISO 17025	< 10	< 10	< 10	< 10
TPH2 (C6 - C10) HS_1D_TOTAL	µg/l	10	ISO 17025	< 10	< 10	< 10	< 10

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



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**Analytical Report Number : 22-87539****Project / Site name: Plot P, Kingsway Business park****Water matrix abbreviations:****Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)**

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in water by ICP-OES (dissolved)	Determination of metals in water by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW, PrW.(Al, Cu,Fe,Zn).	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Boron in water	Determination of boron in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Electrical conductivity at 20oC of water	Determination of electrical conductivity in water by electrometric measurement. Accredited Matrices SW, GW, PW	In-house method	L031-PL	W	ISO 17025
Total Hardness of water	Determination of hardness in waters by calculation from calcium and magnesium. Accredited Matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L045-PL	W	ISO 17025
Monohydric phenols in water	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L102B-PL	W	ISO 17025
Sulphate in water	Determination of sulphate in water after filtration by acidification followed by ICP-OES. Accredited Matrices SW, GW, PW.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
TPH2 (Waters)	Determination of hydrocarbons C6-C10 by headspace GC-MS. Accredited Matrices SW, PW. GW.	In-house method based on USEPA8260	L088-PL	W	ISO 17025
Total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
Dissolved Organic Carbon in water	Determination of dissolved inorganic carbon in water by TOC/DOC NDIR Analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L037-PL	W	ISO 17025
Ammoniacal Nitrogen as N in water	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the discrete analyser (colorimetric) salicylate/nitroprusside method. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025

Analytical Report Number : 22-87539

Project / Site name: Plot P, Kingsway Business park

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
pH at 20oC in water (automated)	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In house method.	L099-PL	W	ISO 17025
TPH1 (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS.	In-house method	L070-PL	W	ISO 17025

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).

For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).

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

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

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
-	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

Sample Deviation Report



Analytical Report Number : 22-87539

Project / Site name: Plot P, Kingsway Business park

This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis. Please note that the associated result(s) may be unreliable and should be interpreted with care.

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
BH02	None Supplied	W	2445272	c	Ammoniacal Nitrogen as N in water	L082-PL	c
BH02	None Supplied	W	2445272	c	Electrical conductivity at 20oC of water	L031-PL	c
BH02	None Supplied	W	2445272	c	pH at 20oC in water (automated)	L099-PL	c
BH03	None Supplied	W	2445273	c	Ammoniacal Nitrogen as N in water	L082-PL	c
BH03	None Supplied	W	2445273	c	Electrical conductivity at 20oC of water	L031-PL	c
BH03	None Supplied	W	2445273	c	pH at 20oC in water (automated)	L099-PL	c
BH04	None Supplied	W	2445274	c	Ammoniacal Nitrogen as N in water	L082-PL	c
BH04	None Supplied	W	2445274	c	Electrical conductivity at 20oC of water	L031-PL	c
BH04	None Supplied	W	2445274	c	pH at 20oC in water (automated)	L099-PL	c
BH05	None Supplied	W	2445275	c	Ammoniacal Nitrogen as N in water	L082-PL	c
BH05	None Supplied	W	2445275	c	Electrical conductivity at 20oC of water	L031-PL	c
BH05	None Supplied	W	2445275	c	pH at 20oC in water (automated)	L099-PL	c

Appendix 7 : Geotechnical Analysis Results

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with: BS 1377-2:1990: Clause 4.3 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Client: BWB Consulting Limited
Client Address: Whitehall Waterfront, 2 Riverside Way,
Leeds, LS1 4EH

Contact: Mike Harper
Site Address: Plot P, Kingsway Bus. Park

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 210939
Job Number: 22-81413
Date Sampled: Not Given
Date Received: 05/08/2022
Date Tested: 07/09/2022
Sampled By: Not Given

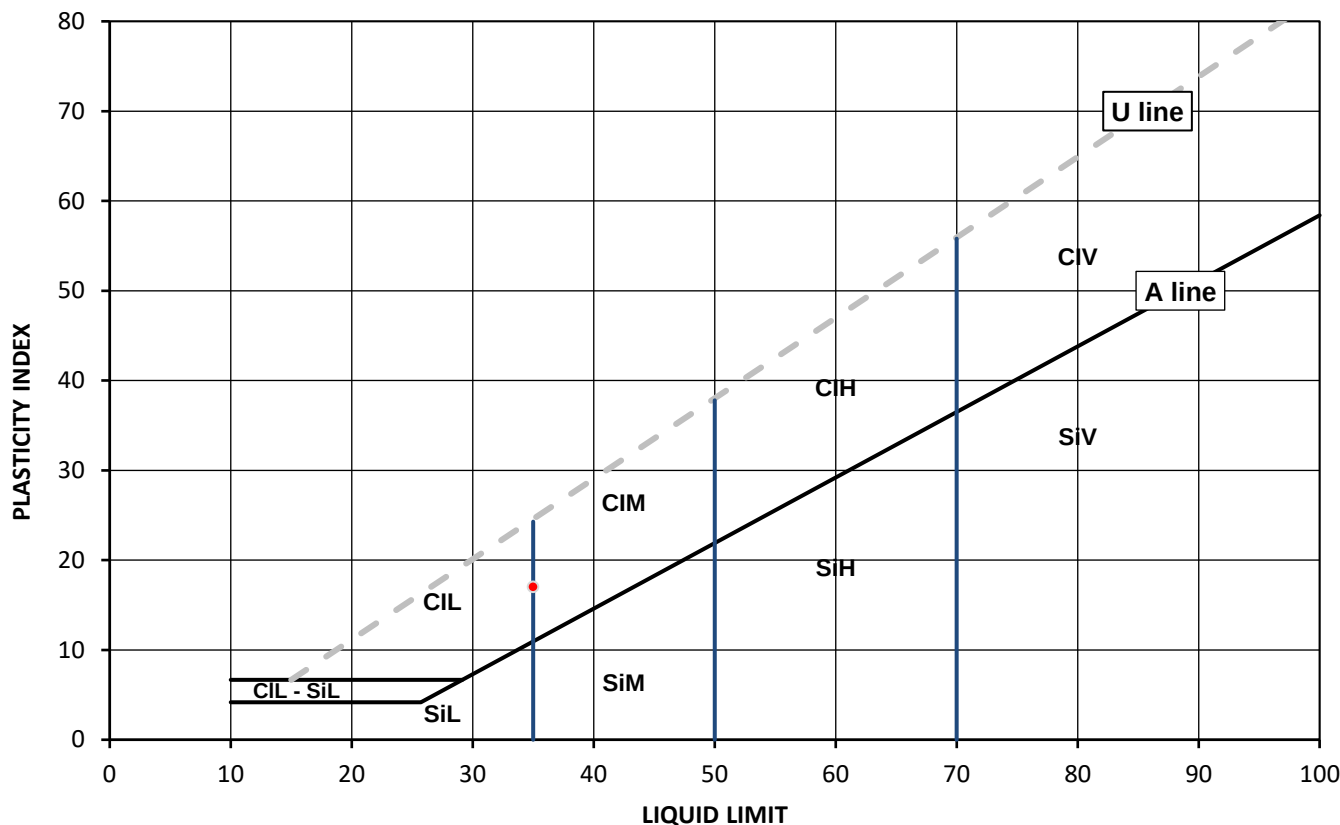
Test Results:

Laboratory Reference: 2409075
Hole No.: TP103
Sample Reference: Not Given
Sample Description: Brownish grey sandy CLAY

Depth Top [m]: 1.00
Depth Base [m]: 1.00
Sample Type: D

Sample Preparation: Tested in natural condition

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
21	35	18	17	100



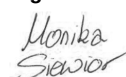
Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

	Plasticity	Liquid Limit
Cl Clay	L Low	below 35
Si Silt	M Medium	35 to 50
	H High	50 to 70
	V Very high	exceeding 70
	O Organic	append to classification for organic material (eg CIHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:



Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

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4041

Client: BWB Consulting Limited
Client Address: Whitehall Waterfront, 2 Riverside Way,
Leeds, LS1 4EH

Contact: Mike Harper
Site Address: Plot P, Kingsway Bus. Park

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 210939
Job Number: 22-81413
Date Sampled: Not Given
Date Received: 05/08/2022
Date Tested: 07/09/2022
Sampled By: Not Given

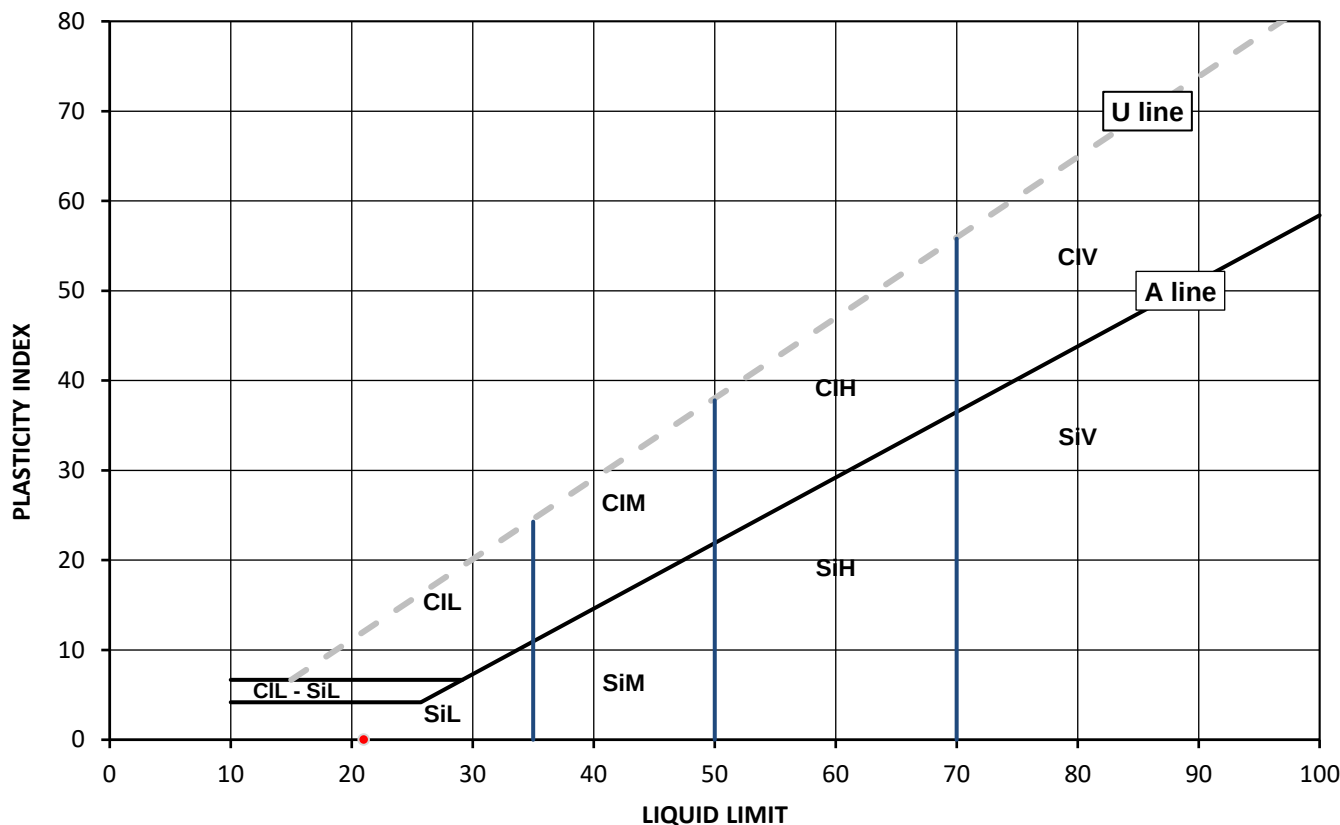
Test Results:

Laboratory Reference: 2409081
Hole No.: TP109
Sample Reference: Not Given
Sample Description: Brownish grey slightly gravelly silty SAND

Depth Top [m]: 0.40
Depth Base [m]: 0.40
Sample Type: D

Sample Preparation: Tested after washing to remove >425um

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
19	21	NP	NP	96



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

Cl	Clay	Plasticity	L	Low	Liquid Limit	below 35
Si	Silt		M	Medium		35 to 50
			H	High		50 to 70
			V	Very high		exceeding 70
			O	Organic		append to classification for organic material (eg CIHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks: NP - non plastic

Signed:

Monika Siewior

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with: BS 1377-2:1990: Clause 4.3 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Client: BWB Consulting Limited
Client Address: Whitehall Waterfront, 2 Riverside Way,
Leeds, LS1 4EH

Contact: Mike Harper
Site Address: Plot P, Kingsway Bus. Park

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 210939
Job Number: 22-81413
Date Sampled: Not Given
Date Received: 05/08/2022
Date Tested: 07/09/2022
Sampled By: Not Given

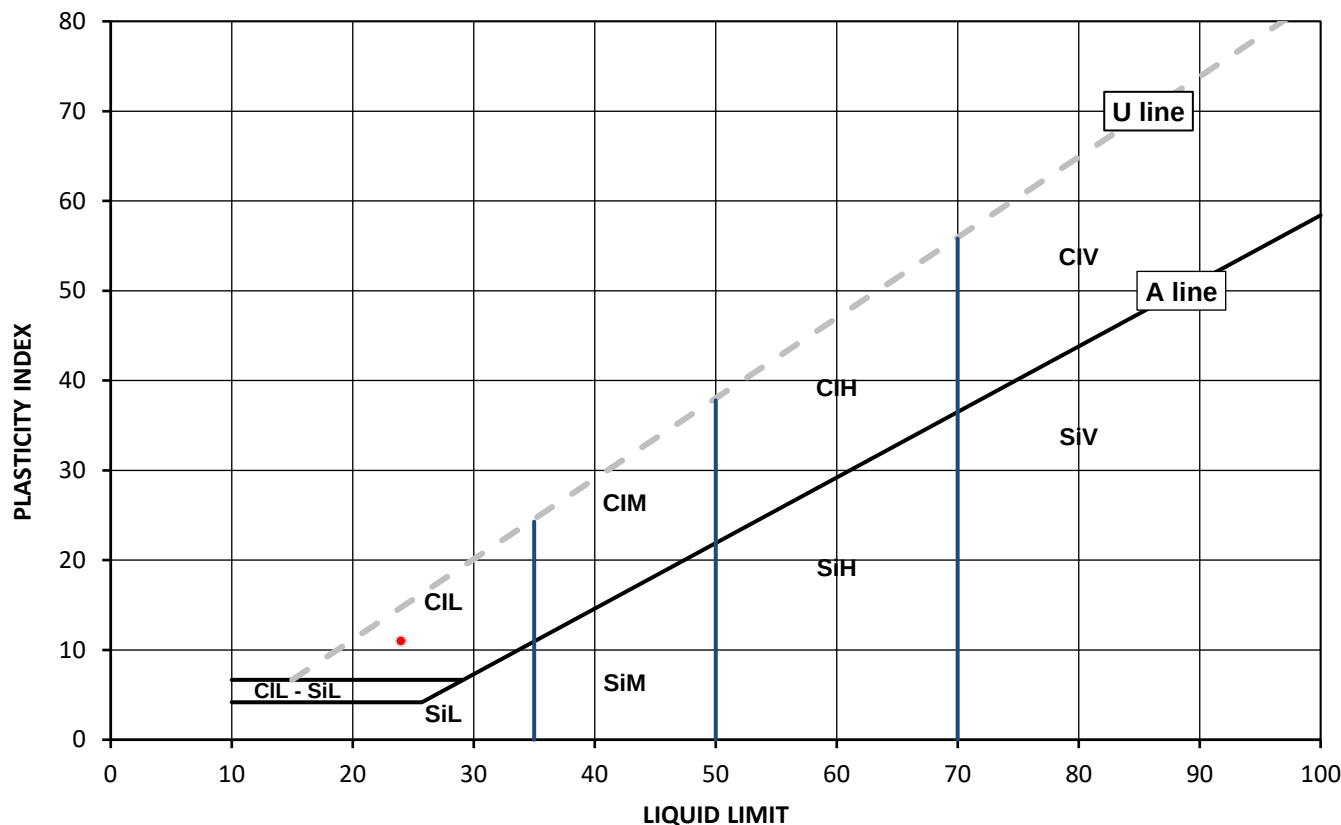
Test Results:

Laboratory Reference: 2409084
Hole No.: TP110
Sample Reference: Not Given
Sample Description: Brownish grey slightly gravelly very sandy CLAY

Depth Top [m]: 2.00
Depth Base [m]: 2.00
Sample Type: D

Sample Preparation: Tested after >425um removed by hand

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
18	24	13	11	95



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

	Plasticity	Liquid Limit
Cl	Clay	below 35
Si	Silt	35 to 50
	L Low	50 to 70
	M Medium	exceeding 70
	H High	append to classification for organic material (eg CIHO)
	V Very high	
	O Organic	

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

Monika Siewior

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with: BS 1377-2:1990: Clause 4.3 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Client: BWB Consulting Limited
Client Address: Whitehall Waterfront, 2 Riverside Way,
Leeds, LS1 4EH

Contact: Mike Harper
Site Address: Plot P, Kingsway Bus. Park

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 210939
Job Number: 22-81413
Date Sampled: Not Given
Date Received: 05/08/2022
Date Tested: 07/09/2022
Sampled By: Not Given

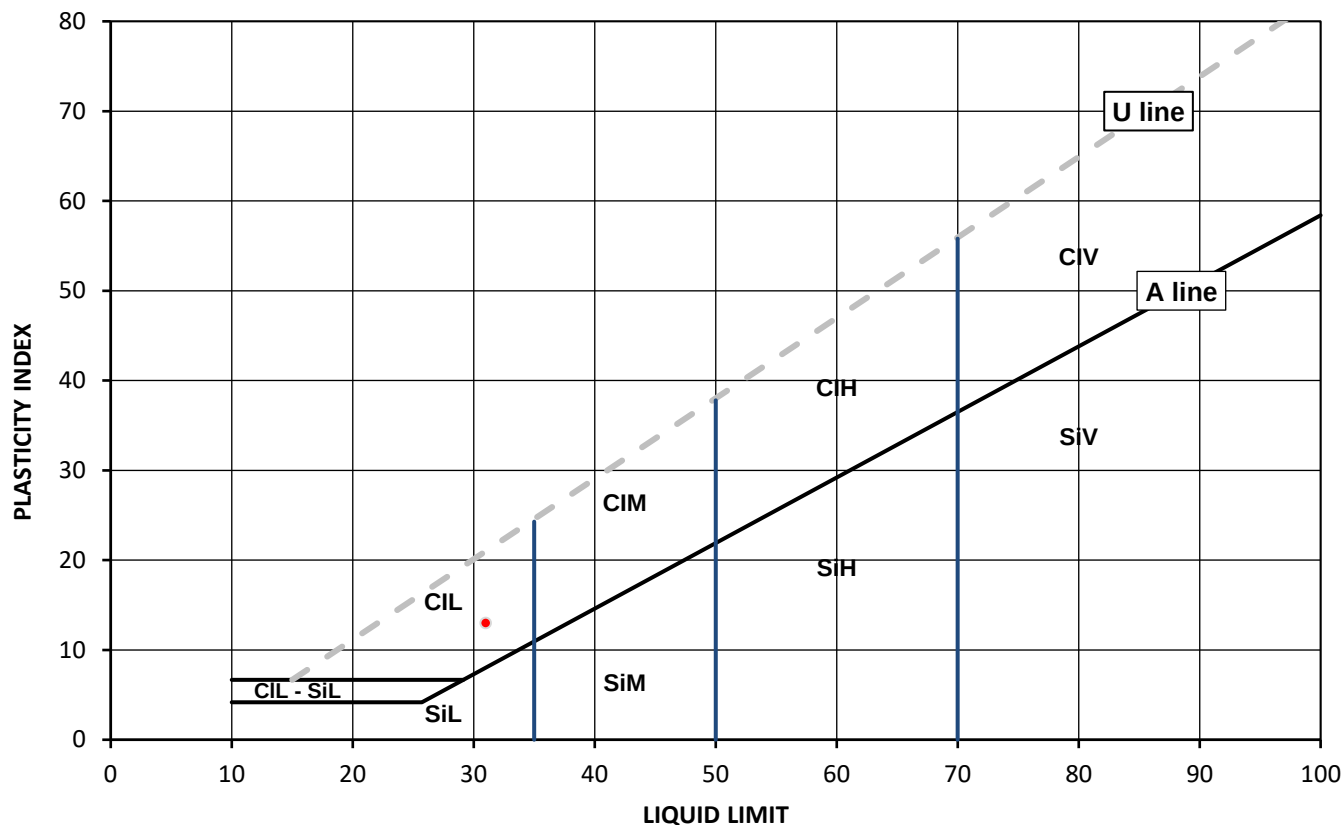
Test Results:

Laboratory Reference: 2409085
Hole No.: TP111
Sample Reference: Not Given
Sample Description: Brownish grey slightly gravelly very sandy CLAY

Depth Top [m]: 0.80
Depth Base [m]: 0.80
Sample Type: D

Sample Preparation: Tested after >425um removed by hand

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
18	31	18	13	98



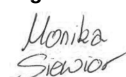
Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

	Plasticity	Liquid Limit
Cl Clay	L Low	below 35
Si Silt	M Medium	35 to 50
	H High	50 to 70
	V Very high	exceeding 70
	O Organic	append to classification for organic material (eg CIHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:



Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with: BS 1377-2:1990: Clause 4.3 and 5

i2 Analytical Ltd
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Brackmills Industrial Estate
Northampton NN4 7EB

Client: BWB Consulting Limited
Client Address: Whitehall Waterfront, 2 Riverside Way,
Leeds, LS1 4EH

Contact: Mike Harper
Site Address: Plot P, Kingsway Bus. Park

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 210939
Job Number: 22-81413
Date Sampled: Not Given
Date Received: 05/08/2022
Date Tested: 07/09/2022
Sampled By: Not Given

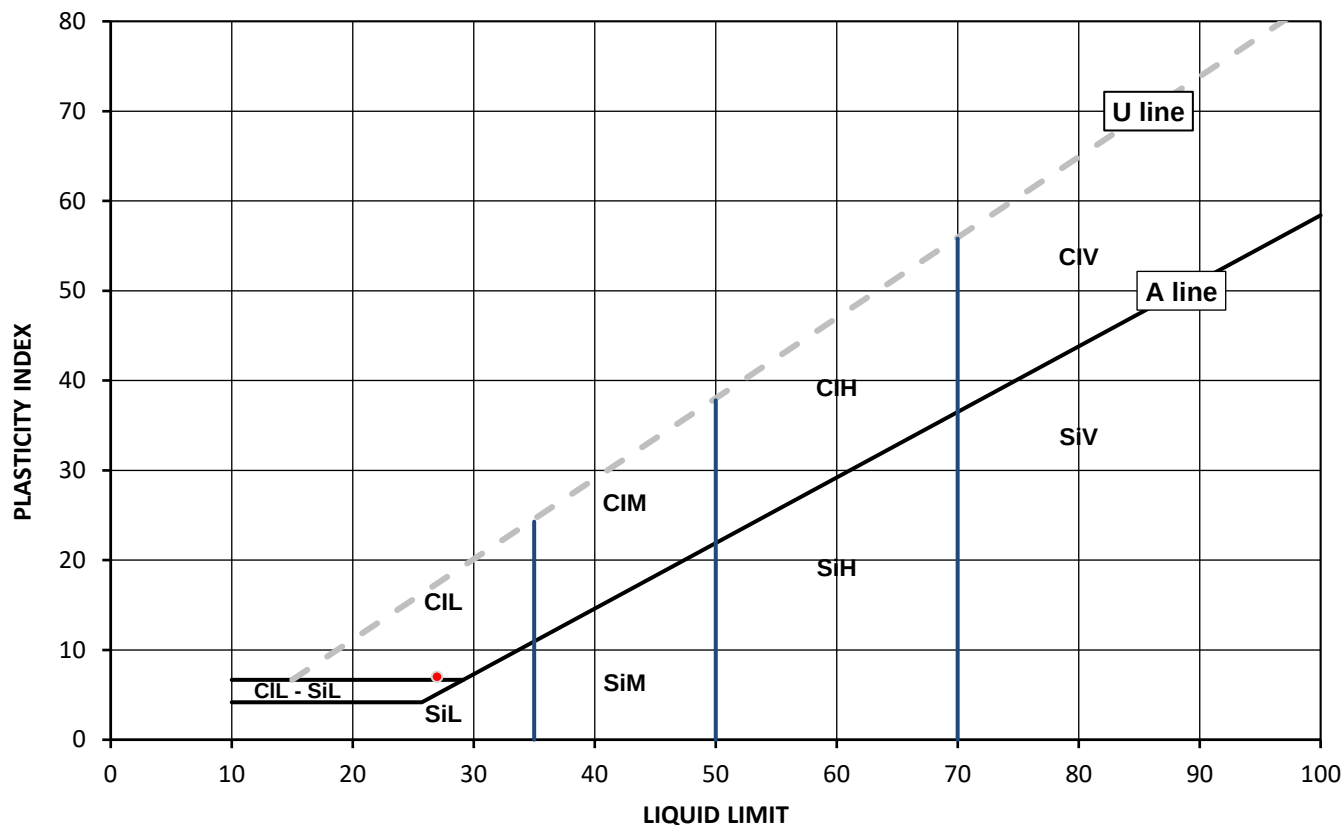
Test Results:

Laboratory Reference: 2409086
Hole No.: TP113
Sample Reference: Not Given
Sample Description: Brown very sandy silty CLAY

Depth Top [m]: 1.00
Depth Base [m]: 1.00
Sample Type: B

Sample Preparation: Tested in natural condition

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
18	27	20	7	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

	Plasticity	Liquid Limit
Cl	Clay	L Low below 35
Si	Silt	M Medium 35 to 50
	H High 50 to 70	V Very high exceeding 70
	O Organic	append to classification for organic material (eg CIHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

Monika Siewior

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with: BS 1377-2:1990: Clause 4.3 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
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Contact: Mike Harper
Site Address: Plot P, Kingsway Bus. Park

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 210939
Job Number: 22-81413
Date Sampled: Not Given
Date Received: 05/08/2022
Date Tested: 07/09/2022
Sampled By: Not Given

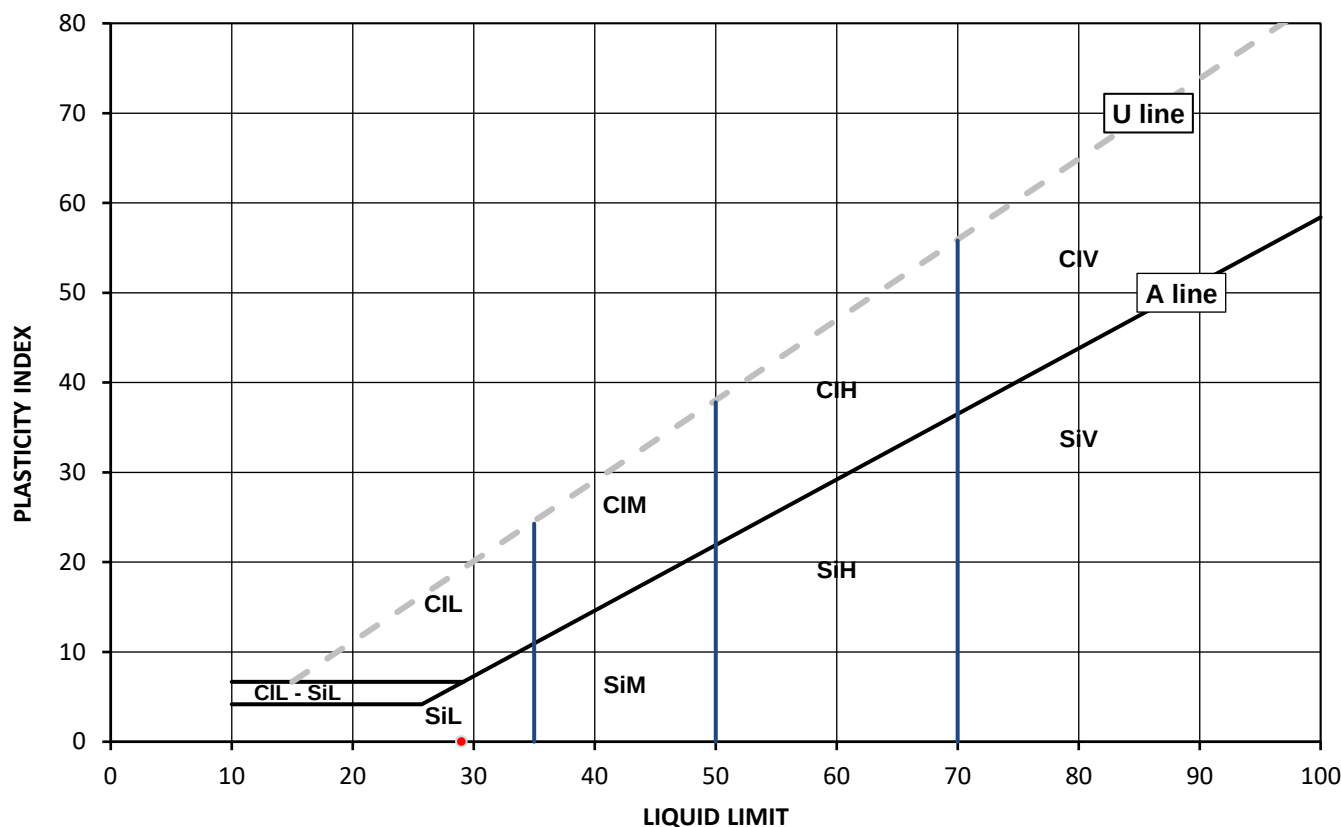
Test Results:

Laboratory Reference: 2409088
Hole No.: TP114
Sample Reference: Not Given
Sample Description: Brown slightly clayey SILT

Depth Top [m]: 1.80
Depth Base [m]: 1.80
Sample Type: D

Sample Preparation: Tested in natural condition

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
22	29	NP	NP	100



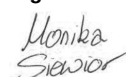
Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

	Plasticity	Liquid Limit
Cl	Clay	below 35
Si	Silt	35 to 50
	L Low	50 to 70
	M Medium	exceeding 70
	H High	append to classification for organic material (eg CIHO)
	V Very high	
	O Organic	

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks: NP - non plastic

Signed:



Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

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DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with:BS 1377-2:1990:Clause 4.3 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Client Reference: 210939
Job Number: 22-81413
Date Sampled: Not Given
Date Received: 05/08/2022
Date Tested: 07/09/2022
Sampled By: Not Given

Depth Top [m]: 1.50
Depth Base [m]: 1.50
Sample Type: D

GF 236.12

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with: BS 1377-2:1990: Clause 4.3 and 5

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Client: BWB Consulting Limited
Client Address: Whitehall Waterfront, 2 Riverside Way,
Leeds, LS1 4EH

Contact: Mike Harper
Site Address: Plot P, Kingsway Bus. Park

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 210939
Job Number: 22-81413
Date Sampled: Not Given
Date Received: 05/08/2022
Date Tested: 07/09/2022
Sampled By: Not Given

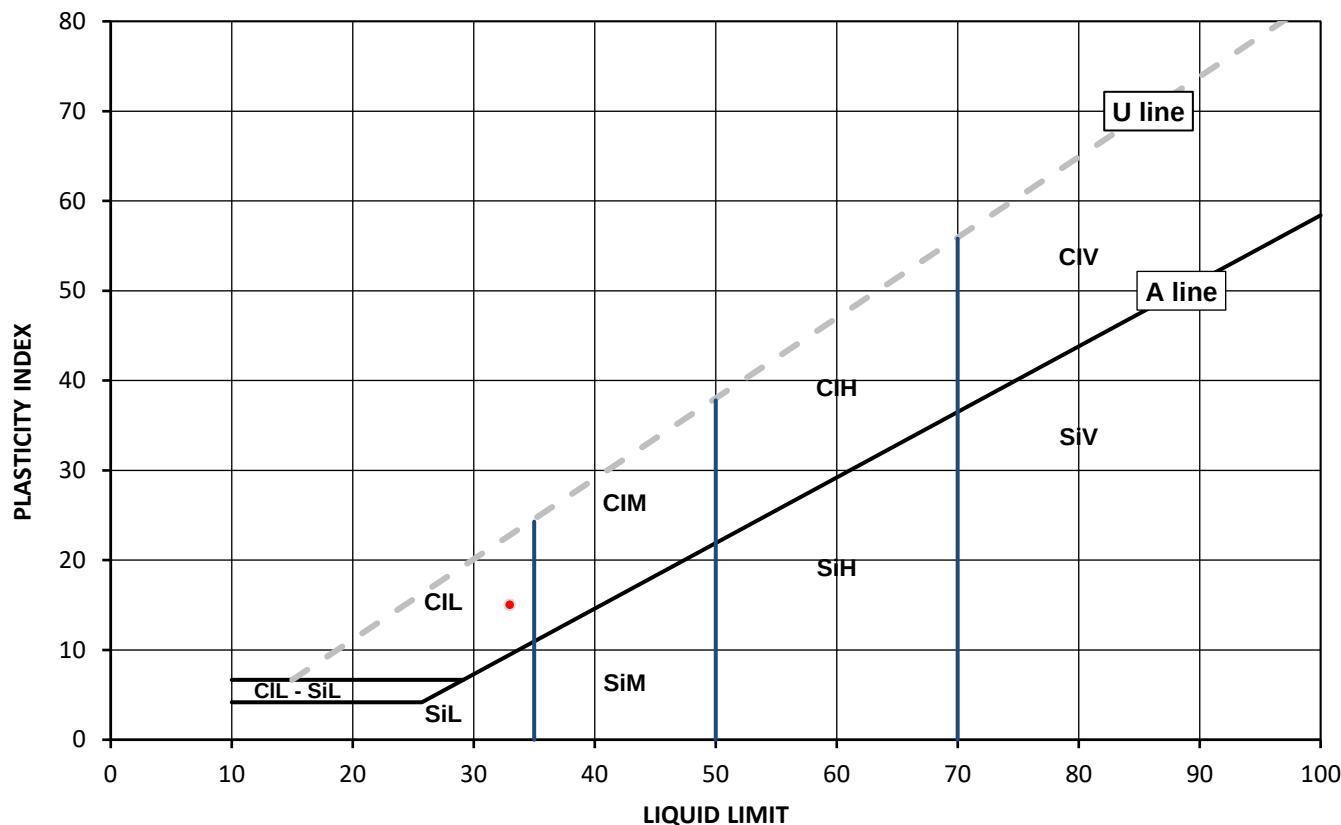
Test Results:

Laboratory Reference: 2409091
Hole No.: TP116
Sample Reference: Not Given
Sample Description: Brownish grey slightly gravelly very sandy CLAY

Depth Top [m]: 1.20
Depth Base [m]: 1.20
Sample Type: D

Sample Preparation: Tested after >425um removed by hand

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
20	33	18	15	99



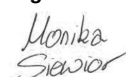
Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

	Plasticity	Liquid Limit
Cl Clay	L Low	below 35
Si Silt	M Medium	35 to 50
	H High	50 to 70
	V Very high	exceeding 70
	O Organic	append to classification for organic material (eg CIHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:



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Client Reference: 210939
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Date Sampled: Not Given
Date Received: 05/08/2022
Date Tested: 07/09/2022
Sampled By: Not Given

