



GEOENVIRONMENTAL GROUND INVESTIGATION

Rockingham, Plot 2 Birdwell Barnsley

Reference

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JPG (Leeds) Ltd. Rockingham, Plot 2, Birdwell, Barnsley. Composite As Built Exploratory Hole Location Plan. Dwg. 5419-JPG-SW-00-DR-G-1102-S2-P01. Dated 23.06.21.

The Harris Partnership Architects. Proposed Industrial Development, Dearne Valley Parkway, Barnsley. Proposed Site Plan. Project No. 15315. Drawing Number (P) 111. Dated July 2020. Revision L. For Gregory Properties.

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CONFIDENTIALITY STATEMENT

This report is addressed to and may be relied upon by the following:

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DOCUMENT HISTORY

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P01	18.08.2021	First Issue	Information	BKW	JBW



EXECUTIVE SUMMARY

Site Address	Plot 2, Birdwell, Rockingham, Barnsley
NGR	Approximate NGR 435280, 400720.
Current Site Use & Proposed Development	The site comprises a large field with no evidence of any above ground buildings or structures. The site surface is generally formed by undeveloped, undulating scrubland with a wooded area adjacent to the southern boundary. It is proposed to develop the site with three industrial units, service yards, car parking and associated access roads.
Previous Reports	A desk study report and coal mining risk assessment for the site were prepared by JPG in February 2021. These reports include a summary of potential geotechnical and environmental constraints and should be read in conjunction with this report.
Fieldwork	Fieldwork comprised the drilling of nine cable percussive boreholes and the excavation of nine trial pits. Samples of soil were obtained and submitted for chemical and geotechnical analysis. Gas and groundwater monitoring wells were installed in selected boreholes. The installations have been monitored for gas/groundwater on six occasions.
Ground and Groundwater Conditions	Made ground was encountered in all exploratory holes and was found to extend to depths of between 10.30m and 20.80m (mean approximately 15.00m), where proven. The made ground was proven to be deepest in the south of the site, nearest the highwall. The made ground was found to be underlain locally by mudstone bedrock of the Pennine Middle Coal Measures. Groundwater was encountered in trial pits as seepages at depths of between 1.25m and 1.30m. Groundwater strikes were recorded in boreholes at depths of between 0.20m and 19.00m.
Geotechnical and Engineering Assessment	Foundations and Ground Floor Construction – Based on the information contained in the previous Abbeydale and WSP reports, the opencast backfill was compacted under the full-time supervision of Mott MacDonald. Based on the findings of the ground investigation, an allowable bearing capacity of 100kN/m² can be assumed for the colliery spoil materials below 1.00m depth. On this basis, it is possible to use a continuous reinforced strip footing and ground-bearing floor slabs founded on the colliery spoil engineered fill following any cut/fill works. Due to the variability of the near-surface ground, the upper 1.00m will require re-engineering and/or replacement with suitability engineered fill. Bedrock strata consisted of extremely weak mudstone of the Pennine Middle Coal Measures. Based on the anticipated loading it is not considered necessary to extend foundations onto/into the underlying bedrock. Earthworks - It is proposed to carry out cut and fill earthworks to create a suitable development platform on the site. Based on the laboratory results, the colliery spoil may be too wet to be incorporated in the earthworks unless it is dried/treated (by the addition of lime). Proper selection and control will be required as part of the works in order to use the materials on the site. The material should not be allowed to deteriorate during excavation and compaction and must be sufficiently protected from traffic after placement. Any earthworks should be carried out in accordance with the Manual of Contract Documents for Highway Works, Volume 1 Specification for Highway Works, Series 600 Earthworks. Control of Groundwater - Reference should be made to guidance given in the Manual of Contract Documents for Highway Works, Volume 1: Specification for Highway Works, Series 600 Earthworks. Roads, Pavements and Hardstanding Surfaces – Based on the results of the laboratory testing, it is likely that a CBR value of >3% can be achieved without the need for ground improvement methods. Any soft spots will need to be removed and/or treated at formation level. Excavations - It is considered likely that if excavations were left unsupported then over time, some collapse would occur. Good working practice with respect to drainage of excavations and formations will be required to protect materials. Obstructions – It is noted that the colliery spoil materials contain cobbles and boulders. An allowance for excavation and processing of over-sized materials for re-use on site should be made. Chemical Attack on Buried Concrete - It is recommended that concrete should be designed to Aggressive Chemical Environment for Concrete (ACEC) Design Sulphate Class DS-3 and ACEC Class AC-4. This assessment assumes that groundwater will not be in direct contact with the foundations. If a deeper foundation solution is adopted, the sulphate classification will need to be reassessed.
Environmental Risk Assessment	Based on the identified potential sources of contamination and available pathways and receptors, the following linkage assessments have been considered. This assessment is based on current site conditions and does not consider exposure pathways following any remediation of the site. Sources – The following potential sources of contamination are considered to be present on the site: - Slightly elevated concentrations of potentially leachable fluoranthene. - Hazardous ground gases (carbon dioxide). - Potentially combustible coal-rich material. Mitigation Measures – In order to mitigate the risk posed by the potential contaminants which are



	present on the site, consideration should be given to the following mitigation measures. Development and Maintenance Workers • Site workers involved in groundworks should take the necessary measures to ensure that all works in excavations and confined spaces are carried out in accordance with best practice in order to prevent exposure to potentially hazardous gases. • Site workers involved in groundworks should use appropriate PPE, i.e. overalls and gloves. Appropriate health and safety measures, e.g. washing hands prior to eating or drinking, should also be enforced. • During development of the site, all workers should remain vigilant to the possible risk of encountering areas of potentially contaminated material. Should potentially contaminated material be encountered, site management should be informed. Further testing may then be required to assess the risk to health and safety of the site workers and the environment. • All employers involved in works at the site should produce an appropriate method statement and risk assessment, to which all employees should comply, e.g. working in confined spaces. Reference should also be made to the appropriate HSE and other guidance for working on contaminated and potentially contaminated sites. Future Site Users • It is recommended that a sufficient thickness of topsoil and subsoil is placed in future landscaped areas. Any imported or site-sourced material will need to be tested to confirm its suitability for use. In addition, any topsoil and subsoil which is to be used on site should not contain any manmade debris, e.g. brick, concrete or metal. • Ground gas protection measures to achieve Characteristic Situation (CS) 2 are required for new buildings constructed on the site.
Waste Classification	In total 13 samples were assessed using HazWasteOnline in order to determine the classification of the materials for disposal off-site. Based on the results of the chemical analysis, all the samples can be classified as non-hazardous.
Hazardous Gas	Ground Gas Risk – In accordance with BS8485:2015, the site is classified as Characteristic Situation (CS) 2. Radon Risk –No radon protective measures are required.
This sheet is intended as a summary only of the assessment of the site in relation to ground condition. It does not provide a definitive engineering analysis.	



1.0 INTRODUCTION

1.1 Instruction

JPG (Leeds) Limited has been instructed by Gregory Projects Limited to carry out a geoenvironmental ground investigation for a proposed commercial/light industrial development at Plot 2 Birdwell, Rockingham.

1.2 Objectives

The objective of the geotechnical ground investigation was to identify potential geotechnical and environmental issues that may represent constraints to the proposed development of the site.

1.3 Scope of Works

The scope of the investigation was set out in our proposal dated 6 January 2021 and included the following works:

- Cable percussive boreholes within the backfilled opencast materials in order to confirm the depth to bedrock and assess the geotechnical parameters of the fill materials and natural soils/rock.
- Trial pitting across the site, in order to obtain samples for geotechnical and chemical testing, to assess the shallow ground conditions at the site and to confirm the composition, extent, depth and nature of any made ground and the underlying natural strata.
- Geotechnical and chemical laboratory testing.
- Groundwater and gas monitoring of standpipes installed in boreholes.
- A qualitative (Tier 2) screening assessment using source-pathway-receptor linkages.
- Assessment of the classification of materials for disposal off-site (not including WAC testing).
- An assessment of the suitability of the natural strata and made ground for re-use in earthworks.
- Engineering assessment to include recommendations with respect to earthworks and potential foundations, ground floor and pavement design.
- Comments on the likely requirements for any remedial measures which may be required, to address potential contamination or ground gas issues.
- Recommendations for further work (if required).



1.4 Location

The site is located approximately 500m to the north east of Junction 36 of the M1 motorway and immediately to the south of the A6195 (Dearne Valley Parkway), to the north of Hoyland Common and approximately 1.5km to the south of Birdwell village centre. The approximate centre of the site is located at NGR 435280, 400720.

A site location plan is given as Figure 1 in Appendix A.

1.5 Site Description and Topography

The site is roughly rectangular in shape with an area of approximately 4.08ha.

Access to the site is from a recently constructed roundabout that abuts the south west. A low-lying earth bund to prevent vehicular access onto the site is present in this location.

The site comprises a large field with no evidence of any above ground buildings or structures. The site surface is generally formed by undeveloped, undulating scrubland with a wooded area adjacent to the southern boundary.

Ground levels generally fall from the south to the north, with levels at approximately 139m AOD in the south and 133m AOD in the north.

A drainage channel crosses the north of the site with flow from west to east. This drainage channel discharges to a pond via a culvert beyond the site's eastern boundary. A further drainage channel extends from the southern boundary before bifurcating in the centre of the site, with one channel extending to the north east and the other to the north west. At the time of the walkover inspection, the drainage channels contained water, but flow direction was not noticeable.

The north-western boundary is formed by the A6195 (Dearne Valley Parkway), a dual carriageway. A wooded area is present beyond the north-eastern boundary, and an industrial estate including vehicle dismantlers is present beyond the wooded area to the south of the site. The site boundaries are generally formed by timber post and rail fences.

An aerial photograph of the site is presented as Figure 2 in Appendix A.

1.6 Development Proposals

It is proposed to develop the site with three industrial units, service yards, car parking and associated access roads.

A plan of the proposed development has been provided. This is referenced below, and a copy is provided in Appendix A.

- The Harris Partnership Architects. Proposed Industrial Development, Dearne Valley Parkway, Barnsley. Proposed Site Plan. Project No. 15315. Drawing Number (P) 111. Dated July 2020. Revision L. For Gregory Properties.



1.7 Previous Reports

The following previous reports were forwarded to JPG for review as part of the desk study assessment.

- WSP. Phase 1 Ground Conditions Report. Land at Rockingham, Barnsley. Report ref. 70019822-001, dated March 2016, for HCA.
- WSP. Phase 2 Ground Conditions Report. Plot 2. Land at Rockingham, Barnsley. Report ref. 70018922-1602, dated October 2016, for HCA.
- Abbeydale Building Environment Consultants. Desk Study Report. HCA Land Plot 2, Birdwell, West Yorkshire. Report ref. 151066DS, dated January 2017, for Environment & Transport, Barnsley Council.
- Abbeydale Building Environment Consultants. Ground Investigation Report. Hoyland North, Barnsley, South Yorkshire. Report ref. 151087GI, dated September 2019, for Environment & Transport, Barnsley Council.

The Abbeydale desk study report includes additional parcels of land to the south west and also includes as an appendix a coal mining assessment report carried out by South Yorkshire Mining Advisory Services (SYMAS), referenced PJ/M3687/5 and dated 16 August 2013. The Abbeydale ground investigation report targets the footprint of a proposed highway, part of which crosses the south of the site.

A desk study report and coal mining risk assessment for the site were subsequently prepared by JPG; these are referenced below.

- JPG. Geoenvironmental Desk Study Report. Plot 2 Birdwell, Rockingham, Barnsley. Report ref: 5419-JPG-SW-XX-RP-G-0601-S2-P01, dated February 2021, for Gregory Projects Limited.
- JPG. Coal Mining Risk Assessment and Coal Recovery Report. Plot 2 Birdwell, Rockingham, Barnsley. Report ref: 5419-JPG-SW-XX-RP-G-0602-S2-P01, dated February 2021, for Gregory Projects Limited.

The desk study report and coal mining risk assessment include a summary of potential geotechnical constraints including mining and environmental constraints and should be read in conjunction with this report.

Following completion of the above reports by JPG, a preliminary phase intrusive ground investigation comprising static Cone Penetration Tests (CPTs) was carried out; this was reported as:

- JPG. Preliminary Intrusive Ground Investigation Report. Rockingham, Plot 2, Birdwell, Barnsley. Report ref: 5419-JPG-SW-XX-RP-G-0603-S2-P01, dated March 2021, for Gregory Projects Limited.



Based on the CPT test data, and in lieu of any laboratory testing, geotechnical parameters were derived. The report recommended further ground investigation to include laboratory testing of soils to confirm the geotechnical parameters of the underlying materials and an assessment of the suitability of the made ground for re-use in earthworks.

Pertinent information contained within the reports referenced above has been incorporated into this assessment, where appropriate.

1.8 Limitations

The general limitations to the nature of the investigation are outlined in Appendix F.



2.0 FIELDWORK

2.1 Rationale

The intrusive investigation was designed to provide an assessment of the properties of the opencast backfill, and the general ground, groundwater, and hazardous ground gas conditions at the site.

The rationale behind each exploratory location is summarised in Table 2.1 below.

Table 2.1 – Exploratory Hole Rationale

Rationale	Exploratory Holes
Trial pits to obtain general site coverage.	TP101 to TP109
Cable percussive boreholes targeting the footprint of the proposed building and assessing the thickness of the made ground colliery spoil. Combined gas/groundwater monitoring wells were installed in boreholes.	BH101 to BH108, including BH107A.

2.2 Fieldwork

The fieldwork was carried out from 17 May to 4 June 2021. The works undertaken are summarised in Table 2.2 below.

Table 2.2 – Summary of Ground Investigation Works

Investigation Method	No of Positions	Maximum Depth (m bgl)	Monitoring Wells	Monitoring
Trial Pits	9	3.50	-	-
Cable Percussive Boreholes	9	20.80	8 x 50 mm	GG, WL

bgl – below ground level

GG – ground gas monitoring (methane, carbon dioxide, oxygen, hydrogen sulphide, gas flow and atmospheric pressure using a portable gas meter).

WL – standing groundwater level using an electric contact dip meter.

The ground investigation has been undertaken in general accordance with the techniques outlined in BS5930:2015 Code of Practice for Site Investigations. An exploratory hole location plan is contained in Appendix A and exploratory hole records are presented in Appendix B. The investigation was carried out under the full-time supervision of an engineer from JPG.

In-situ standard penetration tests (SPTs) were performed in the cable percussive boreholes. The results are included on the exploratory hole logs provided in Appendix B.

2.3 Surveying

The exploratory locations were set out using a hand-held GPS unit. As-built locations were surveyed using a Leica GPS unit.



3.0 LABORATORY TESTING

3.1 Chemical Analysis

Samples obtained from the site were submitted for chemical analysis. The chemical analysis was designed to:

- Confirm that any existing topsoil is suitable for re-use on the site, i.e. within soft landscaping.
- Assess the concentrations of potential contaminants within any made ground on the site, including the colliery spoil made ground.
- Provide information on the solubility of potential contaminants and therefore the potential for impact on controlled waters.

In addition, selected samples of made ground were submitted for analysis for classification for disposal off-site.

Chemical testing was carried out for the following determinands by Derwentside Environmental Testing Services Limited (DETS) in County Durham. Chemical analysis certificates are presented in Appendix C.

Soils – General

Selected samples of soil were tested for the following contaminants on a total concentration basis:

Arsenic	Mercury	Copper
Cadmium	Lead	Nickel
Chromium	Zinc	Selenium
Cyanide (free)	Phenol	
Speciated Poly Aromatic Hydrocarbons (PAH)		
Soil Organic Matter		
Sulphate (water soluble) and pH		
Asbestos Screen		

In addition, selected samples were submitted for the following analysis:

- Hexavalent chromium, total chloride, total sulphate, total sulphide and ammoniacal nitrogen.
- Total TPH & Speciated TPH (TPHCWG).
- VOCs.



Samples of soil leachate were tested for the following contaminants:

Arsenic	Mercury	Copper
Cadmium	Lead	Nickel
Chromium	Zinc	Selenium
Cyanide (free)	Phenol	
Speciated Poly Aromatic Hydrocarbons (PAH)		
Sulphate and pH		

In addition, calorific value (CV) testing was carried out on samples of the colliery spoil in order to assess the potential for combustion.

3.2 Geotechnical Testing

In-situ standard penetration tests (SPT) were performed within the cable percussive boreholes. The results are presented on the exploratory hole records provided in Appendix B.

Laboratory geotechnical testing was carried out by Professional Soils Laboratory (PSL) in Doncaster, in order to determine the physical characteristics of the substrata and comprised the following:

- Moisture content, Atterberg limits and particle size distributions (PSDs)/sedimentations to confirm the field descriptions of the soils encountered.
- Compaction tests (2.5kg and 4.5kg rammer) and particle density to determine the compaction properties of the made ground colliery spoil.
- California Bearing Ratio (CBR) test (2.5kg rammer) to determine the bearing characteristics of the made ground colliery spoil.
- Consolidation testing to determine the settlement characteristics of the made ground colliery spoil.
- pH, 2:1 water soluble sulphate, acid soluble sulphate and total sulphur.
- Organic content.

The geotechnical testing was carried out in accordance with BS 1377:1990, "Methods of Test for Soils for Civil Engineering Purposes". The results of the geotechnical testing are contained in Appendix D.



4.0 GROUND AND GROUNDWATER CONDITIONS

4.1 Introduction

The ground conditions encountered during the investigation were consistent with the anticipated sequence of strata indicated by the desk study information including geological mapping.

4.2 Ground Conditions

Made ground was encountered in all exploratory holes and was proven to a maximum depth of 20.50m bgl. The made ground was found to be deepest in the south (BH107A) and shallowest in the north-west (BH101).

The made ground was generally found to comprise the following types:

- **Reworked (Made Ground) Topsoil:** Generally soft to firm, brownish grey, gravelly clay with rootlets. The gravel included mudstone and rare brick and coal. This made ground was encountered from ground level to a maximum depth of 0.20m.
- **Cohesive Colliery Spoil:** Generally firm and stiff, dark grey, slightly sandy, gravelly clay with the gravel content comprising predominantly mudstone, coal and sandstone with rare red shale. This material often included a low cobble content of mudstone.
- **Granular Colliery Spoil:** Generally medium dense, dark grey, sandy, clayey gravel of generally mudstone and coal with rare red shale, encountered frequently across the site, both over and within the aforementioned cohesive colliery spoil. This material occasionally included a low cobble content of mudstone.

The made ground was found to be underlain by mudstone bedrock of the Pennine Middle Coal Measures.

4.3 In Situ Testing

Standard Penetration Tests

The results of the Standard Penetration Tests (SPTs) in the colliery spoil and natural strata, which were carried out in the cable percussive boreholes have been corrected in accordance with the energy ratio of the testing equipment.

A summary of the results for each material type are presented in Table 4.3.1.

Table 4.3.1 – Summary of SPT N Values

Material Type	No. of Tests	Range of N Values (Uncorrected)	Mean N Value (Uncorrected)	Range of N Values (Corrected)	Mean N Value (Corrected)
Colliery Spoil Made Ground	73	10 – 50	27	8.8 – 44.2	23.7
Mudstone	11	50	50	44.2	44.2



The SPT N values have been plotted against depth (m bgl) for the colliery spoil made ground. The plot is presented as Figure 3 (in Appendix A and the SPT data (uncorrected) is included on the exploratory hole logs contained in Appendix B. The SPT plot shows a general increase in strength with depth of the colliery spoil made ground. SPTs carried out in the mudstone bedrock resulted in refusals (N values of greater than 50).

Hand Shear Vanes

Due to the disturbed nature of the ground arising from trial pits, it was not possible to undertake hand shear vanes. Subsequently, laboratory hand shear vanes were scheduled on undisturbed samples obtained from cable percussive boreholes, the results of which are contained in Section 4.4 of this report.

Static Cone Penetration Testing

Static Cone Penetration Tests (CPTs) were carried out as part of the preliminary phase intrusive ground investigation and reported as:

- JPG. Preliminary Intrusive Ground Investigation Report. Rockingham, Plot 2, Birdwell, Barnsley. Report ref: 5419-JPG-SW-XX-RP-G-0603-S2-P01, dated March 2021, for Gregory Projects Limited.

Based on the CPT test data, and prior to any laboratory testing, the following geotechnical parameters were derived.

Table 4.3.1 – Summary of Geotechnical Parameters Derived from CPTs

Parameter	Units	Minimum	Maximum	Mean	Suggested Characteristic Value
Undrained Shear Strength	kPa	100	>300	250	60
SPT N Value	-	8	30	17	12
Young's Modulus	MPa	60	100	80	60
Coefficient of Volume Compressibility	m ² /MN	0.02	0.08	0.04	0.05
Coefficient of Consolidation	m ² /year	23	25	24	23
Permeability	m/s	1 x 10 ⁻⁹	1 x 10 ⁻⁵	1 x 10 ⁻⁶	1 x 10 ⁻⁶

4.4 Laboratory Testing

33 samples of colliery spoil were submitted for laboratory testing.

The testing suite was designed to classify the materials and assess the suitability of the materials for re-use in earthworks.

Particle size distribution/sedimentation testing was carried out on eight samples in order to confirm the field descriptions of the materials, determine the proportion of clay minerals and classify the materials for earthworks design. The results are summarised in Table 4.4.1.



Table 4.4.1 – Summary of Particle Size Distribution/Sedimentation Testing

Exp Hole	Depth (m bgl)	Material	Cobbles (%)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
BH102	0.2	Cohesive colliery spoil	0	31	24	24	21
BH102	1.50	Granular colliery spoil	0	48	26	26	
BH104	1.20	Cohesive colliery spoil	0	32	23	45	
BH104	2.00	Cohesive colliery spoil	0	25	38	21	16
BH105	1.20	Cohesive colliery spoil	0	28	20	52	
BH105	4.00	Granular colliery spoil	0	29	35	20	16
BH108	1.20	Cohesive colliery spoil	0	27	38	35	
BH108	4.00	Cohesive colliery spoil	0	30	34	20	16

13 samples were submitted for moisture content testing and Atterberg Limit testing. The results are summarised in Table 4.4.2.

Table 4.4.2 – Summary of Moisture Content and Atterberg Limit Testing

Material	Moisture Content (%)		Plasticity Index (%)		Modified Plasticity Index (%)
	No of samples	Range	No of samples	Range	Range
Colliery Spoil Made Ground	13	11 – 20	13	11 – 18	5.8 – 13.3

The colliery spoil made ground (cohesive and granular) had moisture contents that ranged between 11% and 20%.

Atterberg limit tests in the cohesive and the cohesive fraction of the granular colliery spoil gave plasticity indices which ranged from 11% to 18% with modified plasticity indices of between 5.8% and 13.3%. The modified plasticity indexes of the samples correspond to a low volume change potential.

The Atterberg limit testing in the colliery spoil indicate that all of the samples behave as clays, with all samples lying above the A-line.

The results of the Atterberg limit tests in the cohesive and cohesive fraction of the granular colliery spoil made ground indicate that all materials are of low plasticity, apart from BH105 (1.20 -1.65m), which was borderline intermediate plasticity.

Three samples of cohesive colliery spoil and one sample of granular colliery spoil were submitted for dry density/moisture content relationship testing.

The compaction tests were carried out using a 2.5kg and a 4.5kg hammer. The results are summarised in Table 4.4.3.



Table 4.4.3 – Summary of Compaction Test Results

Exp. Hole	Depth (m bgl)	Material	Weight of Rammer	Natural Moisture Content (NMC %)	Max. Dry Density (Mg/m3)	Optimum Moisture Content (OMC %)	Suitability for Compaction and Range of Acceptable Moisture Contents (%)*
BH102	1.50	Granular colliery spoil	2.5kg	16	1.87	13	OK (13.1 – 17.4)
			4.5kg	16	1.98	10	Too wet (10.2 – 15.0)
BH104	1.20	Cohesive colliery spoil	2.5kg	20	1.84	14	Too wet (13.9 – 19.0)
			4.5kg	20	1.95	11	Too wet (11.0 – 16.2)
BH105	1.20	Cohesive colliery spoil	2.5kg	18	1.81	15	OK (14.9 – 19.7)
			4.5kg	18	1.93	12	Too wet (11.6 – 16.3)
BH108	1.20	Cohesive colliery spoil	2.5kg	14	1.83	14	OK (13.8 – 19.2)
			4.5kg	14	1.94	11	OK (11.0 – 15.2)

* To achieve >95% of Maximum Dry Density and <5% Air Voids

Based on the test results, 50% of the cohesive colliery spoil material is considered too wet to achieve suitable compaction in its present condition with either heavy compaction techniques or lighter and will require drying or modifying in order to be incorporated into the earthworks.

Based on the limited testing carried out, the granular colliery spoil material can be considered suitable for re-use on site in its current condition for light compaction but not heavy compaction (too wet). In addition, any oversize material such as cobbles and boulders will need to be removed.

Six samples were submitted for laboratory California Bearing Ratio (CBR) testing. The results are summarised in Table 4.4.4 below.

Table 4.4.4 – Summary of California Bearing Ratio Results

Exp. Hole	Depth (m bgl)	Material	Compaction Conditions	As Received Moisture Content (%)	CBR Value (%)	
					Sample Top	Sample Base
BH101	4.00	Granular colliery spoil	2.5kg	21	0.2	0.2
BH103	2.00	Cohesive colliery spoil	2.5kg	13	7.1	8.2
BH105	4.00	Granular colliery spoil	2.5kg	13	14.6	17.2
BH106	3.00	Cohesive colliery spoil	2.5kg	11	11.4	12.4
BH107A	1.20	Cohesive colliery spoil	2.5kg	12	14.6	19.5
BH108	4.00	Cohesive colliery spoil	2.5kg	13	11.7	14.0

The laboratory CBR results for the samples compacted using a 2.5kg rammer ranged between 7.1% (BH103) and 19.5% (BH107A) with the exception of BH101 which recorded an extremely low CBR of 0.2%. This result is considered anomalous due to the sample's high moisture content.



Two one-dimensional consolidation tests were carried out on undisturbed samples obtained from BH101 and BH105. These included two samples of cohesive colliery spoil and one of granular colliery spoil.

The results are summarised in Table 4.4.5.

Table 4.4.5 – Summary of One-Dimensional Consolidation Tests

Exp. Hole	Specific Depth (m bgl)	Material	Pressure Range (kPa)	M_v (m ² /MN)	C_v (m ² /yr)
BH101	3.00	Medium dense dark grey slightly sandy clayey gravel (Granular colliery spoil)	0 – 50	0.722	6.258
			50 – 100	0.360	5.667
			100 – 200	0.220	3.653
			200 – 400	0.137	2.996
			400 – 200	0.023	5.087
BH105	2.00	Stiff dark grey slightly sandy gravelly clay (Cohesive colliery spoil)	0 – 50	1.956	15.828
			50 – 100	0.775	5.327
			100 – 200	0.348	3.566
			200 – 400	0.176	2.982
			400 – 200	0.032	4.292

M_v – Coefficient of volume compressibility

C_v – Coefficient of the rate of volume compressibility

Taking into consideration the overburden pressure and assuming a future floor loading of 50kN/m², the coefficient of volume compressibility (M_v) is indicated to be approximately 0.36m²/MN for sample BH101 at 3.00m and approximately 0.94m²/MN for sample BH105 at 2.00m depth, suggesting the colliery spoil made ground is of high compressibility. However, this contradicts the results obtained from the CPTs.

Laboratory hand vane tests were carried out on undisturbed samples (top and bottom) obtained from BH101 to BH106 inclusive, BH107A and BH108, at depths of between 4.00m and 9.50m.

The results are summarised in Table 4.4.6.