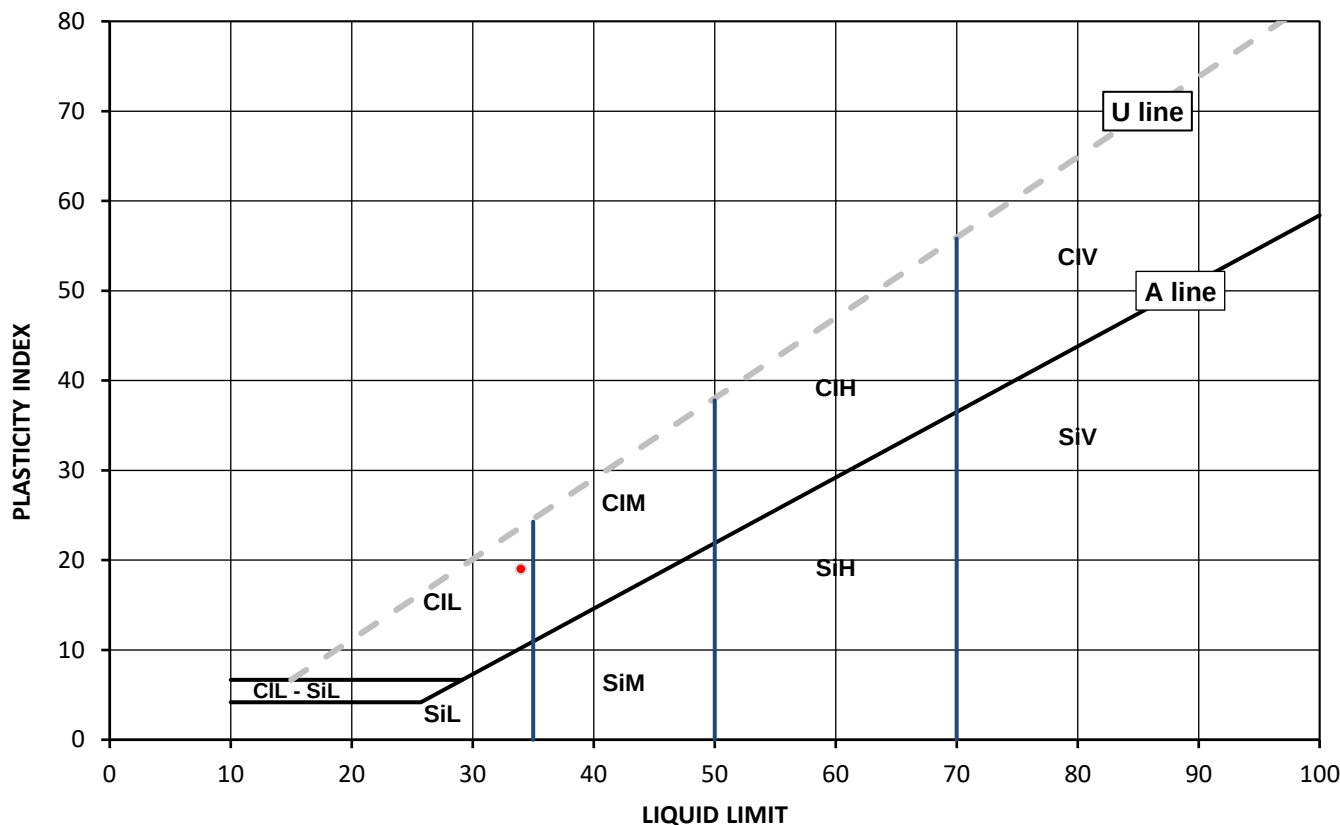
Test Results:

Laboratory Reference: 2409093
Hole No.: TP117
Sample Reference: Not Given
Sample Description: Dark brown slightly gravelly very sandy CLAY

Depth Top [m]: 1.00
Depth Base [m]: 1.00
Sample Type: D

Sample Preparation: Tested after >425um removed by hand

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
19	34	15	19	99



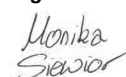
Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

	Plasticity	Liquid Limit
Cl Clay	L Low	below 35
Si Silt	M Medium	35 to 50
	H High	50 to 70
	V Very high	exceeding 70
	O Organic	append to classification for organic material (eg CIHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

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4041

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Contact: Mike Harper
Site Address: Plot P, Kingsway Bus. Park

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Client Reference: 210939
Job Number: 22-81413
Date Sampled: Not Given
Date Received: 05/08/2022
Date Tested: 07/09/2022
Sampled By: Not Given

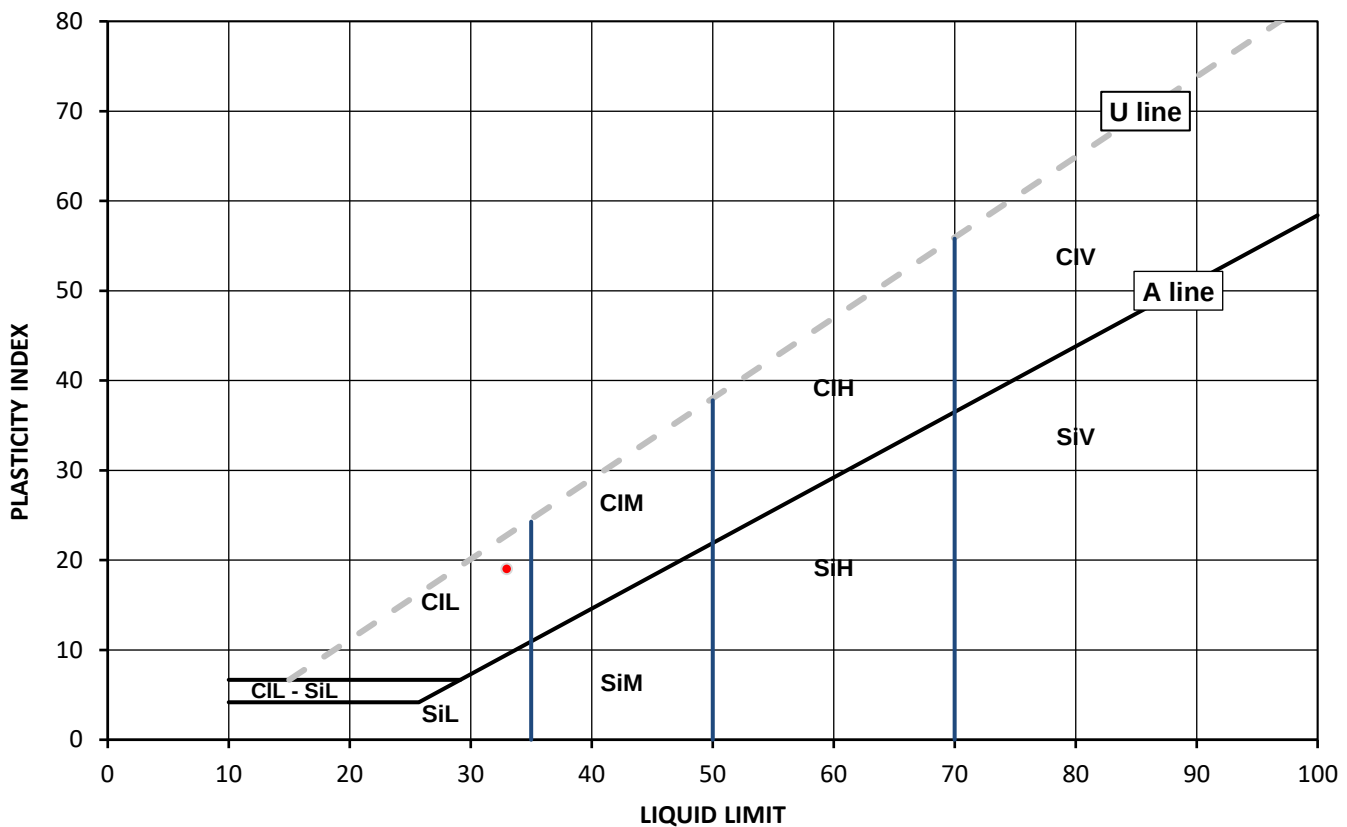
Test Results:

Laboratory Reference: 2409094
Hole No.: TP118
Sample Reference: Not Given
Sample Description: Dark brown very sandy CLAY

Depth Top [m]: 0.60
Depth Base [m]: 0.60
Sample Type: D

Sample Preparation: Tested in natural condition

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
18	33	14	19	100



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

	Plasticity	Liquid Limit
Cl	Clay	below 35
Si	Silt	35 to 50
	L Low	50 to 70
	M Medium	exceeding 70
	H High	
	V Very high	
	O Organic	append to classification for organic material (eg CIHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

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TEST CERTIFICATE

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i2 Analytical Ltd
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Client Reference: 210939
Job Number: 22-81413
Date Sampled: Not Given
Date Received: 05/08/2022
Date Tested: 07/09/2022
Sampled By: Not Given

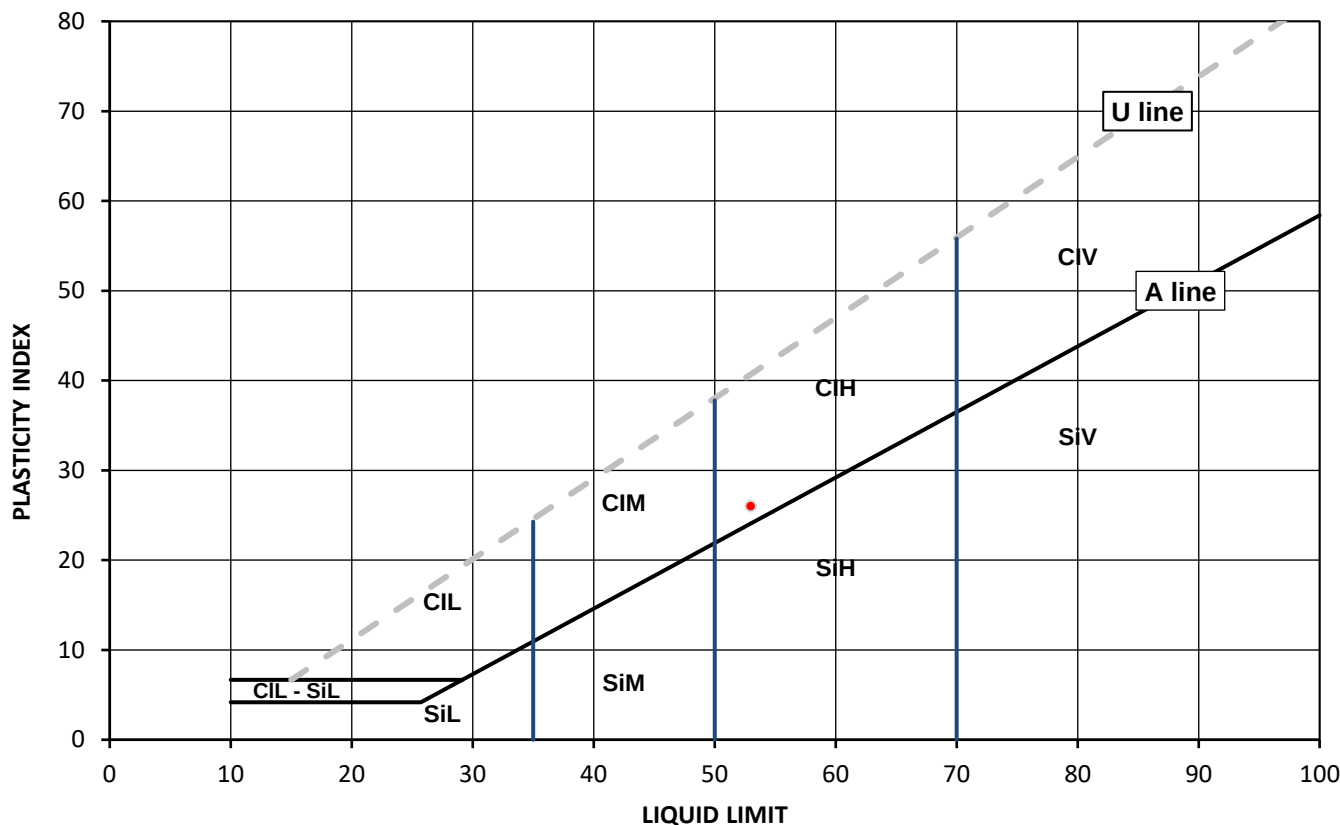
Test Results:

Laboratory Reference: 2409098
Hole No.: TP121
Sample Reference: Not Given
Sample Description: Dark grey slightly sandy CLAY

Depth Top [m]: 1.20
Depth Base [m]: 1.20
Sample Type: B

Sample Preparation: Tested in natural condition

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
54	53	27	26	100



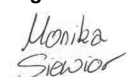
Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

	Plasticity	Liquid Limit
Cl Clay	L Low	below 35
Si Silt	M Medium	35 to 50
	H High	50 to 70
	V Very high	exceeding 70
	O Organic	append to classification for organic material (eg CIHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

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Client Reference: 210939
Job Number: 22-81413
Date Sampled: Not Given
Date Received: 05/08/2022
Date Tested: 07/09/2022
Sampled By: Not Given

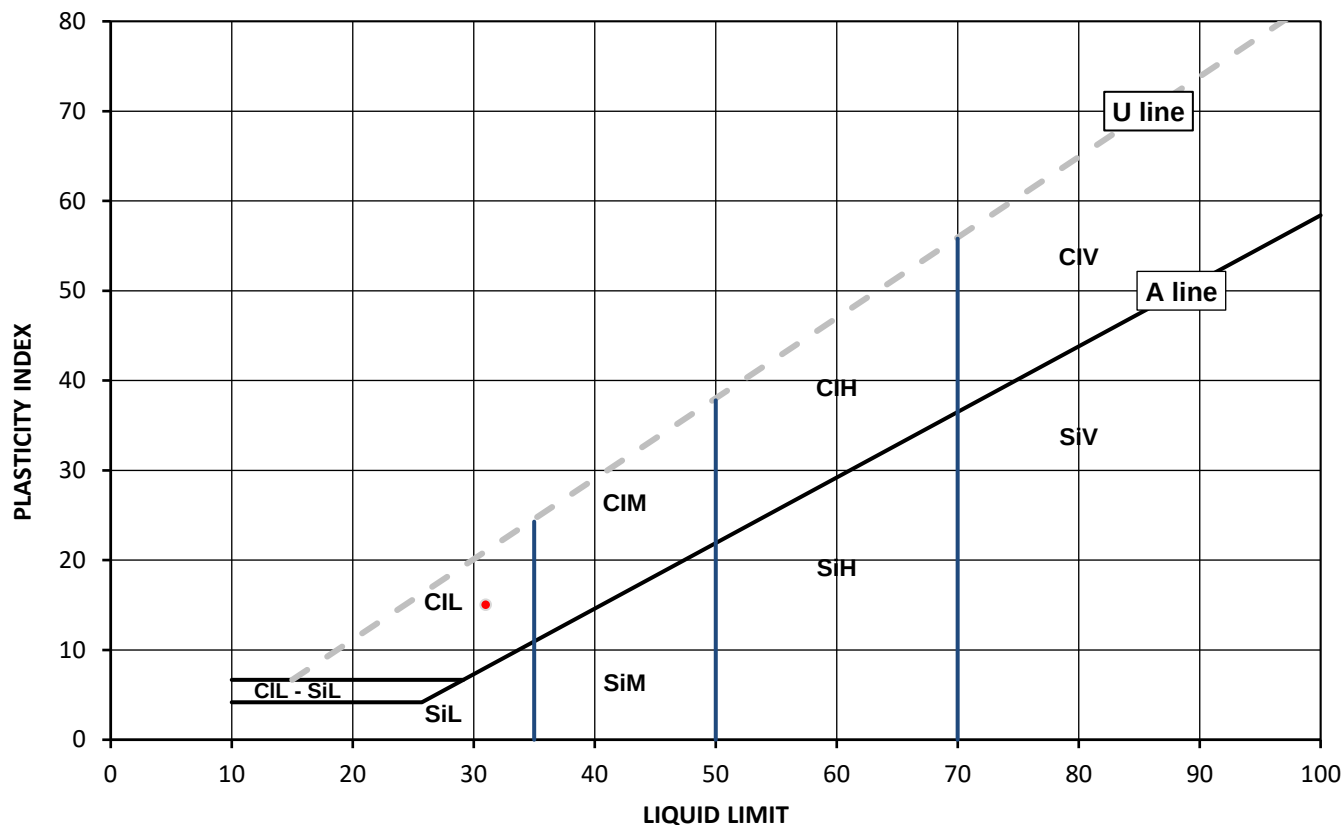
Test Results:

Laboratory Reference: 2409099
Hole No.: BH03
Sample Reference: Not Given
Sample Description: Dark brown slightly gravelly very sandy CLAY

Depth Top [m]: 1.00
Depth Base [m]: 1.00
Sample Type: D

Sample Preparation: Tested after washing to remove >425um

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
19	31	16	15	93



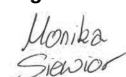
Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

	Plasticity	Liquid Limit
Cl Clay	L Low	below 35
Si Silt	M Medium	35 to 50
	H High	50 to 70
	V Very high	exceeding 70
	O Organic	append to classification for organic material (eg CIHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

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Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 210939
Job Number: 22-81413
Date Sampled: Not Given
Date Received: 05/08/2022
Date Tested: 07/09/2022
Sampled By: Not Given

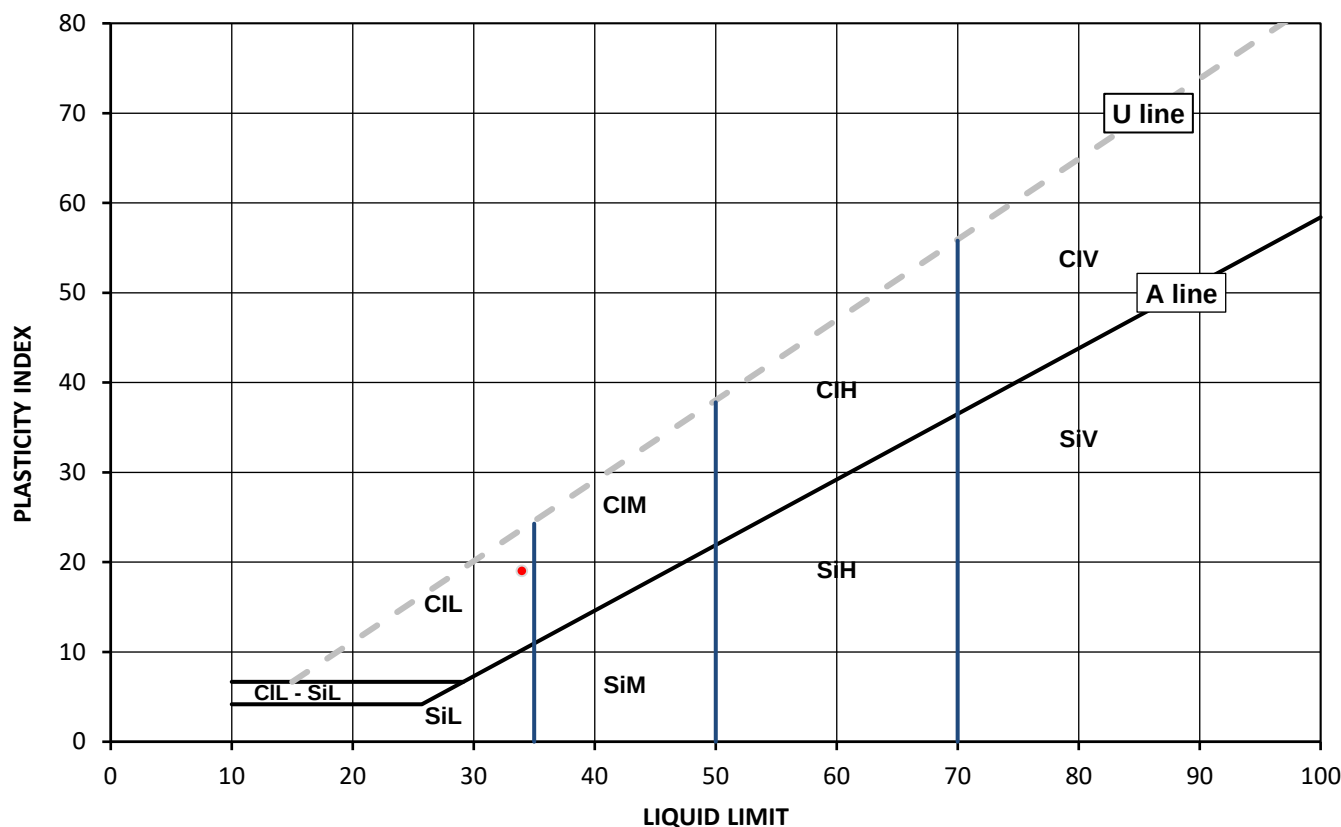
Test Results:

Laboratory Reference: 2409101
Hole No.: BH03
Sample Reference: Not Given
Sample Description: Brown slightly gravelly very sandy CLAY

Depth Top [m]: 3.50
Depth Base [m]: 3.50
Sample Type: B

Sample Preparation: Tested after washing to remove >425um

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
16	34	15	19	90



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

	Plasticity	Liquid Limit
Cl	Clay	below 35
Si	Silt	35 to 50
		50 to 70
		exceeding 70
		append to classification for organic material (eg CIHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:

Monika Siewior

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Reporting Specialist
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TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

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i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
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Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 210939
Job Number: 22-81413
Date Sampled: Not Given
Date Received: 05/08/2022
Date Tested: 07/09/2022
Sampled By: Not Given

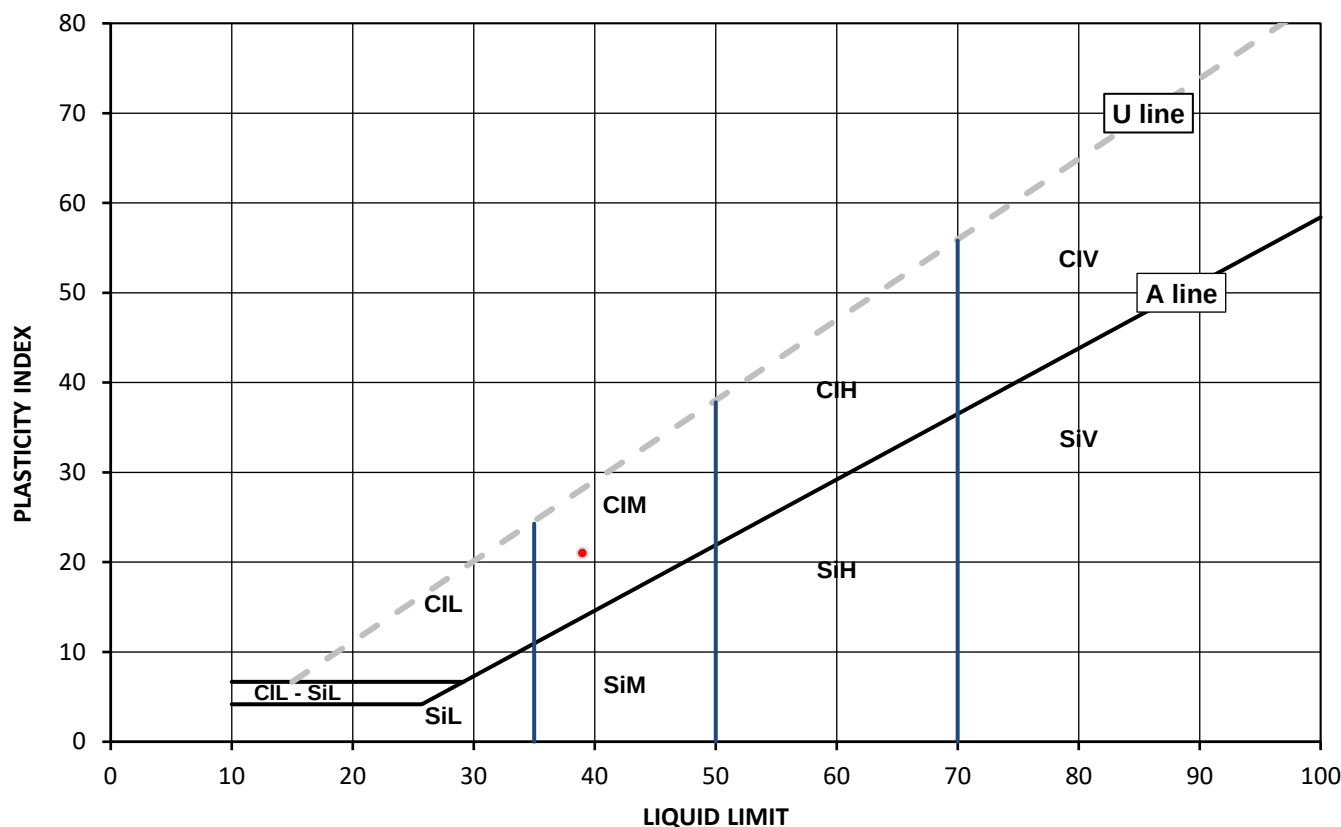
Test Results:

Laboratory Reference: 2409108
Hole No.: BH04
Sample Reference: Not Given
Sample Description: Brown slightly gravelly sandy CLAY

Depth Top [m]: 4.50
Depth Base [m]: 4.50
Sample Type: D

Sample Preparation: Tested after >425um removed by hand

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
18	39	18	21	98



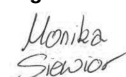
Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

	Plasticity	Liquid Limit
Cl	Clay	L Low below 35
Si	Silt	M Medium 35 to 50
		H High 50 to 70
		V Very high exceeding 70
	O Organic	append to classification for organic material (eg CIHO)

Note: Water Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Signed:



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Contact: Mike Harper

Site Address: Plot P, Kingsway Bus. Park

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

SUMMARY REPORT**SUMMARY OF CLASSIFICATION TEST RESULTS**

Tested in Accordance with:

Water Content by BS 1377-2:1990: Clause 3.2; Atterberg by BS 1377-2: 1990:
Clause 4.3 (4 Point Test), Clause 4.4 (1 Point Test) and 5; PD by BS 1377-2:
1990: Clause 8.2i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Environmental Science

Client Reference: 210939

Job Number: 22-81413

Date Sampled: Not Given

Date Received: 05/08/2022

Date Tested: 07/09/2022

Sampled By: Not Given

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Water Content BS 1377-2 [W] %	Water Content BS EN ISO 17892-2 [W] %	Atterberg				Density			Total Porosity# %		
		Reference	Depth Top m	Depth Base m	Type					% Passing 425um %	WL %	Wp %	Ip %	bulk Mg/m3	dry Mg/m3	PD Mg/m3			
2409099	BH03	Not Given	1.00	1.00	D	Dark brown slightly gravelly very sandy CLAY	Atterberg 4 Point	19		93	31	16	15						
2409101	BH03	Not Given	3.50	3.50	B	Brown slightly gravelly very sandy CLAY	Atterberg 4 Point	16		90	34	15	19						
2409105	BH04	Not Given	0.70	1.20	B	Dark grey sandy gravelly CLAY										2.54			
2409108	BH04	Not Given	4.50	4.50	D	Brown slightly gravelly sandy CLAY	Atterberg 4 Point	18		98	39	18	21						
2409111	BH05	Not Given	1.20	1.65	B	Grey silty SAND										2.60			
2409073	TP101	Not Given	1.00	1.00	B	Mottled brown sandy GRAVEL										2.28			
2409074	TP102	Not Given	1.30	1.30	B	Brown slightly clayey SAND										2.63			
2409075	TP103	Not Given	1.00	1.00	D	Brownish grey sandy CLAY	Atterberg 4 Point	21		100	35	18	17						
2409077	TP104	Not Given	1.00	1.00	B	Light brown slightly clayey slightly gravelly SAND										2.66			
2409078	TP105	Not Given	1.50	1.50	D	Yellowish brown slightly sandy CLAY										2.65			

Note: # Non accredited; NP - Non plastic

Comments:

Signed:

*Monika Siewior*Monika Siewior
Reporting Specialist
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1990: Clause 8.2i2 Analytical Ltd
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Northampton NN4 7EB

Environmental Science

Client Reference: 210939

Job Number: 22-81413

Date Sampled: Not Given

Date Received: 05/08/2022

Date Tested: 07/09/2022

Sampled By: Not Given

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Water Content BS 1377-2 [W] %	Water Content BS EN ISO 17892-2 [W] %	Atterberg				Density			Total Porosity# %		
		Reference	Depth Top m	Depth Base m	Type					% Passing 425um %	WL %	Wp %	Ip %	bulk Mg/m3	dry Mg/m3	PD Mg/m3			
2409081	TP109	Not Given	0.40	0.40	D	Brownish grey slightly gravelly silty SAND	Atterberg 4 Point	19		96	21	NP	NP						
2409083	TP110	Not Given	0.50	0.50	B	Dark grey gravelly clayey SAND										2.22			
2409084	TP110	Not Given	2.00	2.00	D	Brownish grey slightly gravelly very sandy CLAY	Atterberg 4 Point	18		95	24	13	11						
2409085	TP111	Not Given	0.80	0.80	D	Brownish grey slightly gravelly very sandy CLAY	Atterberg 4 Point	18		98	31	18	13						
2409086	TP113	Not Given	1.00	1.00	B	Brown very sandy silty CLAY	Atterberg 4 Point	18		100	27	20	7						
2409087	TP114	Not Given	1.60	1.60	B	Grey clayey very sandy SILT										2.63			
2409088	TP114	Not Given	1.80	1.80	D	Brown slightly clayey SILT	Atterberg 4 Point	22		100	29	NP	NP						
2409089	TP115	Not Given	1.00	1.00	B	Light brown slightly gravelly SAND										2.65			
2409090	TP115	Not Given	1.50	1.50	D	Light brown slightly gravelly slightly clayey SAND	Atterberg 4 Point	12		86	21	NP	NP						
2409091	TP116	Not Given	1.20	1.20	D	Brownish grey slightly gravelly very sandy CLAY	Atterberg 4 Point	20		99	33	18	15						

Note: # Non accredited; NP - Non plastic

Comments:

Signed:

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Clause 4.3 (4 Point Test), Clause 4.4 (1 Point Test) and 5; PD by BS 1377-2:
1990: Clause 8.2i2 Analytical Ltd
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Northampton NN4 7EB

Environmental Science

Client Reference: 210939

Job Number: 22-81413

Date Sampled: Not Given

Date Received: 05/08/2022

Date Tested: 07/09/2022

Sampled By: Not Given

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	Water Content BS 1377-2 [W] %	Water Content BS EN ISO 17892-2 [W] %	Atterberg				Density			Total Porosity# %		
		Reference	Depth Top m	Depth Base m	Type					% Passing 425um %	WL %	Wp %	Ip %	bulk Mg/m3	dry Mg/m3	PD Mg/m3			
2409093	TP117	Not Given	1.00	1.00	D	Dark brown slightly gravelly very sandy CLAY	Atterberg 4 Point	19		99	34	15	19						
2409094	TP118	Not Given	0.60	0.60	D	Dark brown very sandy CLAY	Atterberg 4 Point	18		100	33	14	19						
2409095	TP118	Not Given	1.00	1.00	B	Brown slightly gravelly CLAY										2.56			
2409096	TP118	Not Given	1.70	1.70	B	Dark brown slightly gravelly CLAY										2.66			
2409098	TP121	Not Given	1.20	1.20	B	Dark grey slightly sandy CLAY	Atterberg 4 Point	54		100	53	27	26						

Note: # Non accredited; NP - Non plastic

Comments:

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4041

Client: BWB Consulting Limited

Client Address: Whitehall Waterfront, 2 Riverside Way,
Leeds, LS1 4EH

Contact: Mike Harper

Site Address: Plot P, Kingsway Bus. Park

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

SUMMARY REPORT**DETERMINATION OF WATER CONTENT**

Tested in Accordance with: BS 1377-2: 1990: Clause 3.2

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Environmental Science

Client Reference: 210939

Job Number: 22-81413

Date Sampled: Not Given

Date Received: 05/08/2022

Date Tested: 07/09/2022

Sampled By: Not Given

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	WC	Sample preparation / Oven temperature at the time of testing			
		Reference	Depth Top m	Depth Base m	Type							
2409099	BH03	Not Given	1.00	1.00	D	Dark brown slightly gravelly very sandy CLAY		19	Sample was quartered, oven dried at 106.2 °C			
2409101	BH03	Not Given	3.50	3.50	B	Brown slightly gravelly very sandy CLAY		16	Sample was quartered, oven dried at 106.2 °C			
2409108	BH04	Not Given	4.50	4.50	D	Brown slightly gravelly sandy CLAY		18	Sample was quartered, oven dried at 106.2 °C			
2409075	TP103	Not Given	1.00	1.00	D	Brownish grey sandy CLAY		21	Sample was quartered, oven dried at 106.2 °C			
2409081	TP109	Not Given	0.40	0.40	D	Brownish grey slightly gravelly silty SAND		19	Sample was quartered, oven dried at 106.2 °C			
2409084	TP110	Not Given	2.00	2.00	D	Brownish grey slightly gravelly very sandy CLAY		18	Sample was quartered, oven dried at 106.2 °C			
2409085	TP111	Not Given	0.80	0.80	D	Brownish grey slightly gravelly very sandy CLAY		18	Sample was quartered, oven dried at 106.2 °C			
2409086	TP113	Not Given	1.00	1.00	B	Brown very sandy silty CLAY		18	Sample was quartered, oven dried at 106.2 °C			
2409088	TP114	Not Given	1.80	1.80	D	Brown slightly clayey SILT		22	Sample was quartered, oven dried at 106.2 °C			
2409090	TP115	Not Given	1.50	1.50	D	Light brown slightly gravelly slightly clayey SAND		12	Sample was quartered, oven dried at 106.2 °C			

Comments:

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Signed:

*Monika Siewior*Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd



4041

Client: BWB Consulting Limited

Client Address: Whitehall Waterfront, 2 Riverside Way,
Leeds, LS1 4EH

Contact: Mike Harper

Site Address: Plot P, Kingsway Bus. Park

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

SUMMARY REPORT**DETERMINATION OF WATER CONTENT**

Tested in Accordance with: BS 1377-2: 1990: Clause 3.2

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Environmental Science

Client Reference: 210939

Job Number: 22-81413

Date Sampled: Not Given

Date Received: 05/08/2022

Date Tested: 07/09/2022

Sampled By: Not Given

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	WC	Sample preparation / Oven temperature at the time of testing			
		Reference	Depth Top m	Depth Base m	Type							
2409091	TP116	Not Given	1.20	1.20	D	Brownish grey slightly gravelly very sandy CLAY		20	Sample was quartered, oven dried at 106.2 °C			
2409093	TP117	Not Given	1.00	1.00	D	Dark brown slightly gravelly very sandy CLAY		19	Sample was quartered, oven dried at 106.2 °C			
2409094	TP118	Not Given	0.60	0.60	D	Dark brown very sandy CLAY		18	Sample was quartered, oven dried at 106.2 °C			
2409098	TP121	Not Given	1.20	1.20	B	Dark grey slightly sandy CLAY		54	Sample was quartered, oven dried at 107.8 °C			

Comments:

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Signed:

*Monika Siewior*Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Client: BWB Consulting Limited
Client Address: Whitehall Waterfront, 2 Riverside Way,
Leeds, LS1 4EH

Contact: Mike Harper
Site Address: Plot P, Kingsway Bus. Park

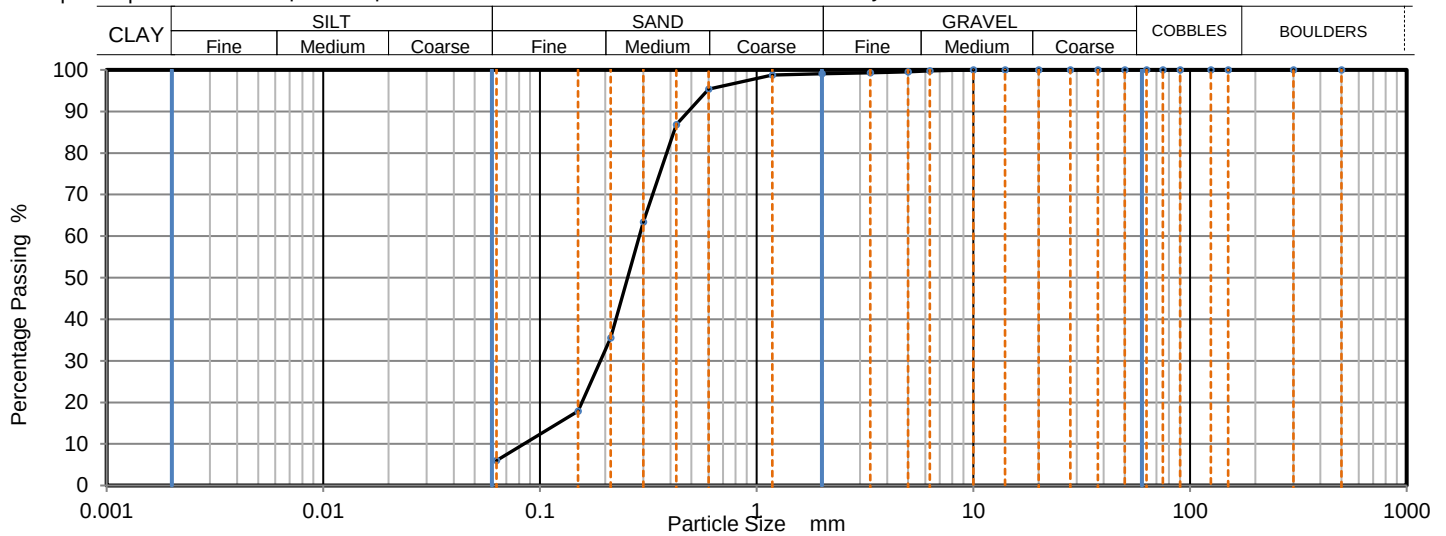
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 210939
Job Number: 22-81413
Date Sampled: Not Given
Date Received: 05/08/2022
Date Tested: 07/09/2022
Sampled By: Not Given

Test Results:

Laboratory Reference: 2409079
Hole No.: TP105
Sample Reference: Not Given
Sample Description: Brown slightly clayey SAND
Sample Preparation: Sample was quartered, oven dried at 106.2 °C and broken down by hand.