Table 4.4.6 – Summary of Undrained Shear Strength Obtained by Laboratory Hand Shear Vanes

Exp. Hole	Specific Depth (m bgl)	Material	Moisture Content (%)	Peak Shear Strength (kPa)
BH101	5.00	Sandy clayey gravel (Colliery spoil made ground)	17	33
BH102	4.00	Sandy clayey gravel (Colliery spoil made ground)	10	>140
BH103	6.50	Sandy clayey gravel (Colliery spoil made ground)	18	38
BH104	8.00	Sandy gravelly clay (Colliery spoil made ground)	16	40
BH105	5.00	Sandy clayey gravel (Colliery spoil made ground)	13	>140
BH106	5.00	Sandy gravelly clay (Colliery spoil made ground)	17	31
BH107A	5.00	Sandy clayey gravel (Colliery spoil made ground)	11	>140
BH108	9.50	Sandy clayey gravel (Colliery spoil made ground)	20	24

Laboratory hand shear vane tests carried out on the cohesive colliery spoil in BH105 to BH107 inclusive resulted in typical undrained shear strengths indicative of low to medium strength materials.



Laboratory hand shear vane tests carried out on samples from BH105, BH102 and BH107A resulted in shear strengths greater than 140kPa, typical of high to very high strength materials. The remaining hand shear vane tests produced shear strengths ranging from 24kN/m² to 40kN/m², indicative of a low strength material.

The almost bimodal distribution of the shear strengths is likely due to disturbance in obtaining the samples. On this basis, the lower values are discarded. Moisture contents in BH105, BH102 and BH107A, all exhibiting high strengths, ranged from 10 to 13%.

4.5 Groundwater

During the site investigation, groundwater was commonly encountered in boreholes and less frequently so in trial pits.

A summary of all groundwater encountered is presented in Table 4.5.1.

Table 4.5.1 – Summary of Recorded Groundwater Events.

Location	Groundwater event	Depth (mbgl)	Stratum
TP102	Inflow (possible land drain)	1.30	Cohesive colliery spoil
TP109	Seepage	1.25	Granular colliery spoil
BH101	Seepage	1.00	Cohesive colliery spoil
BH101	Seepage	4.00	Granular colliery spoil
BH102	Seepage	0.20	Cohesive colliery spoil
BH102	Seepage	1.00	Granular colliery spoil
BH104	Seepage	4.20	Granular colliery spoil
BH104	Seepage	5.00	Granular colliery spoil
BH105	Seepage	7.50	Cohesive colliery spoil
BH105	Seepage	9.00	Cohesive colliery spoil
BH107A	Seepage	2.70	Granular colliery spoil
BH107A	Seepage	14.20	Granular colliery spoil
BH107A	Seepage	19.00	Granular colliery spoil

Groundwater inflow was observed in TP102 at 1.30m and TP109 at 1.25m. There was a significant inflow of groundwater in TP102 whilst a small seepage was noted in TP109. No other trial pits encountered groundwater.

Most boreholes encountered groundwater strikes. Groundwater strikes generally spanned the full depth range of the colliery spoil, ranging from 0.20m to 19.00m. BH106, BH103 and BH108 did not encounter groundwater.

Monitoring wells were installed in all of the boreholes. The response zones of the monitoring wells are entirely in colliery spoil made ground.

A summary of the monitored groundwater levels is presented in Table 4.5.2.



Table 4.5.2 – Summary of Recorded Groundwater Levels.

Location	Water level during monitoring (m bgl)						
	Pipe diameter	08/06/2021	16/06/2021	23/06/2021	29/06/2021	09/07/2021	13/07/2021
BH101	50mm	3.22	3.35	3.65	3.68	3.69	3.72
BH102	50mm	NR	1.98	2.25	2.67	3.34	4.44
BH103	50mm	1.68	5.60	6.20	6.53	6.77	6.96
BH104	50mm	4.00	4.03	4.02	4.04	4.06	4.08
BH105	50mm	5.63	5.57	5.70	5.70	5.77	5.80
BH106	50mm	DRY	DRY	DRY	DRY	DRY	DRY
BH107A	50mm	9.66	9.65	9.93	10.05	10.05	10.07
BH108	50mm	DRY	DRY	DRY	DRY	DRY	DRY

m bgl – metres below ground level; NR – Not Recorded

Groundwater monitoring has been carried out on six occasions. Except for the disparity from visit two to visit three, where there was a significant decrease, water levels over the six visits remained relatively consistent with all boreholes showing a gradual decreasing trend.

BH106 and BH108 both remained completely dry during the monitoring period. Water levels were at their lowest during the final visit, with BH102 decreasing from 3.34 to 4.44m. The most significant fall in water level was seen in BH103 which decreased from 1.68 to 5.60m. This is likely due to the purging process of sampling groundwater from the well, from which the water level did not recharge and therefore is not representative of the groundwater regime and should be discarded.

The water level in BH104 remained the most consistent during the monitoring period, with an initial reading of 4.00m during the first visit and a reading of 4.08m during the final visit.

A reading was not recorded from BH102 during the first visit due to the well and headworks flooding.

It should be noted that the groundwater conditions recorded are based on observations made at the time that site work was carried out. Groundwater levels will vary owing to seasonal and weather-related effects. It should also be noted that these groundwater readings were carried out within the backfilled opencast and may not reflect the groundwater regime within the surrounding natural strata.

4.6 Obstructions

Cobbles were generally encountered frequently throughout the site. Whereas boulders were generally encountered in exploratory holes in the south, corresponding to the footprint of the former opencast coal site.

BH107 and TP106 were terminated on shallow boulders, these are both located in the south of the site in close proximity to the highwall.



4.7 Stability

Based on the ground conditions encountered, it is likely that excavations within cohesive soils will remain stable in the short term. However, it is considered likely that if excavations were left unsupported, collapse will occur.

Instability should be anticipated in excavations in made ground and granular soils and support of excavations will be required.

4.8 Ground Gas

Ground gas monitoring has been undertaken on six occasions. The works were carried out using a portable gas meter in accordance with the standard JPG methodology and included measurements of methane, carbon dioxide, oxygen, hydrogen sulphide, carbon monoxide, gas flows and atmospheric pressure. The results of the gas monitoring are presented in Appendix E and discussed in Section 6.7 of this report.



5.0 GEOTECHNICAL AND ENGINEERING ASSESSMENT

5.1 Development Proposals

It is proposed to develop the site for an industrial end use, comprising three industrial units with associated car parking, service yards, access routes and peripheral areas of landscaping.

A drawing of the proposed development has been provided, which is referenced below, and a copy is contained in Appendix A.

- The Harris Partnership Architects. Proposed Industrial Development, Dearne Valley Parkway, Barnsley. Proposed Site Plan. Project No. 15315. Drawing Number (P) 111. Dated 07.2020. Revision L, for Gregory Properties.

5.2 Foundations and Ground Floor Construction

The selection of foundation type is largely governed by the thickness of any made ground and the nature of the underlying natural strata.

Based on the site layout plan referenced above and the ground investigation works already carried out, the industrial units are to be located wholly on the backfilled opencast and not over the buried highwall.

Ground conditions are likely to comprise colliery spoil made ground/engineered fill to depths of between 13.60m and 23.50m bgl with the deepest made ground located adjacent the highwall in the south. As part of the recent JPG ground investigation, made ground was encountered in all exploratory holes and was proven to a maximum depth of 20.50m bgl.

Based on information contained within the previous Abbeydale and WSP reports, the opencast backfill was compacted under the full-time supervision of Mott MacDonald.

Based on the CPT test results obtained as part of the earlier JPG March 2021, in-situ tests (SPTs) and laboratory testing carried out as part of this ground investigation, an allowable bearing capacity of 100kN/m² can be assumed for the colliery spoil materials below 1.00m depth.

On this basis, it will be possible to utilise a continuous reinforced strip footing and ground-bearing floor slabs founded on the engineered fill following any cut/fill works. Due to the variability of the near surface soils, it should be assumed that at least the upper 1.00m of soils will require re-engineering and/or replacement with suitably engineered fill.

Bedrock strata generally comprised extremely weak mudstone of the Pennine Middle Coal Measures. Based on the anticipated loading, it is not considered likely that foundations will be required to extend onto/into the underlying bedrock.



Any earthworks/ground improvement should be designed in order to provide an acceptable allowable bearing capacity for ground floor slabs and shallow pad foundations.

5.3 Earthworks

It is proposed to carry out cut and fill earthworks to create a suitable development platform on the site.

Based on the laboratory results, the colliery spoil may be too wet to be incorporated in the earthworks unless it is dried/modified (by the addition of lime). Proper selection and control will be required as part of the works in order to use the materials on the site. The material should not be allowed to deteriorate during excavation and compaction and must be sufficiently protected from traffic after placement.

Any earthworks should be carried out in accordance with the Manual of Contract Documents for Highway Works, Volume 1 Specification for Highway Works, Series 600 Earthworks.

Once final site formation levels have been agreed, it is recommended that a detailed Earthworks Specification is produced prior to commencement of works on the site.

5.4 Excavations

It is considered likely that if excavations were left unsupported then over time, some collapse would occur.

Good working practice with respect to drainage of excavations and formations will be required to protect materials. Any excavations for structural foundations must be covered without delay with blinding concrete to prevent softening by water.

The requirement for temporary support of excavations should be assessed on an individual basis and, in any case, excavations of greater than 1.2m depth requiring man entry will require temporary support in accordance with HSE guidance.

Alternatively, the sides of the excavation will need to be battered back for the safety of operatives. Guidance on safe batter slopes can be obtained from CIRIA Report 97 Trenching Practice.

5.5 Control of Groundwater

During the recent JPG ground investigation groundwater was encountered in trial pits at depths of 1.25m and 1.30m. Groundwater strikes were recorded in boreholes at depths of between 0.20m and 19.00m.



Reference should be made to guidance given in the Manual of Contract Documents for Highway Works, Volume 1: Specification for Highway Works, Series 600 Earthworks. In particular the following recommendations are made with respect to the control of surface water and shallow groundwater.

The contractor shall keep earthworks free of water including:

- Arranging for the rapid removal of water which is shed on the earthworks or enter the earthworks from any source.
- Lowering and maintaining by appropriate measures, the water level in excavations sufficiently to enable the permanent works to be constructed.

In order to keep the site free of water the contractor shall do the following:

- Form and maintain cuttings, embankments and other areas of fill with appropriate falls, gradients and sealed surfaces.
- Provide where necessary temporary watercourses, drains, and pumping.
- Discharge accumulated water and groundwater into the permanent outfalls of the drainage system where practicable; and
- Provide adequate means for trapping silt on temporary systems discharging into permanent drainage systems.

5.6 Obstructions

Cobbles were encountered throughout the site, however, there was generally a higher proportion of cobbles and particularly boulders encountered in the south, corresponding to the footprint of the former opencast coal site.

Where foundation excavations encounter large cobbles or boulders they should be broken out/removed and replaced with stone, in order to avoid any hard spots remaining immediately below the foundation.

5.7 Roads, Pavements and Hardstanding Surfaces

Access roads and vehicular parking is to be constructed as part of the development. Laboratory CBR testing has recorded CBR values between 7.1% and 19.5% for light compaction (2.5kg rammer). Generally, where the CBR is <2.5% ground improvement is required.

Based on the high CBR values received from laboratory testing, it is likely that a CBR value of at least 3% will be achievable without the need for ground improvement methods.

Any soft spots will need to be removed/treated at formation level.



5.8 Chemical Attack on Buried Concrete

Laboratory testing has been undertaken on samples of the made ground and groundwater to determine the sulphate content and acidity and hence the concrete class required for buried concrete.

Laboratory testing in the made ground recorded water-soluble sulphate contents ranging between 45mg/l and 2,000mg/l and pH values of between 4.8 and 10.

Laboratory testing of the groundwater recorded sulphate concentrations ranging between 48mg/l and 23,000mg/l and pH values of between 5.9 and 7.5.

Testing of groundwater in BH105 (at 8.00m bgl) resulted in a very high sulphate concentration of 23,000mg/l. When resampled and retested, the sulphate concentration was 49mg/l.

Monitoring of the groundwater has shown that groundwater levels are generally below 2.00m bgl. Concrete foundations should therefore not be in contact with groundwater. For this reason, a characteristic value based on the soil sulphate assessment rather than groundwater has been used. If a deeper foundation solution is adopted, the sulphate classification will need to be reassessed.

Foundations will come into contact with colliery spoil made ground. It is therefore recommended that concrete should be designed to Aggressive Chemical Environment for Concrete (ACEC) Design Sulphate Class DS-3 and ACEC Class AC-4.

This assessment has been made in accordance with BRE Special Digest 1: 2005, entitled 'Concrete in Aggressive Ground'.



6.0 ENVIRONMENTAL RISK ASSESSMENT

6.1 Introduction

The statutory definition of contaminated land is given in the Environmental Protection Act, Part IIA, Section 78, 1990, which was introduced by the Environment Act, Section 57, Department of Environment, 1995 and is defined as:

Land which appears to the Local Authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land that:

- Significant harm is being caused or there is a significant possibility of such harm being caused (where harm is defined as harm to health of living organisms or other interference with the ecological systems of which they form a part and, in the case of man, includes harm to his property); and/or
- Significant pollution of controlled waters is being caused, or there is a significant possibility of such pollution being caused (by the land).

The presence of contaminated materials on a site is generally only of concern if an actual or potentially unacceptable risk exists. The potential for harm to occur requires three conditions to be satisfied:

- **Sources** – The presence of substances (potential contaminants/pollutants), in or under the ground, that may cause harm or pollution.
- **Receptors** - The presence of a receptor which may be harmed, e.g. the water environment or humans, buildings, fauna, and flora; and
- **Pathway** - The existence of a linkage between the Source and the Receptor.

In summary, the presence of measurable concentrations of contaminants within the ground and subsurface environment does not automatically imply that a contamination problem exists, since contamination must be defined in terms of pollutant linkages and an unacceptable risk of harm to available receptors.

The nature and importance of both pathways and receptors, which are relevant to a particular site, will vary according to the sensitivity of the intended end use of the site and the sites characteristics and environmental setting.



Legislation and guidance on the assessment of contaminated sites acknowledges the need for a tiered risk-based approach. This is set out in the Environment Agency's manual *Land contamination: risk management* (published in June 2019, last updated 19 April 2021) and comprises the following stages of risk assessment:

- | | |
|---|---|
| Tier 1: Preliminary risk assessment (PRA) | As part of this assessment, the overall site objectives are defined. Current and historical information about the site and the potential contaminants expected to be present are assessed and an outline conceptual model (CM) is developed. The risks are assessed qualitatively, and the findings reported in the PRA (or desk study). The report recommends what further works would be required in order to assess whether the site is suitable for its proposed use. |
| Tier 2: Generic quantitative risk assessment (GQRA) | The GQRA uses Generic Assessment Criteria and a standard set of generic assumptions based on specific end uses in order to assess the risks to receptors. It includes the collection of more detailed information including laboratory analysis of soil and water samples in order to inform and assess the risks. |
| Tier 3: Detailed quantitative risk assessment (DQRA) | If pollutant linkages are confirmed as part of the GQRA, these are known as relevant pollutant linkages (RPLs) and further detailed assessment is required. At this tier, detailed site-specific information is collected to estimate the risk or to develop site-specific assessment criteria (SSAC). This may include collecting information about the receptor. |

A Tier 1 Assessment has been prepared for the site by JPG and reported as Geoenvironmental Desk Study Report. Plot 2 Birdwell, Rockingham, Barnsley. Report Ref. 5419-JPG-SW-XX-RP-G-0601-S2-P02, dated February 2021.

This environmental risk assessment undertaken by JPG constitutes a Tier 2 Generic Quantitative Risk Assessment (GQRA) and has been carried out in accordance with the Environment Agency's *Land contamination: risk management* guidance.

6.2 Assessment Approach

The results of the chemical analysis for each determinand will be assessed against their respective GAC. These include the LQM/CIEH Suitable 4 Use Levels (S4UL) and Category 4 Screening Levels (C4SL) which were developed using the UK Contaminated Land Exposure Assessment (CLEA) Framework Documents and Software.

The CLEA model uses generic assumptions about the fate and transport of chemicals in the environment and a generic conceptual model (referred to as generic land use scenarios) for site conditions and human behaviour, to estimate child and adult exposures to soil contaminants for those living, working and/or playing on contaminated sites over long time periods.



The S4UL and C4SL screening levels have been derived for a variety of land uses including residential, allotments, commercial and public open space.

In the absence of S4UL and C4SL for potential contaminants, appropriate alternative GAC will be used.

Controlled Waters

Based on the environmental setting of the site, the leachate chemical test results have been compared against Generic Assessment Criteria (GAC) threshold values based on Drinking Water Standards and/or Environmental Quality Standards (EQS).

An exceedance of a threshold value does not directly imply there is an unacceptable risk, however; but indicates that the exceedance should be further assessed via the qualitative source-pathway-receptor (S-P-R) approach.

6.3 Evaluation of Soils Analysis

Initially, the results of the chemical analysis for each potential contaminant will be compared directly with their respective GAC. Based on the current development proposals for the site, i.e. commercial/industrial, the results of the chemical analysis for the soil samples have been assessed against GAC for a commercial end use.

If any significant exceedances of the GAC are noted, then the results will be subject to statistical analysis.

In total, 13 samples, eight of granular colliery spoil, three of cohesive colliery spoil and two of reworked (made ground) topsoil were submitted for chemical analysis.

Human Health

The results have been compared directly with their respective GAC. The results are summarised in Table 6.3.1.



Table 6.3.1 – Summary of Chemical Analysis Results

Determinand	GAC for Commercial End Use (mg/kg)	Sample Mean (mg/kg)	Range of Results (mg/kg)	Do any samples exceed the GAC?
Arsenic	640 (1)	20.50	2.40 – 48.00	No
Cadmium	190 (1)	0.30	<0.01 – 0.70	No
Chromium	8600 (1)	25.33	5.3 – 170	No
Hexavalent Chromium	33 (1)	<1.00	<1.00	No
Copper	68000 (1)	43.60	16.00 – 120.00	No
Lead	2330 (2)	25.80	5.80 – 100.00	No
Mercury	1100 (1)	0.10	0.05 – 0.16	No
Nickel	980 (1)	27.31	18.00 – 38.00	No
Selenium	12000 (1)	0.98	0.70 – 1.30	No
Zinc	730000 (1)	78.000	27.00 – 320.00	No
Cyanide (free)	34(3)	0.20	<0.10 – 0.20	No
Phenol - Monohydric	440(1)	0.40	<0.30 – 0.40	No
Naphthalene	190 (1)	0.11	0.04 – 0.34	No
Acenaphthylene	83000 (1)	<0.03	<0.03	No
Acenaphthene	84000 (1)	<0.03	<0.03	No
Fluorene	63000 (1)	<0.03	<0.03	No
Phenanthrene	22000 (1)	0.09	0.03 – 0.15	No
Anthracene	520000 (1)	0.12	<0.03 - 0.12	No
Fluoranthene	23000 (1)	0.05	<0.03 – 0.07	No
Pyrene	54000 (1)	0.05	<0.03 – 0.06	No
Benzo(a)anthracene	170 (1)	0.03	<0.03 – 0.03	No
Chrysene	350 (1)	0.04	<0.03 – 0.04	No
Benzo(b)fluoranthene	44 (1)	0.04	<0.03 – 0.04	No
Benzo(k)fluoranthene	1200 (1)	<0.03	<0.03	No
Benzo(a)pyrene	35 (1)	<0.03	<0.03	No
Indeno(1,2,3-c,d)pyrene	500 (1)	<0.03	<0.03	No
Dibenzo(a,h)anthracene	4 (1)	<0.03	<0.03	No
Benzo(g,h,i)perylene	3900 (1)	<0.03	<0.03	No

(1) S4UL, (2) C4SL, (3) Atkins AtRisk Value (Resi)

None of the above determinands were detected at concentrations in excess of their respective GAC.

Four samples were submitted for an asbestos screen. No asbestos fibres or asbestos containing materials were detected in any of them samples.

Calorific value (CV) tests were carried out on 10 samples, two of reworked topsoil (made ground), six of granular colliery spoil and two of cohesive colliery spoil. Four of the samples were above the screening value (2MJ/kg), with one sample having a result of 8.9MJ/kg (TP107). Soils with a CV of greater than 10MJ/kg are almost certainly combustible. Soils with values below 2MJ/kg are unlikely to burn. Four of the 11 samples recorded a CV of greater than 2MJ/kg and is therefore deemed to be potentially combustible.

6.4 Evaluation of Controlled Waters Analysis

Six samples were submitted for leachability analysis. These consisted of one reworked topsoil (made ground) sample and five of colliery spoil samples. The result for each determinand was compared directly against their respective GAC. The results are summarised in Table 6.4.1.



Table 6.4.1 – Summary of Leachability Results

Determinand	GAC (µg/l)	TP102 (1.50 – 1.70)	TP104 (0.20 – 0.40)	TP106 (0.10 – 0.30)	TP107 (0.00 – 0.25)	TP108 (0.40- 0.50)	TP109 (0.20 – 0.30)
Arsenic	10 (1)	0.43	0.18	< 0.16	0.2	< 0.16	< 0.16
Cadmium	5 (1)	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Chromium	50 (1)	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
Copper	2000 (1)	0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Lead	10 (1)	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09
Mercury	1 (1)	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nickel	20 (1)	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Selenium	10 (1)	0.85	0.37	< 0.25	< 0.25	< 0.25	< 0.25
Zinc	5000 (1)*	< 1.3	< 1.3	< 1.3	2.4	3.5	1.5
pH	6.5-9.5	6.1	6.4	6.3	6.1	5.9	6.3
Cyanide Free	50 (1)	< 20	< 20	< 20	< 20	< 20	< 20
Sulphate	250,000	37,000	1,400	2,000	32,000	29,000	660
Naphthalene	4.24 (2)	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Anthracene	0.193 (2)	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	0.0122 (2)	0.03	0.01	0.02	< 0.01	< 0.01	< 0.01
Benzo (a) pyrene	0.1 (1)	0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Sum of: Benzo (b) fluoranthene, Benzo (k) fluoranthene, Indeno (1,2,3-c,d) pyrene, and; Benzo (g,h,i) perylene.	0.1 (1)	0.09	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenol	14.9 (2)	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50

(1) Water Supply (Water Quality) Regulations 2000.

*Historical 1989 Threshold Value.

(2) Water Framework Directive 2015, Surface Water, Maximum Threshold Value.

Two elevated concentrations of leachable fluoranthene were recorded in TP102 and TP106, both samples of granular colliery spoil, with concentrations of 0.03µg/l and 0.02µg/l respectively.

All of the samples have a pH slightly below the GAC for drinking water standards, ranging from 5.9 to 6.4, indicative of slightly acidic conditions. This issue relates to concrete design and is addressed in Section 5.8 of this report.

6.5 Evaluation of Hazardous Gases

Based on the desk study information and ground conditions encountered, i.e. topsoil overlying deep colliery spoil made ground and coal seams with associated workings both under and adjacent to the site, it is considered that there is the potential for the presence of hazardous gases on the site.



6.6 Ground Gas Monitoring

In order to assess the potential risks posed to the proposed development from hazardous gases, monitoring wells were installed in eight cable percussive boreholes.

Ground gas monitoring has been undertaken on six occasions. The works were carried out using a portable infra-red gas meter in accordance with the standard JPG methodology and included the measurement of methane, carbon dioxide, oxygen, hydrogen sulphide, carbon monoxide, gas flows and atmospheric pressure.

6.7 Summary of Results

The results of the gas monitoring are presented on the site visit record sheets in Appendix E and are summarised below:

- Maximum methane concentrations of 0.2% and 0.1% were recorded in BH103 and BH102 during visits three and five, respectively.
- Carbon dioxide has been recorded in all of the monitoring wells on every visit, maximum steady concentrations ranged between 0.2% v/v and 13.9% v/v.
- Reduced oxygen concentrations (i.e. <16% v/v) were recorded in all of the monitoring visits. The lowest recording being 0.2% v/v in BH106.
- A maximum peak flow of 4.4 l/hr was recorded in BH101. Maximum steady flows of 0.1 l/hr were recorded in BH104 and BH107A.

Three of the monitoring visits were carried out during periods of steady atmospheric pressure. Two of the monitoring visits were during regionally rising pressure and the remaining visit was during regionally falling atmospheric pressure. Barometric pressures during the monitoring period ranged between 996mB and 1009mB.

6.8 Requirements for Gas Protection Measures

The results of the gas monitoring have been assessed in accordance with the following:

- BS8485:2015, 'Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings'.

A maximum steady concentration of carbon dioxide (CO₂) of 13.9% v/v was recorded in BH108 during the sixth monitoring visit. The other visits identified carbon dioxide above 5% v/v within BH103, BH104 and BH106. The source of the carbon dioxide is considered to be the colliery spoil made ground associated with the backfilled opencast sites.

Based on the maximum steady concentration of CO₂ and the maximum steady flow, the Gas Screening Value (GSV) for carbon dioxide is 0.0139 l/hr. Based on this result and the elevated concentrations (>5% v/v) of CO₂ recorded on the site, the site would be classified as Characteristic Situation (CS) 2 (low risk), in accordance with BS8485:2015.



6.9 Radon Risks

The site is not in a radon affected area as defined by Public Health England, as less than 1% of properties are above the action level. No radon protective measures will be required for new properties constructed on the site.

6.10 Summary of Sources, Pathways and Receptors

Sources

Based on the results of the analysis carried out, the following potential sources of contamination are considered to be present on the site:

- Potentially combustible coal-rich material.
- Slightly elevated concentrations of potentially leachable fluoranthene.
- Hazardous ground gases (carbon dioxide).

Pathways

Based on the available information and the proposed development of the site for an industrial end use, the following potential exposure pathways will require consideration, both during the development works and on completion of the construction.

- Bonfires, garden fires, sources of ignition.
- Leaching/migration of potential contaminants from soil into groundwater and surface water via groundwater and surface water flow.
- Ingestion and dermal contact with contaminated groundwater.
- Inhalation of hazardous gases.

Receptors

The potential receptors are considered to be:

- Development workers and future maintenance workers involved in excavations, e.g. foundations or where services are being installed or repaired following development.
- Future end users of the site (e.g. employees).
- Future end users of the site and buildings (in case of fire).
- Groundwater in the underlying Secondary A Aquifer (bedrock); and,
- Inland rivers (drainage channels) located on site and Shortbridge Dyke, 50m east of the site.

6.11 Source – Pathway – Receptor Linkages

Based on the above potential sources, pathways and receptors, the following linkage assessments have been considered.



This assessment is based on current site conditions (unless stated) and does not consider exposure pathways following any further works on the site.

Development Workers and Future Maintenance Workers

Based on the sources of potential contamination which have been identified on the site, there is a risk to development and maintenance workers involved in groundworks at the site. There is the potential for exposure to the following:

- Elevated concentrations of hazardous ground gases (carbon dioxide).

Future End Users of the Site

There is potential for exposure to the following:

- Potentially combustible coal-rich material.
- Elevated concentrations of hazardous ground gases (carbon dioxide).

Groundwater in the Underlying Aquifers and Nearby Surface Watercourse

Based on the site in its current condition, there is potential for exposure to the following:

- Slightly elevated concentrations of leachable PAH species (including fluoranthene) within the soils.

An assessment of risk to controlled waters should consider the environmental setting of the site, which is summarised below:

- The Water Supply (Water Quality) Regulations, from which the majority of the GAC for leachate have been derived, is considered to be conservative when applied to an assessment of controlled waters. They are based on the concentrations of potential contaminants at the point of use, i.e. consumers' taps. For this reason, the slightly raised levels of leachable fluoranthene are deemed not significant.
- The bedrock geology below the site is classified as a Secondary A Aquifer. There are no records of any groundwater abstractions within 1km of the site. There are no potable water abstraction licences within 2km of the site. The site does not lie within an Environment Agency Groundwater Source Protection Zone.
- There are three watercourses (drainage channels) classed as 'Inland Rivers' on site, which feed into Shortbridge Dyke, 50m to the east of the site.
- The shallow ground conditions include cohesive and granular colliery spoil. The colliery spoil is predominantly cohesive in nature at shallow depth. The cohesive residual soil (weathered mudstone) and colliery spoil will limit the downward migration of potential contaminants to the underlying Secondary A Aquifer.
- The nature of the proposed development comprises a large industrial development with large areas of hardstanding for vehicles and storage. The building and hard cover will form a barrier to the downward migration of rainwater and therefore reduce the potential for infiltration, downward migration and leaching of potential contaminants.