Depth Top [m]: 2.50
Depth Base [m]: 2.50
Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	99		
2	99		
1.18	99		
0.6	95		
0.425	87		
0.3	63		
0.212	36		
0.15	18		
0.063	7		

Sample Proportions	% dry mass
Very coarse	0
Gravel	1
Sand	93
Fines <0.063mm	7

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

Uniformity Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks:

Signed:

Monika Siewior

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Client: BWB Consulting Limited
Client Address: Whitehall Waterfront, 2 Riverside Way,
Leeds, LS1 4EH

Contact: Mike Harper
Site Address: Plot P, Kingsway Bus. Park

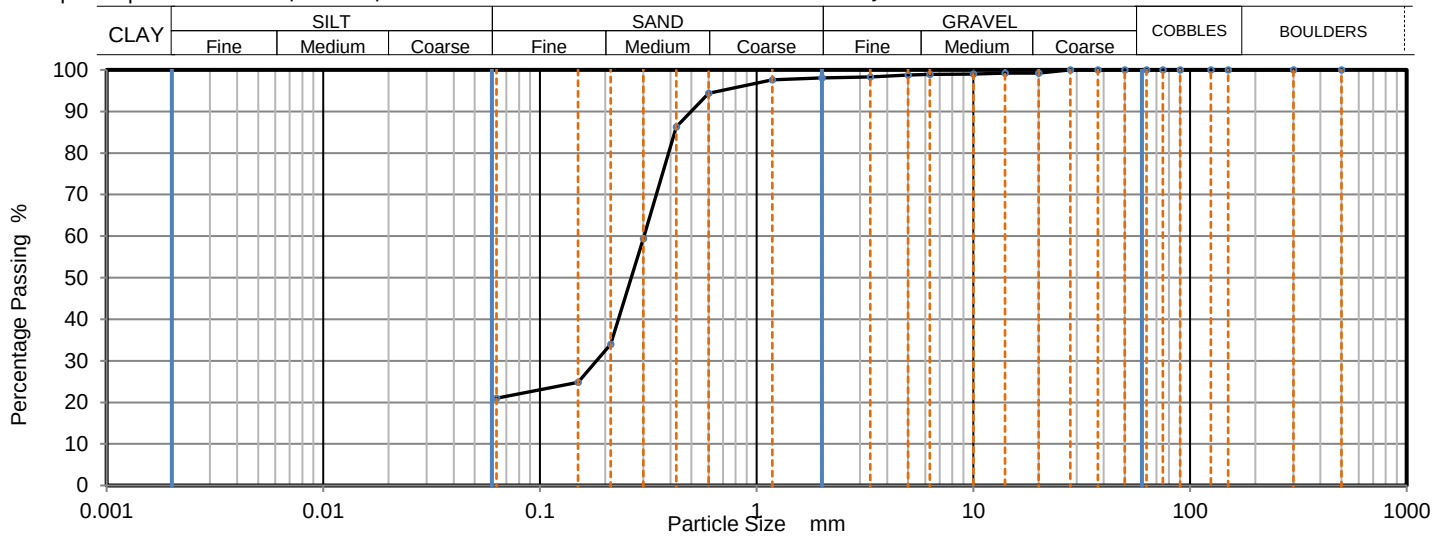
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 210939
Job Number: 22-81413
Date Sampled: Not Given
Date Received: 05/08/2022
Date Tested: 07/09/2022
Sampled By: Not Given

Test Results:

Laboratory Reference: 2409080
Hole No.: TP107
Sample Reference: Not Given
Sample Description: Brown slightly gravelly clayey SAND
Sample Preparation: Sample was quartered, oven dried at 107.7 °C and broken down by hand.

Depth Top [m]: 2.30
Depth Base [m]: 2.30
Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	99		
14	99		
10	99		
6.3	99		
5	99		
3.35	98		
2	98		
1.18	98		
0.6	94		
0.425	86		
0.3	59		
0.212	34		
0.15	25		
0.063	22		

Sample Proportions	% dry mass
Very coarse	0
Gravel	2
Sand	76
Fines <0.063mm	22

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	> 4.8
Curvature Coefficient	

Uniformity Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks:

Signed:

Monika Siewior

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Client: BWB Consulting Limited
Client Address: Whitehall Waterfront, 2 Riverside Way,
Leeds, LS1 4EH

Contact: Mike Harper
Site Address: Plot P, Kingsway Bus. Park

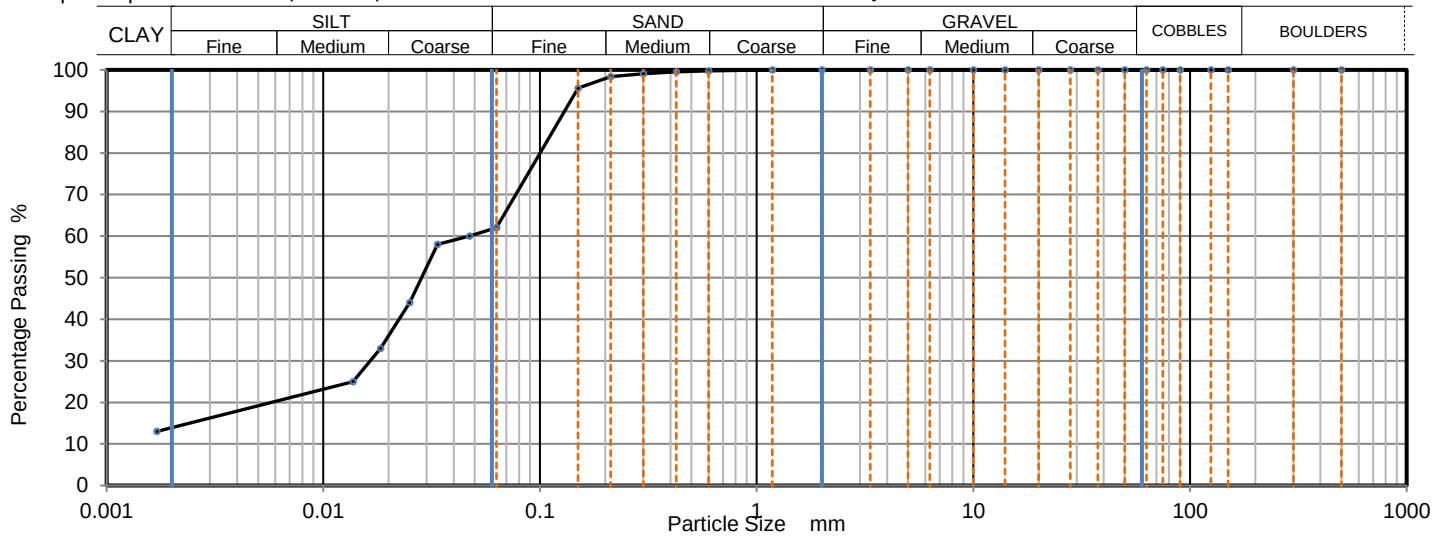
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 210939
Job Number: 22-81413
Date Sampled: Not Given
Date Received: 05/08/2022
Date Tested: 07/09/2022
Sampled By: Not Given

Test Results:

Laboratory Reference: 2409087
Hole No.: TP114
Sample Reference: Not Given
Sample Description: Grey clayey very sandy SILT
Sample Preparation: Sample was quartered, oven dried at 108.2 °C and broken down by hand.

Depth Top [m]: 1.60
Depth Base [m]: 1.60
Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100	0.0630	62
300	100	0.0473	60
150	100	0.0337	58
125	100	0.0250	44
90	100	0.0184	33
75	100	0.0137	25
63	100	0.0104	13
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100		
0.425	100		
0.3	99		
0.212	98		
0.15	96		
0.063	62		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	38
Silt	48
Clay	14

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	> 30
Curvature Coefficient	

Uniformity Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clauses 9.2 and 9.5

Remarks:

Signed:

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Client: BWB Consulting Limited
Client Address: Whitehall Waterfront, 2 Riverside Way,
Leeds, LS1 4EH

Contact: Mike Harper
Site Address: Plot P, Kingsway Bus. Park

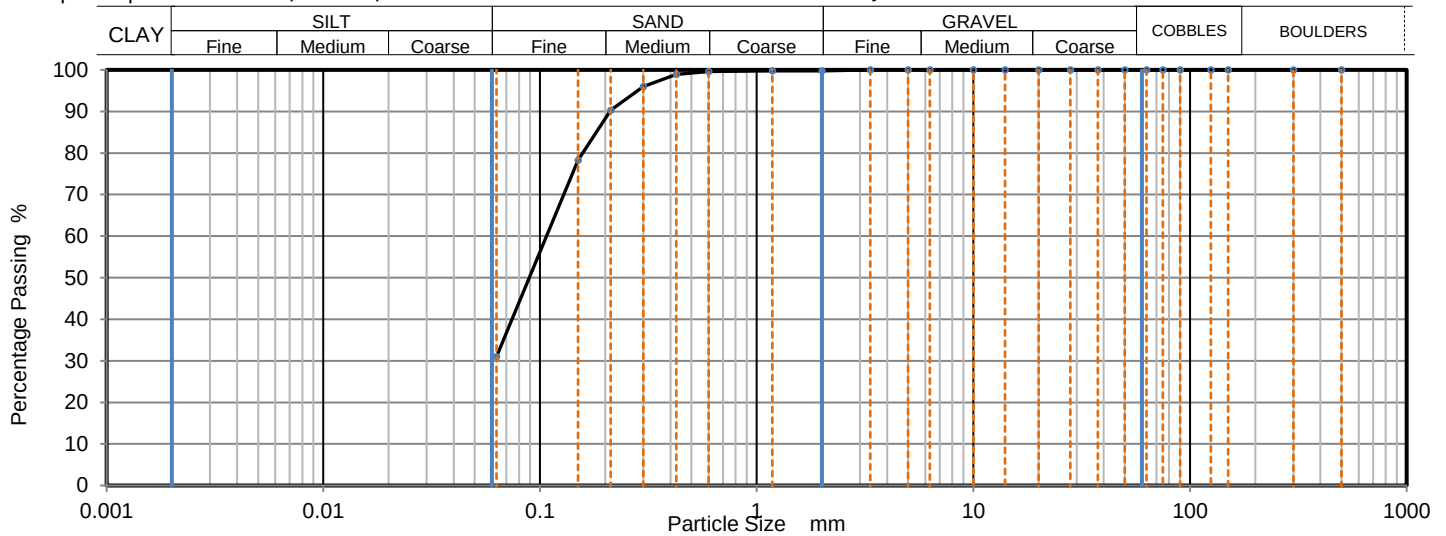
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 210939
Job Number: 22-81413
Date Sampled: Not Given
Date Received: 05/08/2022
Date Tested: 07/09/2022
Sampled By: Not Given

Test Results:

Laboratory Reference: 2409100
Hole No.: BH03
Sample Reference: Not Given
Sample Description: Brown clayey SAND
Sample Preparation: Sample was quartered, oven dried at 106.3 °C and broken down by hand.

Depth Top [m]: 2.00
Depth Base [m]: 2.45
Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100		
0.425	99		
0.3	96		
0.212	90		
0.15	78		
0.063	31		

Sample Proportions	% dry mass
Very coarse	0
Gravel	0
Sand	69
Fines <0.063mm	31

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	> 1.7
Curvature Coefficient	

Uniformity Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks:

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Client: BWB Consulting Limited
Client Address: Whitehall Waterfront, 2 Riverside Way,
Leeds, LS1 4EH

Contact: Mike Harper
Site Address: Plot P, Kingsway Bus. Park

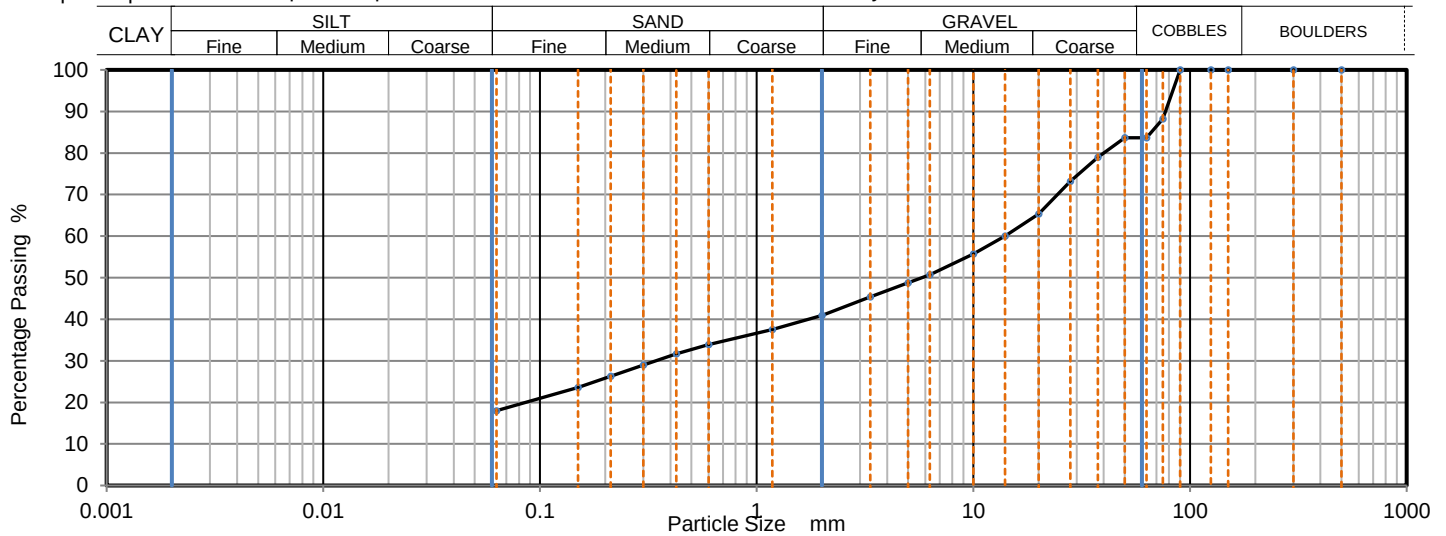
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 210939
Job Number: 22-81413
Date Sampled: Not Given
Date Received: 05/08/2022
Date Tested: 07/09/2022
Sampled By: Not Given

Test Results:

Laboratory Reference: 2409106
Hole No.: BH04
Sample Reference: Not Given
Sample Description: Dark grey clayey very sandy GRAVEL with cobbles
Sample Preparation: Sample was quartered, oven dried at 106.3 °C and broken down by hand.

Depth Top [m]: 1.20
Depth Base [m]: 1.65
Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	88		
63	84		
50	84		
37.5	79		
28	73		
20	65		
14	60		
10	56		
6.3	51		
5	49		
3.35	45		
2	41		
1.18	38		
0.6	34		
0.425	32		
0.3	29		
0.212	26		
0.15	24		
0.063	19		

Sample Proportions	% dry mass
Very coarse	16
Gravel	43
Sand	22
Fines <0.063mm	19

Grading Analysis	
D100	mm 90
D60	mm 14
D30	mm 0.341
D10	mm
Uniformity Coefficient	> 220
Curvature Coefficient	

Uniformity Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks:

Signed:

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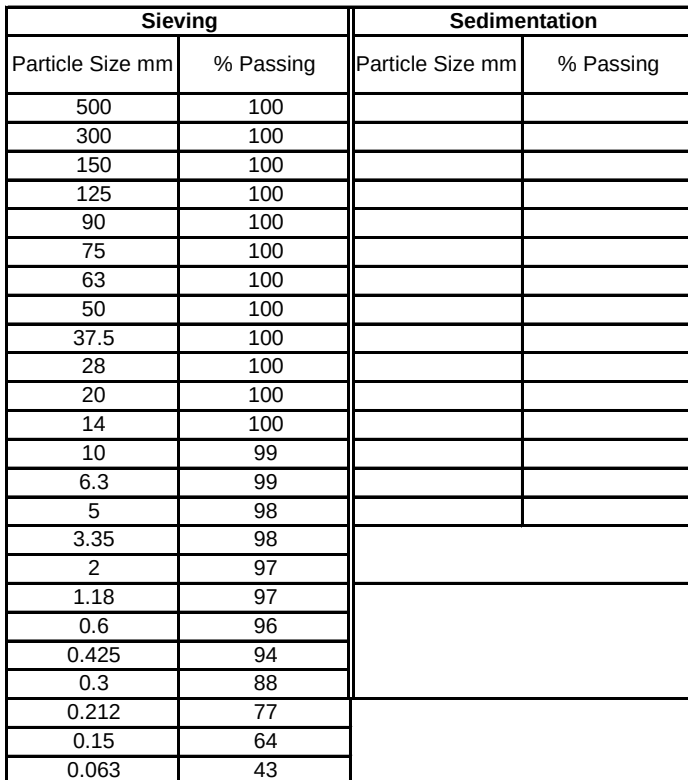
DETERMINATION OF PARTICLE SIZE DISTRIBUTION

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Client Reference: 210939
Job Number: 22-81413
Date Sampled: Not Given
Date Received: 05/08/2022
Date Tested: 07/09/2022
Sampled By: Not Given

Depth Top [m]: 1.10
Depth Base [m]: 1.10
Sample Type: B



Grading Analysis		
D100	mm	14
D60	mm	0.129
D30	mm	
D10	mm	
Uniformity Coefficient		> 2.1
Curvature Coefficient		

GF 100.21



4041

TEST CERTIFICATE**DETERMINATION OF DRY DENSITY/MOISTURE
CONTENT RELATIONSHIP METHOD USING
2.5 KG RAMMER**

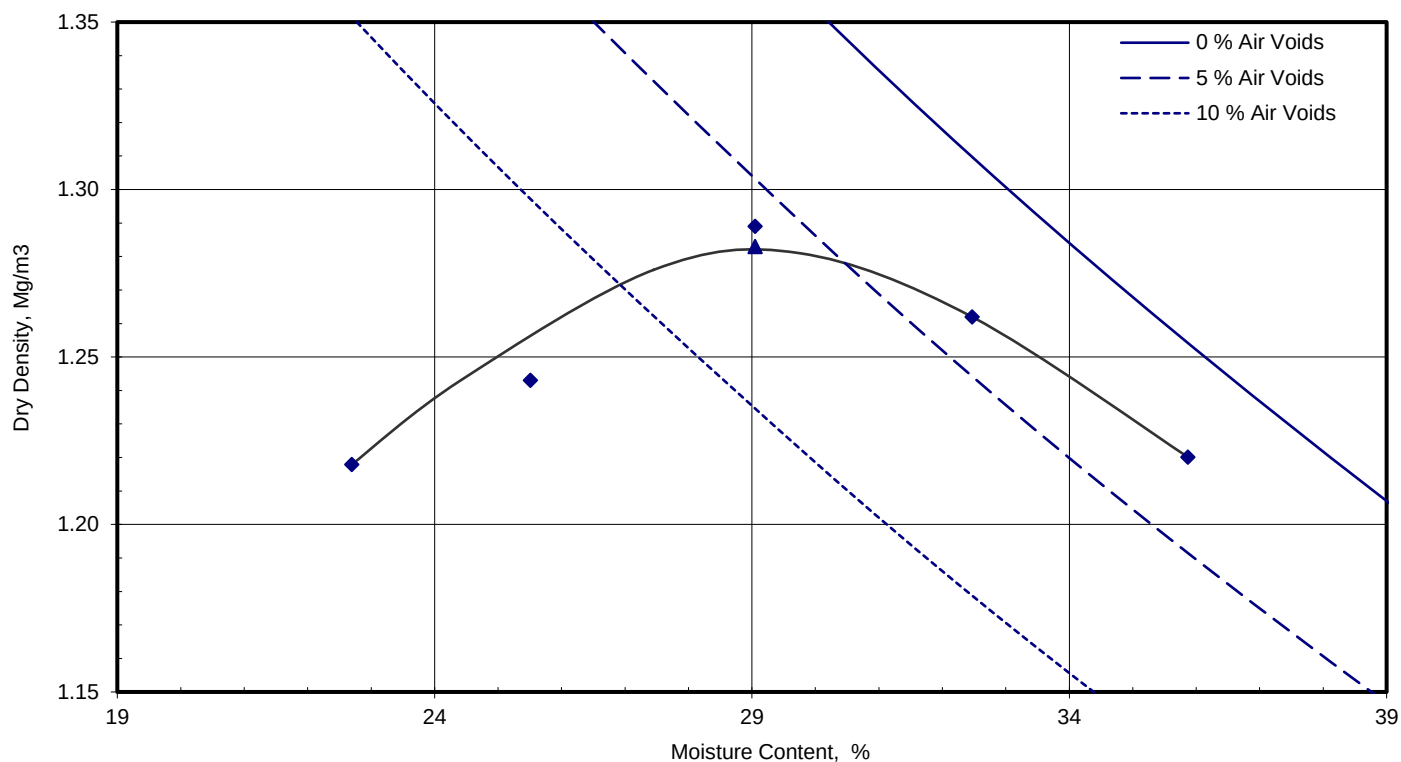
Tested in Accordance with: BS 1377-4: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Environmental Science

Client: BWB Consulting Limited
Client Address: Whitehall Waterfront, 2 Riverside Way,
Leeds, LS1 4EHContact: Mike Harper
Site Address: Plot P, Kingsway Bus. ParkClient Reference: 210939
Job Number: 22-81413
Date Sampled: Not Given
Date Received: 05/08/2022
Date Tested: 13/09/2022
Sampled By: Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Test Results:Laboratory Reference: 2409073
Hole No.: TP101
Sample Reference: Not Given
Sample Description: Mottled brown sandy GRAVEL
Sample Preparation: Sample was quartered and broken down by hand. Material used was natural.Depth Top [m]: 1.00
Depth Base [m]: 1.00
Sample Type: B

Compaction Point No.	1	2	3	4	5
Moisture Content %	23	26	29	32	36
Dry Density Mg/m³	1.22	1.24	1.29	1.26	1.22

Mould Type	1 Litre
Samples Used	Single sample tested
Material Retained on 37.5 mm Sieve %	5
Material Retained on 20.0 mm Sieve %	19
Particle Density - Measured using gas jar Mg/m³	2.28
As received Moisture Content %	20
Maximum Dry Density Mg/m³	1.28

Optimum Moisture Content %	29
----------------------------	----

Note: Tested in Accordance with BS 1377-4: 1990: Clause 3.3 using 2.5kg [light] Rammer

Remarks: Insufficient amount of material - compacted in 1 litre mould

Signed:

*Monika Siewior*Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

DETERMINATION OF DRY DENSITY/MOISTURE CONTENT RELATIONSHIP METHOD USING 2.5 KG RAMMER

Tested in Accordance with: BS 1377-4: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Client: BWB Consulting Limited
Client Address: Whitehall Waterfront, 2 Riverside Way,
Leeds, LS1 4EH

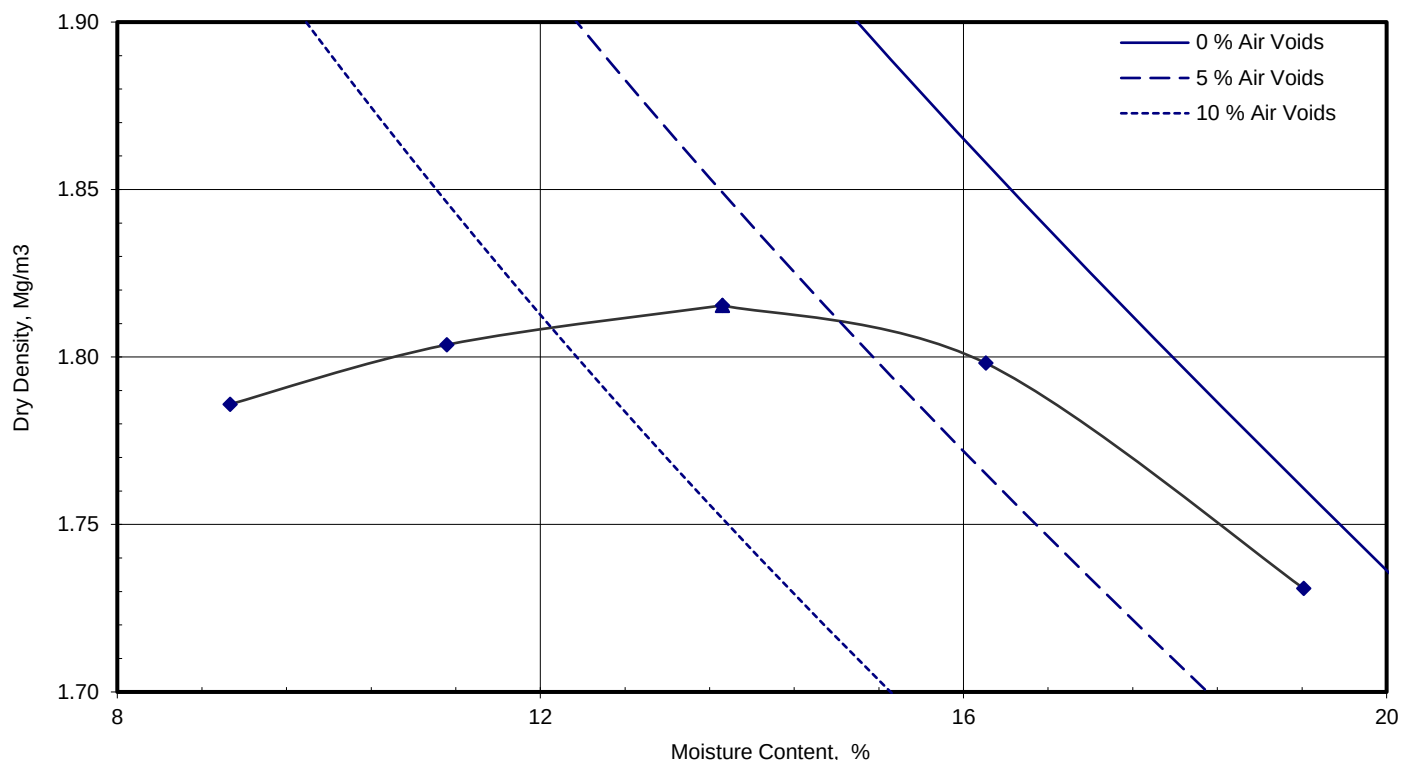
Contact: Mike Harper
Site Address: Plot P, Kingsway Bus. Park

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 210939
Job Number: 22-81413
Date Sampled: Not Given
Date Received: 05/08/2022
Date Tested: 13/09/2022
Sampled By: Not Given

Test Results:

Laboratory Reference: 2409077
Hole No.: TP104
Sample Reference: Not Given
Sample Description: Light brown slightly clayey slightly gravelly SAND
Sample Preparation: Sample was quartered and broken down by hand. Material used was natural.

Depth Top [m]: 1.00
Depth Base [m]: 1.00
Sample Type: B


Compaction Point No.	1	2	3	4	5
Moisture Content %	9.1	11	14	16	19
Dry Density Mg/m³	1.79	1.80	1.82	1.80	1.73

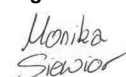
Mould Type	1 Litre
Samples Used	Single sample tested
Material Retained on 37.5 mm Sieve %	0
Material Retained on 20.0 mm Sieve %	3
Particle Density - Measured using gas jar Mg/m³	2.66
As received Moisture Content %	4.6
Maximum Dry Density Mg/m³	1.82

Optimum Moisture Content %	14
----------------------------	----

Note: Tested in Accordance with BS 1377-4: 1990: Clause 3.3 using 2.5kg [light] Rammer

Remarks:

Signed:



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TEST CERTIFICATE

DETERMINATION OF DRY DENSITY/MOISTURE CONTENT RELATIONSHIP METHOD USING 2.5 KG RAMMER

Tested in Accordance with: BS 1377-4: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

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Client Address: Whitehall Waterfront, 2 Riverside Way,
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Contact: Mike Harper
Site Address: Plot P, Kingsway Bus. Park

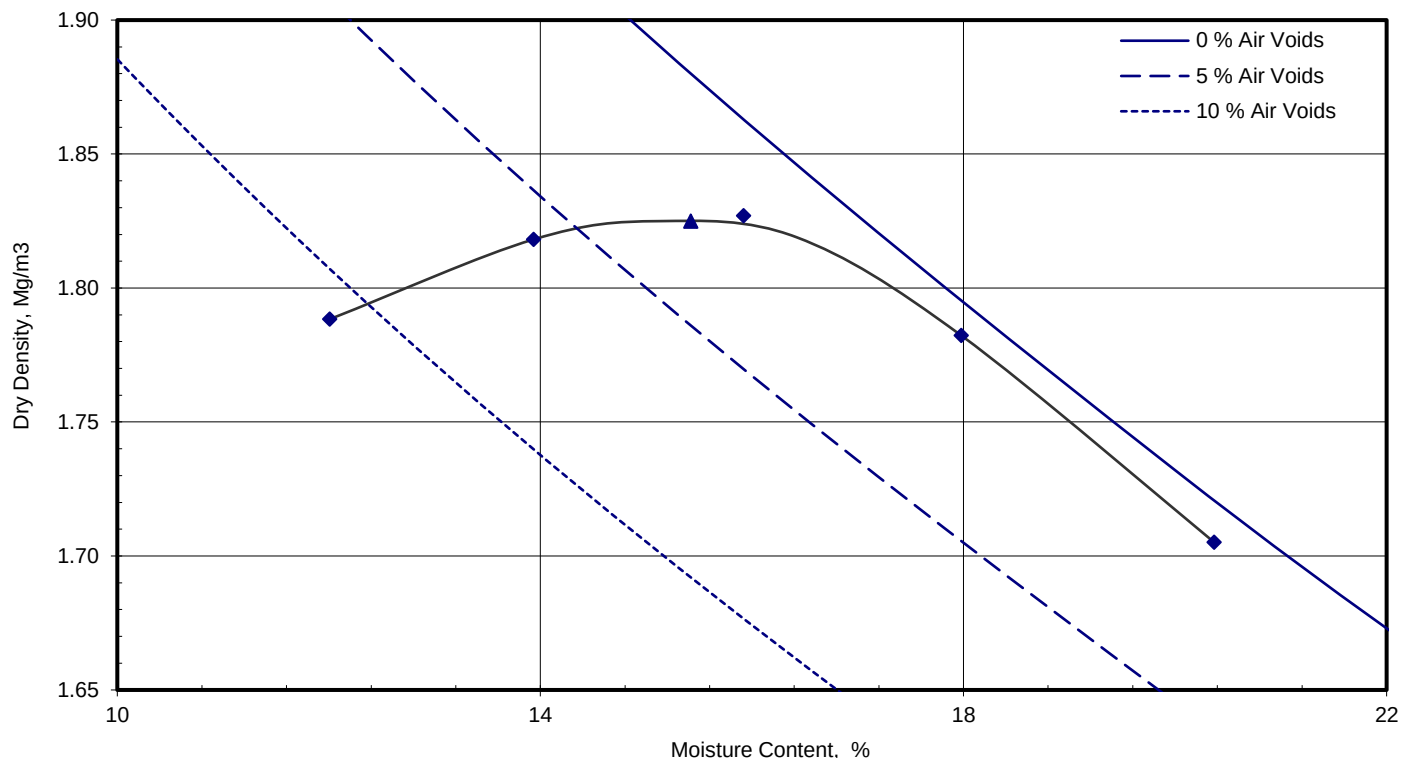
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 210939
Job Number: 22-81413
Date Sampled: Not Given
Date Received: 05/08/2022
Date Tested: 13/09/2022
Sampled By: Not Given

Test Results:

Laboratory Reference: 2409078
Hole No.: TP105
Sample Reference: Not Given
Sample Description: Yellowish brown slightly sandy CLAY
Sample Preparation: Sample was quartered and broken down by hand. Material used was natural.

Depth Top [m]: 1.50
Depth Base [m]: 1.50
Sample Type: D



Compaction Point No.	1	2	3	4	5
Moisture Content %	12	14	16	18	20
Dry Density Mg/m³	1.79	1.82	1.83	1.78	1.71

Mould Type	1 Litre
Samples Used	Single sample tested
Material Retained on 37.5 mm Sieve %	0
Material Retained on 20.0 mm Sieve %	0
Particle Density - Measured using gas jar Mg/m³	2.65
As received Moisture Content %	18
Maximum Dry Density Mg/m³	1.82

Optimum Moisture Content %	15
----------------------------	----

Note: Tested in Accordance with BS 1377-4: 1990: Clause 3.3 using 2.5kg [light] Rammer

Remarks:

Signed:

Monika Siewior

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Reporting Specialist
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

DETERMINATION OF DRY DENSITY/MOISTURE CONTENT RELATIONSHIP METHOD USING 2.5 KG RAMMER

Tested in Accordance with: BS 1377-4: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Client: BWB Consulting Limited
Client Address: Whitehall Waterfront, 2 Riverside Way,
Leeds, LS1 4EH

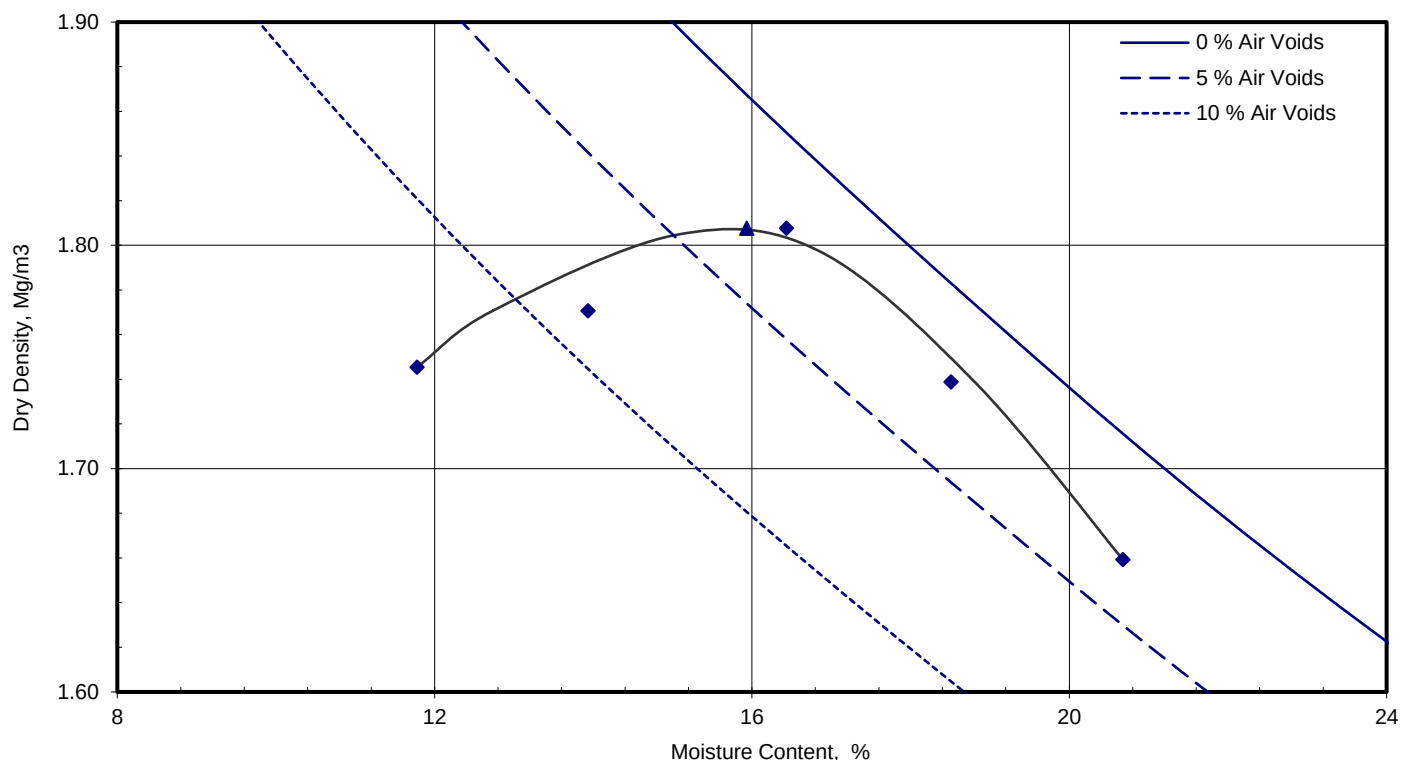
Contact: Mike Harper
Site Address: Plot P, Kingsway Bus. Park

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 210939
Job Number: 22-81413
Date Sampled: Not Given
Date Received: 05/08/2022
Date Tested: 13/09/2022
Sampled By: Not Given

Test Results:

Laboratory Reference: 2409096
Hole No.: TP118
Sample Reference: Not Given
Sample Description: Dark brown slightly gravelly CLAY
Sample Preparation: Sample was quartered and broken down by hand. Material used was natural.