Bases on the factors above, i.e. the presence of colliery spoil, large areas of hardstanding and low sensitivity of the site with regard to controlled waters, it is concluded that there are no plausible linkages to controlled water receptors. Therefore, the risk to controlled waters is considered to be very low.

Buildings and Services

Recommendations with respect to the chemical attack on buried concrete are given Section 5.8.



6.12 Conceptual Site Model & Risk Rating

The conceptual model, updated following the recent ground investigation, is summarised in Table 6.12 below.

Table 6.12 Updated Conceptual Model

Source	Pathway	Receptor	Risk Rating	Comments
Contamination in Soil, Rock or Water Slightly elevated concentrations of leachable PAH species (including fluoranthene) within the soils.	Leaching of mobilised contaminants	Groundwater Secondary A Aquifer.	Negligible	Recorded geology is classified as a Secondary A Aquifer. Site not located in a groundwater Source Protection Zone. No records of any groundwater abstractions within 1km of the site.
	Migration via ground-water flow.	Surface Water Features On site drainage channels	Negligible	No surface water abstractions within 2km.
Hazardous Ground Gases/Soil Vapours Colliery spoil made ground below site.	Ground Gas Migration - Migration through granular colliery spoil made ground. - Inhalation.	Future Site Users - Pedestrians - Future Highway Maintenance workers.	Low/ Moderate	Gas monitoring has identified the site is classified as Characteristic Situation (CS) 2 (low risk), in accordance with BS8485:2015 due to elevated concentrations (>5% v/v) of CO2 recorded on the site.
		Users During Development - Pedestrians - Construction Workers	Low/ Moderate	Appropriate health and safety procedures to be in place during the construction phase of the development.
Potentially combustible coal-rich made ground	Combustion of soils with elevated calorific value in the presence of a heat source	Future Site Users - Pedestrians - Future Highway Maintenance workers.	Low/ Moderate	Elevated levels of calorific value were identified in the laboratory testing results of the made ground.
Aggressive Contaminants in Soil/Water	Direct contact.	Construction Materials Concrete.	Moderate	In accordance with the sulphate assessment of the made ground soils and groundwater, concrete should be designed to Aggressive Chemical Environment for Concrete (ACEC) Design Sulphate Class DS-3 and ACEC Class AC-4. If a deeper foundation solution is adopted, the sulphate classification will need to be reassessed.
		Construction Materials Services.	Moderate	



6.13 Mitigation Measures

In order to mitigate the risks posed by the potential contaminants which are present on the site, consideration should be given to the following mitigation measures.

Development and Maintenance Workers

- Site workers involved in groundworks should take the necessary measures to ensure that all works in excavations and confined spaces are carried out in accordance with best practice in order to prevent exposure to potentially hazardous gases.
- Site workers involved in groundworks should use appropriate PPE, i.e., overalls and gloves. Appropriate health and safety measures, e.g., washing hands prior to eating or drinking, should also be enforced.
- During development of the site, all workers should remain vigilant to the possible risk of encountering areas of potentially contaminated material. Should potentially contaminated material be encountered, site management should be informed. Further testing may then be required to assess the risk to health and safety of the site workers and the environment.
- All employers involved in works at the site should produce an appropriate method statement and risk assessment, to which all employees should comply, e.g. working in confined spaces. Reference should also be made to the appropriate HSE and other guidance for working on contaminated and potentially contaminated sites.

Future Site Users

As part of the preparatory/enabling works for the site, any coal-rich materials should be removed to at least 1m below finished ground levels in landscaped areas to ensure that there is no risk of combustion. Coal-rich materials should also be removed from service corridors and replaced with granular fill materials.

In landscaped areas, a suitable thickness of topsoil and subsoil should be placed. It is likely that this will comprise a minimum 150mm topsoil and a minimum 300mm subsoil.

Ground gas protection measures to achieve Characteristic Situation (CS) 2 are required for new buildings constructed on the site.

6.14 Classification of Materials for Disposal Off-Site

In total 13 samples were assessed using HazWasteOnline™ in order to determine the classification of the materials for disposal off-site.

Based on the results of the chemical analysis, all the samples can be classified as non-hazardous.

Details of the classification generated by HazWasteOnline™, is included in Appendix C.



The results of the chemical analysis and the waste classification should be forwarded to the landfill operator to confirm this assessment and provide a price for disposal.



Appendix A Figures/Drawings

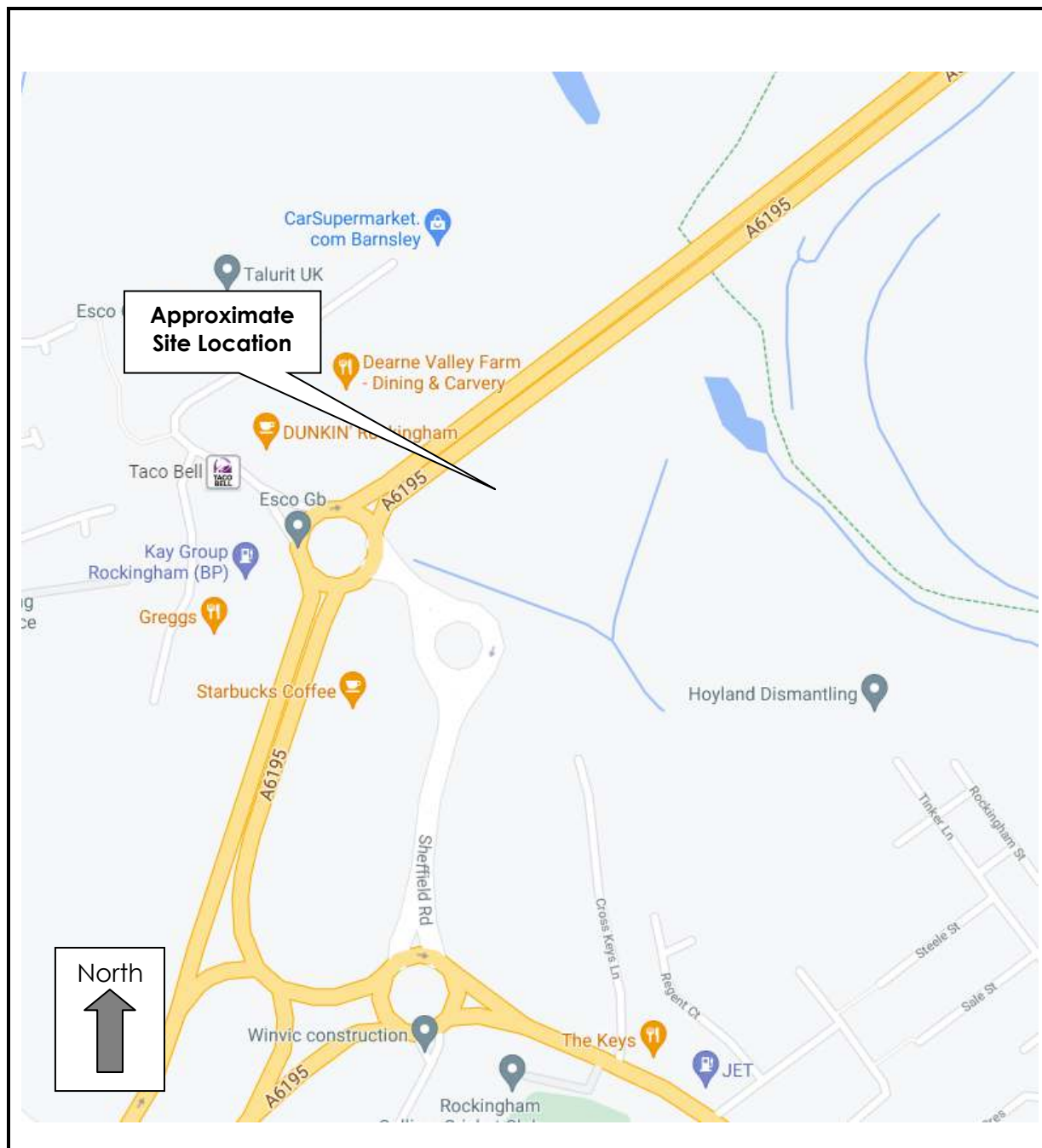


Figure 1 – Site Location Plan

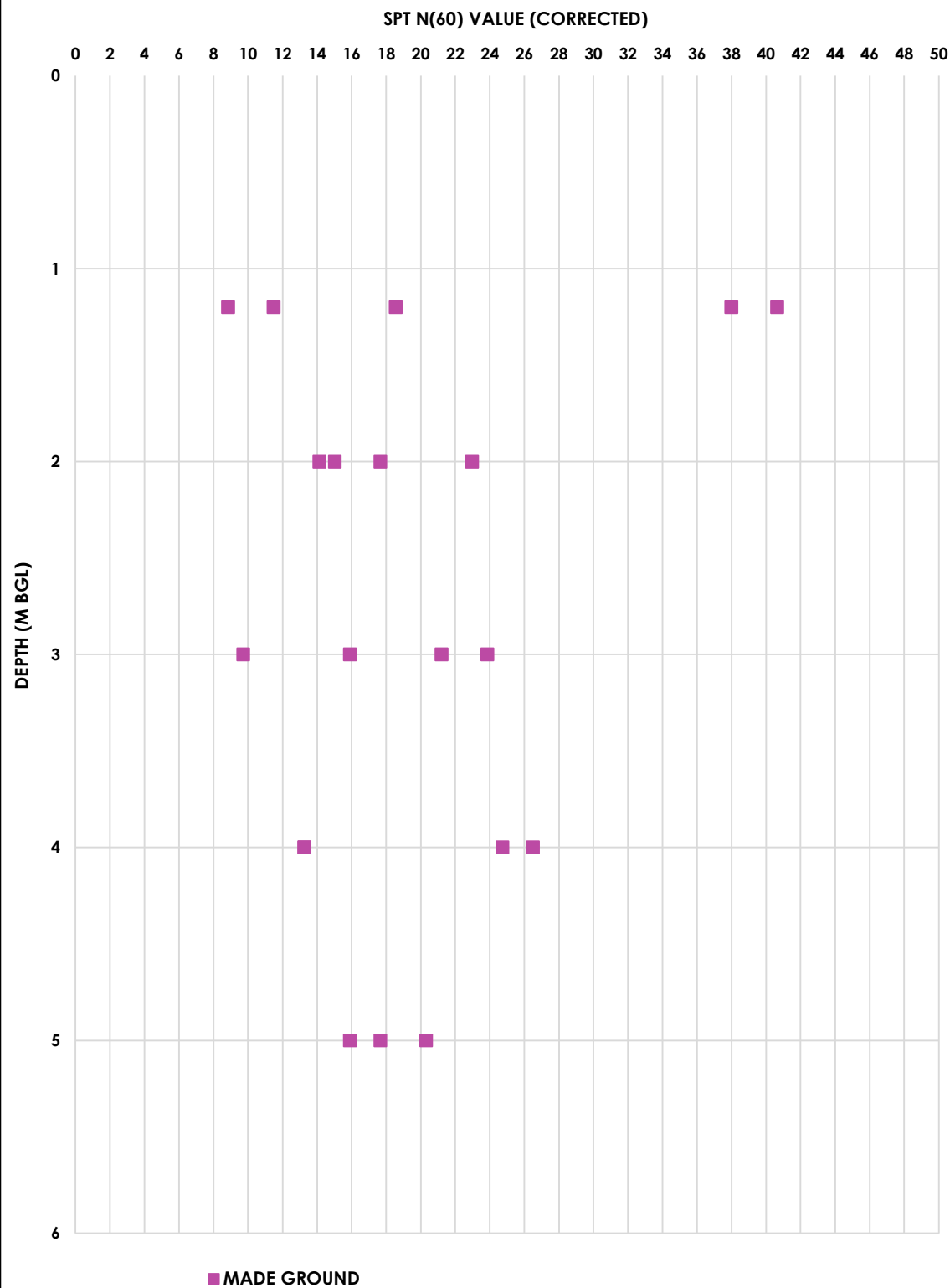
Site	Plot 2 Birdwell, Rockingham, Barnsley
Client	Gregory Projects Limited
Job Number	5419
Scale	NTS



Figure 2 – Aerial Photograph

Site	Plot 2 Birdwell, Rockingham, Barnsley
Client	Gregory Projects Limited
Job Number	5419
Scale	NTS

SPT N VALUE VS. DEPTH (MBGL)