Depth Top [m]: 1.70
Depth Base [m]: 1.70
Sample Type: B


Compaction Point No.	1	2	3	4	5
Moisture Content %	12	14	16	19	21
Dry Density Mg/m³	1.75	1.77	1.81	1.74	1.66

Mould Type	1 Litre
Samples Used	Single sample tested
Material Retained on 37.5 mm Sieve %	0
Material Retained on 20.0 mm Sieve %	0
Particle Density - Measured using gas jar Mg/m³	2.66
As received Moisture Content %	16
Maximum Dry Density Mg/m³	1.81

Optimum Moisture Content %	16
----------------------------	----

Note: Tested in Accordance with BS 1377-4: 1990: Clause 3.3 using 2.5kg [light] Rammer

Remarks:

Signed:

Monika Siewior

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

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4041

TEST CERTIFICATE**DETERMINATION OF DRY DENSITY/MOISTURE
CONTENT RELATIONSHIP METHOD USING
2.5 KG RAMMER**

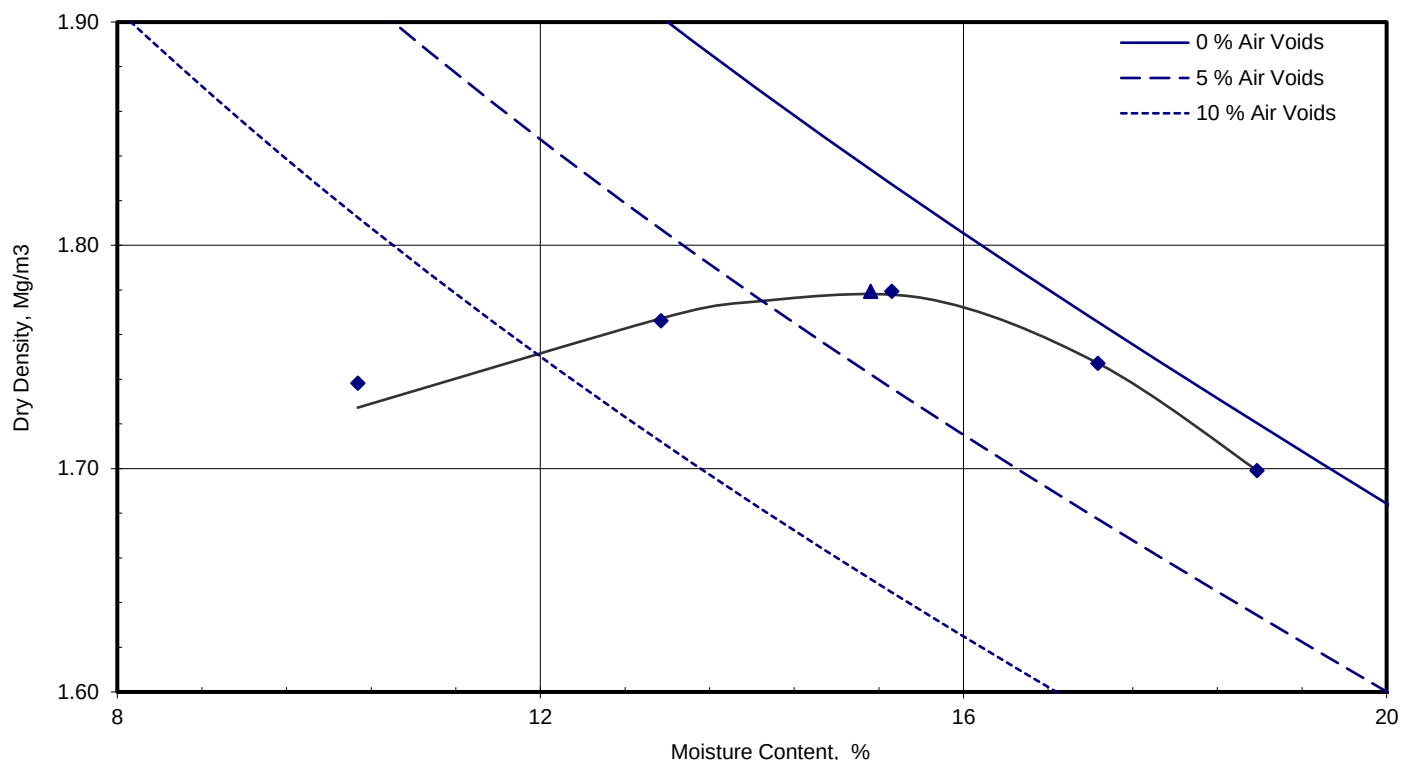
Tested in Accordance with: BS 1377-4: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Environmental Science

Client: BWB Consulting Limited
Client Address: Whitehall Waterfront, 2 Riverside Way,
Leeds, LS1 4EHContact: Mike Harper
Site Address: Plot P, Kingsway Bus. Park

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 210939
Job Number: 22-81413
Date Sampled: Not Given
Date Received: 05/08/2022
Date Tested: 13/09/2022
Sampled By: Not Given**Test Results:**Laboratory Reference: 2409105
Hole No.: BH04
Sample Reference: Not Given
Sample Description: Dark grey sandy gravelly CLAY
Sample Preparation: Sample was quartered and broken down by hand. Material used was natural.Depth Top [m]: 0.70
Depth Base [m]: 1.20
Sample Type: B

Compaction Point No.	1	2	3	4	5	
Moisture Content	%	10	13	15	17	19
Dry Density	Mg/m³	1.74	1.77	1.78	1.75	1.70

Mould Type		1 Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	8
Material Retained on 20.0 mm Sieve	%	46
Particle Density - Measured using gas jar	Mg/m³	2.54
As received Moisture Content	%	13
Maximum Dry Density	Mg/m³	1.78

Optimum Moisture Content	%	15
--------------------------	---	----

Note: Tested in Accordance with BS 1377-4: 1990: Clause 3.3 using 2.5kg [light] Rammer

Remarks: Zone X - test carried out as per client request.
Insufficient amount of material - compacted in 1 litre mould.

Signed:

*Monika Siewior*Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

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Page 1 of 1

Date Reported: 15/09/2022

GF 109.22



4041

TEST CERTIFICATE**DETERMINATION OF DRY DENSITY/MOISTURE
CONTENT RELATIONSHIP METHOD USING
4.5 KG RAMMER**

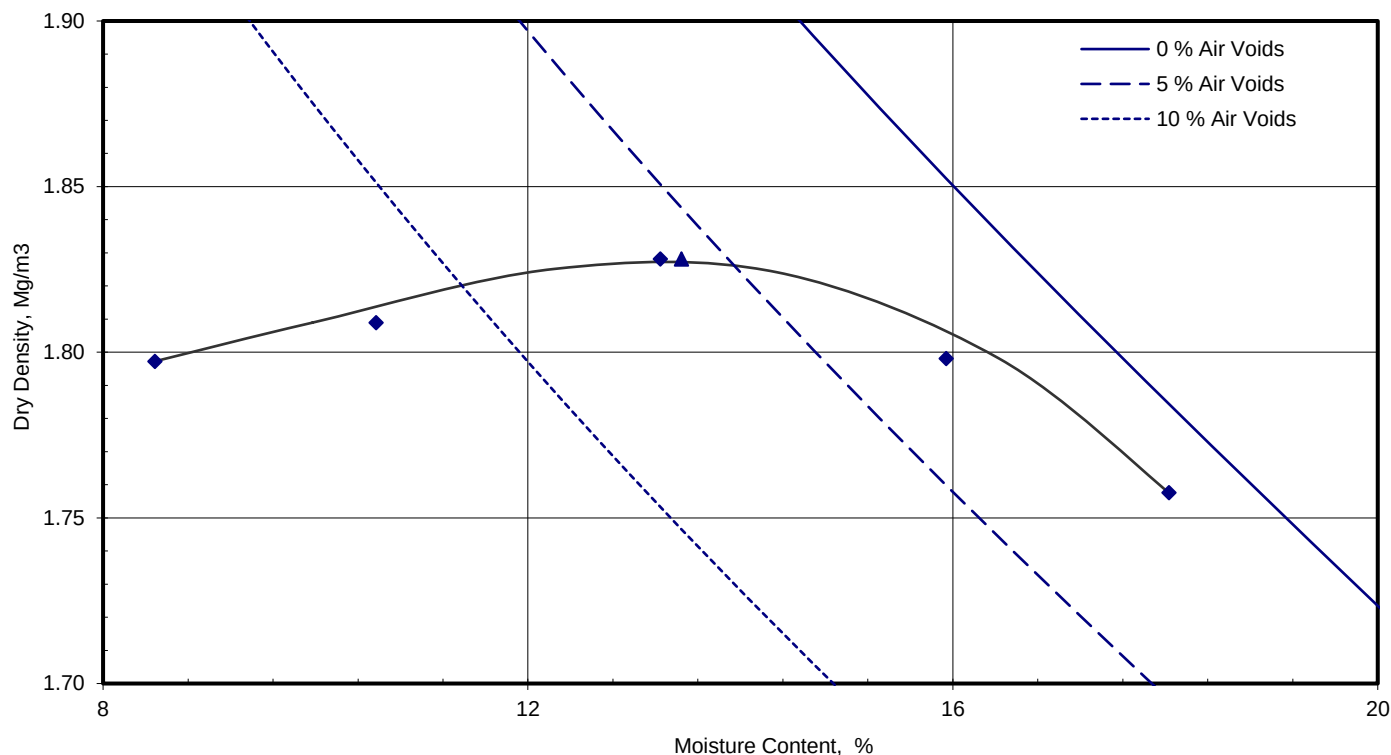
Tested in Accordance with: BS 1377-4: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Environmental Science

Client: BWB Consulting Limited
Client Address: Whitehall Waterfront, 2 Riverside Way,
Leeds, LS1 4EHContact: Mike Harper
Site Address: Plot P, Kingsway Bus. Park

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 210939
Job Number: 22-81413
Date Sampled: Not Given
Date Received: 05/08/2022
Date Tested: 13/09/2022
Sampled By: Not Given**Test Results:**Laboratory Reference: 2409074
Hole No.: TP102
Sample Reference: Not Given
Sample Description: Brown slightly clayey SAND
Sample Preparation: Sample was quartered and broken down by hand. Material used was natural.Depth Top [m]: 1.30
Depth Base [m]: 1.30
Sample Type: B

Compaction Point No.	1	2	3	4	5
Moisture Content	% 8.5	11	13	16	18
Dry Density	Mg/m³ 1.80	1.81	1.83	1.80	1.76

Mould Type	1 Litre
Samples Used	Single sample tested
Material Retained on 37.5 mm Sieve	% 0
Material Retained on 20.0 mm Sieve	% 0
Particle Density - Measured using gas jar	Mg/m³ 2.63
As received Moisture Content	% 13
Maximum Dry Density	Mg/m³ 1.83

Optimum Moisture Content	% 13
--------------------------	------

Note: Tested in Accordance with BS 1377-4: 1990: Clause 3.5 using 4.5kg [heavy] Rammer

Remarks:

Signed:

*Monika Siewior*Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

DETERMINATION OF DRY DENSITY/MOISTURE CONTENT RELATIONSHIP METHOD USING 4.5 KG RAMMER

Tested in Accordance with: BS 1377-4: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Client: BWB Consulting Limited
Client Address: Whitehall Waterfront, 2 Riverside Way,
Leeds, LS1 4EH

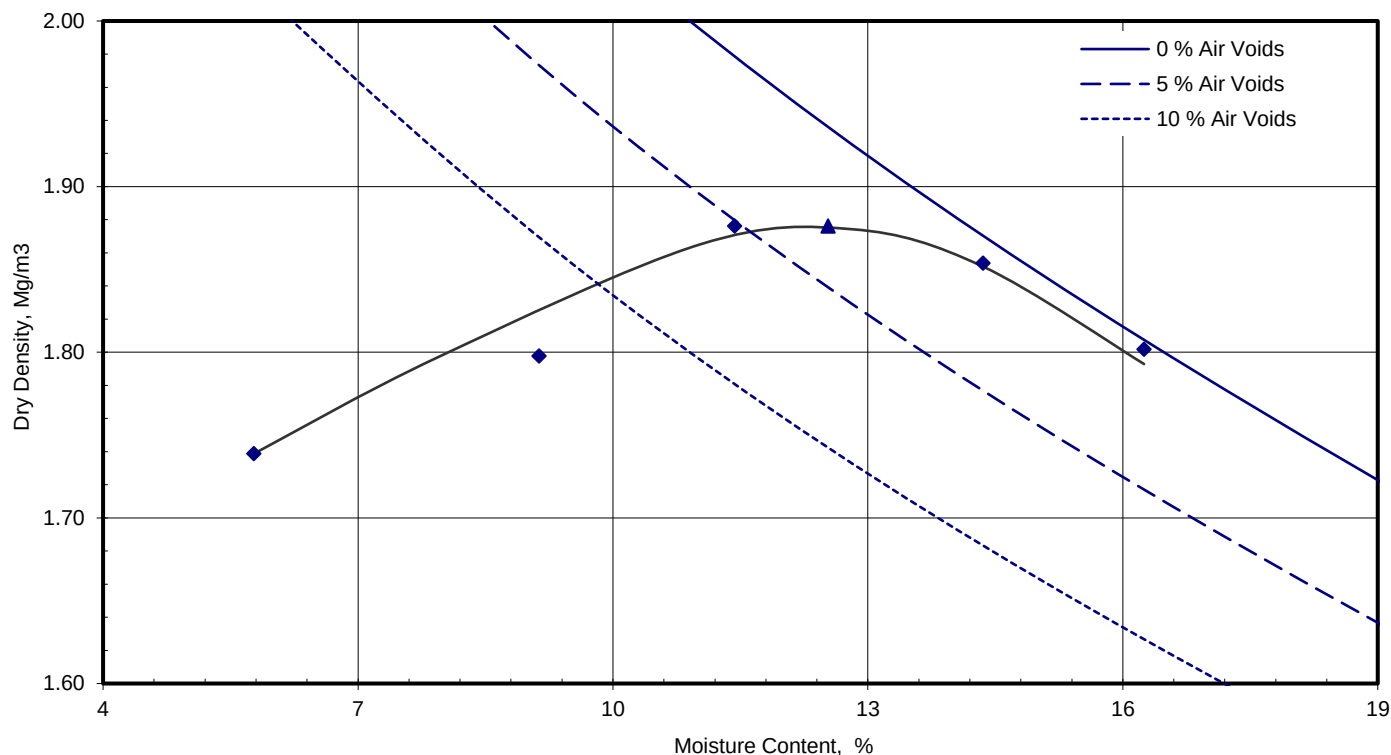
Contact: Mike Harper
Site Address: Plot P, Kingsway Bus. Park

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 210939
Job Number: 22-81413
Date Sampled: Not Given
Date Received: 05/08/2022
Date Tested: 13/09/2022
Sampled By: Not Given

Test Results:

Laboratory Reference: 2409095
Hole No.: TP118
Sample Reference: Not Given
Sample Description: Brown slightly gravelly CLAY
Sample Preparation: Sample was quartered and broken down by hand. Material used was natural.

Depth Top [m]: 1.00
Depth Base [m]: 1.00
Sample Type: B


Compaction Point No.	1	2	3	4	5
Moisture Content %	5.8	9.1	11	14	16
Dry Density Mg/m³	1.74	1.80	1.88	1.85	1.80

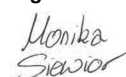
Mould Type	1 Litre
Samples Used	Single sample tested
Material Retained on 37.5 mm Sieve %	0
Material Retained on 20.0 mm Sieve %	1
Particle Density - Measured using gas jar Mg/m³	2.56
As received Moisture Content %	24
Maximum Dry Density Mg/m³	1.88

Optimum Moisture Content %	13
----------------------------	----

Note: Tested in Accordance with BS 1377-4: 1990: Clause 3.5 using 4.5kg [heavy] Rammer

Remarks:

Signed:



Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

DETERMINATION OF DRY DENSITY/MOISTURE CONTENT RELATIONSHIP METHOD USING 4.5 KG RAMMER

Tested in Accordance with: BS 1377-4: 1990

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Client: BWB Consulting Limited
Client Address: Whitehall Waterfront, 2 Riverside Way,
Leeds, LS1 4EH

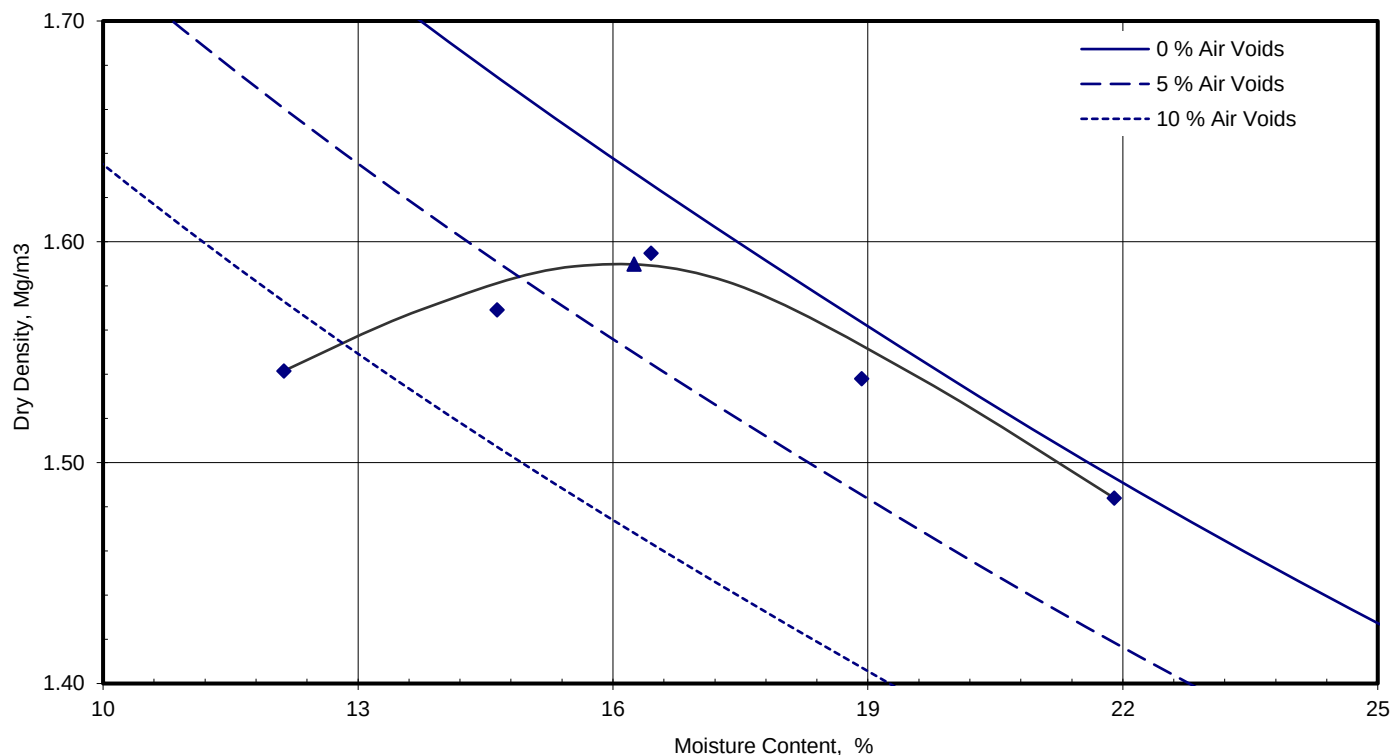
Contact: Mike Harper
Site Address: Plot P, Kingsway Bus. Park

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 210939
Job Number: 22-81413
Date Sampled: Not Given
Date Received: 05/08/2022
Date Tested: 13/09/2022
Sampled By: Not Given

Test Results:

Laboratory Reference: 2409083
Hole No.: TP110
Sample Reference: Not Given
Sample Description: Dark grey gravelly clayey SAND
Sample Preparation: Sample was quartered and broken down by hand. Material used was natural.

Depth Top [m]: 0.50
Depth Base [m]: 0.50
Sample Type: B


Compaction Point No.	1	2	3	4	5	
Moisture Content	%	12	15	16	19	22
Dry Density	Mg/m³	1.54	1.57	1.59	1.54	1.48

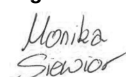
Mould Type		1 Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	0
Material Retained on 20.0 mm Sieve	%	6
Particle Density - Measured using gas jar	Mg/m³	2.22
As received Moisture Content	%	24
Maximum Dry Density	Mg/m³	1.59

Optimum Moisture Content	%	16
--------------------------	---	----

Note: Tested in Accordance with BS 1377-4: 1990: Clause 3.5 using 4.5kg [heavy] Rammer

Remarks:

Signed:



Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

DETERMINATION OF THE CALIFORNIA BEARING RATIO (CBR)

Tested in Accordance with: BS 1377-4: 1990: Clause 7

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Client: BWB Consulting Limited
Client Address: Whitehall Waterfront, 2 Riverside Way,
Leeds, LS1 4EH

Contact: Mike Harper
Site Address: Plot P, Kingsway Bus. Park

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 210939
Job Number: 22-81413
Date Sampled: Not Given
Date Received: 05/08/2022
Date Tested: 13/09/2022
Sampled By: Not Given

Test Results:

Laboratory Reference: 2409076
Hole No.: TP104
Sample Reference: Not Given
Sample Description: Brownish grey slightly sandy CLAY

Depth Top [m]: 0.50
Depth Base [m]: 0.50
Sample Type: B

Specimen Preparation:

Condition Remoulded
Details Recompacted with specified standard effort using 2.5kg rammer

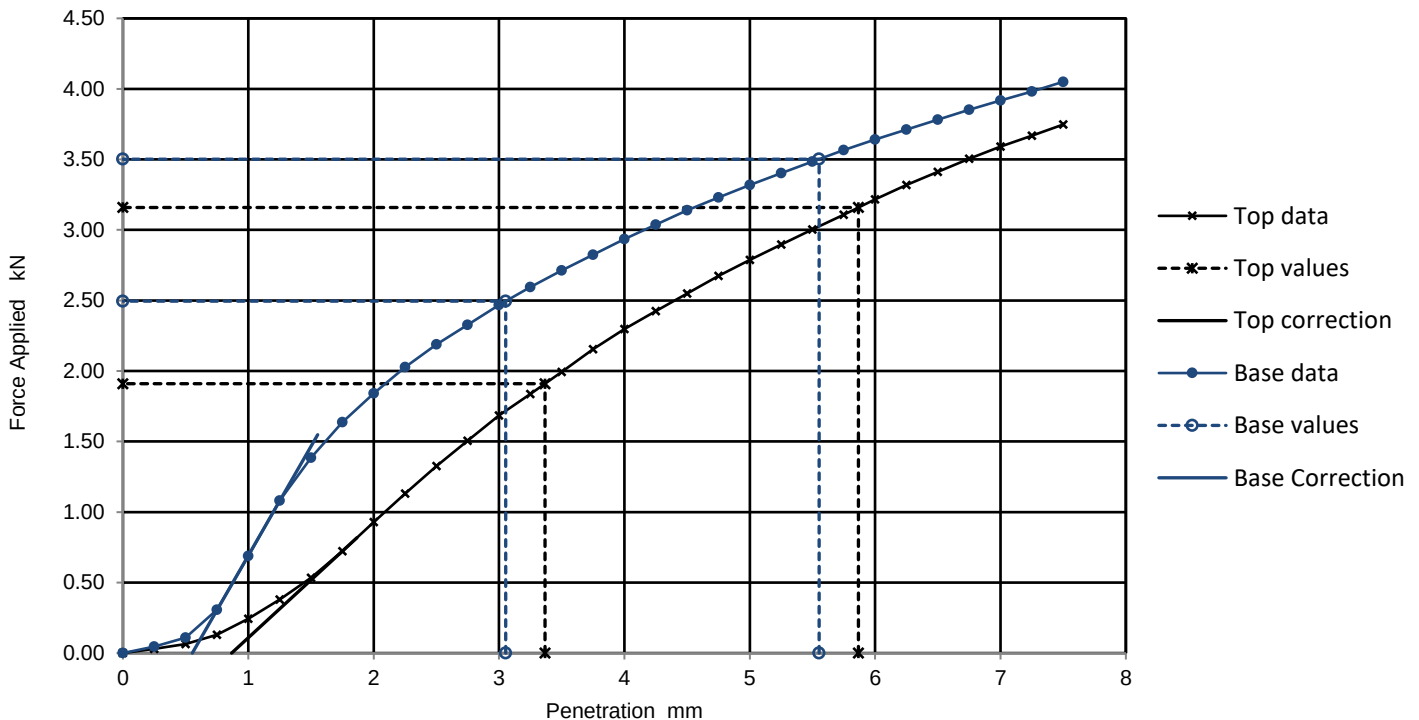
Soaking details Not soaked
Period of soaking days
Time to surface days
Amount of swell recorded mm
Dry density after soaking Mg/m3

Material retained on 20mm sieve removed 1 %

Initial Specimen details Bulk density 2.03 Mg/m3
Dry density 1.76 Mg/m3
Moisture content 15 %

Surcharge applied 8 kg
4.9 kPa

Force v Penetration Plots



Results

TOP
BASE

Curve correction applied	CBR Values, %			
	2.5mm	5mm	Highest	Average
Yes	14.0	16.0	16.0	17.0
Yes	19.0	18.0	19.0	

Moisture Content %
15
15

Remarks:

Test/ Specimen specific remarks:

Signed:

Monika Siewior

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

DETERMINATION OF THE CALIFORNIA BEARING RATIO (CBR)

Tested in Accordance with: BS 1377-4: 1990: Clause 7

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Client: BWB Consulting Limited
Client Address: Whitehall Waterfront, 2 Riverside Way,
Leeds, LS1 4EH

Contact: Mike Harper
Site Address: Plot P, Kingsway Bus. Park

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 210939
Job Number: 22-81413
Date Sampled: Not Given
Date Received: 05/08/2022
Date Tested: 13/09/2022
Sampled By: Not Given

Test Results:

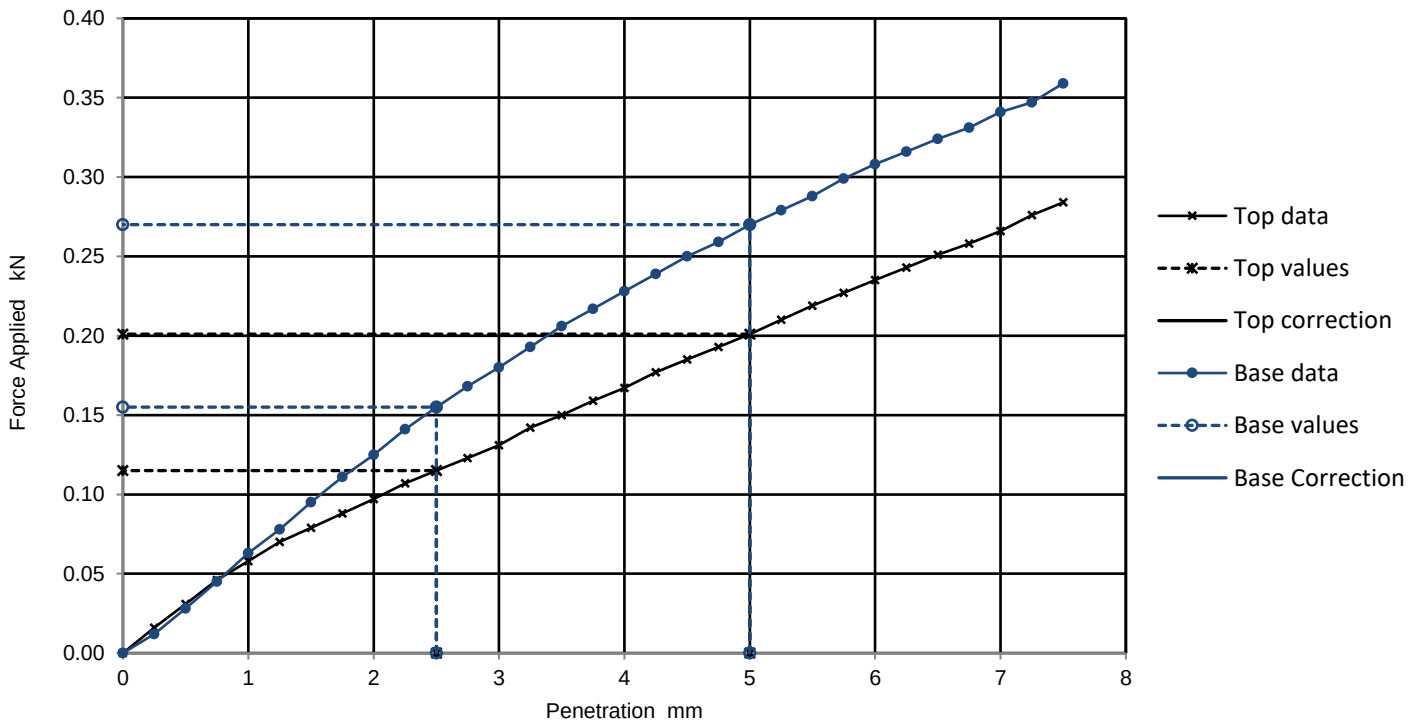
Laboratory Reference: 2409082
Hole No.: TP109
Sample Reference: Not Given
Sample Description: Grgreyish brown slightly sandy CLAY

Depth Top [m]: 2.00
Depth Base [m]: 2.00
Sample Type: D

Specimen Preparation:

Condition	Remoulded	Soaking details	Not soaked
Details	Recompacted with specified standard effort using 2.5kg rammer	Period of soaking	days
		Time to surface	days
		Amount of swell recorded	mm
		Dry density after soaking	Mg/m3
Material retained on 20mm sieve removed	1 %		
Initial Specimen details	Bulk density	2.10	Mg/m3
	Dry density	1.74	Mg/m3
	Moisture content	21	%
	Surcharge applied	8	kg
		4.9	kPa

Force v Penetration Plots



Results

TOP
BASE

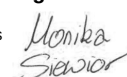
Curve correction applied	CBR Values, %			
	2.5mm	5mm	Highest	Average
No	0.9	1.0	1.0	
No	1.2	1.4	1.4	

Moisture Content %
19
20

Remarks:

Test/ Specimen specific remarks:

Signed:



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Reporting Specialist
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

DETERMINATION OF THE CALIFORNIA BEARING RATIO (CBR)

Tested in Accordance with: BS 1377-4: 1990: Clause 7

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Client: BWB Consulting Limited
Client Address: Whitehall Waterfront, 2 Riverside Way,
Leeds, LS1 4EH

Contact: Mike Harper
Site Address: Plot P, Kingsway Bus. Park

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 210939
Job Number: 22-81413
Date Sampled: Not Given
Date Received: 05/08/2022
Date Tested: 13/09/2022
Sampled By: Not Given

Test Results:

Laboratory Reference: 2409092
Hole No.: TP116
Sample Reference: Not Given
Sample Description: Brownish grey gravelly CLAY

Depth Top [m]: 1.50
Depth Base [m]: 1.50
Sample Type: B

Specimen Preparation:

Condition Remoulded
Details Recompacted with specified standard effort using 2.5kg rammer

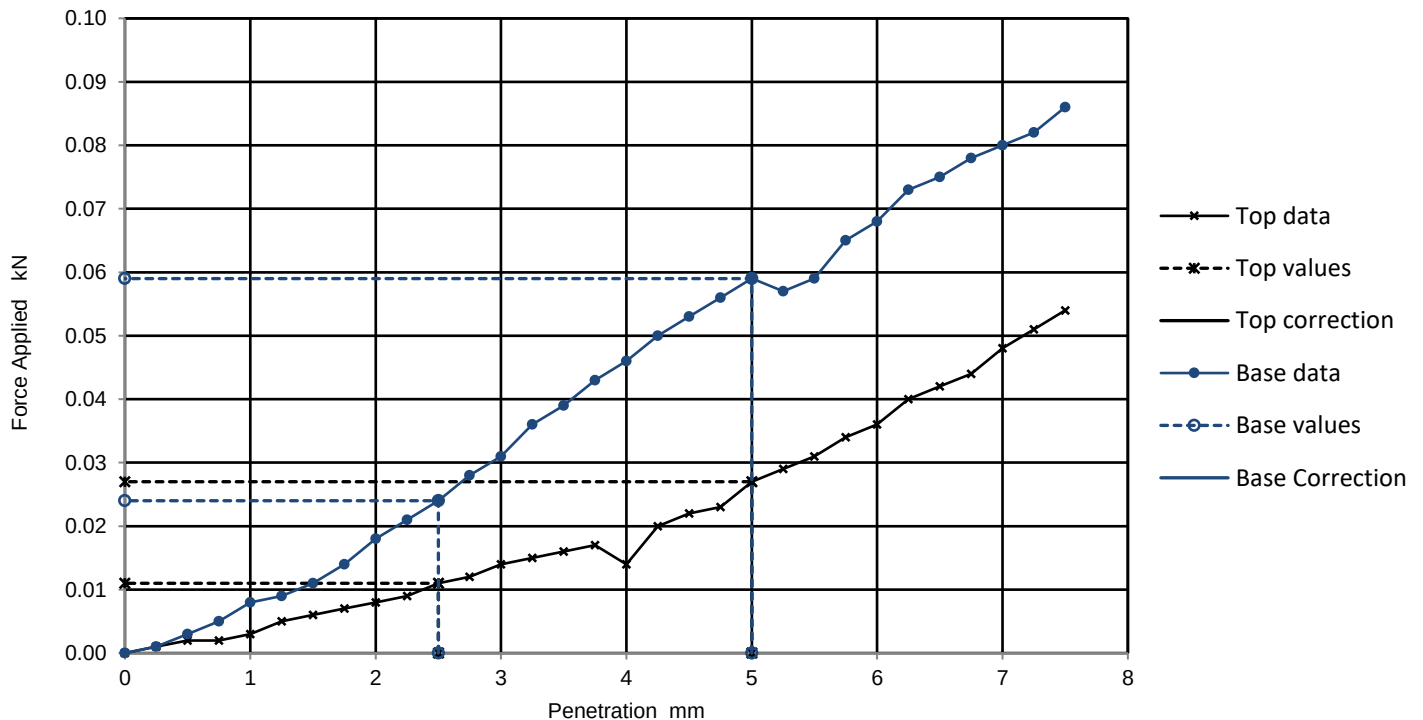
Soaking details Not soaked
Period of soaking days
Time to surface days
Amount of swell recorded mm
Dry density after soaking Mg/m3

Material retained on 20mm sieve removed 7 %

Initial Specimen details Bulk density 1.98 Mg/m3
Dry density 1.59 Mg/m3
Moisture content 24 %

Surcharge applied 8 kg
4.9 kPa

Force v Penetration Plots



Results

TOP
BASE

Curve correction applied	CBR Values, %			
	2.5mm	5mm	Highest	Average
No	0.1	0.1	0.1	
No	0.2	0.3	0.3	

Moisture Content %
24
20

Remarks:

Test/ Specimen specific remarks:

Signed:

Monika Siewior

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

DETERMINATION OF THE CALIFORNIA BEARING RATIO (CBR)

Tested in Accordance with: BS 1377-4: 1990: Clause 7

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Client: BWB Consulting Limited
Client Address: Whitehall Waterfront, 2 Riverside Way,
Leeds, LS1 4EH

Contact: Mike Harper
Site Address: Plot P, Kingsway Bus. Park

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 210939
Job Number: 22-81413
Date Sampled: Not Given
Date Received: 05/08/2022
Date Tested: 13/09/2022
Sampled By: Not Given

Test Results:

Laboratory Reference: 2409097
Hole No.: TP120
Sample Reference: Not Given
Sample Description: Black CLAY

Depth Top [m]: 0.30
Depth Base [m]: 0.30
Sample Type: B

Specimen Preparation:

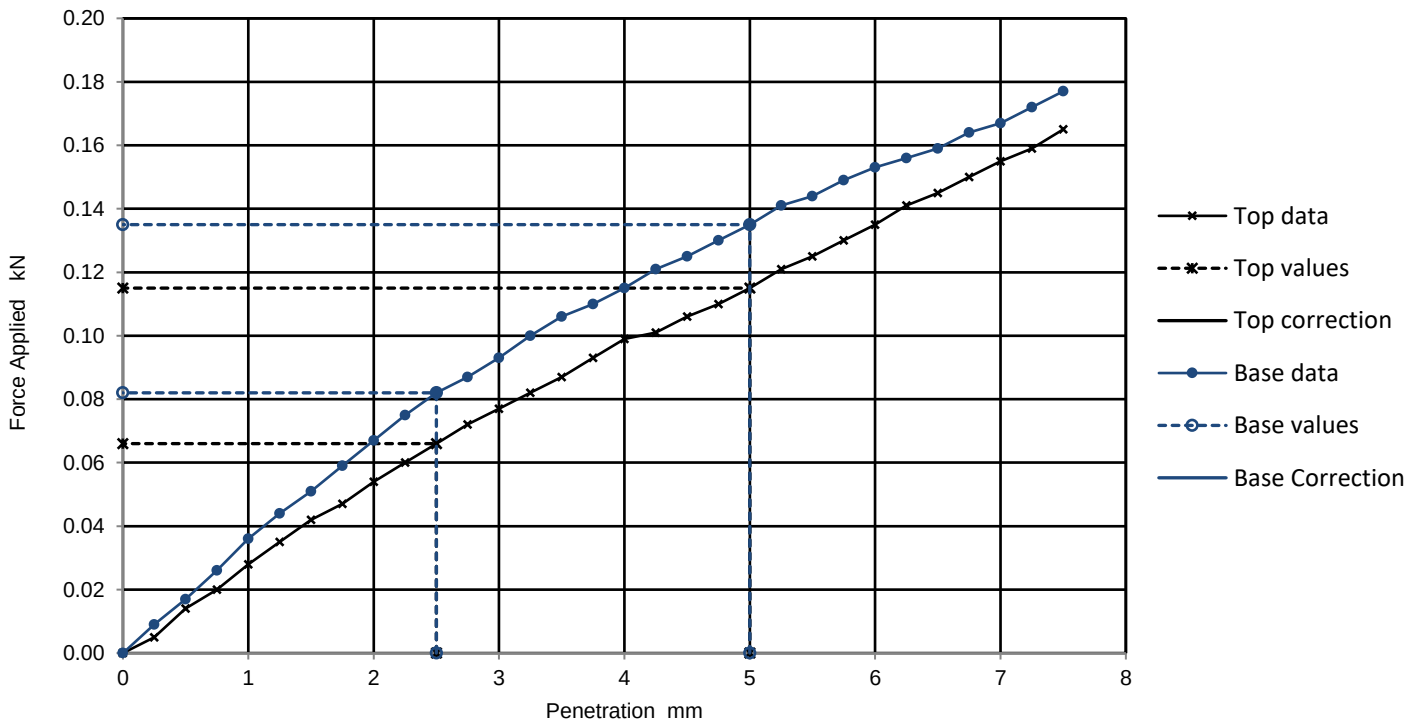
Condition Remoulded
Details Recompacted with specified standard effort using 2.5kg rammer

Soaking details Not soaked
Period of soaking days
Time to surface days
Amount of swell recorded mm
Dry density after soaking Mg/m3

Material retained on 20mm sieve removed 0 %

Initial Specimen details Bulk density 1.84 Mg/m3
Dry density 1.29 Mg/m3
Moisture content 43 %
Surcharge applied 8 kg
4.9 kPa

Force v Penetration Plots



Results

TOP
BASE

Curve correction applied	CBR Values, %			
	2.5mm	5mm	Highest	Average
No	0.5	0.6	0.6	0.6
No	0.6	0.7	0.7	

Moisture Content %
47
42

Remarks:

Test/ Specimen specific remarks:

Signed:

Monika Siewior

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

DETERMINATION OF THE CALIFORNIA BEARING RATIO (CBR)

Tested in Accordance with: BS 1377-4: 1990: Clause 7

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Client: BWB Consulting Limited
Client Address: Whitehall Waterfront, 2 Riverside Way,
Leeds, LS1 4EH

Contact: Mike Harper
Site Address: Plot P, Kingsway Bus. Park

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 210939
Job Number: 22-81413
Date Sampled: Not Given
Date Received: 05/08/2022
Date Tested: 14/09/2022
Sampled By: Not Given

Test Results:

Laboratory Reference: 2409098
Hole No.: TP121
Sample Reference: Not Given
Sample Description: Dark grey slightly sandy CLAY

Depth Top [m]: 1.20
Depth Base [m]: 1.20
Sample Type: B

Specimen Preparation:

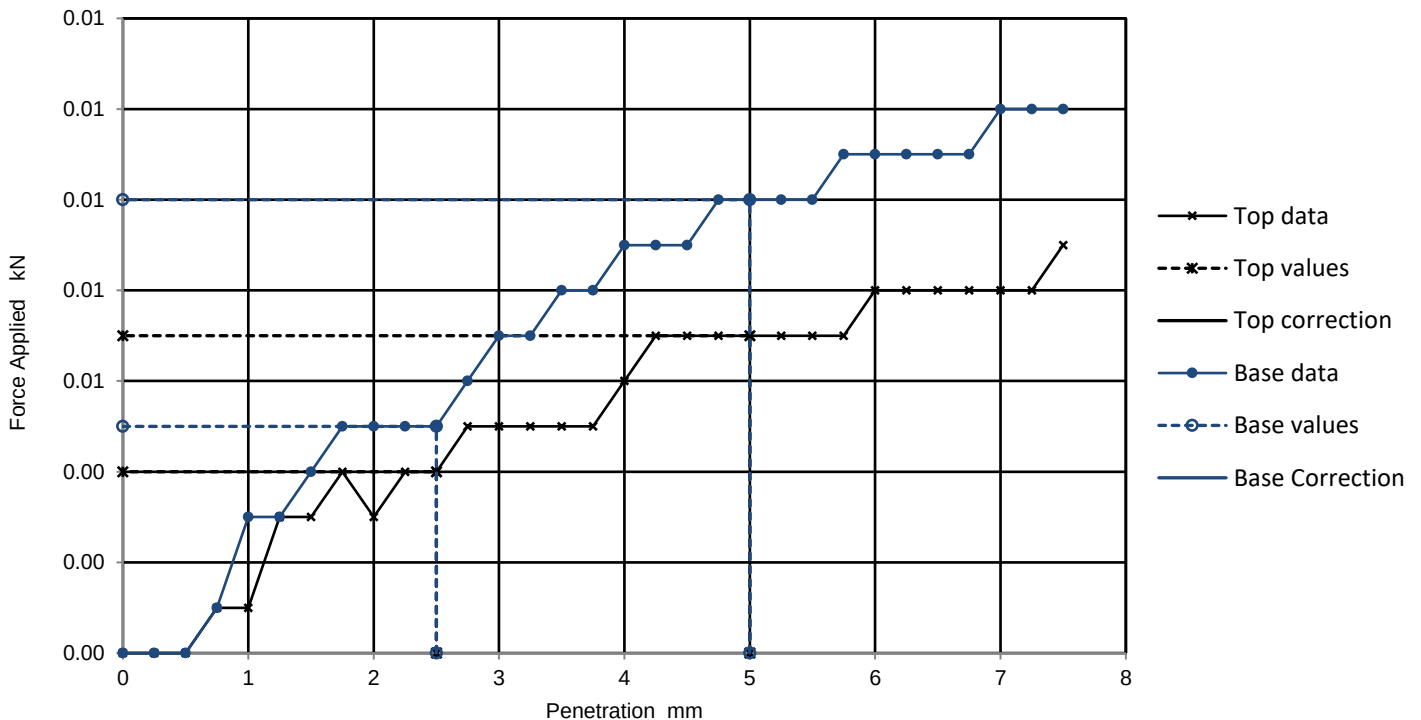
Condition Remoulded
Details Recompacted with specified standard effort using 2.5kg rammer

Soaking details Not soaked
Period of soaking days
Time to surface days
Amount of swell recorded mm
Dry density after soaking Mg/m3

Material retained on 20mm sieve removed 0 %

Initial Specimen details Bulk density 1.62 Mg/m3
Dry density 1.00 Mg/m3
Moisture content 62 %
Surcharge applied 8 kg
4.8 kPa

Force v Penetration Plots



Results

TOP
BASE

Curve correction applied	CBR Values, %			
	2.5mm	5mm	Highest	Average
No	0.0	0.0	0.0	
No	0.0	0.1	0.1	

Moisture Content %
52
60

Remarks:

Test/ Specimen specific remarks:

Signed:

Monika Siewior

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

DETERMINATION OF THE CALIFORNIA BEARING RATIO (CBR)

Tested in Accordance with: BS 1377-4: 1990: Clause 7

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Client: BWB Consulting Limited
Client Address: Whitehall Waterfront, 2 Riverside Way,
Leeds, LS1 4EH

Contact: Mike Harper
Site Address: Plot P, Kingsway Bus. Park

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 210939
Job Number: 22-81413
Date Sampled: Not Given
Date Received: 05/08/2022
Date Tested: 14/09/2022
Sampled By: Not Given

Test Results:

Laboratory Reference: 2409109
Hole No.: BH05
Sample Reference: Not Given
Sample Description: Dark grey TOPSOIL

Depth Top [m]: 0.10
Depth Base [m]: 0.50
Sample Type: B

Specimen Preparation:

Condition Remoulded
Details Recompacted with specified standard effort using 2.5kg rammer

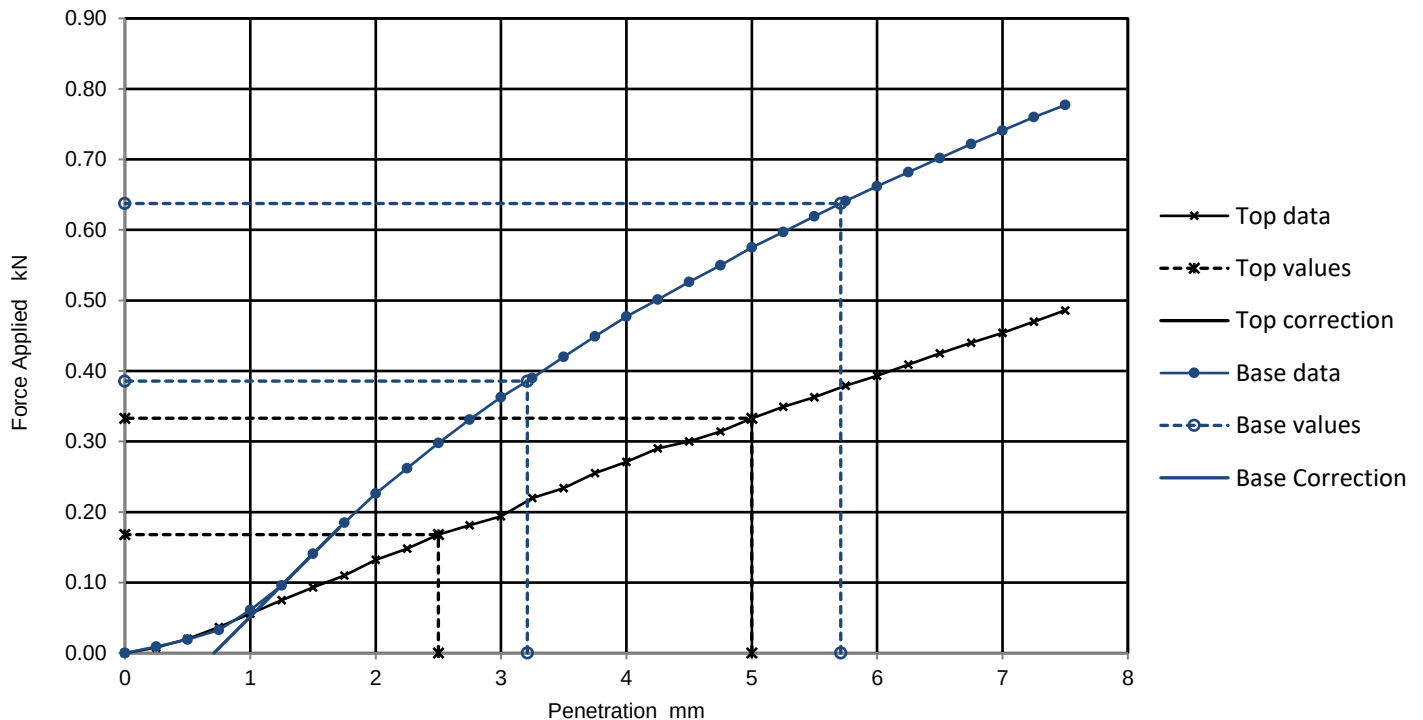
Soaking details Not soaked
Period of soaking days
Time to surface days
Amount of swell recorded mm
Dry density after soaking Mg/m3

Material retained on 20mm sieve removed 8 %

Initial Specimen details Bulk density 1.63 Mg/m3
Dry density 1.03 Mg/m3
Moisture content 58 %

Surcharge applied 8 kg
4.8 kPa

Force v Penetration Plots



Results

TOP
BASE

Curve correction applied	CBR Values, %			
	2.5mm	5mm	Highest	Average
No	1.3	1.7	1.7	
Yes	2.9	3.2	3.2	

Moisture Content %
58
61

Remarks:

Test/ Specimen specific remarks:

Signed:

Monika Siewior

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

DETERMINATION OF THE UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITHOUT MEASUREMENT OF PORE PRESSURE

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Tested in Accordance with: BS 1377-7: 1990: Clause 8

Client: BWB Consulting Limited
Client Address: Whitehall Waterfront, 2 Riverside Way,
Leeds, LS1 4EH

Contact: Mike Harper
Site Address: Plot P, Kingsway Bus. Park

Client Reference: 210939
Job Number: 22-81413
Date Sampled: Not Given
Date Received: 05/08/2022
Date Tested: 07/09/2022
Sampled By: Not Given

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

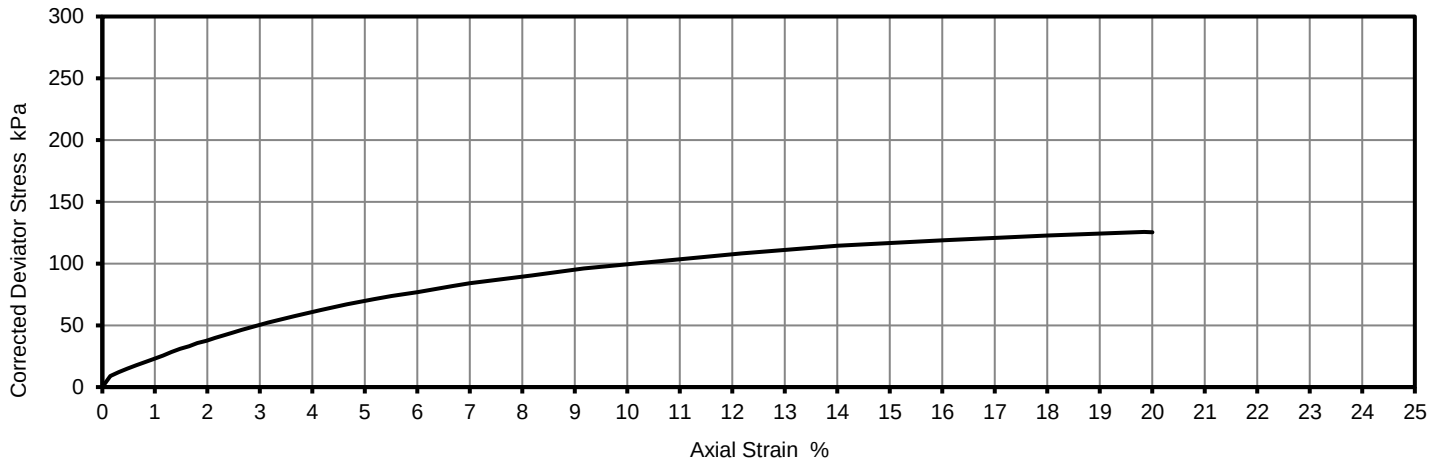
Test Results:

Laboratory Reference: 2409102
Hole No.: BH03
Sample Reference: Not Given
Sample Description: Brown slightly gravelly slightly sandy CLAY
Sample Preparation: Sample prepared in accordance with BS 1377-1:2016 Clause 9.1.1.

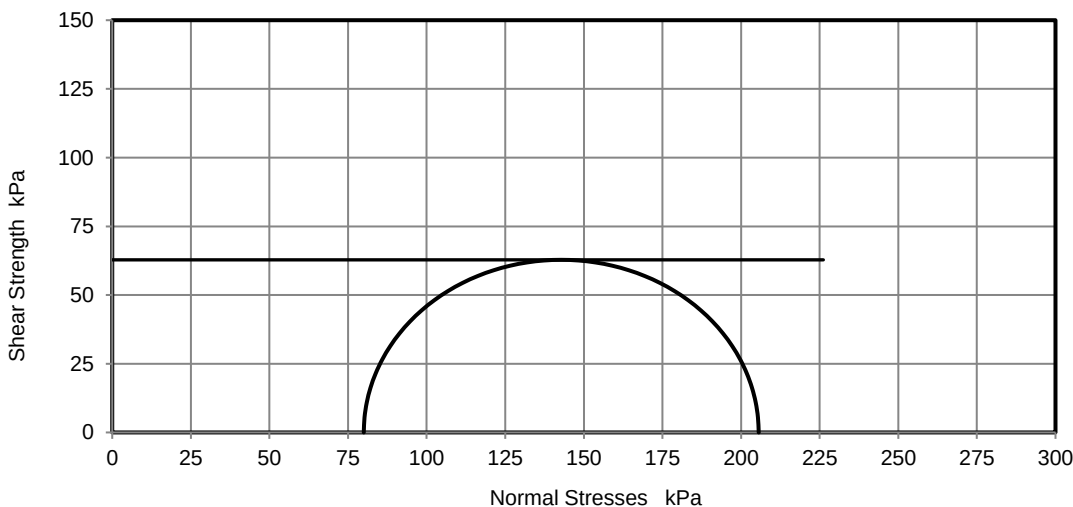
Depth Top [m]: 4.00
Depth Base [m]: 4.50
Sample Type: B

Test Number	1	Rate of Strain	1.98	%/min
Length	201.59	Cell Pressure	80	kPa
Diameter	100.84	Axial Strain at failure	19.8	%
Bulk Density	2.23	Deviator Stress, ($\sigma_1 - \sigma_3$) _f	126	kPa
Moisture Content	18	Undrained Shear Strength, c_u	63	kPa $\frac{1}{2}(\sigma_1 - \sigma_3)_f$
Dry Density	1.88	Mode of Failure	Compound	
Membrane Correction	1.06	Membrane thickness	0.28	mm

Deviator Stress v Axial Strain



Mohr Circles



Position within sample



Note: Deviator stress corrected for area change and membrane effects. Mohr circles and their interpretation is not covered by BS1377.
This is provided for information only.

Remarks:

Signed:

Monika Siewior

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Opinions and interpretations expressed herein are outside of the scope of the UKAS Accreditation. This report may not be reproduced other than in full without the prior written approval of the issuing laboratory. The results included within the report relate only to the sample(s) submitted for testing.

TEST CERTIFICATE

DETERMINATION OF THE UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITHOUT MEASUREMENT OF PORE PRESSURE

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Tested in Accordance with: BS 1377-7: 1990: Clause 8

Client: BWB Consulting Limited
Client Address: Whitehall Waterfront, 2 Riverside Way,
Leeds, LS1 4EH

Contact: Mike Harper
Site Address: Plot P, Kingsway Bus. Park

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 210939
Job Number: 22-81413
Date Sampled: Not Given
Date Received: 05/08/2022
Date Tested: 07/09/2022
Sampled By: Not Given

Test Results:

Laboratory Reference: 2409103

Hole No.: BH03

Sample Reference: Not Given

Sample Description: Brown slightly sandy CLAY

Sample Preparation: Sample prepared in accordance with BS 1377-1:2016 Clause 9.1.1.

Depth Top [m]: 6.00

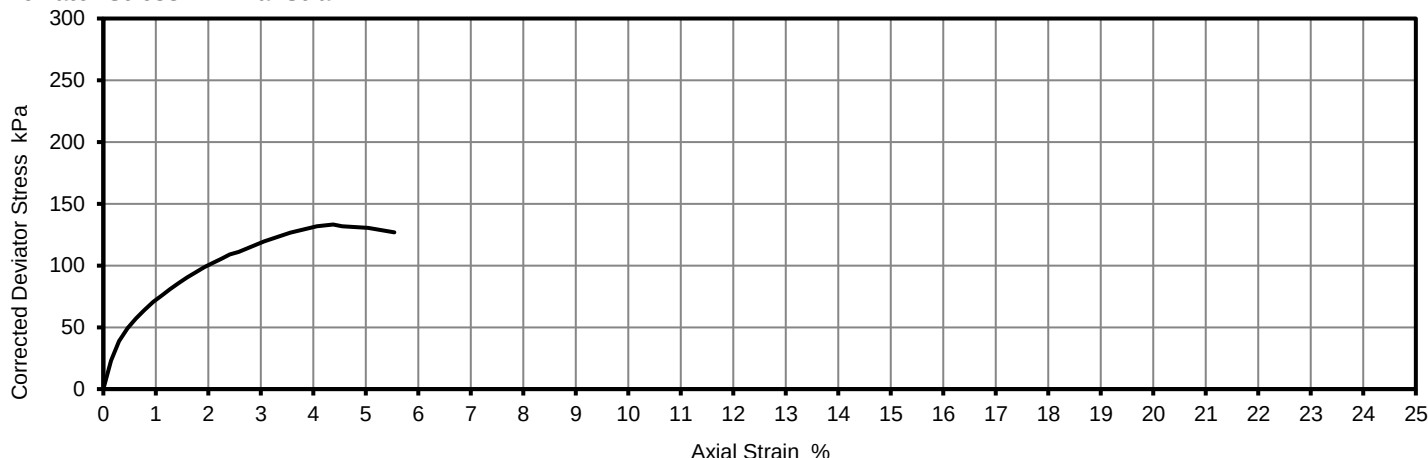
Depth Base [m]: 6.45

Sample Type: U

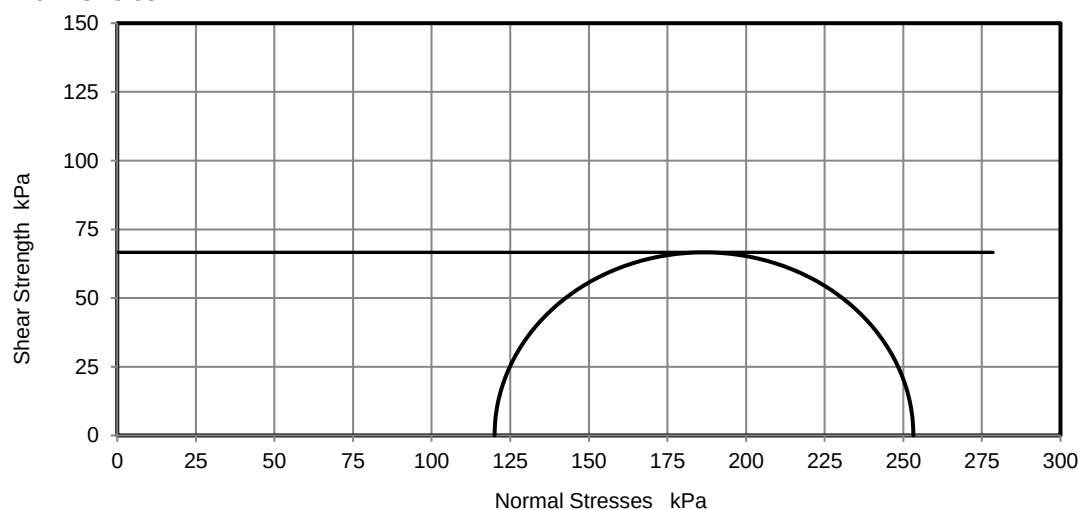
Test Number	1
Length	202.78 mm
Diameter	102.03 mm
Bulk Density	2.03 Mg/m ³
Moisture Content	29 %
Dry Density	1.57 Mg/m ³
Membrane Correction	0.34 kPa

Rate of Strain	1.97 %/min
Cell Pressure	120 kPa
Axial Strain at failure	4.4 %
Deviator Stress, ($\sigma_1 - \sigma_3$) _f	133 kPa
Undrained Shear Strength, c_u	67 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)_f$
Mode of Failure	Brittle
Membrane thickness	0.29 mm

Deviator Stress v Axial Strain



Mohr Circles



Position within sample



Note: Deviator stress corrected for area change and membrane effects. Mohr circles and their interpretation is not covered by BS1377.
This is provided for information only.

Remarks:

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Monika Siewior
Reporting Specialist
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TEST CERTIFICATE

DETERMINATION OF THE UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITHOUT MEASUREMENT OF PORE PRESSURE

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Tested in Accordance with: BS 1377-7: 1990: Clause 8

Client: BWB Consulting Limited
Client Address: Whitehall Waterfront, 2 Riverside Way,
Leeds, LS1 4EH

Contact: Mike Harper
Site Address: Plot P, Kingsway Bus. Park

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 210939
Job Number: 22-81413
Date Sampled: Not Given
Date Received: 05/08/2022
Date Tested: 07/09/2022
Sampled By: Not Given

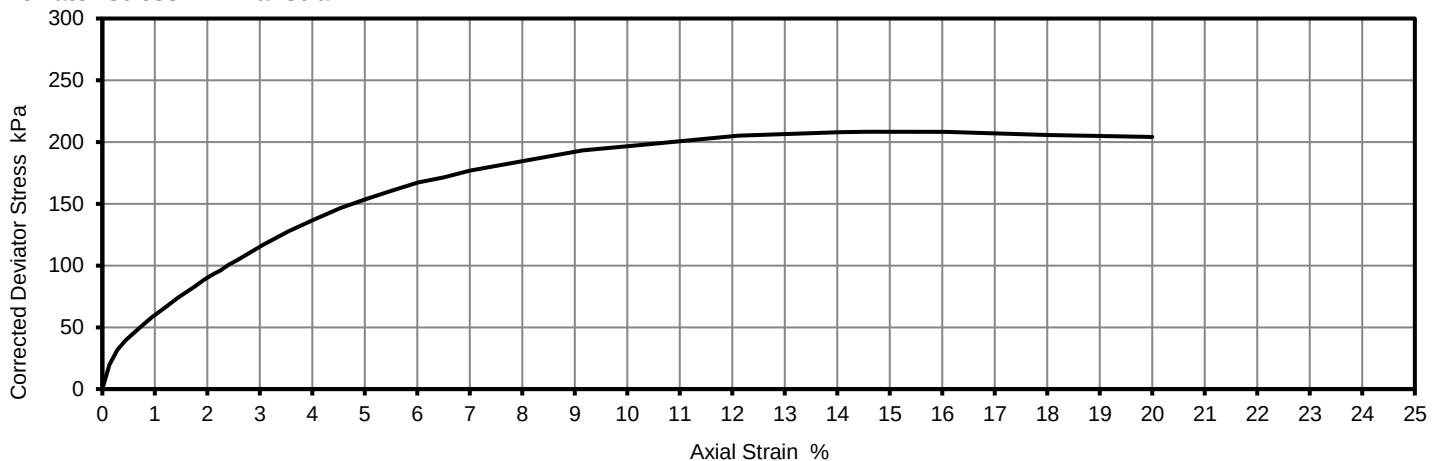
Test Results:

Laboratory Reference: 2409107
Hole No.: BH04
Sample Reference: Not Given
Sample Description: Brown slightly gravelly slightly sandy CLAY
Sample Preparation: Sample prepared in accordance with BS 1377-1:2016 Clause 9.1.1.

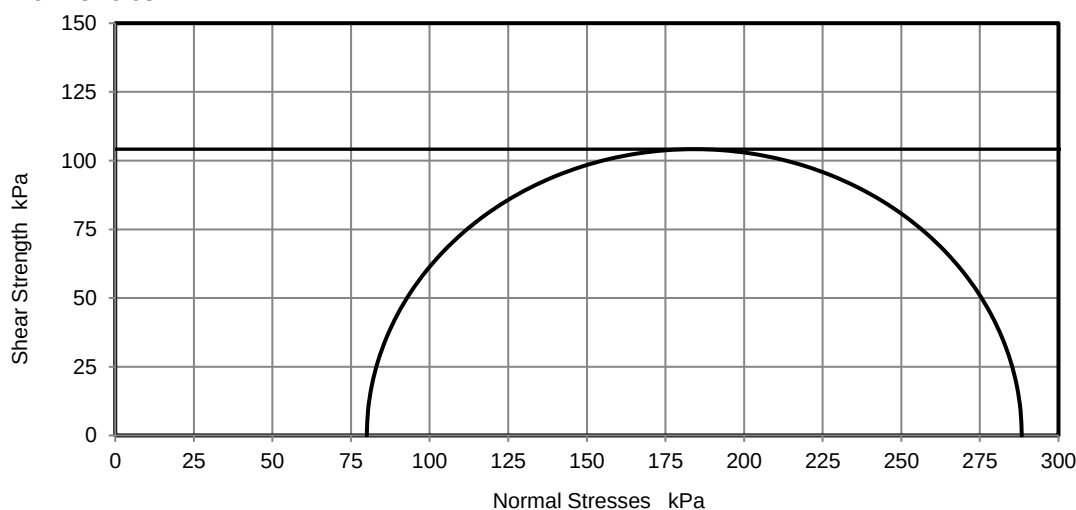
Depth Top [m]: 4.00
Depth Base [m]: 4.45
Sample Type: U

Test Number	1	Rate of Strain	1.97	%/min
Length	203.42	Cell Pressure	80	kPa
Diameter	103.62	Axial Strain at failure	14.6	%
Bulk Density	2.08	Deviator Stress, ($\sigma_1 - \sigma_3$) _f	208	kPa
Moisture Content	15	Undrained Shear Strength, c_u	104	kPa $\frac{1}{2}(\sigma_1 - \sigma_3)_f$
Dry Density	1.80	Mode of Failure	Compound	
Membrane Correction	0.74	Membrane thickness	0.26	mm

Deviator Stress v Axial Strain



Mohr Circles



Position within sample



Note: Deviator stress corrected for area change and membrane effects. Mohr circles and their interpretation is not covered by BS1377.
This is provided for information only.

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Signed:

Monika Siewior

Page 1 of 1

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 15/09/2022

GF 184.12

4041

Tested in Accordance with: BS 1377-7: 1990: Clause 8

Client: BWB Consulting Limited
Client Address: Whitehall Waterfront, 2 Riverside Way,
Leeds, LS1 4EH

Contact: Mike Harper
Site Address: Plot P, Kingsway Bus. Park

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 210939
Job Number: 22-81413
Date Sampled: Not Given
Date Received: 05/08/2022
Date Tested: 07/09/2022
Sampled By: Not Given

Test Results:

Laboratory Reference: 2409112

Hole No.: BH05

Sample Reference: Not Given

Sample Description: Brown slightly sandy CLAY

Sample Preparation: Sample prepared in accordance with BS 1377-1:2016 Clause 9.1.1.

Depth Top [m]: 4.00

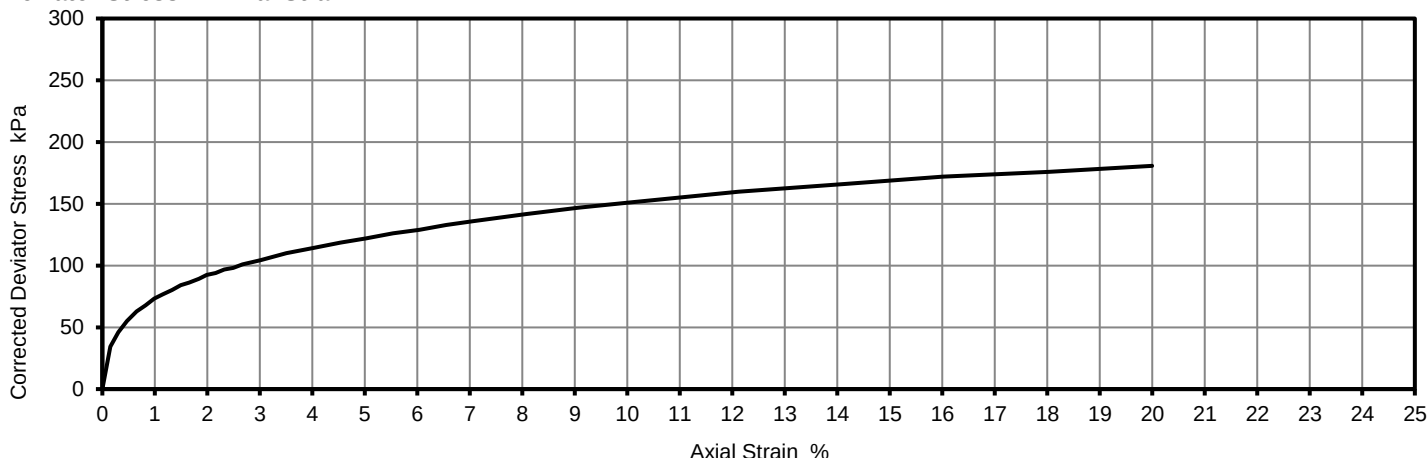
Depth Base [m]: 4.45

Sample Type: D

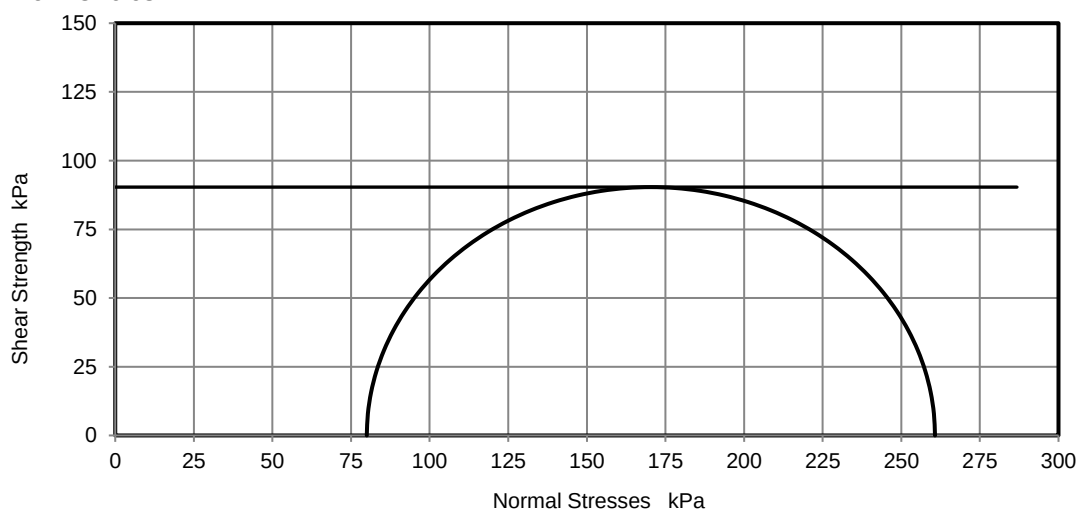
Test Number	1
Length	139.83 mm
Diameter	69.03 mm
Bulk Density	2.11 Mg/m ³
Moisture Content	23 %
Dry Density	1.71 Mg/m ³
Membrane Correction	1.39 kPa

Rate of Strain	2.00 %/min
Cell Pressure	80 kPa
Axial Strain at failure	20.0 %
Deviator Stress, ($\sigma_1 - \sigma_3$) _f	181 kPa
Undrained Shear Strength, c_u	90 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)_f$
Mode of Failure	Compound
Membrane thickness	0.25 mm

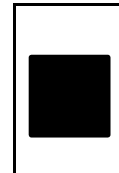
Deviator Stress v Axial Strain



Mohr Circles



Position within sample



Note: Deviator stress corrected for area change and membrane effects. Mohr circles and their interpretation is not covered by BS1377.
This is provided for information only.

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Signed:

Monika Siewior

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd

TEST CERTIFICATE

DETERMINATION OF THE UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITHOUT MEASUREMENT OF PORE PRESSURE

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Tested in Accordance with: BS 1377-7: 1990: Clause 8

Client: BWB Consulting Limited
Client Address: Whitehall Waterfront, 2 Riverside Way,
Leeds, LS1 4EH

Contact: Mike Harper
Site Address: Plot P, Kingsway Bus. Park

Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 210939
Job Number: 22-81413
Date Sampled: Not Given
Date Received: 05/08/2022
Date Tested: 07/09/2022
Sampled By: Not Given

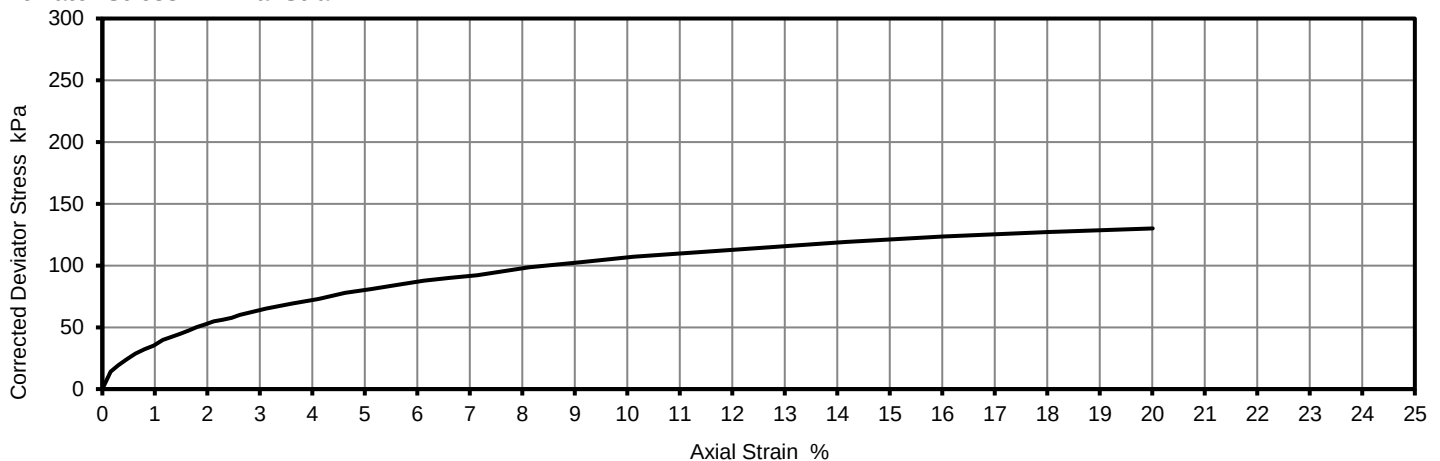
Test Results:

Laboratory Reference: 2409113
Hole No.: BH05
Sample Reference: Not Given
Sample Description: Brown slightly sandy CLAY
Sample Preparation: Sample prepared in accordance with BS 1377-1:2016 Clause 9.1.1.