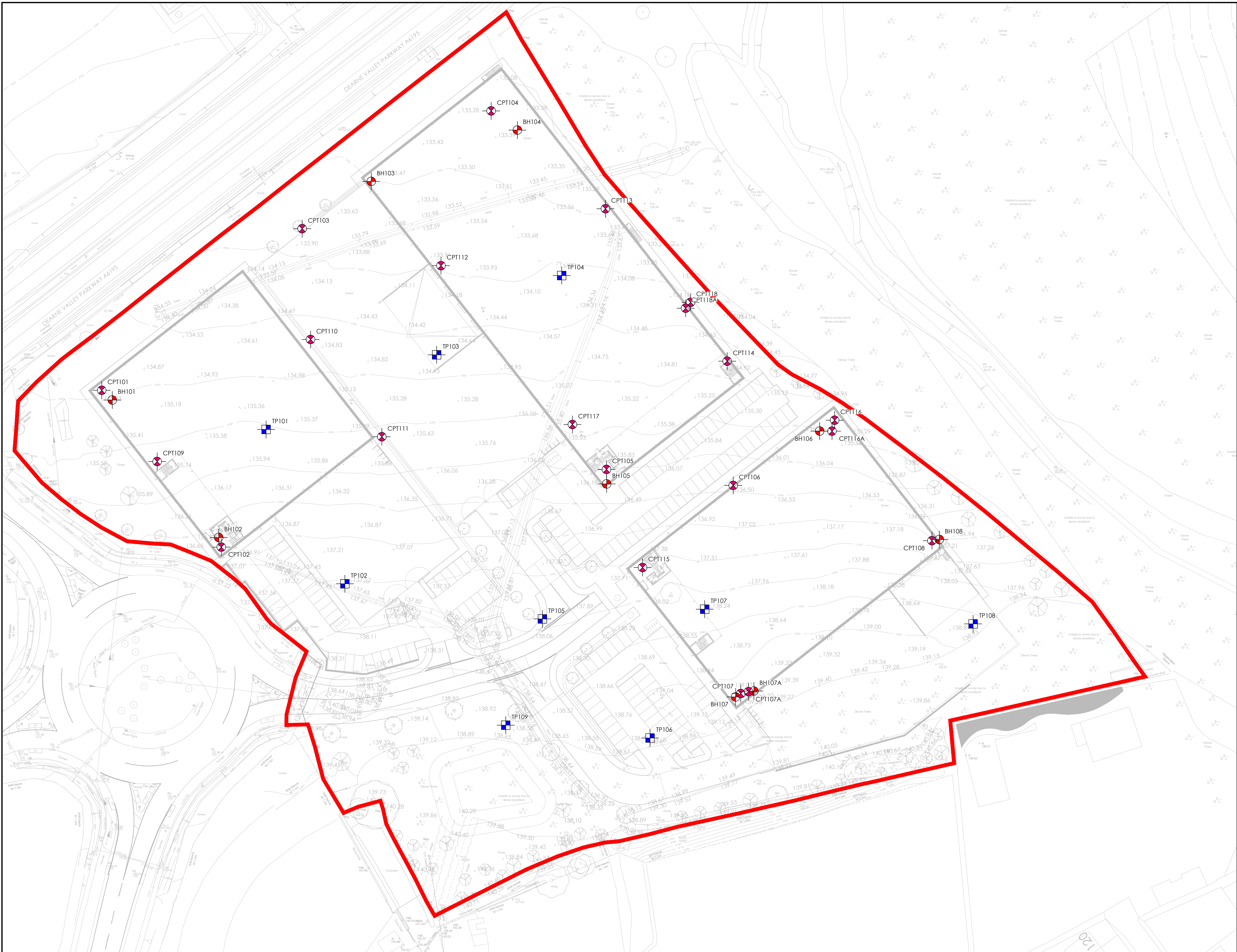
DO NOT SCALE (A1)

NOTES

JPG - SITE INVESTIGATION

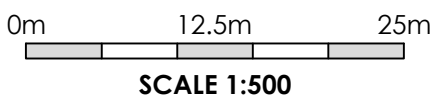
MARCH/APRIL/MAY 2021

- BH101
CABLE PERCUSSIVE BOREHOLE
- CPT101
CONE PENETRATION TEST
- TP101
TRIAL PIT



JPG-EXPLORATORY HOLE LOCATION PLAN (AS BUILT)

SCALE 1:500



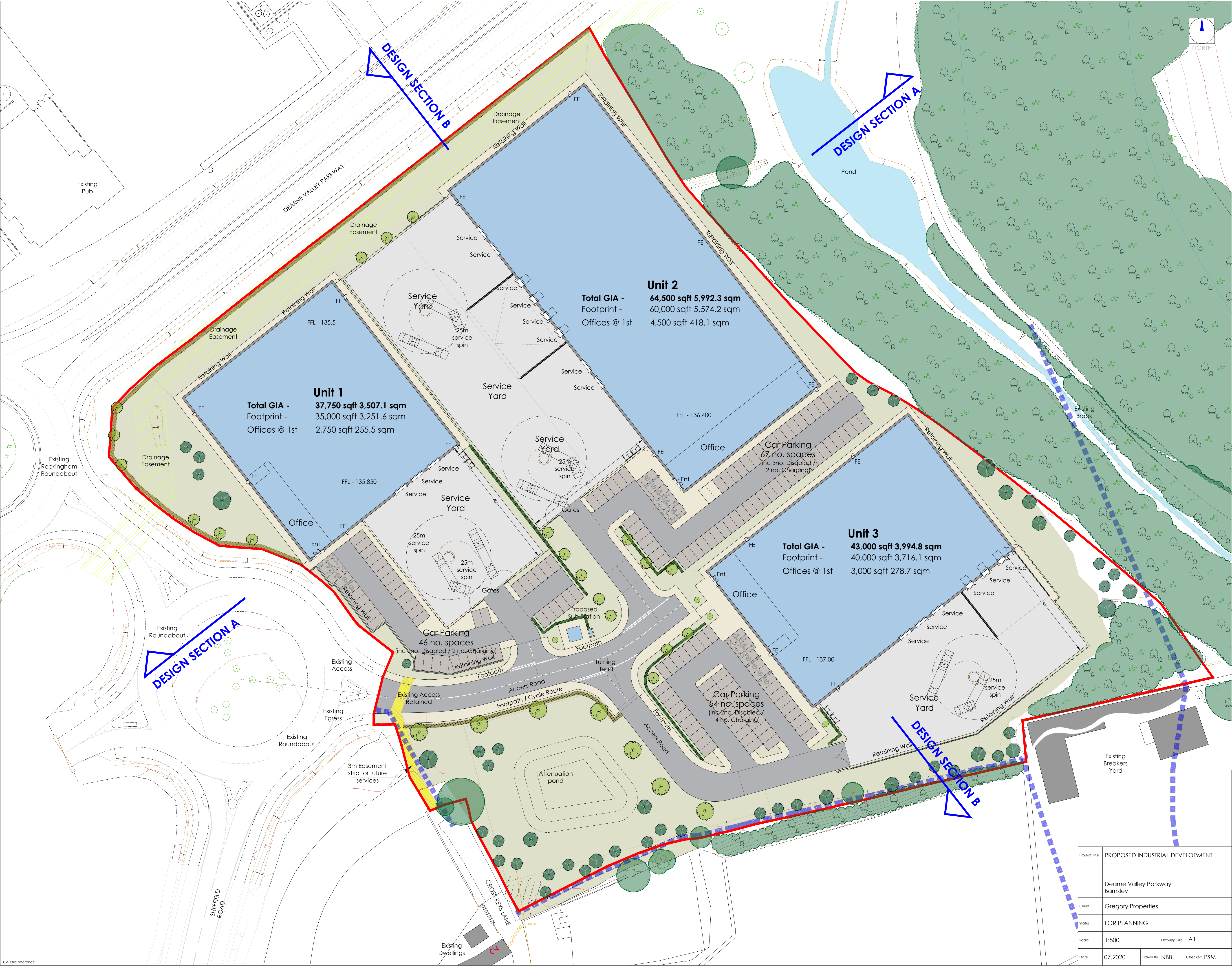
POI	FIRST ISSUE	23.06.21	BKW	LSG
REV	DESCRIPTION	DATE	CHK	BY

Project
ROCKINGHAM
PLOT 2
BIRDWELL
BARNSELY

Drawing Title
EXPLORATORY HOLE LOCATION PLAN
(AS BUILT)

INFORMATION ISSUE

JPG
www.jpg.group
Leeds - 0113 263 1155 | London - 0207 947 4148



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Public Rights of Way
Taken from Barnsley MBC Definitive Map

Note:
Information is based on OS map and received information and is subject to full topographical and building survey.
Assumed site boundary and site constraints subject to confirmation.
All legal easements and extent of existing underground services, locations are subject to confirmation.

0 5 10 15 20 25m
SCALE 1:500

L	25.03.21	Units office content amended	NBB	PSM
K	19.03.21	Cut and fill & Landscape Updated	NBB	PSM
J	12.03.21	Cut and fill Updated	NBB	PSM
H	04.03.21	Site Drain Added	NBB	PSM
G	25.02.21	Updated for planning submission	NBB	PSM
F	19.02.21	Updated inline with discussions	NBB	PSM
E	20.01.21	Redline adjusted & public footpaths added	NBB	PSM
D	16.11.20	Updated	NBB	PSM
C	02.11.20	Updated	NBB	PSM
B	20.10.20	Added side Road	AL	PSM
A	21.07.20	Updated	NBB	PSM
Rev	Date	Description	Rev By	Check By
Project Title	PROPOSED INDUSTRIAL DEVELOPMENT			
Drawing Title	PROPOSED SITE PLAN			
Job/Dwg No.	15315 - (P)111			Rev L
Client	Gregory Properties			
Status	FOR PLANNING			
Scale	1:500	Drawing Size	A1	
Date	07.2020	Drawn By	NBB	Checked PSM
2 St. Johns North, Wakefield, WF1 3GA t. 01924 201800 ☐ Carvers Warehouse, 77 Dale Street, Manchester, M1 2HG t. 0161 2386555 ☐ The Old Rectory, 79 High Street, Newport Pagnell, MK16 8AB t. 01908 211577 ☐ 101 London Road, Reading, RG1 8BY t. 0118 9507700 ☐ 10 Goss Court, St Christophers Place, London, W1U 1JJ t. 0207 4091215 THE HARRIS PARTNERSHIP ARCHITECTS www.harrispartnership.com				



Appendix B Exploratory Hole Logs



5 John Charles Way
Leeds
LS12 6QA

Trial Pit Log

Project Name: Plot 2, Rockingham, Birdwell		Client: Gregory Projects Ltd		Date: 07/06/2021	
Location: Barnsley		Contractor: Hather Plant Hire Ltd		Co-ords: E435190.31 N400729.51	
Project No. : 5419		Crew Name:		Equipment: JCB 3CX with 2ft toothed bucket	
Location Number TP101	Location Type TP	Level 135.76m AoD	Logged By BKW	Scale 1:10	Page Number Sheet 1 of 2

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.00 - 0.20	ES		0.20	135.56		MADE GROUND: Soft to firm brownish grey slightly gravelly CLAY with rootlets. Gravel is subangular to subrounded fine to coarse of mudstone and rare coal. (Reworked topsoil)	
								MADE GROUND: Firm grey slightly sandy gravelly CLAY with low cobble content. Gravel is subangular to subrounded fine to coarse of mudstone and rare coal. Cobbles are angular of mudstone.	
		0.80 - 1.00	D		0.80	134.96		MADE GROUND: Stiff dark grey slightly sandy gravelly CLAY with low cobble content. Gravel is subangular to subrounded fine to coarse of mudstone and coal. Cobbles are angular of mudstone.	1
									2

Dimensions		Trench Support and Comment				Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks		Date	Rate	Remarks
3.00	0.60	Stable.	None.					

Remarks

1. No visual or olfactory evidence of hydrocarbons. 2. No groundwater encountered.





5 John Charles Way
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Trial Pit Log

Project Name: Plot 2, Rockingham, Birdwell

Client: Gregory Projects Ltd

Date: 07/06/2021

Location: Barnsley

Contractor: Hather Plant Hire Ltd

Co-ords: E435190.31 N400729.51

Project No. : 5419

Crew Name:

Equipment: JCB 3CX with 2ft toothed bucket

Location Number TP101	Location Type TP	Level 135.76m AoD	Logged By BKW	Scale 1:10	Page Number Sheet 2 of 2
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					3.10	132.66		MADE GROUND: Stiff dark grey slightly sandy gravelly CLAY with low cobble content. Gravel is subangular to subrounded fine to coarse of mudstone and coal. Cobbles are angular of mudstone.	3
								End of Trial Pit at 3.10m	4

Dimensions		Trench Support and Comment				Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks		Date	Rate	Remarks
3.00	0.60	Stable.	None.					

Remarks

1. No visual or olfactory evidence of hydrocarbons. 2. No groundwater encountered.





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Trial Pit Log

Project Name: Plot 2, Rockingham, Birdwell		Client: Gregory Projects Ltd		Date: 07/06/2021	
Location: Barnsley		Contractor: Hather Plant Hire Ltd		Co-ords: E435212.92 N400685.20	
Project No. : 5419		Crew Name:		Equipment: JCB 3CX with 2ft toothed bucket	
Location Number TP102	Location Type TP	Level 137.67m AoD	Logged By BKW	Scale 1:10	Page Number Sheet 1 of 2

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		1.50 - 1.70	D ES		1.40	136.27		MADE GROUND: Firm grey slightly sandy gravelly CLAY with high cobble content and low boulder content. Gravel is subangular to subrounded fine to coarse of mudstone and rare coal. Cobbles and boulders are angular of mudstone.	1
		1.50 - 1.70						MADE GROUND: Dark grey sandy slightly clayey GRAVEL. Gravel is angular to subrounded fine to coarse of red shale, mustone and rare coal.	2

Dimensions		Trench Support and Comment				Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks		Date	Rate	Remarks
3.00	0.60	Stable.	None.					

Remarks

1. No visual or olfactory evidence of hydrocarbons. 2. Groundwater encountered at 1.30m, possible land drain.





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Trial Pit Log

Project Name: Plot 2, Rockingham, Birdwell		Client: Gregory Projects Ltd		Date: 07/06/2021	
Location: Barnsley		Contractor: Hather Plant Hire Ltd		Co-ords: E435212.92 N400685.20	
Project No. : 5419		Crew Name:		Equipment: JCB 3CX with 2ft toothed bucket	
Location Number TP102	Location Type TP	Level 137.67m AoD	Logged By BKW	Scale 1:10	Page Number Sheet 2 of 2

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					2.30	135.37		MADE GROUND: Dark grey sandy slightly clayey GRAVEL. Gravel is angular to subrounded fine to coarse of red shale, mustone and rare coal. <u>From 2.00m: no red shale present.</u>	
					3.00	134.67		MADE GROUND: Stiff dark grey slightly sandy gravelly CLAY with low cobble content of mudstone. Gravel is subangular to subrounded fine to coarse of mudstone and coal. Cobbles are angular of mudstone.	
								End of Trial Pit at 3.00m	3
									4

Dimensions		Trench Support and Comment				Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks		Date	Rate	Remarks
3.00	0.60	Stable.	None.					

Remarks

1. No visual or olfactory evidence of hydrocarbons. 2. Groundwater encountered at 1.30m, possible land drain.





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Trial Pit Log

Project Name: Plot 2, Rockingham, Birdwell

Client: Gregory Projects Ltd

Date: 07/06/2021

Location: Barnsley

Contractor: Hather Plant Hire Ltd

Co-ords: E435239.26 N400750.92

Project No. : 5419

Crew Name:

Equipment: JCB 3CX with 2ft toothed bucket

Location Number TP103	Location Type TP	Level 134.92m AoD	Logged By BKW	Scale 1:10	Page Number Sheet 1 of 2
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10 - 0.20	ES		0.20	134.72		MADE GROUND: Firm grey slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse of mudstone.	
		0.40 - 0.60	D					MADE GROUND: Stiff dark grey slightly sandy gravelly CLAY with low cobble content. Gravel is subangular to subrounded fine to coarse of mudstone and coal. Cobbles are angular of mudstone.	
					2.00	132.92			2

Dimensions		Trench Support and Comment				Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks		Date	Rate	Remarks
3.00	0.60	Stable.	None.					