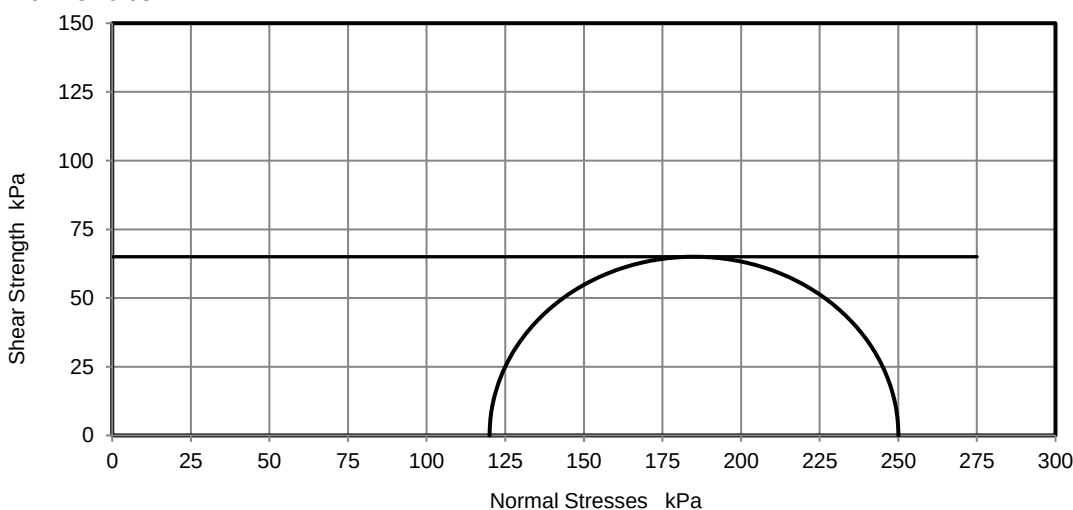
Depth Top [m]: 6.00
Depth Base [m]: 6.45
Sample Type: U

Test Number	1	Rate of Strain	2.00	%/min
Length	140.65	Cell Pressure	120	kPa
Diameter	69.44	Axial Strain at failure	20.0	%
Bulk Density	2.10	Deviator Stress, ($\sigma_1 - \sigma_3$) _f	130	kPa
Moisture Content	22	Undrained Shear Strength, c_u	65	kPa $\frac{1}{2}(\sigma_1 - \sigma_3)_f$
Dry Density	1.72	Mode of Failure	Compound	
Membrane Correction	1.33	Membrane thickness	0.24	mm

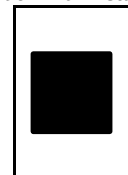
Deviator Stress v Axial Strain



Mohr Circles



Position within sample



Note: Deviator stress corrected for area change and membrane effects. Mohr circles and their interpretation is not covered by BS1377.
This is provided for information only.

Remarks:

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Signed:

Monika Siewior

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd



DETERMINATION OF THE ONE-DIMENSIONAL CONSOLIDATION PROPERTIES

Tested in Accordance with: BS 1377-5:1990: Clause 3

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Client: BWB Consulting Limited

Client Address: Whitehall Waterfront, 2 Riverside Way,
Leeds, LS1 4EH

Contact: Mike Harper
Site Address: Plot P, Kingsway Bus. Park

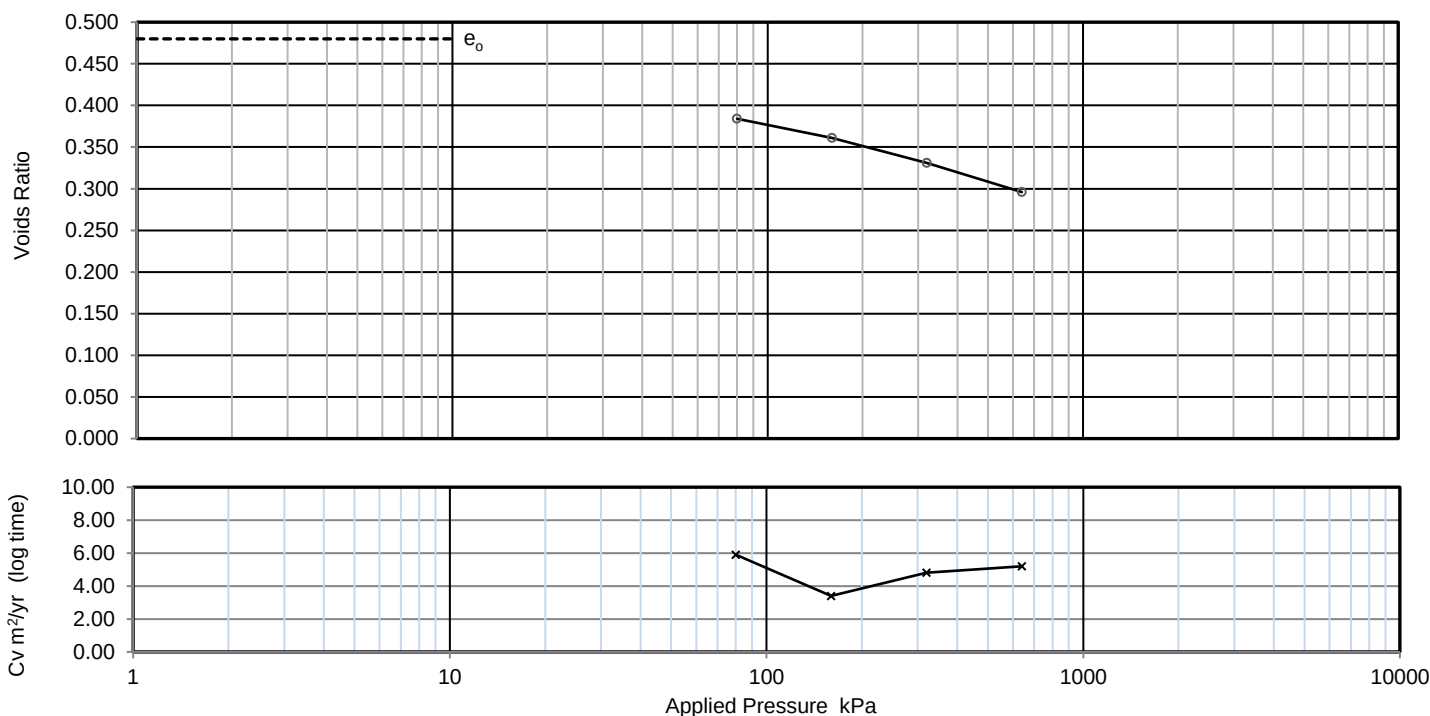
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 210939
Job Number: 22-81413
Date Sampled: Not Given
Date Received: 05/08/2022
Date Tested: 08/09/2022
Sampled By: Not Given

Test Results:

Laboratory Reference: 2409102
Hole No.: BH03
Sample Reference: Not Given
Sample Description: Brown slightly gravelly slightly silty CLAY

Depth Top [m]: 4.00
Depth Base [m]: 4.50
Sample Type: B

[illegible]

Preparation

Carried out on top of U100

Index tests

Orientation of the sample

Particle density

Liquid limit

Plastic limit

Vertical		
assumed	2.65	Mg/m3
N/A		%
N/A		%

Specimen details

Diameter

Height

Moisture Content

Bulk density

Dry density

Voids Ratio

Saturation

Ava. tempe

Swelling Pressure

Settlement on saturation

Total test time

Total test time

Initial	Final	
50.05	-	mm
20.04	17.55	mm
18	14	%
2.11	2.33	Mg/m ³
1.79	2.05	Mg/m ³
0.480	0.296	
98	123	%
22.0		°C
Not measured		kPa
		%
4		days

Note: C_v corrected to 20°C

Remarks:

Signed:

Monika
Siewior

Monika Siewior
Reporting Specialist

for and on behalf of i2 Analytical Ltd

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DETERMINATION OF THE ONE-DIMENSIONAL CONSOLIDATION PROPERTIES

Tested in Accordance with: BS 1377-5:1990: Clause 3

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Client: BWB Consulting Limited

Client Address: Whitehall Waterfront, 2 Riverside Way,
Leeds, LS1 4EH

Contact: Mike Harper
Site Address: Plot P, Kingsway Bus. Park

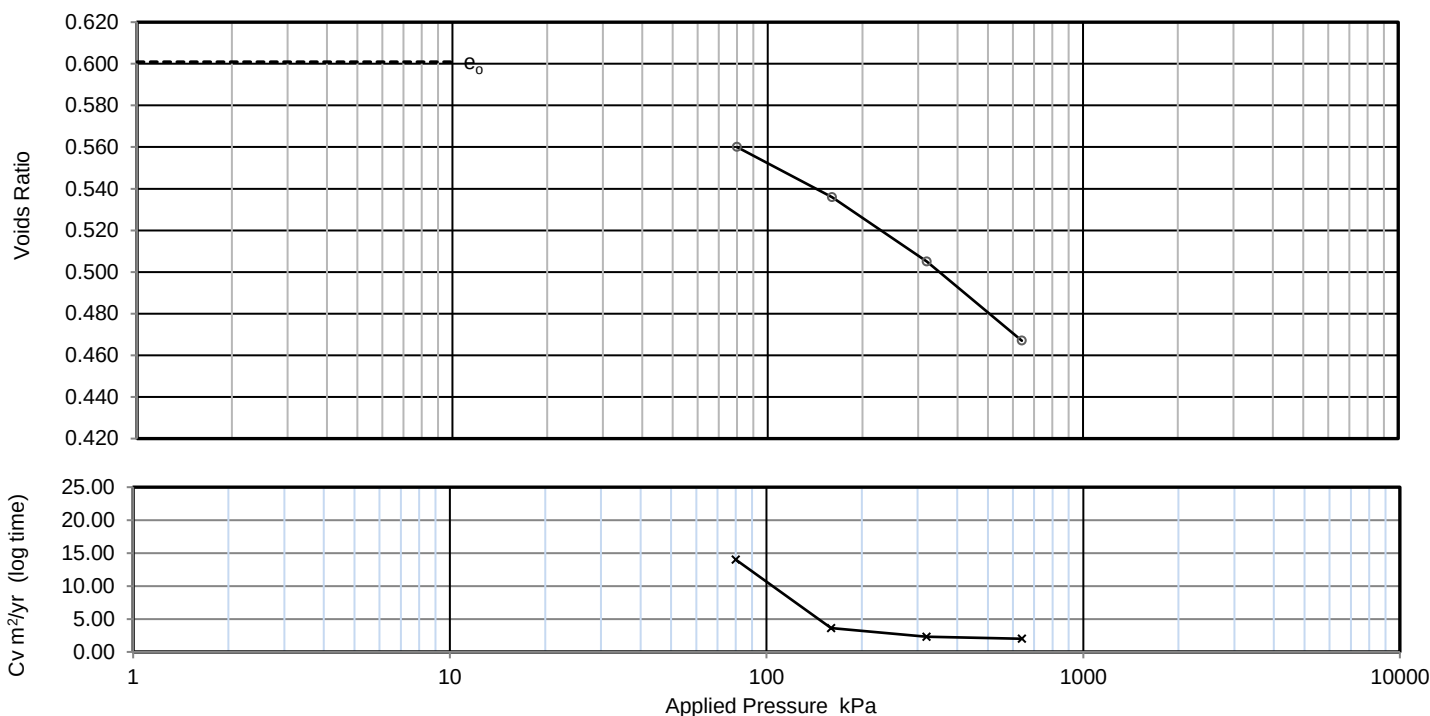
Testing carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland

Client Reference: 210939
Job Number: 22-81413
Date Sampled: Not Given
Date Received: 05/08/2022
Date Tested: 08/09/2022
Sampled By: Not Given

Test Results:

Laboratory Reference: 2409112
Hole No.: BH05
Sample Reference: Not Given
Sample Description: Brown slightly sandy CLAY

Depth Top [m]: 4.00
Depth Base [m]: 4.45
Sample Type: D

[illegible]

Preparation

Carried out on top of U100

Index tests

Orientation of the sample

Particle density

Liquid limit

Plastic limit

Vertical		
assumed	2.65	Mg/m3
N/A		%
N/A		%

Specimen details

Diameter

Height

Moistur

Bulk density

Dry density

Voids Ratio

Saturation

Avg. temperature for test

Swelling Pressure

Settlement on saturation

Total test time

Initial	Final	
50.04	-	mm
20.16	18.48	mm
22	21	%
2.03	2.18	Mg/m ³
1.66	1.81	Mg/m ³
0.601	0.467	
99	119	%
22.0		°C
Not measured		kPa
4		days

Note: Cv corrected to 20°C

Remarks:

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Signed:

Monika
Siewior

Monika Siewior
Reporting Specialist

for and on behalf of i2 Analytical Ltd

Mike Harper
BWB Consulting Limited
Whitehall Waterfront
2 Riverside Way
Leeds
LS1 4EH

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

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

e: mike.harper@bwbconsulting.com

Analytical Report Number : 22-81416

Project / Site name:	Plot P, Kingsway Bus. Park	Samples received on:	05/08/2022
Your job number:	210939	Samples instructed on/ Analysis started on:	01/09/2022
Your order number:	2412	Analysis completed by:	09/09/2022
Report Issue Number:	1	Report issued on:	09/09/2022
Samples Analysed:	8 soil samples		

Signed:

Izabela Wójcik
Izabela Wójcik
Reporting Specialist
For & on behalf of i2 Analytical Ltd.

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

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

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

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

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

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

Analytical Report Number: 22-81416

Project / Site name: Plot P, Kingsway Bus. Park

Your Order No: 2412

Lab Sample Number				2409118	2409119	2409120	2409121	2409122
Sample Reference				TP101	TP103	TP110	TP112	TP114
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				1.00-1.00	0.50-0.50	3.60-3.60	0.50-0.50	2.30-2.30
Date Sampled				Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	15	13	12	12	17
Total mass of sample received	kg	0.001	NONE	0.5	0.5	0.5	0.5	0.5

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.8	7.5	7.6	7.9	7.8
Total Sulphate as SO ₄	%	0.005	MCERTS	0.124	0.024	0.019	0.065	0.01
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.046	0.0073	0.029	0.29	0.021
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	45.6	7.3	29.1	291	20.7
Total Sulphur	%	0.005	MCERTS	0.149	0.022	0.062	0.052	0.036

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

Analytical Report Number: 22-81416

Project / Site name: Plot P, Kingsway Bus. Park

Your Order No: 2412

Lab Sample Number				2409123	2409124	2409125
Sample Reference				TP116	TP120	BH03
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				1.80-1.80	1.10-1.10	6.50-6.50
Date Sampled				Deviating	Deviating	Deviating
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status			
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	25	17	19
Total mass of sample received	kg	0.001	NONE	0.5	0.5	0.5

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.3	7.3	8.4
Total Sulphate as SO ₄	%	0.005	MCERTS	0.016	0.014	0.013
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.027	0.0052	0.013
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	27	5.2	12.6
Total Sulphur	%	0.005	MCERTS	0.01	0.014	0.019

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

Analytical Report Number : 22-81416

Project / Site name: Plot P, Kingsway Bus. Park

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

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

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2409118	TP101	None Supplied	1.00-1.00	Brown loam and sand with gravel and vegetation.
2409119	TP103	None Supplied	0.50-0.50	Brown loam and sand with gravel and vegetation.
2409120	TP110	None Supplied	3.60-3.60	Brown clay.
2409121	TP112	None Supplied	0.50-0.50	Brown clay.
2409122	TP114	None Supplied	2.30-2.30	Brown sand.
2409123	TP116	None Supplied	1.80-1.80	Brown clay and sand.
2409124	TP120	None Supplied	1.10-1.10	Brown clay.
2409125	BH03	None Supplied	6.50-6.50	Brown clay.

Analytical Report Number : 22-81416

Project / Site name: Plot P, Kingsway Bus. Park

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphate in soil as %	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total Sulphur in soil as %	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS

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

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

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

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Sample Deviation Report



Analytical Report Number : 22-81416

Project / Site name: Plot P, Kingsway Bus. Park

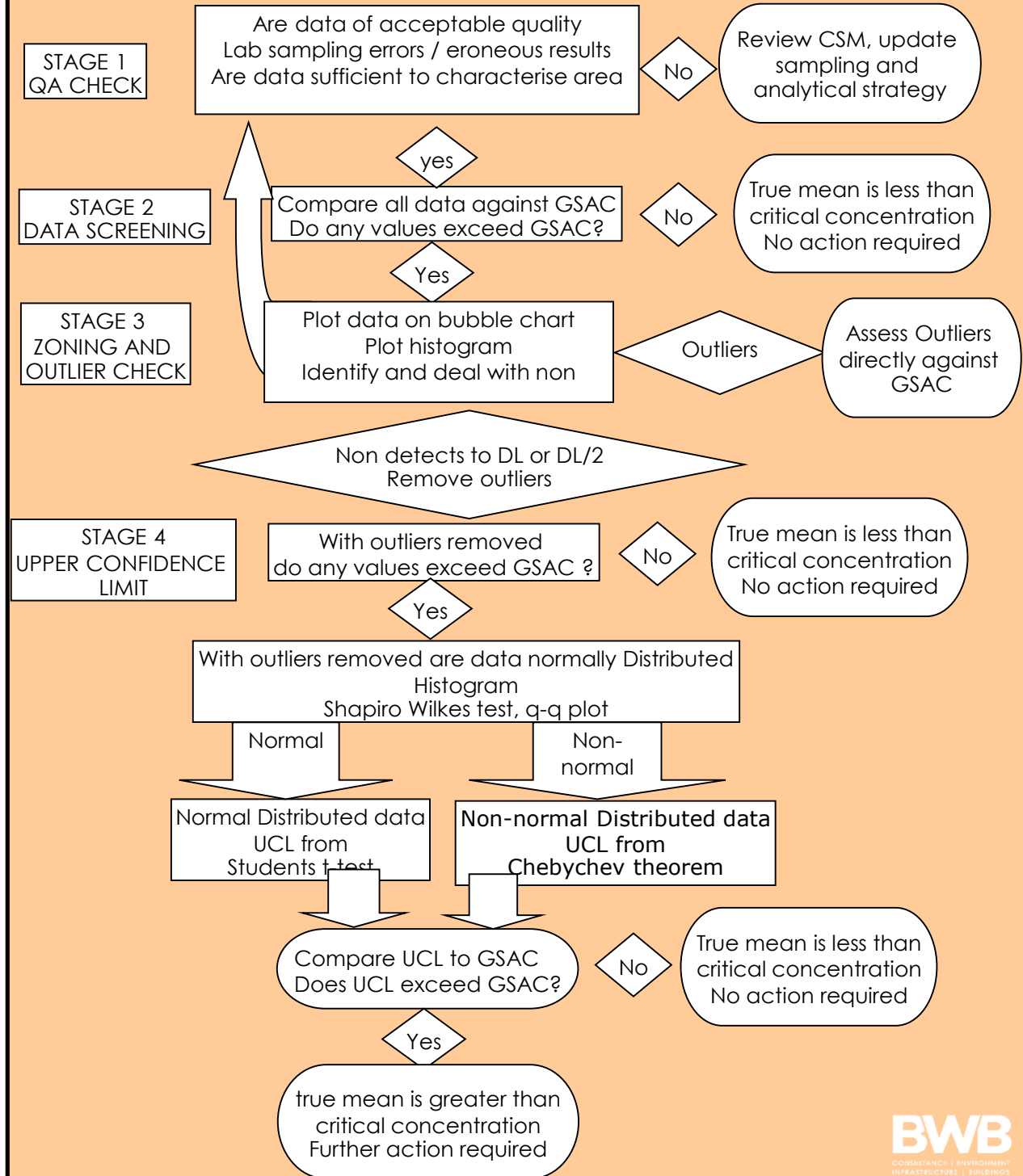
This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis. Please note that the associated result(s) may be unreliable and should be interpreted with care.

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
BH03	None Supplied	S	2409125	a	None Supplied	None Supplied	None Supplied
TP101	None Supplied	S	2409118	a	None Supplied	None Supplied	None Supplied
TP103	None Supplied	S	2409119	a	None Supplied	None Supplied	None Supplied
TP110	None Supplied	S	2409120	a	None Supplied	None Supplied	None Supplied
TP112	None Supplied	S	2409121	a	None Supplied	None Supplied	None Supplied
TP114	None Supplied	S	2409122	a	None Supplied	None Supplied	None Supplied
TP116	None Supplied	S	2409123	a	None Supplied	None Supplied	None Supplied
TP120	None Supplied	S	2409124	a	None Supplied	None Supplied	None Supplied

Appendix 8: CLEA Assessment Worksheets

STATISTICAL APPROACH FOR ASSESSING RISK TO HUMAN HEALTH FROM CONTAMINATED LAND 2008

CIEH/CLAIRE Guidance on Comparing Soil Contamination Data with a Critical Concentration May 2008



Human Health Generic QRA Worksheet



**Job Name: Plot P, Kingsway Business Park
Rochdale**

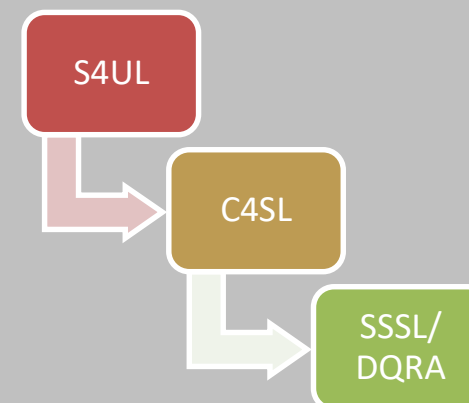
Job Number: 2100939

description: The site is located on a collection of fields, immediately south of Kingsway Business Park tram station in Rochdale, OL16 4JN. The proposed development is anticipated to comprise a commercial and/or warehouse use with associated infrastructure.

Define CSM – Is site represented by a standard land use?

Residential with / without homegrown produce
Commercial / Industrial
Public Open Space - Residential (S4UL/C4SL only)
Public Open Space - Park (S4UL/C4SL only)

GSAC Hierarchy



GSAC Type (BWB, LQM S4UL, C4SL, Bespoke)	LQM_CIEH_S4UL
Key Receptor/CSM (Residential/Commercial/POS)	S4UL Commercial
Organic Matter % (If unknown use 1%)	1

Generic Assessment Criteria

Job Name: Plot P, Kingsway Business ParkRochdal S4UL Commercial

Job Number: 2100939



	mg/kg	Source
Arsenic	6.40E+02	LQM_CIEH_S4UL
Barium	2.21E+04	LQM_CIEH_S4UL
Beryllium	1.20E+01	LQM_CIEH_S4UL
Boron	2.40E+05	LQM_CIEH_S4UL
Cadmium	1.90E+02	LQM_CIEH_S4UL
Chromium VI	3.30E+01	LQM_CIEH_S4UL
Chromium III	8.60E+03	LQM_CIEH_S4UL
Copper	6.80E+04	LQM_CIEH_S4UL
Lead*	2.33E+03	DEFRA_C4SL
Inorganic Mercury	1.10E+03	LQM_CIEH_S4UL
Nickel	9.80E+02	LQM_CIEH_S4UL
Selenium	1.20E+04	LQM_CIEH_S4UL
Vanadium	9.00E+03	LQM_CIEH_S4UL
Zinc	7.30E+05	LQM_CIEH_S4UL
Cyanide (Free)	4.30E+01	BWB
Cyanide (Complex)	2.13E+02	BWB
Phenols (Total)	4.40E+02	LQM_CIEH_S4UL
Benzene	2.70E+01	LQM_CIEH_S4UL
Toluene	5.60E+04	LQM_CIEH_S4UL
Ethyl benzene	5.70E+03	LQM_CIEH_S4UL
Total Xylene	5.90E+03	LQM_CIEH_S4UL
TPH (EC5-6) aliphatic	3.20E+03	LQM_CIEH_S4UL
TPH (>EC6-8) aliphatic	7.80E+03	LQM_CIEH_S4UL
TPH (>EC8-10) aliphatic	2.00E+03	LQM_CIEH_S4UL
TPH (>EC10-12) aliphatic	9.70E+03	LQM_CIEH_S4UL
TPH (>EC12-16) aliphatic	5.90E+04	LQM_CIEH_S4UL
TPH (>EC16-21) aliphatic	1.60E+06	LQM_CIEH_S4UL
TPH (>EC21-35) aliphatic	1.60E+06	LQM_CIEH_S4UL
TPH (>EC35-44) aliphatic	1.60E+06	LQM_CIEH_S4UL
TPH (>EC6-7) aromatic (benzene)	2.60E+04	LQM_CIEH_S4UL
TPH (>EC7-8) aromatic (toluene)	5.60E+04	LQM_CIEH_S4UL
TPH (>EC8-10) aromatic	3.50E+03	LQM_CIEH_S4UL
TPH (>EC10-12) aromatic	1.60E+04	LQM_CIEH_S4UL
TPH (>EC12-16) aromatic	3.60E+04	LQM_CIEH_S4UL
TPH (>EC16-21) aromatic	2.80E+04	LQM_CIEH_S4UL
TPH (>EC21-35) aromatic	2.80E+04	LQM_CIEH_S4UL
TPH (>EC35-44) aromatic	2.80E+04	LQM_CIEH_S4UL
Total TPH	5.00E+02	LQM_CIEH_S4UL
Naphthalene	1.90E+02	LQM_CIEH_S4UL
Acenaphthylene	8.30E+04	LQM_CIEH_S4UL
Acenaphthene	8.40E+04	LQM_CIEH_S4UL
Fluorene	6.30E+04	LQM_CIEH_S4UL
Phenanthrene	2.20E+04	LQM_CIEH_S4UL
Anthracene	5.20E+05	LQM_CIEH_S4UL
Fluoranthene	2.30E+04	LQM_CIEH_S4UL
Pyrene	5.40E+04	LQM_CIEH_S4UL
Benzo(a)anthracene	1.70E+02	LQM_CIEH_S4UL
Chrysene	3.50E+02	LQM_CIEH_S4UL
Benzo(b)fluoranthene	4.40E+01	LQM_CIEH_S4UL
Benzo(k)fluoranthene	1.20E+03	LQM_CIEH_S4UL
Benzo(a)pyrene	3.50E+01	LQM_CIEH_S4UL
Indeno(1,2,3-c,d)pyrene	5.00E+02	LQM_CIEH_S4UL

Generic Assessment Criteria

Job Name: Plot P, Kingsway Business ParkRochdal S4UL Commercial

Job Number: 2100939



	mg/kg	Source
Dibenzo(a,h)anthracene	3.50E+00	LQM_CIEH_S4UL
Benzo(g,hi)perylene	3.90E+03	LQM_CIEH_S4UL
Coal Tar (B(a)P as surrogate marker	1.50E+01	LQM_CIEH_S4UL
Tetrachloroethene (PCE)	1.90E+01	LQM_CIEH_S4UL
Trichloroethene (TCE)	1.20E+00	LQM_CIEH_S4UL
cis -1,2-Dichloroethene	1.40E+01	LQM_CIEH_S4UL
Vinyl Chloride (VC)	5.90E-02	LQM_CIEH_S4UL
1,1,2,2-Tetrachloroethane (PCA)	2.70E+02	LQM_CIEH_S4UL
1,1,1-Trichloroethane (TCA)	6.60E+02	LQM_CIEH_S4UL
1,2-Dichloroethane	6.70E-01	LQM_CIEH_S4UL
Carbon Tetrachloride	2.90E+00	LQM_CIEH_S4UL
Carbon disulphide	1.10E+01	LQM_CIEH_S4UL

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[illegible]

Determinand	Number of tests	Range (mg/kg)	S4UL Commercial GSAC (m	Detection Limit (mg/kg)	Min	Max	No. of Exceedances	No. Non detects	< or not
Arsenic	8	3.5 to 52	6.40E+02	1	3.5	52	0	0	
Barium	8	21 to 560	2.21E+04	1	21	560	0	0	
Beryllium	8	0.33 to 2.6	1.20E+01	0.06	0.33	2.6	0	0	
Boron	8	<0.2 to 3.8	2.40E+05	0.2	0.2	3.8	0	3	<
Cadmium	8	<0.2 to 0.2	1.90E+02	0.2	0.2	0.2	0	8	<
Chromium VI	8	<1.8 to 3.3	3.30E+01	1.8	1.8	3.3	0	7	<
Chromium III	8	7.9 to 31	8.60E+03	1	7.9	31	0	0	
Copper	8	9.8 to 140	6.80E+04	1	9.8	140	0	0	
Lead*	8	6.1 to 270	2.33E+03	1	6.1	270	0	0	
Inorganic Mercury	8	<0.3 to 0.3	1.10E+03	0.3	0.3	0.3	0	8	<
Nickel	8	9 to 55	9.80E+02	1	9	55	0	0	
Selenium	8	<1 to 1.1	1.20E+04	1	1	1.1	0	7	<
Vanadium	8	8.2 to 83	9.00E+03	1	8.2	83	0	0	
Zinc	8	26 to 81	7.30E+05	1	26	81	0	0	
Cyanide (Free)	8	<1 to 1	4.30E+01	1	1	1	0	8	<
Cyanide (Complex)	8	<1 to 19	2.13E+02	1	1	19	0	7	<
Phenols (Total)	8	<1 to 1	4.40E+02	1	1	1	0	8	<
Benzene	3	<0.001 to 0.001	2.70E+01	0.001	0.001	0.001	0	3	<
Toluene	3	<0.001 to 0.001	5.60E+04	0.001	0.001	0.001	0	3	<
Ethyl benzene	3	<0.001 to 0.001	5.70E+03	0.001	0.001	0.001	0	3	<
Total Xylene	3	0.002 to 0.002	5.90E+03	0.001	0.002	0.002	0	0	
TPH (EC5-6) aliphatic	3	<0.001 to 0.001	3.20E+03	0	0.001	0.001	0	197	<
TPH (>EC6-8) aliphatic	3	<0.001 to 0.001	7.80E+03	0	0.001	0.001	0	197	<
TPH (>EC8-10) aliphatic	3	<0.001 to 0.001	2.00E+03	0	0.001	0.001	0	197	<
TPH (>EC10-12) aliphatic	3	<1 to 1	9.70E+03	0	1	1	0	197	<
TPH (>EC12-16) aliphatic	3	<2 to 2	5.90E+04	0	2	2	0	197	<
TPH (>EC16-21) aliphatic	3	<8 to 8	1.60E+06	0	8	8	0	197	<
TPH (>EC21-35) aliphatic	3	<8 to 8	1.60E+06	0	8	8	0	197	<
TPH (>EC35-44) aliphatic	0	<0 to 0	1.60E+06	0	0	0	0	197	<
TPH (>EC6-7) aromatic (benzene)	3	<0.001 to 0.001	2.60E+04	0	0.001	0.001	0	197	<
TPH (>EC7-8) aromatic (toluene)	0	<0 to 0	5.60E+04	0	0	0	0	200	<
TPH (>EC8-10) aromatic	3	<0.001 to 0.001	3.50E+03	0	0.001	0.001	0	197	<
TPH (>EC10-12) aromatic	3	<1 to 1	1.60E+04	0	1	1	0	197	<
TPH (>EC12-16) aromatic	0	<0 to 0	3.60E+04	0	0	0	0	200	<
TPH (>EC16-21) aromatic	3	<10 to 14	2.80E+04	0	10	14	0	197	<
TPH (>EC21-35) aromatic	3	<10 to 25	2.80E+04	0	10	25	0	197	<
TPH (>EC35-44) aromatic	0	<0 to 0	2.80E+04	0	0	0	0	200	<
Total TPH	0	<0 to 0	5.00E+02	0	0	0	0	200	<
Naphthalene	8	<0.05 to 0.05	1.90E+02	0	0.05	0.05	0	192	<
Acenaphthylene	8	<0.05 to 0.05	8.30E+04	0	0.05	0.05	0	192	<
Acenaphthene	8	<0.05 to 0.4	8.40E+04	0	0.05	0.4	0	192	<
Fluorene	8	<0.05 to 0.3	6.30E+04	0	0.05	0.3	0	192	<
Phenanthrene	8	<0.05 to 3.5	2.20E+04	0	0.05	3.5	0	192	<
Anthracene	8	<0.05 to 0.98	5.20E+05	0	0.05	0.98	0	192	<
Fluoranthene	8	<0.05 to 5.7	2.30E+04	0	0.05	5.7	0	192	<
Pyrene	8	<0.05 to 4.9	5.40E+04	0	0.05	4.9	0	192	<
Benzo(a)anthracene	8	<0.05 to 4.1	1.70E+02	0	0.05	4.1	0	192	<
Chrysene	8	<0.05 to 2.7	3.50E+02	0	0.05	2.7	0	192	<
Benzo(b)fluoranthene	8	<0.05 to 3.5	4.40E+01	0	0.05	3.5	0	192	<
Benzo(k)fluoranthene	8	<0.05 to 1.9	1.20E+03	0	0.05	1.9	0	192	<
Benzo(a)pyrene	8	<0.05 to 3.6	3.50E+01	0	0.05	3.6	0	192	<
Indeno(1,2,3-c,d)pyrene	8	<0.05 to 2.2	5.00E+02	0	0.05	2.2	0	192	<
Dibenzo(a,h)anthracene	8	<0.05 to 0.54	3.50E+00	0	0.05	0.54	0	192	<
Benzo(g,h,i)perylene	8	<0.05 to 2.3	3.90E+03	0	0.05	2.3	0	192	<
Coal Tar (B(a)P as surrogate mark	8	<0.05 to 3.6	1.50E+01	0	0.05	3.6	0	192	<
Tetrachloroethene (PCE)	0	<0 to 0	1.90E+01	0	0	0	0	200	<
Trichloroethene (TCE)	0	<0 to 0	1.20E+00	0	0	0	0	200	<
cis-1,2-Dichloroethene	0	<0 to 0	1.40E+01	0	0	0	0	200	<
Vinyl Chloride (VC)	0	<0 to 0	5.90E-02	0	0	0	0	200	<
1,1,2,2-Tetrachloroethane (PCA)	0	<0 to 0	2.70E+02	0	0	0	0	200	<

Human Health Generic QRA Worksheet



**Job Name: Plot P, Kingsway Business Park
Rochdale**

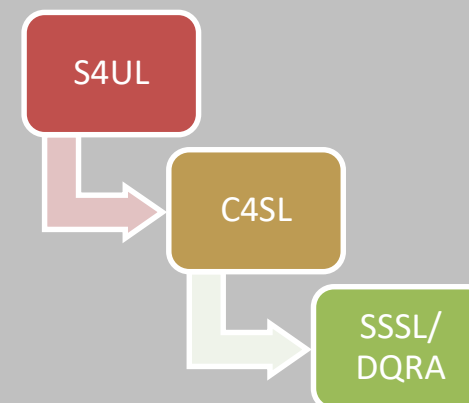
Job Number: 2100939

description: The site is located on a collection of fields, immediately south of Kingsway Business Park tram station in Rochdale, OL16 4JN. The proposed development is anticipated to comprise a commercial and/or warehouse use with associated infrastructure.

Define CSM – Is site represented by a standard land use?

Residential with / without homegrown produce
Commercial / Industrial
Public Open Space - Residential (S4UL/C4SL only)
Public Open Space - Park (S4UL/C4SL only)

GSAC Hierarchy



GSAC Type (BWB, LQM S4UL, C4SL, Bespoke)

LQM_CIEH_S4UL

Key Receptor/CSM (Residential/Commercial/POS)

S4UL Commercial

Organic Matter % (If unknown use 1%)

2.5

Generic Assessment Criteria

Job Name: Plot P, Kingsway Business ParkRochdal S4UL Commercial

Job Number: 2100939



	mg/kg	Source
Arsenic	6.40E+02	LQM_CIEH_S4UL
Barium	2.21E+04	LQM_CIEH_S4UL
Beryllium	1.20E+01	LQM_CIEH_S4UL
Boron	2.40E+05	LQM_CIEH_S4UL
Cadmium	1.90E+02	LQM_CIEH_S4UL
Chromium VI	3.30E+01	LQM_CIEH_S4UL
Chromium III	8.60E+03	LQM_CIEH_S4UL
Copper	6.80E+04	LQM_CIEH_S4UL
Lead*	2.33E+03	DEFRA_C4SL
Inorganic Mercury	1.10E+03	LQM_CIEH_S4UL
Nickel	9.80E+02	LQM_CIEH_S4UL
Selenium	1.20E+04	LQM_CIEH_S4UL
Vanadium	9.00E+03	LQM_CIEH_S4UL
Zinc	7.30E+05	LQM_CIEH_S4UL
Cyanide (Free)	4.30E+01	BWB
Cyanide (Complex)	2.13E+02	BWB
Phenols (Total)	6.90E+02	LQM_CIEH_S4UL
Benzene	4.70E+01	LQM_CIEH_S4UL
Toluene	1.10E+05	LQM_CIEH_S4UL
Ethyl benzene	1.30E+04	LQM_CIEH_S4UL
Total Xylene	1.40E+04	LQM_CIEH_S4UL
TPH (EC5-6) aliphatic	5.90E+03	LQM_CIEH_S4UL
TPH (>EC6-8) aliphatic	1.70E+04	LQM_CIEH_S4UL
TPH (>EC8-10) aliphatic	4.80E+03	LQM_CIEH_S4UL
TPH (>EC10-12) aliphatic	2.30E+04	LQM_CIEH_S4UL
TPH (>EC12-16) aliphatic	8.20E+04	LQM_CIEH_S4UL
TPH (>EC16-21) aliphatic	1.70E+06	LQM_CIEH_S4UL
TPH (>EC21-35) aliphatic	1.70E+06	LQM_CIEH_S4UL
TPH (>EC35-44) aliphatic	1.70E+06	LQM_CIEH_S4UL
TPH (>EC6-7) aromatic (benzene)	4.60E+04	LQM_CIEH_S4UL
TPH (>EC7-8) aromatic (toluene)	1.10E+05	LQM_CIEH_S4UL
TPH (>EC8-10) aromatic	8.10E+03	LQM_CIEH_S4UL
TPH (>EC10-12) aromatic	2.80E+04	LQM_CIEH_S4UL
TPH (>EC12-16) aromatic	3.70E+04	LQM_CIEH_S4UL
TPH (>EC16-21) aromatic	2.80E+04	LQM_CIEH_S4UL
TPH (>EC21-35) aromatic	2.80E+04	LQM_CIEH_S4UL
TPH (>EC35-44) aromatic	2.80E+04	LQM_CIEH_S4UL
Total TPH	5.00E+02	LQM_CIEH_S4UL
Naphthalene	4.60E+02	LQM_CIEH_S4UL
Acenaphthylene	9.70E+04	LQM_CIEH_S4UL
Acenaphthene	9.70E+04	LQM_CIEH_S4UL
Fluorene	6.80E+04	LQM_CIEH_S4UL
Phenanthrene	2.20E+04	LQM_CIEH_S4UL
Anthracene	5.40E+05	LQM_CIEH_S4UL
Fluoranthene	2.30E+04	LQM_CIEH_S4UL
Pyrene	5.40E+04	LQM_CIEH_S4UL
Benzo(a)anthracene	1.70E+02	LQM_CIEH_S4UL
Chrysene	3.50E+02	LQM_CIEH_S4UL
Benzo(b)fluoranthene	4.40E+01	LQM_CIEH_S4UL
Benzo(k)fluoranthene	1.20E+03	LQM_CIEH_S4UL
Benzo(a)pyrene	3.50E+01	LQM_CIEH_S4UL
Indeno(1,2,3-c,d)pyrene	5.10E+02	LQM_CIEH_S4UL

Generic Assessment Criteria

Job Name: Plot P, Kingsway Business ParkRochdal S4UL Commercial

Job Number: 2100939



	mg/kg	Source
Dibenzo(a,h)anthracene	3.60E+00	LQM_CIEH_S4UL
Benzo(g,hi)perylene	4.00E+03	LQM_CIEH_S4UL
Coal Tar (B(a)P as surrogate marker	1.50E+01	LQM_CIEH_S4UL
Tetrachloroethene (PCE)	4.20E+01	LQM_CIEH_S4UL
Trichloroethene (TCE)	2.60E+00	LQM_CIEH_S4UL
cis -1,2-Dichloroethene	2.40E+01	LQM_CIEH_S4UL
Vinyl Chloride (VC)	7.70E-02	LQM_CIEH_S4UL
1,1,2,2-Tetrachloroethane (PCA)	5.50E+02	LQM_CIEH_S4UL
1,1,1-Trichloroethane (TCA)	1.30E+03	LQM_CIEH_S4UL
1,2-Dichloroethane	9.70E-01	LQM_CIEH_S4UL
Carbon Tetrachloride	6.30E+00	LQM_CIEH_S4UL
Carbon disulphide	2.20E+01	LQM_CIEH_S4UL

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Determinand	Number of tests	Range (mg/kg)	S4UL Commercial	GSAC (m	Detection Limit (mg/kg)	Min	Max	No. of Exceedances	No. Non detects	< or not
Arsenic	8	3.5 to 52		6.40E+02	1	3.5	52	0	0	
Barium	8	21 to 560		2.21E+04	1	21	560	0	0	
Beryllium	8	0.33 to 2.6		1.20E+01	0.06	0.33	2.6	0	0	
Boron	8	<0.2 to 3.8		2.40E+05	0.2	0.2	3.8	0	3	<
Cadmium	8	<0.2 to 0.2		1.90E+02	0.2	0.2	0.2	0	8	<
Chromium VI	8	<1.8 to 3.3		3.30E+01	1.8	1.8	3.3	0	7	<
Chromium III	8	7.9 to 31		8.60E+03	1	7.9	31	0	0	
Copper	8	9.8 to 140		6.80E+04	1	9.8	140	0	0	
Lead*	8	6.1 to 270		2.33E+03	1	6.1	270	0	0	
Inorganic Mercury	8	<0.3 to 0.3		1.10E+03	0.3	0.3	0.3	0	8	<
Nickel	8	9 to 55		9.80E+02	1	9	55	0	0	
Selenium	8	<1 to 1.1		1.20E+04	1	1	1.1	0	7	<
Vanadium	8	8.2 to 83		9.00E+03	1	8.2	83	0	0	
Zinc	8	26 to 81		7.30E+05	1	26	81	0	0	
Cyanide (Free)	8	<1 to 1		4.30E+01	1	1	1	0	8	<
Cyanide (Complex)	8	<1 to 19		2.13E+02	1	1	19	0	7	<
Phenols (Total)	8	<1 to 1		6.90E+02	1	1	1	0	8	<
Benzene	3	<0.001 to 0.001		4.70E+01	0.001	0.001	0.001	0	3	<
Toluene	3	<0.001 to 0.001		1.10E+05	0.001	0.001	0.001	0	3	<
Ethyl benzene	3	<0.001 to 0.001		1.30E+04	0.001	0.001	0.001	0	3	<
Total Xylene	3	0.002 to 0.002		1.40E+04	0.001	0.002	0.002	0	0	
TPH (EC5-6) aliphatic	3	<0.001 to 0.001		5.90E+03	0	0.001	0.001	0	197	<
TPH (>EC6-8) aliphatic	3	<0.001 to 0.001		1.70E+04	0	0.001	0.001	0	197	<
TPH (>EC8-10) aliphatic	3	<0.001 to 0.001		4.80E+03	0	0.001	0.001	0	197	<
TPH (>EC10-12) aliphatic	3	<1 to 1		2.30E+04	0	1	1	0	197	<
TPH (>EC12-16) aliphatic	3	<2 to 2		8.20E+04	0	2	2	0	197	<
TPH (>EC16-21) aliphatic	3	<8 to 8		1.70E+06	0	8	8	0	197	<
TPH (>EC21-35) aliphatic	3	<8 to 8		1.70E+06	0	8	8	0	197	<
TPH (>EC35-44) aliphatic	0	<0 to 0		1.70E+06	0	0	0	0	197	<
TPH (>EC6-7) aromatic (benzene)	3	<0.001 to 0.001		4.60E+04	0	0.001	0.001	0	197	<
TPH (>EC7-8) aromatic (toluene)	0	<0 to 0		1.10E+05	0	0	0	0	200	<
TPH (>EC8-10) aromatic	3	<0.001 to 0.001		8.10E+03	0	0.001	0.001	0	197	<
TPH (>EC10-12) aromatic	3	<1 to 1		2.80E+04	0	1	1	0	197	<
TPH (>EC12-16) aromatic	0	<0 to 0		3.70E+04	0	0	0	0	200	<
TPH (>EC16-21) aromatic	3	<10 to 14		2.80E+04	0	10	14	0	197	<
TPH (>EC21-35) aromatic	3	<10 to 25		2.80E+04	0	10	25	0	197	<
TPH (>EC35-44) aromatic	0	<0 to 0		2.80E+04	0	0	0	0	200	<
Total TPH	0	<0 to 0		5.00E+02	0	0	0	0	200	<
Naphthalene	8	<0.05 to 0.05		4.60E+02	0	0.05	0.05	0	192	<
Acenaphthylene	8	<0.05 to 0.05		9.70E+04	0	0.05	0.05	0	192	<
Acenaphthene	8	<0.05 to 0.4		9.70E+04	0	0.05	0.4	0	192	<
Fluorene	8	<0.05 to 0.3		6.80E+04	0	0.05	0.3	0	192	<
Phenanthrene	8	<0.05 to 3.5		2.20E+04	0	0.05	3.5	0	192	<
Anthracene	8	<0.05 to 0.98		5.40E+05	0	0.05	0.98	0	192	<
Fluoranthene	8	<0.05 to 5.7		2.30E+04	0	0.05	5.7	0	192	<
Pyrene	8	<0.05 to 4.9		5.40E+04	0	0.05	4.9	0	192	<
Benzo(a)anthracene	8	<0.05 to 4.1		1.70E+02	0	0.05	4.1	0	192	<
Chrysene	8	<0.05 to 2.7		3.50E+02	0	0.05	2.7	0	192	<
Benzo(b)fluoranthene	8	<0.05 to 3.5		4.40E+01	0	0.05	3.5	0	192	<
Benzo(k)fluoranthene	8	<0.05 to 1.9		1.20E+03	0	0.05	1.9	0	192	<
Benzo(a)pyrene	8	<0.05 to 3.6		3.50E+01	0	0.05	3.6	0	192	<
Indeno(1,2,3-c,d)pyrene	8	<0.05 to 2.2		5.10E+02	0	0.05	2.2	0	192	<
Dibenzo(a,h)anthracene	8	<0.05 to 0.54		3.60E+00	0	0.05	0.54	0	192	<
Benzo(g,h,i)perylene	8	<0.05 to 2.3		4.00E+03	0	0.05	2.3	0	192	<
Coal Tar (B(a)P as surrogate mark	8	<0.05 to 3.6		1.50E+01	0	0.05	3.6	0	192	<
Tetrachloroethene (PCE)	0	<0 to 0		4.20E+01	0	0	0	0	200	<
Trichloroethene (TCE)	0	<0 to 0		2.60E+00	0	0	0	0	200	<
cis-1,2-Dichloroethene	0	<0 to 0		2.40E+01	0	0	0	0	200	<
Vinyl Chloride (VC)	0	<0 to 0		7.70E-02	0	0	0	0	200	<
1,1,2,2-Tetrachloroethane (PCA)	0	<0 to 0		5.50E+02	0	0	0	0	200	<

Appendix 9: Leachate Screening Worksheets

*EQS Standard: Phenol and Benzene annual average of 300µg/l; Toluene 500µg/l for Freshwater, 400µg/l for Saltwater; 1,1,1-TCA 1,000µg/l.

Project Name:	Plot P
Project Number:	210939
Assessment for:	Soil Leachate Assessment
Laboratory:	i2
Receptor:	Drinking Water
Receptor Water Hardness:	>200



100 = Assessment Criteria Exceedance)
50 = M-BAT Bioavailability Assessment Required

Contaminant		Units	Detection Limit	Guideline Concentration	Source	Number of Samples	Min	Max	No of Exceedences	TP104	TP113	TP101			
										0.30	0.30	0.30			
Heavy Metals	Arsenic	µg/l	1	10	UK DWS	2	2.70	3.60	0	2.70	3.60	< 1.0			
	Barium	mg/l	0.05	700	UK DWS	3	1.60	94.00	0	1.60	22.00	94.00			
	Beryllium	µg/l	0.2	None Available		3	0.30	0.30	0	0.30	0.30	0.30			
	Cadmium	µg/l	0.08	3	UK DWS	0	0.00	0.00	0	< 0.08	< 0.08	< 0.08			
	Chromium III	µg/l	0.4	4.7	UK DWS	3	0.60	1.40	0	0.60	1.40	1.10			
	Chromium VI	µg/l		3.4	EQS Freshwater	0	0.00	0.00	0						
	Copper	µg/l	0.7	2000	UK DWS	3	6.30	31.00	0	6.30	31.00	16.00			
	Lead	µg/l	1	10	UK DWS	3	3.00	5.20	0	3.00	4.70	5.20			
	Mercury	µg/l	0.5	1	UK DWS	0	0.00	0.00	0	< 0.5	< 0.5	< 0.5			
	Nickel	µg/l	0.3	20	UK DWS	3	3.50	7.30	0	3.50	4.60	7.30			
	Selenium	µg/l	4	10	UK DWS	0	0.00	0.00	0	< 4.0	< 4.0	< 4.0			
	Vanadium	µg/l	1.7	None Available		1	6.80	6.80	0	< 1.7	< 1.7	6.80			
	Zinc	µg/l	0.4	5000	EQS Freshwater	3	8.20	17.00	0	8.20	11.00	17.00			
	Sulphate	mg/l	0.1	400	EQS Freshwater	3	1.40	14.40	0	1.40	4.10	14.40			
	Boron	µg/l	10	300	UK DWS	3	13.00	20.00	0	13.00	20.00	18.00			
	pH					0	0.00	0.00	0						
Inorganics	Cyanide (total)	µg/l	10	70	UK DWS	0	0.00	0.00	0	< 10	< 10	< 10			
	Phenol*	µg/l		7.7	EQS Freshwater	0	0.00	0.00	0						
	Ammonia (NH3 as N)	mg/l		0.015	EQS Freshwater	0	0.00	0.00	0						

*EQS Standard: Phenol and Benzene annual average of 300µg/l; Toluene 500µg/l for Freshwater, 400µg/l for Saltwater; 1,1,1-TCA 1,000µg/l.

Project Name:	Plot P
Project Number:	210939
Assessment for:	Soil Leachate Assessment
Laboratory:	i2
Receptor:	Freshwater
Receptor Water Hardness:	>200



100 = Assessment Criteria Exceedance)
50 = M-BAT Bioavailability Assessment Required

Contaminant		Units	Detection Limit	Guideline Concentration	Source	Number of Samples	Min	Max	No of Exceedences	TP104	TP113	TP101			
										0.30	0.30	0.30			
Heavy Metals	Arsenic	µg/l	1	50	EQS Freshwater	2	2.70	3.60	0	2.70	3.60	< 1.0			
	Barium	mg/l	0.05	700	UK DWS	3	1.60	94.00	0	1.60	22.00	94.00			
	Beryllium	µg/l	0.2	None Available		3	0.30	0.30	0	0.30	0.30	0.30			
	Cadmium	µg/l	0.08	0.25	EQS Freshwater	0	0.00	0.00	0	< 0.08	< 0.08	< 0.08			
	Chromium III	µg/l	0.4	4.7	EQS Freshwater	3	0.60	1.40	0	0.60	1.40	1.10			
	Chromium VI	µg/l		3.4	EQS Freshwater	0	0.00	0.00	0						
	Copper	µg/l	0.7	1	EQS Freshwater	3	6.30	31.00	3	6.30	31.00	16.00			
	Lead	µg/l	1	1.2	EQS Freshwater	3	3.00	5.20	3	3.00	4.70	5.20			
	Mercury	µg/l	0.5	0.07	EQS Freshwater	0	0.00	0.00	0	< 0.5	< 0.5	< 0.5			
	Nickel	µg/l	0.3	4	EQS Freshwater	3	3.50	7.30	2	3.50	4.60	7.30			
	Selenium	µg/l	4	10	UK DWS	0	0.00	0.00	0	< 4.0	< 4.0	< 4.0			
	Vanadium	µg/l	1.7	None Available		1	6.80	6.80	0	< 1.7	< 1.7	6.80			
	Zinc	µg/l	0.4	10.9	EQS Freshwater	3	8.20	17.00	2	8.20	11.00	17.00			
	Sulphate	mg/l	0.1	400	EQS Freshwater	3	1.40	14.40	0	1.40	4.10	14.40			
	Boron	µg/l	10	2000	EQS Freshwater	3	13.00	20.00	0	13.00	20.00	18.00			
	pH					0	0.00	0.00	0						
Inorganics	Cyanide (total)	µg/l	10	1	EQS Freshwater	0	0.00	0.00	0	< 10	< 10	< 10			
	Phenol*	µg/l		7.7	EQS Freshwater	0	0.00	0.00	0						
	Ammonia (NH3 as N)	mg/l		0.015	EQS Freshwater	0	0.00	0.00	0						

Appendix 10: Groundwater Screening Worksheets

*EQS Standard: Phenol and Benzene annual average of 300µg/l; Toluene 500µg/l for Freshwater, 400µg/l for Saltwater; 1,1,1-TCA 1,000µg/l.

Project Name:	Plot P Kingsway
Project Number:	210939
Assessment for:	Water Assessment
Laboratory:	i2
Receptor:	Drinking Water
Receptor Water Hardness:	<40 (No Data)



100

= Assessment Criteria Exceedance)

50

= M-BAT Bioavailability Assessment Required

Contaminant		Units	Detection Limit	Guideline Concentration	Source	Number of Samples	Min	Max	No of Exceedences	BH02	BH03	BH04	BH05		
Heavy Metals	Arsenic	µg/l	0.15	10	UK DWS	4	0.16	3.05	0	0.16	3.05	0.31	1.34		
	Barium	mg/l	0.06	700	UK DWS	4	55.00	220.00	0	55.00	190.00	220.00	180.00		
	Beryllium	µg/l	0.10	None Available		0	0.00	0.00	0	< 0.1	< 0.1	< 0.1	< 0.1		
	Cadmium	µg/l	0.02	3	UK DWS	4	0.04	0.23	0	0.23	0.04	0.05	0.15		
	Chromium III	µg/l	0.20	4.7	UK DWS	2	1.20	1.40	0	< 0.2	1.20	< 0.2	1.40		
	Copper	µg/l	0.50	2000	UK DWS	4	1.70	12.00	0	1.70	3.00	8.60	12.00		
	Lead	µg/l	0.20	10	UK DWS	2	0.20	0.50	0	< 0.2	0.20	< 0.2	0.50		
	Mercury	µg/l	0.05	1	UK DWS	0	0.00	0.00	0	< 0.05	< 0.05	< 0.05	< 0.05		
	Nickel	µg/l	0.50	20	UK DWS	4	4.40	8.60	0	4.40	5.80	4.80	8.60		
	Selenium	µg/l	0.60	10	UK DWS	3	1.00	1.50	0	1.50	1.50	< 0.6	1.00		
	Vanadium	µg/l	0.20	None Available		3	0.30	3.80	0	< 0.2	2.30	0.30	3.80		
	Zinc	µg/l	0.50	5000	UK DWS	4	4.70	42.00	0	42.00	9.60	6.50	4.70		
	Sulphate	mg/l	0.045	250	UK DWS	4	10.40	93.20	0	93.20	65.60	31.60	10.40		
	Boron	µg/l	10.00	1000	UK DWS	4	20.00	96.00	0	83.00	29.00	96.00	20.00		
	pH					4	6.30	7.20	0	6.30	6.40	7.20	7.10		
Inorganics	Cyanide (total)	µg/l	10	70	UK DWS	0	0.00	0.00	0	< 10	< 10	< 10	< 10		
	Phenol*	µg/l	10	7.7	EQS Freshwater	0	0.00	0.00	0	< 10	< 10	< 10	< 10		
	Ammonia (NH3 as N)	mg/l		0.015	EQS Freshwater	4	0.03	0.07	4	0.07	0.03	0.03	0.04		
BTEX	Benzene*	µg/l	1	10	EQS Freshwater	0	0.00	0.00	0						
	Ethylbenzene	µg/l	1	300	UK DWS	0	0.00	0.00	0						
	Toluene*	µg/l	1	700	EQS Freshwater	0	0.00	0.00	0						
	Xylene	µg/l		500	UK DWS	0	0.00	0.00	0						
Total Petroleum Hydrocarbons	Aliphatic C5-C6	µg/l	1	10	UK DWS	0	0.00	0.00	0						
	Aliphatic C6-C8	µg/l	1	10	UK DWS	0	0.00	0.00	0						
	Aliphatic C8-C10	µg/l	1	10	UK DWS	0	0.00	0.00	0						
	Aliphatic C10-C12	µg/l	10	10	UK DWS	0	0.00	0.00	0						
	Aliphatic C12-C16	µg/l	10	10	UK DWS	0	0.00	0.00	0						
	Aliphatic C16-C21	µg/l	10	10	UK DWS	0	0.00	0.00	0						
	Aliphatic C21-C35	µg/l	10	10	UK DWS	0	0.00	0.00	0						
	Aromatic EC5-EC7	µg/l	1	10	EQS Freshwater	0	0.00	0.00	0						
	Aromatic EC7-EC8	µg/l	1	700	UK DWS	0	0.00	0.00	0						
	Aromatic EC8-EC10	µg/l	1	10	UK DWS	0	0.00	0.00	0						
	Aromatic EC10-EC12	µg/l	10	10	UK DWS	0	0.00	0.00	0						
	Aromatic EC12-EC16	µg/l	10	10	UK DWS	0	0.00	0.00	0						
	Aromatic EC16-EC21	µg/l	10	10	UK DWS	0	0.00	0.00	0						
	Aromatic EC21-EC35	µg/l	10	10	UK DWS	0	0.00	0.00	0						
	Total TPH (EC5-EC35)	µg/l		10	EQS Freshwater	0	0.00	0.00	0						
Polycyclic Aromatic Hydrocarbons	Acenaphthene	µg/l	0.01	None Available		0	0.00	0.00	0	< 0.01	< 0.01	< 0.01	< 0.01		
	Acenaphthylene	µg/l	0.01	None Available		0	0.00	0.00	0	< 0.01	< 0.01	< 0.01	< 0.01		
	Anthracene	µg/l	0.01	0.1	EQS Freshwater	0	0.00	0.00	0	< 0.01	< 0.01	< 0.01	< 0.01		
	Benzo(a)anthracene	µg/l	0.01	None Available		0	0.00	0.00	0	< 0.01	< 0.01	< 0.01	< 0.01		
	Benzo(a)pyrene	µg/l	0.01	0.7	UK DWS	0	0.00	0.00	0	< 0.01	< 0.01	< 0.01	< 0.01		
	Benzo(b)fluoranthene	µg/l	0.01	None Available		0	0.00	0.00	0	< 0.01	< 0.01	< 0.01	< 0.01		
	Benzo(k)fluoranthene	µg/l	0.01	None Available		0	0.00	0.00	0	< 0.01	< 0.01	< 0.01	< 0.01		
	Benzo(g,h,i)perylene	µg/l	0.01	None Available		0	0.00	0.00	0	< 0.01	< 0.01	< 0.01	< 0.01		
	Chrysene	µg/l	0.01	None Available		0	0.00	0.00	0	< 0.01	< 0.01	< 0.01	< 0.01		
	Dibenzo(a,h)anthracene	µg/l	0.01	None Available		0	0.00	0.00	0	< 0.01	< 0.01	< 0.01	< 0.01		
	Fluoranthene	µg/l	0.01	0.0063	EQS Freshwater	0	0.00	0.00	0	< 0.01	< 0.01	< 0.01	< 0.01		
	Fluorene	µg/l	0.01	None Available		0	0.00	0.00	0	< 0.01	< 0.01	< 0.01	< 0.01		
	Indeno(1,2,3-c,d)pyrene	µg/l	0.01	None Available		0	0.00	0.00	0	< 0.01	< 0.01	< 0.01	< 0.01		
	Naphthalene	µg/l	0.01	2	EQS Freshwater	0	0.00	0.00	0	< 0.01	< 0.01	< 0.01	< 0.01		
	Phenanthrene	µg/l	0.01	None Available		0	0.00	0.00	0	< 0.01	< 0.01	< 0.01	< 0.01		
	Pyrene	µg/l	0.01	None Available		0	0.00	0.00	0	< 0.01	< 0.01	< 0.01	< 0.01		
	Total PAH	µg/l	0.16	0.1	WHO (Health)	0	0.00	0.00	0	< 0.16	< 0.16	< 0.16	< 0.16		

*EQS Standard: Phenol and Benzene annual average of 300µg/l; Toluene 500µg/l for Freshwater, 400µg/l for Saltwater; 1,1,1-TCA 1,000µg/l.

Project Name:	Plot P Kingsway
Project Number:	210939
Assessment for:	Water Assessment
Laboratory:	i2
Receptor:	Freshwater
Receptor Water Hardness:	<40 (No Data)



100

= Assessment Criteria

50

= M-BAT Bioavailability Assessment Required

Contaminant		Units	Detection Limit	Guideline Concentration	Source	Number of Samples	Min	Max	No of Exceedences	BH02	BH03	BH04	BH05		
Heavy Metals	Arsenic	µg/l	0.15	50	EQS Freshwater	4	0.16	3.05	0	0.16	3.05	0.31	1.34		
	Barium	mg/l	0.06	700	UK DWS	4	55.00	220.00	0	55.00	190.00	220.00	180.00		
	Beryllium	µg/l	0.10	None Available		0	0.00	0.00	0	< 0.1	< 0.1	< 0.1	< 0.1		
	Cadmium	µg/l	0.02	0.08	EQS Freshwater	4	0.04	0.23	2	0.23	0.04	0.05	0.15		
	Chromium III	µg/l	0.20	4.7	EQS Freshwater	2	1.20	1.40	0	< 0.2	1.20	< 0.2	1.40		
	Copper	µg/l	0.50	1	EQS Freshwater	4	1.70	12.00	4	1.70	3.00	8.60	12.00		
	Lead	µg/l	0.20	1.2	EQS Freshwater	2	0.20	0.50	0	< 0.2	0.20	< 0.2	0.50		
	Mercury	µg/l	0.05	0.07	EQS Freshwater	0	0.00	0.00	0	< 0.05	< 0.05	< 0.05	< 0.05		
	Nickel	µg/l	0.50	4	EQS Freshwater	4	4.40	8.60	4	4.40	5.80	4.80	8.60		
	Selenium	µg/l	0.60	10	UK DWS	3	1.00	1.50	0	1.50	1.50	< 0.6	1.00		
	Vanadium	µg/l	0.20	None Available		3	0.30	3.80	0	< 0.2	2.30	0.30	3.80		
	Zinc	µg/l	0.50	10.9	EQS Freshwater	4	4.70	42.00	1	42.00	9.60	6.50	4.70		
	Sulphate	mg/l	0.045	400	EQS Freshwater	4	10.40	93.20	0	93.20	65.60	31.60	10.40		
	Boron	µg/l	10.00	2000	EQS Freshwater	4	20.00	96.00	0	83.00	29.00	96.00	20.00		
	pH					4	6.30	7.20	0	6.30	6.40	7.20	7.10		
Inorganics	Cyanide (total)	µg/l	10	1	EQS Freshwater	0	0.00	0.00	0	< 10	< 10	< 10	< 10		
	Phenol*	µg/l	10	7.7	EQS Freshwater	0	0.00	0.00	0	< 10	< 10	< 10	< 10		
	Ammonia (NH3 as N)	mg/l		0.015	EQS Freshwater	4	0.03	0.07	4	0.07	0.03	0.03	0.04		
BTEX	Benzene*	µg/l	1	10	EQS Freshwater	0	0.00	0.00	0						
	Ethylbenzene	µg/l	1	300	UK DWS	0	0.00	0.00	0						
	Toluene*	µg/l	1	74	EQS Freshwater	0	0.00	0.00	0						
	Xylene	µg/l		30	EQS Freshwater	0	0.00	0.00	0						
Total Petroleum Hydrocarbons	Aliphatic C5-C6	µg/l	1	10	UK DWS	0	0.00	0.00	0						
	Aliphatic C6-C8	µg/l	1	10	UK DWS	0	0.00	0.00	0						
	Aliphatic C8-C10	µg/l	1	10	UK DWS	0	0.00	0.00	0						
	Aliphatic C10-C12	µg/l	10	10	UK DWS	0	0.00	0.00	0						
	Aliphatic C12-C16	µg/l	10	10	UK DWS	0	0.00	0.00	0						
	Aliphatic C16-C21	µg/l	10	10	UK DWS	0	0.00	0.00	0						
	Aliphatic C21-C35	µg/l	10	10	UK DWS	0	0.00	0.00	0						
	Aromatic EC5-EC7	µg/l	1	10	EQS Freshwater	0	0.00	0.00	0						
	Aromatic EC7-EC8	µg/l	1	74	EQS Freshwater	0	0.00	0.00	0						
	Aromatic EC8-EC10	µg/l	1	10	UK DWS	0	0.00	0.00	0						
	Aromatic EC10-EC12	µg/l	10	10	UK DWS	0	0.00	0.00	0						
	Aromatic EC12-EC16	µg/l	10	10	UK DWS	0	0.00	0.00	0						
	Aromatic EC16-EC21	µg/l	10	10	UK DWS	0	0.00	0.00	0						
	Aromatic EC21-EC35	µg/l	10	10	UK DWS	0	0.00	0.00	0						
	Total TPH (EC5-EC35)	µg/l		10	EQS Freshwater	0	0.00	0.00	0						
Polycyclic Aromatic Hydrocarbons	Acenaphthene	µg/l	0.01	None Available		0	0.00	0.00	0	< 0.01	< 0.01	< 0.01	< 0.01		
	Acenaphthylene	µg/l	0.01	None Available		0	0.00	0.00	0	< 0.01	< 0.01	< 0.01	< 0.01		
	Anthracene	µg/l	0.01	0.1	EQS Freshwater	0	0.00	0.00	0	< 0.01	< 0.01	< 0.01	< 0.01		
	Benzo(a)anthracene	µg/l	0.01	None Available		0	0.00	0.00	0	< 0.01	< 0.01	< 0.01	< 0.01		
	Benzo(a)pyrene	µg/l	0.01	0.00017	EQS Freshwater	0	0.00	0.00	0	< 0.01	< 0.01	< 0.01	< 0.01		
	Benzo(b)fluoranthene	µg/l	0.01	None Available		0	0.00	0.00	0	< 0.01	< 0.01	< 0.01	< 0.01		
	Benzo(k)fluoranthene	µg/l	0.01	None Available		0	0.00	0.00	0	< 0.01	< 0.01	< 0.01	< 0.01		
	Benzo(g,h,i)perylene	µg/l	0.01	None Available		0	0.00	0.00	0	< 0.01	< 0.01	< 0.01	< 0.01		
	Chrysene	µg/l	0.01	None Available		0	0.00	0.00	0	< 0.01	< 0.01	< 0.01	< 0.01		
	Dibenzo(a,h)anthracene	µg/l	0.01	None Available		0	0.00	0.00	0	< 0.01	< 0.01	< 0.01	< 0.01		
	Fluoranthene	µg/l	0.01	0.0063	EQS Freshwater	0	0.00	0.00	0	< 0.01	< 0.01	< 0.01	< 0.01		
	Fluorene	µg/l	0.01	None Available		0	0.00	0.00	0	< 0.01	< 0.01	< 0.01	< 0.01		
	Indeno(1,2,3-c,d)pyrene	µg/l	0.01	None Available		0	0.00	0.00	0	< 0.01	< 0.01	< 0.01	< 0.01		
	Naphthalene	µg/l	0.01	2	EQS Freshwater	0	0.00	0.00	0	< 0.01	< 0.01	< 0.01	< 0.01		
	Phenanthrene	µg/l	0.01	None Available		0	0.00	0.00	0	< 0.01	< 0.01	< 0.01	< 0.01		
	Pyrene	µg/l	0.01	None Available		0	0.00	0.00	0	< 0.01	< 0.01	< 0.01	< 0.01		
	Total PAH	µg/l	0.16	0.1	WHO (Health)	0	0.00	0.00	0	< 0.16	< 0.16	< 0.16	< 0.16		

Appendix 11 : Waste Classification

Waste Classification Report

HazWasteOnline™ classifies waste as either **hazardous** or **non-hazardous** based on its chemical composition, related legislation and the rules and data defined in the current UK or EU technical guidance (Appendix C) (note that HP 9 Infectious is not assessed). It is the responsibility of the classifier named below to:

- understand the origin of the waste
- select the correct List of Waste code(s)
- confirm that the list of determinands, results and sampling plan are fit for purpose
- select and justify the chosen metal species (Appendix B)
- correctly apply moisture correction and other available corrections
- add the meta data for their user-defined substances (Appendix A)
- check that the classification engine is suitable with respect to the national destination of the waste (Appendix C)



730Z2-IRWBF-RV6TF

To aid the reviewer, the laboratory results, assumptions and justifications managed by the classifier are highlighted in **pale yellow**.

Job name

210939 Plot P Kingsway

Description/Comments

Project

210939 Plot P Kingsway

Site

210939 Plot P Kingsway

Classified by

Name: **Richard Robinson**
Date: **26 Sep 2022 11:08 GMT**
Telephone: **0115 924 1100**
Company: **BWB Consulting Ltd**
Waterfront House, Station Street
Nottingham
NG2 3DQ

HazWasteOnline™ provides a two day, hazardous waste classification course that covers the use of the software and both basic and advanced waste classification techniques. Certification has to be renewed every 3 years.