Remarks

1. No visual or olfactory evidence of hydrocarbons. 2. No groundwater encountered.





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Trial Pit Log

Project Name: Plot 2, Rockingham, Birdwell		Client: Gregory Projects Ltd		Date: 07/06/2021	
Location: Barnsley		Contractor: Hather Plant Hire Ltd		Co-ords: E435239.26 N400750.92	
Project No. : 5419		Crew Name:		Equipment: JCB 3CX with 2ft toothed bucket	
Location Number TP103	Location Type TP	Level 134.92m AoD	Logged By BKW	Scale 1:10	Page Number Sheet 2 of 2

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					3.30	131.62		MADE GROUND: Dark grey sandy clayey GRAVEL. Gravel is angular to subrounded fine to coarse of mudstone and coal with rare red shale.	3
								End of Trial Pit at 3.30m	4

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks
3.00	0.60	Stable.	None.				

Remarks

1. No visual or olfactory evidence of hydrocarbons. 2. No groundwater encountered.





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Trial Pit Log

Project Name: Plot 2, Rockingham, Birdwell

Client: Gregory Projects Ltd

Date: 07/06/2021

Location: Barnsley

Contractor: Hather Plant Hire Ltd

Co-ords: E435275.12 N400773.68

Project No. : 5419

Crew Name:

Equipment: JCB 3CX with 2ft toothed bucket

Location Number TP104	Location Type TP	Level 134.16m AoD	Logged By BKW	Scale 1:10	Page Number Sheet 1 of 2
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20 - 0.40	D		0.15	134.01		MADE GROUND: Firm brownish grey slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse of mudstone. (Reworked topsoil)	1
		0.20 - 0.40	ES					MADE GROUND: Brown slightly clayey gravelly fine to coarse SAND with low cobble content. Gravel is subangular to subrounded fine to coarse of mudstone. Cobbles are angular of mudstone.	
					0.40	133.76		MADE GROUND: Stiff grey very gravelly CLAY. Gravel is angular to subangular fine to coarse of mudstone and rare coal.	
					0.80	133.36		MADE GROUND: Dark grey sandy clayey GRAVEL with low cobble content and pockets of gravelly clay. Gravel is angular to subrounded fine to coarse of mudstone and coal with rare red shale and sandstone. Cobbles are angular of mudstone.	
									2

Dimensions		Trench Support and Comment				Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks		Date	Rate	Remarks
3.00	0.60	Stable.	None.					

Remarks

1. No visual or olfactory evidence of hydrocarbons. 2. No groundwater encountered.





5 John Charles Way
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LS12 6QA

Trial Pit Log

Project Name: Plot 2, Rockingham, Birdwell		Client: Gregory Projects Ltd		Date: 07/06/2021	
Location: Barnsley		Contractor: Hather Plant Hire Ltd		Co-ords: E435275.12 N400773.68	
Project No. : 5419		Crew Name:		Equipment: JCB 3CX with 2ft toothed bucket	
Location Number TP104	Location Type TP	Level 134.16m AoD	Logged By BKW	Scale 1:10	Page Number Sheet 2 of 2

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					3.40	130.76		MADE GROUND: Dark grey sandy clayey GRAVEL with low cobble content and pockets of gravelly clay. Gravel is angular to subrounded fine to coarse of mudstone and coal with rare red shale and sandstone. Cobbles are angular of mudstone.	3
								End of Trial Pit at 3.40m	4

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks
3.00	0.60	Stable.	None.				

Remarks

1. No visual or olfactory evidence of hydrocarbons. 2. No groundwater encountered.





Trial Pit Log

Project Name: Plot 2, Rockingham, Birdwell

Client: Gregory Projects Ltd

Date: 07/06/2021

Location: Barnsley

Contractor: Hather Plant Hire Ltd

Co-ords: E435269.60 N400675.10

Project No. : 5419

Crew Name:

Equipment: JCB 3CX with 2ft toothed bucket

Location Number
TP105

Location Type
TP

Level
137.99m AoD

Logged By
BKW

Scale
1:10

Page Number
Sheet 1 of 2

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.80 - 1.00	ES		0.10	137.89		MADE GROUND: Firm brownish grey slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse of mudstone. (Reworked topsoil)	1
								MADE GROUND: Firm grey very gravelly CLAY with low cobble content. Gravel is angular to subrounded fine to coarse of mudstone and rare coal. Cobbles are angular of mudstone.	
								MADE GROUND: Dark grey slightly clayey sandy GRAVEL. Gravel is angular to subangular fine to coarse of mudstone and coal.	
		1.20 - 1.40	D		1.20	136.79			2

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks
3.00	0.60	Stable.	None.				

1. No visual or olfactory evidence of hydrocarbons. 2. No groundwater encountered.





5 John Charles Way
Leeds
LS12 6QA

Trial Pit Log

Project Name: Plot 2, Rockingham, Birdwell

Client: Gregory Projects Ltd

Date: 07/06/2021

Location: Barnsley

Contractor: Hather Plant Hire Ltd

Co-ords: E435269.60 N400675.10

Project No. : 5419

Crew Name:

Equipment: JCB 3CX with 2ft toothed bucket

Location Number TP105	Location Type TP	Level 137.99m AoD	Logged By BKW	Scale 1:10	Page Number Sheet 2 of 2
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
								MADE GROUND: Dark grey slightly clayey sandy GRAVEL. Gravel is angular to subangular fine to coarse of mudstone and coal.	
								From 2.50m: becoming more sandy with depth.	
					3.30	134.69		End of Trial Pit at 3.30m	3
									4

Dimensions		Trench Support and Comment				Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks		Date	Rate	Remarks
3.00	0.60	Stable.	None.					

Remarks

1. No visual or olfactory evidence of hydrocarbons. 2. No groundwater encountered.





5 John Charles Way
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LS12 6QA

Trial Pit Log

Project Name: Plot 2, Rockingham, Birdwell

Client: Gregory Projects Ltd

Date: 07/06/2021

Location: Barnsley

Contractor: Hather Plant Hire Ltd

Co-ords: E435300.49 N400640.91

Project No. : 5419

Crew Name:

Equipment: JCB 3CX with 2ft toothed bucket

Location Number TP106	Location Type TP	Level 138.84m AoD	Logged By BKW	Scale 1:10	Page Number Sheet 1 of 1
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10 - 0.30	ES					MADE GROUND: Grey clayey GRAVEL with a medium cobble content. Gravel is subangular to subrounded fine to coarse of mudstone. Cobbles are angular of mudstone.	
		1.10 - 1.25	ES		1.10	137.74		MADE GROUND: Red gravelly fine to coarse SAND. Gravel angular to subangular fine to coarse of red shale.	
		1.30 - 1.40	D		1.25	137.59		MADE GROUND: Grey clayey GRAVEL with medium cobble content. Gravel is subangular to subrounded fine to coarse of mudstone. Cobbles are angular of mudstone.	
					1.80	137.04		At 1.70m very hard digging, bucket scraping. Suspected large boulder, edge of boulder could not be seen. At 1.70m very hard digging, bucket scraping. Suspected large boulder, edge of boulder cannot be seen.	
								End of Trial Pit at 1.80m	

Dimensions		Trench Support and Comment				Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks		Date	Rate	Remarks
3.00	0.60	Stable.	None.					

Remarks

1. No visual or olfactory evidence of hydrocarbons. 2. No groundwater encountered. 3. Trial Pit terminated on boulder at 1.80m.





5 John Charles Way
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LS12 6QA

Trial Pit Log

Project Name: Plot 2, Rockingham, Birdwell

Client: Gregory Projects Ltd

Date: 07/06/2021

Location: Barnsley

Contractor: Hather Plant Hire Ltd

Co-ords: E435316.17 N400677.90

Project No. : 5419

Crew Name:

Equipment: JCB 3CX with 2ft toothed bucket

Location Number TP107	Location Type TP	Level 138.37m AoD	Logged By BKW	Scale 1:10	Page Number Sheet 1 of 2
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.00 - 0.25	ES		0.25	138.12		MADE GROUND: Brown slightly sandy gravelly CLAY. Gravel is subangular to rounded fine to coarse of mudstone and rare sandstone. (Reworked topsoil)	
								MADE GROUND: Grey slightly sandy gravelly CLAY with low boulder content and medium cobble content. Gravel is angular to subrounded fine to coarse of mudstone. Cobbles and boulders are angular of mudstone.	
									1
									2

Dimensions		Trench Support and Comment				Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks		Date	Rate	Remarks
3.00	0.60	Stable.	None.					

Remarks

1. No visual or olfactory evidence of hydrocarbons. 2. No groundwater encountered.





5 John Charles Way
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LS12 6QA

Trial Pit Log

Project Name: Plot 2, Rockingham, Birdwell		Client: Gregory Projects Ltd		Date: 07/06/2021	
Location: Barnsley		Contractor: Hather Plant Hire Ltd		Co-ords: E435316.17 N400677.90	
Project No. : 5419		Crew Name:		Equipment: JCB 3CX with 2ft toothed bucket	
Location Number TP107	Location Type TP	Level 138.37m AoD	Logged By BKW	Scale 1:10	Page Number Sheet 2 of 2

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		2.40 - 2.60	D		2.20	136.17		MADE GROUND: Grey slightly sandy gravelly CLAY with low boulder content and medium cobble content. Gravel is angular to subrounded fine to coarse of mudstone. Cobbles and boulders are angular of mudstone.	3
								MADE GROUND: Dark grey slightly sandy gravelly CLAY with rare wood. Gravel is angular to subangular of mudstone, coal and red shale. Wood encountered was 0.7m x 0.3m x 0.3m in size. From 2.40m: pockets of firm yellowish beige clay encountered.	
		3.10 - 3.30	ES		3.00	135.37		MADE GROUND: Dark grey and orangish red slightly clayey gravelly fine to coarse SAND. Gravel is angular to subangular fine to coarse of mudstone, coal and red shale.	
					3.50	134.87		End of Trial Pit at 3.50m	4

Dimensions		Trench Support and Comment				Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks		Date	Rate	Remarks
3.00	0.60	Stable.	None.					

Remarks

1. No visual or olfactory evidence of hydrocarbons. 2. No groundwater encountered.





5 John Charles Way
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LS12 6QA

Trial Pit Log

Project Name: Plot 2, Rockingham, Birdwell

Client: Gregory Projects Ltd

Date: 07/06/2021

Location: Barnsley

Contractor: Hather Plant Hire Ltd

Co-ords: E435393.19 N400673.67

Project No. : 5419

Crew Name:

Equipment: JCB 3CX with 2ft toothed bucket

Location Number TP108	Location Type TP	Level 138.82m AoD	Logged By BKW	Scale 1:10	Page Number Sheet 1 of 2
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.40 - 0.50	ES					MADE GROUND: Grey slightly sandy clayey GRAVEL with a medium cobble content and low boulder content. Gravel is angular to subrounded fine to coarse of mudstone. Cobbles and boulders are angular to subangular of mudstone.	
		1.20 - 1.40	D						

Dimensions			Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks		Date	Rate	Remarks
3.00	0.60	Stable.	None.					

Remarks

1. No visual or olfactory evidence of hydrocarbons. 2. No groundwater encountered.





5 John Charles Way
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LS12 6QA

Trial Pit Log

Project Name: Plot 2, Rockingham, Birdwell		Client: Gregory Projects Ltd		Date: 07/06/2021	
Location: Barnsley		Contractor: Hather Plant Hire Ltd		Co-ords: E435393.19 N400673.67	
Project No. : 5419		Crew Name:		Equipment: JCB 3CX with 2ft toothed bucket	
Location Number TP108	Location Type TP	Level 138.82m AoD	Logged By BKW	Scale 1:10	Page Number Sheet 2 of 2

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					3.20	135.62		MADE GROUND: Grey slightly sandy clayey GRAVEL with a medium cobble content and low boulder content. Gravel is angular to subrounded fine to coarse of mudstone. Cobbles and boulders are angular to subangular of mudstone.	3
								End of Trial Pit at 3.20m	4

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks
3.00	0.60	Stable.	None.				

Remarks

1. No visual or olfactory evidence of hydrocarbons. 2. No groundwater encountered.





5 John Charles Way
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Trial Pit Log

Project Name: Plot 2, Rockingham, Birdwell		Client: Gregory Projects Ltd		Date: 07/06/2021	
Location: Barnsley		Contractor: Hather Plant Hire Ltd		Co-ords: E435259.07 N400644.59	
Project No. : 5419		Crew Name:		Equipment: JCB 3CX with 2ft toothed bucket	
Location Number TP109	Location Type TP	Level 138.75m AoD	Logged By BKW	Scale 1:10	Page Number Sheet 1 of 2

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20 - 0.30	ES					MADE GROUND: Grey clayey GRAVEL with a medium cobble content. Gravel is subangular to subrounded fine to coarse of mudstone. Cobbles are angular of mudstone.	
		1.00 - 1.20	D						1
								At 1.50m: material becomes dark grey, increasingly coal rich and sandy with depth.	2

Dimensions		Trench Support and Comment			Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks	Date	Rate	Remarks
3.00	0.60	Stable.	None.				

Remarks

1. No visual or olfactory evidence of hydrocarbons. 2. Groundwater seepage encountered at 1.25m.





5 John Charles Way
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LS12 6QA

Trial Pit Log

Project Name: Plot 2, Rockingham, Birdwell		Client: Gregory Projects Ltd		Date: 07/06/2021	
Location: Barnsley		Contractor: Hather Plant Hire Ltd		Co-ords: E435259.07 N400644.59	
Project No. : 5419		Crew Name:		Equipment: JCB 3CX with 2ft toothed bucket	
Location Number TP109	Location Type TP	Level 138.75m AoD	Logged By BKW	Scale 1:10	Page Number Sheet 2 of 2

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					3.20	135.55		MADE GROUND: Grey clayey GRAVEL with a medium cobble content. Gravel is subangular to subrounded fine to coarse of mudstone. Cobbles are angular of mudstone.	3
								End of Trial Pit at 3.20m	4

Dimensions		Trench Support and Comment				Pumping Data		
Pit Length	Pit Width	Pit Stability	Shoring Used	Remarks		Date	Rate	Remarks
3.00	0.60	Stable.	None.					