HazWasteOnline™ Certification:

Course
Hazardous Waste Classification
3 year Refresher overdue

Date
08 Dec 2016

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	TP101	0.30	Non Hazardous		2
2	TP104	0.30	Non Hazardous		5
3	TP112	0.70	Non Hazardous		8
4	TP113	0.30	Non Hazardous		11
5	TP114	1.80	Non Hazardous		14
6	TP115	1.50	Non Hazardous		16
7	TP116	0.90	Non Hazardous		18
8	TP119	0.60	Non Hazardous		20

Related documents

#	Name	Description
1	BWB Contaminated Land Suite WM3	waste stream template used to create this Job

Report

Created by: Richard Robinson

Created date: 26 Sep 2022 11:08 GMT

Appendices	Page
Appendix A: Classifier defined and non GB MCL determinands	23
Appendix B: Rationale for selection of metal species	24
Appendix C: Version	25

Classification of sample: TP101



Non Hazardous Waste

Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
TP101	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.30 m	
Moisture content:	
10%	
(no correction)	

Hazard properties

None identified

Determinands

Moisture content: **10% No Moisture Correction applied (MC)**

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	confirm TPH has NOT arisen from diesel or petrol				☒						
2	arsenic { arsenic trioxide }				52 mg/kg	1.32	68.657 mg/kg	0.00687 %			
	033-003-00-0	215-481-4	1327-53-3								
3	beryllium { beryllium oxide }				2.6 mg/kg	2.775	7.216 mg/kg	0.000722 %			
	004-003-00-8	215-133-1	1304-56-9								
4	boron { boron tribromide/trichloride/trifluoride (combined) }				0.3 mg/kg	13.43	4.029 mg/kg	0.000403 %			
			10294-33-4, 10294-34-5, 7637-07-2								
5	cadmium { cadmium sulfide }			1	<0.2 mg/kg	1.285	<0.257 mg/kg	<0.00002 %			<LOD
	048-010-00-4	215-147-8	1306-23-6								
6	chromium { chromium(III) oxide (worst case) }				31 mg/kg	1.462	45.308 mg/kg	0.00453 %			
		215-160-9	1308-38-9								
7	copper { dicopper oxide; copper (I) oxide }				140 mg/kg	1.126	157.624 mg/kg	0.0158 %			
	029-002-00-X	215-270-7	1317-39-1								
8	lead { lead chromate }			1	180 mg/kg	1.56	280.767 mg/kg	0.018 %			
	082-004-00-2	231-846-0	7758-97-6								
9	mercury { mercury dichloride }				<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %			<LOD
	080-010-00-X	231-299-8	7487-94-7								
10	nickel { nickel dihydroxide }				55 mg/kg	1.579	86.872 mg/kg	0.00869 %			
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]								
11	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %			<LOD
	034-002-00-8										
12	zinc { zinc chromate }				63 mg/kg	2.774	174.771 mg/kg	0.0175 %			
	024-007-00-3	236-878-9	13530-65-9								
13	pH				6.9 pH		6.9 pH	6.9 pH			
			pH								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
14	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				19 mg/kg	1.884	35.796 mg/kg	0.00358 %		
	006-007-00-5									
15	TPH (C6 to C40) petroleum group				42 mg/kg		42 mg/kg	0.0042 %		
			TPH							
16	benzene				<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
	601-020-00-8	200-753-7	71-43-2							
17	ethylbenzene				<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
	601-023-00-4	202-849-4	100-41-4							
18	toluene				<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
	601-021-00-3	203-625-9	108-88-3							
19	xylene				<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]							
20	acenaphthene				0.4 mg/kg		0.4 mg/kg	0.00004 %		
		201-469-6	83-32-9							
21	acenaphthylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8							
22	anthracene				0.98 mg/kg		0.98 mg/kg	0.000098 %		
		204-371-1	120-12-7							
23	benzo[a]anthracene				4.1 mg/kg		4.1 mg/kg	0.00041 %		
	601-033-00-9	200-280-6	56-55-3							
24	benzo[a]pyrene; benzo[def]chrysene				3.6 mg/kg		3.6 mg/kg	0.00036 %		
	601-032-00-3	200-028-5	50-32-8							
25	benzo[b]fluoranthene				3.5 mg/kg		3.5 mg/kg	0.00035 %		
	601-034-00-4	205-911-9	205-99-2							
26	benzo[ghi]perylene				2.3 mg/kg		2.3 mg/kg	0.00023 %		
		205-883-8	191-24-2							
27	benzo[k]fluoranthene				1.9 mg/kg		1.9 mg/kg	0.00019 %		
	601-036-00-5	205-916-6	207-08-9							
28	chrysene				2.7 mg/kg		2.7 mg/kg	0.00027 %		
	601-048-00-0	205-923-4	218-01-9							
29	dibenz[a,h]anthracene				0.54 mg/kg		0.54 mg/kg	0.000054 %		
	601-041-00-2	200-181-8	53-70-3							
30	fluoranthene				5.7 mg/kg		5.7 mg/kg	0.00057 %		
		205-912-4	206-44-0							
31	fluorene				0.27 mg/kg		0.27 mg/kg	0.000027 %		
		201-695-5	86-73-7							
32	indeno[123-cd]pyrene				2.2 mg/kg		2.2 mg/kg	0.00022 %		
		205-893-2	193-39-5							
33	naphthalene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
34	phenanthrene				3.5 mg/kg		3.5 mg/kg	0.00035 %		
		201-581-5	85-01-8							
35	pyrene				4.9 mg/kg		4.9 mg/kg	0.00049 %		
		204-927-3	129-00-0							
36	phenol				<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
	604-001-00-2	203-632-7	108-95-2							
Total:								0.0846 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because No significant volatile contamination or calorific materials present.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0042%)

Classification of sample: TP104

 **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
TP104	Chapter:
Sample Depth:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
0.30 m	Entry:
Moisture content:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
11%	
(no correction)	

Hazard properties

None identified

Determinands

Moisture content: **11% No Moisture Correction applied (MC)**

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	confirm TPH has NOT arisen from diesel or petrol				☒						
2	arsenic { arsenic trioxide }				7.4 mg/kg	1.32	9.77 mg/kg	0.000977 %			
	033-003-00-0	215-481-4	1327-53-3								
3	beryllium { beryllium oxide }				0.51 mg/kg	2.775	1.415 mg/kg	0.000142 %			
	004-003-00-8	215-133-1	1304-56-9								
4	boron { boron tribromide/trichloride/trifluoride (combined) }				<0.2 mg/kg	13.43	<2.686 mg/kg	<0.000269 %			<LOD
			10294-33-4, 10294-34-5, 7637-07-2								
5	cadmium { cadmium sulfide }			1	<0.2 mg/kg	1.285	<0.257 mg/kg	<0.00002 %			<LOD
	048-010-00-4	215-147-8	1306-23-6								
6	chromium { chromium(III) oxide (worst case) }				27 mg/kg	1.462	39.462 mg/kg	0.00395 %			
		215-160-9	1308-38-9								
7	copper { dicopper oxide; copper (I) oxide }				17 mg/kg	1.126	19.14 mg/kg	0.00191 %			
	029-002-00-X	215-270-7	1317-39-1								
8	lead { lead chromate }			1	11 mg/kg	1.56	17.158 mg/kg	0.0011 %			
	082-004-00-2	231-846-0	7758-97-6								
9	mercury { mercury dichloride }				<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %			<LOD
	080-010-00-X	231-299-8	7487-94-7								
10	nickel { nickel dihydroxide }				18 mg/kg	1.579	28.431 mg/kg	0.00284 %			
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]								
11	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %			<LOD
	034-002-00-8										
12	zinc { zinc chromate }				37 mg/kg	2.774	102.643 mg/kg	0.0103 %			
	024-007-00-3	236-878-9	13530-65-9								
13	pH				8 pH		8 pH	8pH			
			PH								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
14	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884	mg/kg	<0.000188 %		<LOD
	006-007-00-5										
15	TPH (C6 to C40) petroleum group				<10 mg/kg		<10	mg/kg	<0.001 %		<LOD
			TPH								
16	benzene				<1 mg/kg		<1	mg/kg	<0.0001 %		<LOD
	601-020-00-8	200-753-7	71-43-2								
17	ethylbenzene				<1 mg/kg		<1	mg/kg	<0.0001 %		<LOD
	601-023-00-4	202-849-4	100-41-4								
18	toluene				<1 mg/kg		<1	mg/kg	<0.0001 %		<LOD
	601-021-00-3	203-625-9	108-88-3								
19	xylene				<1 mg/kg		<1	mg/kg	<0.0001 %		<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]								
20	acenaphthene				<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9								
21	acenaphthylene				<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8								
22	anthracene				<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		204-371-1	120-12-7								
23	benzo[a]anthracene				<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-033-00-9	200-280-6	56-55-3								
24	benzo[a]pyrene; benzo[def]chrysene				<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-032-00-3	200-028-5	50-32-8								
25	benzo[b]fluoranthene				<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-034-00-4	205-911-9	205-99-2								
26	benzo[ghi]perylene				<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		205-883-8	191-24-2								
27	benzo[k]fluoranthene				<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-036-00-5	205-916-6	207-08-9								
28	chrysene				<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-048-00-0	205-923-4	218-01-9								
29	dibenz[a,h]anthracene				<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-041-00-2	200-181-8	53-70-3								
30	fluoranthene				<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		205-912-4	206-44-0								
31	fluorene				<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		201-695-5	86-73-7								
32	indeno[123-cd]pyrene				<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		205-893-2	193-39-5								
33	naphthalene				<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3								
34	phenanthrene				<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		201-581-5	85-01-8								
35	pyrene				<0.05 mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		204-927-3	129-00-0								
36	phenol				<1 mg/kg		<1	mg/kg	<0.0001 %		<LOD
	604-001-00-2	203-632-7	108-95-2								
Total:									0.0234 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP112

 **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
TP112	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.70 m	
Moisture content:	
14%	
(no correction)	

Hazard properties

None identified

Determinands

Moisture content: **14% No Moisture Correction applied (MC)**

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	confirm TPH has NOT arisen from diesel or petrol				☒						
2	arsenic { arsenic trioxide }				6.7 mg/kg	1.32	8.846 mg/kg	0.000885 %			
	033-003-00-0	215-481-4	1327-53-3								
3	beryllium { beryllium oxide }				0.78 mg/kg	2.775	2.165 mg/kg	0.000216 %			
	004-003-00-8	215-133-1	1304-56-9								
4	boron { boron tribromide/trichloride/trifluoride (combined) }				0.4 mg/kg	13.43	5.372 mg/kg	0.000537 %			
			10294-33-4, 10294-34-5, 7637-07-2								
5	cadmium { cadmium sulfide }			1	<0.2 mg/kg	1.285	<0.257 mg/kg	<0.00002 %			<LOD
	048-010-00-4	215-147-8	1306-23-6								
6	chromium { chromium(III) oxide (worst case) }				22 mg/kg	1.462	32.154 mg/kg	0.00322 %			
		215-160-9	1308-38-9								
7	copper { dicopper oxide; copper (I) oxide }				19 mg/kg	1.126	21.392 mg/kg	0.00214 %			
	029-002-00-X	215-270-7	1317-39-1								
8	lead { lead chromate }			1	41 mg/kg	1.56	63.952 mg/kg	0.0041 %			
	082-004-00-2	231-846-0	7758-97-6								
9	mercury { mercury dichloride }				<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %			<LOD
	080-010-00-X	231-299-8	7487-94-7								
10	nickel { nickel dihydroxide }				21 mg/kg	1.579	33.169 mg/kg	0.00332 %			
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]								
11	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %			<LOD
	034-002-00-8										
12	zinc { zinc chromate }				56 mg/kg	2.774	155.352 mg/kg	0.0155 %			
	024-007-00-3	236-878-9	13530-65-9								
13	pH				9.2 pH		9.2 pH	9.2 pH			
			pH								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
14	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
	006-007-00-5									
15	TPH (C6 to C40) petroleum group				20 mg/kg		20 mg/kg	0.002 %		
			TPH							
16	acenaphthene				0.33 mg/kg		0.33 mg/kg	0.000033 %		
		201-469-6	83-32-9							
17	acenaphthylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8							
18	anthracene				0.54 mg/kg		0.54 mg/kg	0.000054 %		
		204-371-1	120-12-7							
19	benzo[a]anthracene				1.2 mg/kg		1.2 mg/kg	0.00012 %		
	601-033-00-9	200-280-6	56-55-3							
20	benzo[a]pyrene; benzo[def]chrysene				0.98 mg/kg		0.98 mg/kg	0.000098 %		
	601-032-00-3	200-028-5	50-32-8							
21	benzo[b]fluoranthene				0.89 mg/kg		0.89 mg/kg	0.000089 %		
	601-034-00-4	205-911-9	205-99-2							
22	benzo[ghi]perylene				0.51 mg/kg		0.51 mg/kg	0.000051 %		
		205-883-8	191-24-2							
23	benzo[k]fluoranthene				0.53 mg/kg		0.53 mg/kg	0.000053 %		
	601-036-00-5	205-916-6	207-08-9							
24	chrysene				0.99 mg/kg		0.99 mg/kg	0.000099 %		
	601-048-00-0	205-923-4	218-01-9							
25	dibenz[a,h]anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-041-00-2	200-181-8	53-70-3							
26	fluoranthene				2.1 mg/kg		2.1 mg/kg	0.00021 %		
		205-912-4	206-44-0							
27	fluorene				0.3 mg/kg		0.3 mg/kg	0.00003 %		
		201-695-5	86-73-7							
28	indeno[123-cd]pyrene				0.41 mg/kg		0.41 mg/kg	0.000041 %		
		205-893-2	193-39-5							
29	naphthalene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
30	phenanthrene				2 mg/kg		2 mg/kg	0.0002 %		
		201-581-5	85-01-8							
31	pyrene				2.1 mg/kg		2.1 mg/kg	0.00021 %		
		204-927-3	129-00-0							
32	phenol				<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
	604-001-00-2	203-632-7	108-95-2							
Total:								0.0337 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1 Only the metal concentration has been used for classification	

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and ≤ 75°C"

Force this Hazardous property to non hazardous because No significant volatile contamination or calorific materials present.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.002%)

Classification of sample: TP113

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
TP113	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.30 m	
Moisture content:	
22%	
(no correction)	

Hazard properties

None identified

Determinands

Moisture content: 22% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
1	confirm TPH has NOT arisen from diesel or petrol				☒					
2	arsenic { arsenic trioxide }				11 mg/kg	1.32	14.524 mg/kg	0.00145 %		
	033-003-00-0	215-481-4	1327-53-3							
3	beryllium { beryllium oxide }				0.45 mg/kg	2.775	1.249 mg/kg	0.000125 %		
	004-003-00-8	215-133-1	1304-56-9							
4	boron { boron tribromide/trichloride/trifluoride (combined) }				0.8 mg/kg	13.43	10.744 mg/kg	0.00107 %		
			10294-33-4, 10294-34-5, 7637-07-2							
5	cadmium { cadmium sulfide }			1	<0.2 mg/kg	1.285	<0.257 mg/kg	<0.00002 %		<LOD
	048-010-00-4	215-147-8	1306-23-6							
6	chromium { chromium(III) oxide (worst case) }				13 mg/kg	1.462	19 mg/kg	0.0019 %		
		215-160-9	1308-38-9							
7	copper { dicopper oxide; copper (I) oxide }				28 mg/kg	1.126	31.525 mg/kg	0.00315 %		
	029-002-00-X	215-270-7	1317-39-1							
8	lead { lead chromate }			1	65 mg/kg	1.56	101.388 mg/kg	0.0065 %		
	082-004-00-2	231-846-0	7758-97-6							
9	mercury { mercury dichloride }				<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %		<LOD
	080-010-00-X	231-299-8	7487-94-7							
10	nickel { nickel dihydroxide }				9 mg/kg	1.579	14.215 mg/kg	0.00142 %		
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]							
11	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %		<LOD
	034-002-00-8									
12	zinc { zinc chromate }				37 mg/kg	2.774	102.643 mg/kg	0.0103 %		
	024-007-00-3	236-878-9	13530-65-9							
13	pH				6.9 pH		6.9 pH	6.9 pH		
			PH							

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
14	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %			<LOD
	006-007-00-5										
15	TPH (C6 to C40) petroleum group				38 mg/kg		38 mg/kg	0.0038 %			
			TPH								
16	benzene				<1 mg/kg		<1 mg/kg	<0.0001 %			<LOD
	601-020-00-8	200-753-7	71-43-2								
17	ethylbenzene				<1 mg/kg		<1 mg/kg	<0.0001 %			<LOD
	601-023-00-4	202-849-4	100-41-4								
18	toluene				<1 mg/kg		<1 mg/kg	<0.0001 %			<LOD
	601-021-00-3	203-625-9	108-88-3								
19	xylene				<1 mg/kg		<1 mg/kg	<0.0001 %			<LOD
	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]								
20	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		201-469-6	83-32-9								
21	acenaphthylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		205-917-1	208-96-8								
22	anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		204-371-1	120-12-7								
23	benzo[a]anthracene				0.23 mg/kg		0.23 mg/kg	0.000023 %			
	601-033-00-9	200-280-6	56-55-3								
24	benzo[a]pyrene; benzo[def]chrysene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-032-00-3	200-028-5	50-32-8								
25	benzo[b]fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-034-00-4	205-911-9	205-99-2								
26	benzo[ghi]perylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		205-883-8	191-24-2								
27	benzo[k]fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-036-00-5	205-916-6	207-08-9								
28	chrysene				0.22 mg/kg		0.22 mg/kg	0.000022 %			
	601-048-00-0	205-923-4	218-01-9								
29	dibenz[a,h]anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-041-00-2	200-181-8	53-70-3								
30	fluoranthene				0.35 mg/kg		0.35 mg/kg	0.000035 %			
		205-912-4	206-44-0								
31	fluorene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		201-695-5	86-73-7								
32	indeno[123-cd]pyrene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		205-893-2	193-39-5								
33	naphthalene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
	601-052-00-2	202-049-5	91-20-3								
34	phenanthrene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %			<LOD
		201-581-5	85-01-8								
35	pyrene				0.33 mg/kg		0.33 mg/kg	0.000033 %			
		204-927-3	129-00-0								
36	phenol				<1 mg/kg		<1 mg/kg	<0.0001 %			<LOD
	604-001-00-2	203-632-7	108-95-2								
Total:									0.0308 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1 Only the metal concentration has been used for classification	

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because No significant volatile contamination or calorific materials present.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0038%)

Classification of sample: TP114

 **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
TP114	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
1.80 m	
Moisture content:	
20%	
(no correction)	

Hazard properties

None identified

Determinands

Moisture content: 20% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	confirm TPH has NOT arisen from diesel or petrol				☒						
2	arsenic { arsenic trioxide }				3.5 mg/kg	1.32	4.621 mg/kg	0.000462 %			
	033-003-00-0	215-481-4	1327-53-3								
3	beryllium { beryllium oxide }				0.33 mg/kg	2.775	0.916 mg/kg	0.0000916 %			
	004-003-00-8	215-133-1	1304-56-9								
4	boron { boron tribromide/trichloride/trifluoride (combined) }				<0.2 mg/kg	13.43	<2.686 mg/kg	<0.000269 %			<LOD
			10294-33-4, 10294-34-5, 7637-07-2								
5	cadmium { cadmium sulfide }			1	<0.2 mg/kg	1.285	<0.257 mg/kg	<0.00002 %			<LOD
	048-010-00-4	215-147-8	1306-23-6								
6	chromium { chromium(III) oxide (worst case) }				7.9 mg/kg	1.462	11.546 mg/kg	0.00115 %			
		215-160-9	1308-38-9								
7	copper { dicopper oxide; copper (I) oxide }				11 mg/kg	1.126	12.385 mg/kg	0.00124 %			
	029-002-00-X	215-270-7	1317-39-1								
8	lead { lead chromate }			1	7 mg/kg	1.56	10.919 mg/kg	0.0007 %			
	082-004-00-2	231-846-0	7758-97-6								
9	mercury { mercury dichloride }				<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %			<LOD
	080-010-00-X	231-299-8	7487-94-7								
10	nickel { nickel dihydroxide }				20 mg/kg	1.579	31.59 mg/kg	0.00316 %			
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]								
11	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %			<LOD
	034-002-00-8										
12	zinc { zinc chromate }				26 mg/kg	2.774	72.128 mg/kg	0.00721 %			
	024-007-00-3	236-878-9	13530-65-9								
13	pH				7.6 pH		7.6 pH	7.6 pH			
			pH								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
14	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
	006-007-00-5									
15	TPH (C6 to C40) petroleum group				<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
			TPH							
16	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9							
17	acenaphthylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8							
18	anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		204-371-1	120-12-7							
19	benzo[a]anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-033-00-9	200-280-6	56-55-3							
20	benzo[a]pyrene; benzo[def]chrysene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-032-00-3	200-028-5	50-32-8							
21	benzo[b]fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-034-00-4	205-911-9	205-99-2							
22	benzo[ghi]perylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-883-8	191-24-2							
23	benzo[k]fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-036-00-5	205-916-6	207-08-9							
24	chrysene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-048-00-0	205-923-4	218-01-9							
25	dibenz[a,h]anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-041-00-2	200-181-8	53-70-3							
26	fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-912-4	206-44-0							
27	fluorene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-695-5	86-73-7							
28	indeno[123-cd]pyrene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-893-2	193-39-5							
29	naphthalene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
30	phenanthrene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-581-5	85-01-8							
31	pyrene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		204-927-3	129-00-0							
32	phenol				<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
	604-001-00-2	203-632-7	108-95-2							
Total:								0.0159 %		

Key

- User supplied data
- Determinand values ignored for classification, see column 'Conc. Not Used' for reason
- Determinand defined or amended by HazWasteOnline (see Appendix A)
- Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
- <LOD Below limit of detection
- ND Not detected
- CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: TP115



Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
TP115	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
1.50 m	
Moisture content:	
20%	
(no correction)	

Hazard properties

None identified

Determinands

Moisture content: 20% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	confirm TPH has NOT arisen from diesel or petrol				☒						
2	arsenic { arsenic trioxide }				3.8 mg/kg	1.32	5.017 mg/kg	0.000502 %			
	033-003-00-0	215-481-4	1327-53-3								
3	beryllium { beryllium oxide }				0.33 mg/kg	2.775	0.916 mg/kg	0.0000916 %			
	004-003-00-8	215-133-1	1304-56-9								
4	boron { boron tribromide/trichloride/trifluoride (combined) }				<0.2 mg/kg	13.43	<2.686 mg/kg	<0.000269 %			<LOD
			10294-33-4, 10294-34-5, 7637-07-2								
5	cadmium { cadmium sulfide }			1	<0.2 mg/kg	1.285	<0.257 mg/kg	<0.00002 %			<LOD
	048-010-00-4	215-147-8	1306-23-6								
6	chromium { chromium(III) oxide (worst case) }				9.8 mg/kg	1.462	14.323 mg/kg	0.00143 %			
		215-160-9	1308-38-9								
7	copper { dicopper oxide; copper (I) oxide }				9.8 mg/kg	1.126	11.034 mg/kg	0.0011 %			
	029-002-00-X	215-270-7	1317-39-1								
8	lead { lead chromate }			1	6.1 mg/kg	1.56	9.515 mg/kg	0.00061 %			
	082-004-00-2	231-846-0	7758-97-6								
9	mercury { mercury dichloride }				<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %			<LOD
	080-010-00-X	231-299-8	7487-94-7								
10	nickel { nickel dihydroxide }				10 mg/kg	1.579	15.795 mg/kg	0.00158 %			
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]								
11	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %			<LOD
	034-002-00-8										
12	zinc { zinc chromate }				26 mg/kg	2.774	72.128 mg/kg	0.00721 %			
	024-007-00-3	236-878-9	13530-65-9								
13	pH				8.6 pH		8.6 pH	8.6 pH			
			pH								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
14	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
	006-007-00-5									
15	TPH (C6 to C40) petroleum group				<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
			TPH							
16	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9							
17	acenaphthylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8							
18	anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		204-371-1	120-12-7							
19	benzo[a]anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-033-00-9	200-280-6	56-55-3							
20	benzo[a]pyrene; benzo[def]chrysene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-032-00-3	200-028-5	50-32-8							
21	benzo[b]fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-034-00-4	205-911-9	205-99-2							
22	benzo[ghi]perylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-883-8	191-24-2							
23	benzo[k]fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-036-00-5	205-916-6	207-08-9							
24	chrysene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-048-00-0	205-923-4	218-01-9							
25	dibenz[a,h]anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-041-00-2	200-181-8	53-70-3							
26	fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-912-4	206-44-0							
27	fluorene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-695-5	86-73-7							
28	indeno[123-cd]pyrene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-893-2	193-39-5							
29	naphthalene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
30	phenanthrene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-581-5	85-01-8							
31	pyrene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		204-927-3	129-00-0							
32	phenol				<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
	604-001-00-2	203-632-7	108-95-2							
Total:								0.0144 %		

Key

- User supplied data
- Determinand values ignored for classification, see column 'Conc. Not Used' for reason
- Determinand defined or amended by HazWasteOnline (see Appendix A)
- Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
- <LOD Below limit of detection
- ND Not detected
- CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: TP116



Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
TP116	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.90 m	
Moisture content:	
27%	
(no correction)	

Hazard properties

None identified

Determinands

Moisture content: 27% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	confirm TPH has NOT arisen from diesel or petrol				☒						
2	arsenic { arsenic trioxide }				9.4 mg/kg	1.32	12.411 mg/kg	0.00124 %			
	033-003-00-0	215-481-4	1327-53-3								
3	beryllium { beryllium oxide }				0.45 mg/kg	2.775	1.249 mg/kg	0.000125 %			
	004-003-00-8	215-133-1	1304-56-9								
4	boron { boron tribromide/trichloride/trifluoride (combined) }				3.8 mg/kg	13.43	51.034 mg/kg	0.0051 %			
			10294-33-4, 10294-34-5, 7637-07-2								
5	cadmium { cadmium sulfide }			1	<0.2 mg/kg	1.285	<0.257 mg/kg	<0.00002 %			<LOD
	048-010-00-4	215-147-8	1306-23-6								
6	chromium { chromium(III) oxide (worst case) }				13 mg/kg	1.462	19 mg/kg	0.0019 %			
		215-160-9	1308-38-9								
7	copper { dicopper oxide; copper (I) oxide }				23 mg/kg	1.126	25.895 mg/kg	0.00259 %			
	029-002-00-X	215-270-7	1317-39-1								
8	lead { lead chromate }			1	56 mg/kg	1.56	87.35 mg/kg	0.0056 %			
	082-004-00-2	231-846-0	7758-97-6								
9	mercury { mercury dichloride }				<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %			<LOD
	080-010-00-X	231-299-8	7487-94-7								
10	nickel { nickel dihydroxide }				10 mg/kg	1.579	15.795 mg/kg	0.00158 %			
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]								
11	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1 mg/kg	1.405	<1.405 mg/kg	<0.000141 %			<LOD
	034-002-00-8										
12	zinc { zinc chromate }				52 mg/kg	2.774	144.256 mg/kg	0.0144 %			
	024-007-00-3	236-878-9	13530-65-9								
13	pH				5.6 pH		5.6 pH	5.6 pH			
			pH								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
14	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
	006-007-00-5									
15	TPH (C6 to C40) petroleum group				<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
			TPH							
16	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9							
17	acenaphthylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8							
18	anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		204-371-1	120-12-7							
19	benzo[a]anthracene				0.61 mg/kg		0.61 mg/kg	0.000061 %		
	601-033-00-9	200-280-6	56-55-3							
20	benzo[a]pyrene; benzo[def]chrysene				0.59 mg/kg		0.59 mg/kg	0.000059 %		
	601-032-00-3	200-028-5	50-32-8							
21	benzo[b]fluoranthene				0.72 mg/kg		0.72 mg/kg	0.000072 %		
	601-034-00-4	205-911-9	205-99-2							
22	benzo[ghi]perylene				0.41 mg/kg		0.41 mg/kg	0.000041 %		
		205-883-8	191-24-2							
23	benzo[k]fluoranthene				0.25 mg/kg		0.25 mg/kg	0.000025 %		
	601-036-00-5	205-916-6	207-08-9							
24	chrysene				0.54 mg/kg		0.54 mg/kg	0.000054 %		
	601-048-00-0	205-923-4	218-01-9							
25	dibenz[a,h]anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-041-00-2	200-181-8	53-70-3							
26	fluoranthene				1.2 mg/kg		1.2 mg/kg	0.00012 %		
		205-912-4	206-44-0							
27	fluorene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-695-5	86-73-7							
28	indeno[123-cd]pyrene				0.3 mg/kg		0.3 mg/kg	0.00003 %		
		205-893-2	193-39-5							
29	naphthalene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
30	phenanthrene				0.58 mg/kg		0.58 mg/kg	0.000058 %		
		201-581-5	85-01-8							
31	pyrene				0.99 mg/kg		0.99 mg/kg	0.000099 %		
		204-927-3	129-00-0							
32	phenol				<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
	604-001-00-2	203-632-7	108-95-2							
Total:								0.0347 %		

Key

- User supplied data
- Determinand values ignored for classification, see column 'Conc. Not Used' for reason
- Determinand defined or amended by HazWasteOnline (see Appendix A)
- Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
- <LOD Below limit of detection
- ND Not detected
- CLP: Note 1 Only the metal concentration has been used for classification

Classification of sample: TP119



Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
TP119	Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Sample Depth:	Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)
0.60 m	
Moisture content:	
7.5%	
(no correction)	

Hazard properties

None identified

Determinands

Moisture content: 7.5% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number								
1	confirm TPH has NOT arisen from diesel or petrol				☒						
2	arsenic { arsenic trioxide }				16 mg/kg	1.32	21.125 mg/kg	0.00211 %			
	033-003-00-0	215-481-4	1327-53-3								
3	beryllium { beryllium oxide }				1.1 mg/kg	2.775	3.053 mg/kg	0.000305 %			
	004-003-00-8	215-133-1	1304-56-9								
4	boron { boron tribromide/trichloride/trifluoride (combined) }				0.4 mg/kg	13.43	5.372 mg/kg	0.000537 %			
			10294-33-4, 10294-34-5, 7637-07-2								
5	cadmium { cadmium sulfide }			1	<0.2 mg/kg	1.285	<0.257 mg/kg	<0.00002 %			<LOD
	048-010-00-4	215-147-8	1306-23-6								
6	chromium { chromium(III) oxide (worst case) }				30 mg/kg	1.462	43.847 mg/kg	0.00438 %			
		215-160-9	1308-38-9								
7	copper { dicopper oxide; copper (I) oxide }				92 mg/kg	1.126	103.582 mg/kg	0.0104 %			
	029-002-00-X	215-270-7	1317-39-1								
8	lead { lead chromate }			1	270 mg/kg	1.56	421.15 mg/kg	0.027 %			
	082-004-00-2	231-846-0	7758-97-6								
9	mercury { mercury dichloride }				<0.3 mg/kg	1.353	<0.406 mg/kg	<0.0000406 %			<LOD
	080-010-00-X	231-299-8	7487-94-7								
10	nickel { nickel dihydroxide }				31 mg/kg	1.579	48.964 mg/kg	0.0049 %			
	028-008-00-X	235-008-5 [1] 234-348-1 [2]	12054-48-7 [1] 11113-74-9 [2]								
11	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				1.1 mg/kg	1.405	1.546 mg/kg	0.000155 %			
	034-002-00-8										
12	zinc { zinc chromate }				81 mg/kg	2.774	224.706 mg/kg	0.0225 %			
	024-007-00-3	236-878-9	13530-65-9								
13	pH				8.6 pH		8.6 pH	8.6 pH			
			pH								

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	EU CLP index number	EC Number	CAS Number							
14	cyanides { salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex }				<1 mg/kg	1.884	<1.884 mg/kg	<0.000188 %		<LOD
	006-007-00-5									
15	TPH (C6 to C40) petroleum group				19 mg/kg		19 mg/kg	0.0019 %		
			TPH							
16	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-469-6	83-32-9							
17	acenaphthylene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		205-917-1	208-96-8							
18	anthracene				0.35 mg/kg		0.35 mg/kg	0.000035 %		
		204-371-1	120-12-7							
19	benzo[a]anthracene				0.86 mg/kg		0.86 mg/kg	0.000086 %		
	601-033-00-9	200-280-6	56-55-3							
20	benzo[a]pyrene; benzo[def]chrysene				0.75 mg/kg		0.75 mg/kg	0.000075 %		
	601-032-00-3	200-028-5	50-32-8							
21	benzo[b]fluoranthene				0.99 mg/kg		0.99 mg/kg	0.000099 %		
	601-034-00-4	205-911-9	205-99-2							
22	benzo[ghi]perylene				0.45 mg/kg		0.45 mg/kg	0.000045 %		
		205-883-8	191-24-2							
23	benzo[k]fluoranthene				0.36 mg/kg		0.36 mg/kg	0.000036 %		
	601-036-00-5	205-916-6	207-08-9							
24	chrysene				0.77 mg/kg		0.77 mg/kg	0.000077 %		
	601-048-00-0	205-923-4	218-01-9							
25	dibenz[a,h]anthracene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-041-00-2	200-181-8	53-70-3							
26	fluoranthene				1.5 mg/kg		1.5 mg/kg	0.00015 %		
		205-912-4	206-44-0							
27	fluorene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		201-695-5	86-73-7							
28	indeno[123-cd]pyrene				0.37 mg/kg		0.37 mg/kg	0.000037 %		
		205-893-2	193-39-5							
29	naphthalene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
	601-052-00-2	202-049-5	91-20-3							
30	phenanthrene				0.77 mg/kg		0.77 mg/kg	0.000077 %		
		201-581-5	85-01-8							
31	pyrene				1.4 mg/kg		1.4 mg/kg	0.00014 %		
		204-927-3	129-00-0							
32	phenol				<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
	604-001-00-2	203-632-7	108-95-2							
Total:								0.0754 %		

Key

	User supplied data
	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
	Determinand defined or amended by HazWasteOnline (see Appendix A)
	Speciated Determinand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1 Only the metal concentration has been used for classification	

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and ≤ 75°C"

Force this Hazardous property to non hazardous because No significant volatile contamination or calorific materials present.

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0019%)

Appendix A: Classifier defined and non GB MCL determinands

confirm TPH has NOT arisen from diesel or petrol

Description/Comments: Chapter 3, section 4b requires a positive confirmation for benzo[a]pyrene to be used as a marker in evaluating Carc. 1B; H350 (HP 7) and Muta. 1B; H340 (HP 11)
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

boron tribromide/trichloride/trifluoride (combined) (CAS Number: 10294-33-4, 10294-34-5, 7637-07-2)

Description/Comments: Combines the hazard statements and the average of the conversion factors for boron tribromide, boron trichloride and boron trifluoride
Data source: N/A
Data source date: 06 Aug 2015
Hazard Statements: EUH014, Acute Tox. 2; H330, Acute Tox. 2; H300, Skin Corr. 1A; H314, Skin Corr. 1B; H314

chromium(III) oxide (worst case) (EC Number: 215-160-9, CAS Number: 1308-38-9)

Description/Comments: Data from C&L Inventory Database
Data source: <https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/33806>
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4; H332, Acute Tox. 4; H302, Eye Irrit. 2; H319, STOT SE 3; H335, Skin Irrit. 2; H315, Resp. Sens. 1; H334, Skin Sens. 1; H317, Repr. 1B; H360FD, Aquatic Acute 1; H400, Aquatic Chronic 1; H410

pH (CAS Number: PH)

Description/Comments: Appendix C4
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex

GB MCL index number: 006-007-00-5
Description/Comments: Conversion factor based on a worst case compound: sodium cyanide
Additional Hazard Statement(s): EUH032 >= 0.2 %
Reason for additional Hazards Statement(s):
20 Nov 2021 - EUH032 >= 0.2 % hazard statement sourced from: WM3, Table C12.2

TPH (C6 to C40) petroleum group (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: Flam. Liq. 3; H226, Asp. Tox. 1; H304, STOT RE 2; H373, Muta. 1B; H340, Carc. 1B; H350, Repr. 2; H361d, Aquatic Chronic 2; H411

ethylbenzene (EC Number: 202-849-4, CAS Number: 100-41-4)

GB MCL index number: 601-023-00-4
Description/Comments:
Additional Hazard Statement(s): Carc. 2; H351
Reason for additional Hazards Statement(s):
20 Nov 2021 - Carc. 2; H351 hazard statement sourced from: IARC Group 2B (77) 2000

acenaphthene (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2; H319, STOT SE 3; H335, Skin Irrit. 2; H315, Aquatic Acute 1; H400, Aquatic Chronic 1; H410, Aquatic Chronic 2; H411

acenaphthylene (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database
Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4; H302, Acute Tox. 1; H330, Acute Tox. 1; H310, Eye Irrit. 2; H319, STOT SE 3; H335, Skin Irrit. 2; H315

■ **anthracene** (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 17 Jul 2015

Hazard Statements: Eye Irrit. 2; H319 , STOT SE 3; H335 , Skin Irrit. 2; H315 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

■ **benzo[ghi]perylene** (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 23 Jul 2015

Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

■ **fluoranthene** (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 21 Aug 2015

Hazard Statements: Acute Tox. 4; H302 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

■ **fluorene** (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 06 Aug 2015

Hazard Statements: Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

■ **indeno[123-cd]pyrene** (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 06 Aug 2015

Hazard Statements: Carc. 2; H351

■ **phenanthrene** (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 06 Aug 2015

Hazard Statements: Acute Tox. 4; H302 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Carc. 2; H351 , Skin Sens. 1; H317 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410 , Skin Irrit. 2; H315

■ **pyrene** (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014

Data source: <http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database>

Data source date: 21 Aug 2015

Hazard Statements: Skin Irrit. 2; H315 , Eye Irrit. 2; H319 , STOT SE 3; H335 , Aquatic Acute 1; H400 , Aquatic Chronic 1; H410

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

Worst case species based on risk phrases

beryllium {beryllium oxide}

Worst case species based on risk phrases

boron {boron tribromide/trichloride/trifluoride (combined)}

Worst case species based on risk phrases

cadmium {cadmium sulfide}

Worst case species based on risk phrases

chromium {chromium(III) oxide (worst case)}

All chromium VI concentrations below the laboratory LoD.

copper {dicopper oxide; copper (I) oxide}

Most likely common species

lead {lead chromate}

Worst case species based on risk phrases

mercury {mercury dichloride}

Worst case species based on risk phrases

nickel {nickel dihydroxide}

Worst case species based on risk phrases

selenium {selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex}

Worst case species based on risk phrases

zinc {zinc chromate}

Worst case species based on risk phrases

cyanides {salts of hydrogen cyanide with the exception of complex cyanides such as ferrocyanides, ferricyanides and mercuric oxycyanide and those specified elsewhere in this Annex}

Worst case species

Appendix C: VersionHazWasteOnline Classification Engine: **WM3 1st Edition v1.2.GB - Oct 2021**

HazWasteOnline Classification Engine Version: 2022.263.5340.9974 (20 Sep 2022)

HazWasteOnline Database: 2022.263.5340.9974 (20 Sep 2022)

This classification utilises the following guidance and legislation:

WM3 v1.2.GB - Waste Classification - 1st Edition v1.2.GB - Oct 2021**CLP Regulation** - Regulation 1272/2008/EC of 16 December 2008**1st ATP** - Regulation 790/2009/EC of 10 August 2009**2nd ATP** - Regulation 286/2011/EC of 10 March 2011**3rd ATP** - Regulation 618/2012/EU of 10 July 2012**4th ATP** - Regulation 487/2013/EU of 8 May 2013**Correction to 1st ATP** - Regulation 758/2013/EU of 7 August 2013**5th ATP** - Regulation 944/2013/EU of 2 October 2013**6th ATP** - Regulation 605/2014/EU of 5 June 2014**WFD Annex III replacement** - Regulation 1357/2014/EU of 18 December 2014**Revised List of Waste 2014** - Decision 2014/955/EU of 18 December 2014**7th ATP** - Regulation 2015/1221/EU of 24 July 2015**8th ATP** - Regulation (EU) 2016/918 of 19 May 2016**9th ATP** - Regulation (EU) 2016/1179 of 19 July 2016**10th ATP** - Regulation (EU) 2017/776 of 4 May 2017**HP14 amendment** - Regulation (EU) 2017/997 of 8 June 2017**13th ATP** - Regulation (EU) 2018/1480 of 4 October 2018**14th ATP** - Regulation (EU) 2020/217 of 4 October 2019**15th ATP** - Regulation (EU) 2020/1182 of 19 May 2020**The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use)(Amendment etc.) (EU Exit)****Regulations 2020** - UK: 2020 No. 1567 of 16th December 2020**The Waste and Environmental Permitting etc. (Legislative Functions and Amendment etc.) (EU Exit) Regulations 2020** - UK: 2020 No. 1540 of 16th December 2020**GB MCL List** - version 1.1 of 09 June 2021