Remarks

1. No visual or olfactory evidence of hydrocarbons. 2. Groundwater seepage encountered at 1.25m.





5 John Charles Way
Leeds
LS12 6QA

Cable Percussion Log

Project Name: Plot 2, Rockingham, Birdwell

Client: Gregory Projects Ltd

Date: 17/05/2021 - 18/05/2021

Location: Barnsley

Contractor: Central Alliance

Co-ords: E435176.72 N400698.46

Project No. : 5419

Crew Name: CT & LT

Drilling Equipment: Dando 2000

Borehole Number BH102	Hole Type CP	Level 136.82m AoD	Logged By BKW	Scale 1:60	Page Number Sheet 1 of 2
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20 - 1.00	B		0.20	136.62		MADE GROUND: Soft dark grey slightly gravelly CLAY with rootlets. Gravel is subangular to subrounded fine to coarse of mudstone and rare coal. (Reworked topsoil)	
		1.20 - 1.65 1.20	D SPT	N=21 (2,3/4,5,6,6)	1.30	135.52		MADE GROUND: Soft dark grey gravelly CLAY. Gravel is subangular to subrounded fine to coarse of mudstone and coal.	1
		1.50 - 2.00	B					MADE GROUND: Medium dense dark grey slightly sandy clayey GRAVEL. Gravel is fine to coarse angular to subrounded of mudstone and coal.	
		2.00 - 2.45 2.00	D SPT	N=26 (4,4/5,6,8,7)					2
		2.50 - 3.00	B						
		3.00 - 3.45 3.00	D SPT	N=27 (5,5/4,8,8,7)					3
		3.50 - 4.00	D						
		4.00 - 4.45	U						4
		4.50	D						
		4.50 - 5.00	B						
		5.00 - 5.45 5.00	D SPT	N=20 (6,4/4,4,5,7)					5
		5.50 - 6.00	B						6
		6.50 - 6.95	U						
		7.00	D						7
		7.50 - 8.00	B						
		8.00 - 8.45 8.00	D SPT	N=23 (3,3/4,6,6,7)					8
		8.50 - 9.00	B						9
		9.50 - 9.95 9.50	D SPT	N=25 (4,7/6,6,7,6)					10
		11.00 - 11.45 11.00	D SPT	N=23 (6,6/6,7,5,5)					11
									12

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
12.75	200	1.50	200	12.30	12.50	00:30	Chisel				

Remarks

1. No visual or olfactory evidence of hydrocarbons. 2. Groundwater encountered at 0.20m and 1.00m.





5 John Charles Way
Leeds
LS12 6QA

Cable Percussion Log

Project Name: Plot 2, Rockingham, Birdwell

Client: Gregory Projects Ltd

Date: 17/05/2021 - 18/05/2021

Location: Barnsley

Contractor: Central Alliance

Co-ords: E435176.72 N400698.46

Project No. : 5419

Crew Name: CT & LT

Drilling Equipment: Dando 2000

Borehole Number BH102	Hole Type CP	Level 136.82m AoD	Logged By BKW	Scale 1:60	Page Number Sheet 2 of 2
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		12.50 - 12.95 12.50	D SPT	N=50 (25 for 85mm/50 for 85mm)	12.30	124.52		MADE GROUND: Medium dense dark grey slightly sandy clayey GRAVEL. Gravel is fine to coarse angular to subrounded of mudstone and coal. Extremely weak distinctly weathered grey MUDSTONE. End of Borehole at 12.75m	13
		12.65 - 13.10 12.65	D SPT	N=50 (25 for 20mm/50 for 80mm)	12.75	124.07			14
									15
									16
									17
									18
									19
									20
									21
									22
									23
									24

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
12.75	200	1.50	200	12.30	12.50	00:30	Chisel				

Remarks
1. No visual or olfactory evidence of hydrocarbons. 2. Groundwater encountered at 0.20m and 1.00m.





5 John Charles Way
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LS12 6QA

Cable Percussion Log

Project Name: Plot 2, Rockingham, Birdwell

Client: Gregory Projects Ltd

Date: 20/05/2021

Location: Barnsley

Contractor: Central Alliance

Co-ords: E435220.49 N400800.71

Project No. : 5419

Crew Name: CT & LT

Drilling Equipment: Dando 2000

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH103	CP	133.61m AoD	BKW	1:60	Sheet 1 of 2

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Type	Results						
		0.20 - 1.00	B		0.20	133.41		MADE GROUND: Soft dark grey slightly gravelly CLAY with rootlets. Gravel is subangular to subrounded fine to coarse of mudstone and rare coal. (Reworked topsoil)		
		1.20 - 1.65	B					From 0.20m to 2.00m: Boulders of mudstone recovered as grey slightly sandy gravel. Gravel is angular to subangular fine to coarse of mudstone.	1	
		1.20 - 1.65	D							
		1.20	SPT	N=43 (8,8/10,10,12,11)						
		2.00 - 2.45	B						2	
		2.00 - 2.45	D							
		2.00	SPT	N=17 (3,2/5,4,4,4)						
		3.00 - 3.45	B						3	
		3.00 - 3.45	D							
		3.00	SPT	N=18 (2,3/5,4,4,5)						
		4.00 - 4.45	B						4	
		4.00 - 4.45	D							
		4.00	SPT	N=15 (3,4/4,4,3,4)						
	5.00 - 5.45	B			5.00	128.61		MADE GROUND: Medium dense dark grey slightly sandy clayey GRAVEL with low cobble content. Gravel is angular to subangular of mudstone and coal. Cobbles are angular of mudstone.	5	
	5.00 - 5.45	D								
	5.00	SPT	N=18 (4,5/4,5,5,4)					6		
	6.50 - 6.95	U								
	7.00	D							7	
	8.00 - 8.45	D								
	8.00	SPT	N=27 (2,3/5,6,8,8)						8	
	9.50 - 9.95	U							9	
	10.00	D							10	
	11.00 - 11.45	D								
	11.00	SPT	N=32 (3,3/10,8,7,7)						11	
									12	

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
15.26	200	1.50	200	14.80 15.00	15.00 15.20	00:30 00:30	Chisel Chisel				

Remarks

1. No visual or olfactory evidence of hydrocarbons. 2. No groundwater encountered.





5 John Charles Way
Leeds
LS12 6QA

Cable Percussion Log

Project Name: Plot 2, Rockingham, Birdwell

Client: Gregory Projects Ltd

Date: 20/05/2021

Location: Barnsley

Contractor: Central Alliance

Co-ords: E435220.49 N400800.71

Project No. : 5419

Crew Name: CT & LT

Drilling Equipment: Dando 2000

Borehole Number BH103	Hole Type CP	Level 133.61m AoD	Logged By BKW	Scale 1:60	Page Number Sheet 2 of 2
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		12.50 - 12.95 12.50	D SPT	N=23 (5,4/4,5,7,7)				MADE GROUND: Medium dense dark grey slightly sandy clayey GRAVEL with low cobble content. Gravel is angular to subangular of mudstone and coal. Cobbles are angular of mudstone.	13
		14.00 - 14.45 14.00	D SPT	N=41 (5,7/9,10,10,12)					14
		15.00 - 15.45 15.00	D SPT	N=50 (25 for 115mm/50 for 110mm)	14.80	118.81		Extremely weak distinctly weathered grey MUDSTONE.	15
		15.20 - 15.65 15.20	D SPT	N=50 (25 for 20mm/50 for 40mm)	15.26	118.35			16
								End of Borehole at 15.26m	17
									18
									19
									20
									21
									22
									23
									24

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
15.26	200	1.50	200	14.80 15.00	15.00 15.20	00:30 00:30	Chisel Chisel				

Remarks
1. No visual or olfactory evidence of hydrocarbons. 2. No groundwater encountered.





5 John Charles Way
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LS12 6QA

Cable Percussion Log

Project Name: Plot 2, Rockingham, Birdwell

Client: Gregory Projects Ltd

Date: 21/05/2021 - 25/05/2021

Location: Barnsley

Contractor: Central Alliance

Co-ords: E435262.43 N400815.44

Project No. : 5419

Crew Name: CT & LT

Drilling Equipment: Dando 2000

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH104	CP	133.54m AoD	BKW	1:60	Sheet 1 of 2

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20 - 1.00	B		0.20	133.34		MADE GROUND: Soft dark grey slightly gravelly CLAY with rootlets. Gravel is subangular to subrounded fine to coarse of mudstone and rare coal. (Reworked topsoil)	
		1.20 - 1.65	B					MADE GROUND: Stiff dark grey very gravelly CLAY. Gravel is angular to subangular fine to coarse of mudstone, coal and rare pyrite.	1
		1.20 - 1.65	D						
		1.20	SPT	N=46 (10,12/12,10,12,12)					2
		2.00 - 2.45	B						
		2.00 - 2.45	D						
		2.00	SPT	N=20 (3,3/3,4,6,7)	2.80	130.74			
		3.00 - 3.45	B					MADE GROUND: Medium dense dark grey slightly sandy very clayey GRAVEL. Gravel is subangular to subrounded fine to coarse of mudstone, coal, rare pyrite and brick.	3
		3.00 - 3.45	D						
		3.00	SPT	N=24 (6,5/6,6,5,7)					
		4.00 - 4.45	B						4
		4.00 - 4.45	D						
		4.00	SPT	N=28 (6,7/7,8,7,6)					
		5.00 - 5.45	B						5
		5.00 - 5.45	D					From 5.00m to 6.00m: clay is soft and has a slight solvent odour.	
		5.00	SPT	N=23 (6,4/6,6,5,6)					
		5.70	ES		5.70	127.84			6
		6.50 - 6.95	D					MADE GROUND: Firm grey slightly sandy gravelly CLAY with low cobble content. Gravel is subangular to subrounded fine to coarse of mudstone and coal. Cobbles are angular of mudstone.	7
		6.50	SPT	N=17 (3,4/3,5,5,4)					
		8.00 - 8.45	U						8
		8.50	D						9
		9.50 - 9.95	D						10
		9.50	SPT	15 (3,4/15 for 231mm)				At 9.50m: Possible boulder.	
		11.00 - 11.45	U						11
		11.50	D		11.50	122.04		MADE GROUND: Medium dense dark grey slightly sandy clayey GRAVEL. Gravel is angular to	12

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
13.80	200	1.50	200	1.60	1.80	00:30	Chisel				
		6.00	200	1.80	2.00	00:30	Chisel				
				2.80	3.00	00:30	Chisel				
				13.50	13.70	01:00	Chisel				

Remarks

1. No visual or olfactory evidence of hydrocarbons. 2. No groundwater encountered. 3. Groundwater encountered at 4.20m and 5.00m.





5 John Charles Way
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LS12 6QA

Cable Percussion Log

Project Name: Plot 2, Rockingham, Birdwell

Client: Gregory Projects Ltd

Date: 21/05/2021 - 25/05/2021

Location: Barnsley

Contractor: Central Alliance

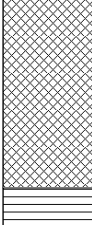
Co-ords: E435262.43 N400815.44

Project No. : 5419

Crew Name: CT & LT

Drilling Equipment: Dando 2000

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH104	CP	133.54m AoD	BKW	1:60	Sheet 2 of 2

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		13.00 - 13.45 13.00	D SPT	N=21 (4,5/5,6,4,6)				MADE GROUND: Medium dense dark grey slightly sandy clayey GRAVEL. Gravel is angular to subrounded fine to coarse of mudstone and coal.	13
		13.50 - 13.95 13.50	D SPT	N=50 (25 for 95mm/50 for 100mm)	13.50 13.80	120.04 119.74		Extremely weak distinctly weathered grey MUDSTONE.	14
		13.70 - 14.15 13.70	D SPT	N=50 (25 for 20mm/50 for 80mm)				End of Borehole at 13.80m	15
									16
									17
									18
									19
									20
									21
									22
									23
									24

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
13.80	200	1.50 6.00	200 200	1.60 1.80 2.80 13.50	1.80 2.00 3.00 13.70	00:30 00:30 00:30 01:00	Chisel Chisel Chisel Chisel				

Remarks

1. No visual or olfactory evidence of hydrocarbons. 2. No groundwater encountered. 3. Groundwater encountered at 4.20m and 5.00m.





5 John Charles Way
Leeds
LS12 6QA

Cable Percussion Log

Project Name: Plot 2, Rockingham, Birdwell

Client: Gregory Projects Ltd

Date: 03/06/2021 - 04/06/2021

Location: Barnsley

Contractor: Central Alliance

Co-ords: E435288.03 N400713.85

Project No. : 5419

Crew Name: CT & LT

Drilling Equipment: Dando 2000

Borehole Number BH105		Hole Type CP		Level 136.43m AoD		Logged By BKW		Scale 1:60		Page Number Sheet 1 of 2	
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
		Depth (m)	Type	Results							
		0.20 - 1.00	B	N=13 (5,4/3,4,3,3)	0.20	136.23		MADE GROUND: Soft grey slightly gravelly CLAY with rootlets. Gravel is subangular to subrounded fine to coarse of mudstone and rare coal. (Reworked topsoil) MADE GROUND: Stiff dark grey slightly sandy gravelly CLAY with low cobble content. Gravel is angular to subrounded fine to coarse of mudstone, coal and sandstone. Cobbles are subangular, tabular of mudstone.		1	
		1.20 - 1.65	B								2
		1.20 - 1.65	D								3
		1.20	SPT								4
		2.00 - 2.45	U					MADE GROUND: Medium dense dark grey sandy clayey GRAVEL. Gravel is subangular to subrounded fine to coarse of mudstone and coal.		5	
		2.50	D							6	
		3.00 - 3.45	B		4.00	132.43				7	
		3.00 - 3.45	D							8	
		3.00	SPT	N=11 (2,2/2,3,3,3)				MADE GROUND: Firm to stiff medium strength dark grey slightly sandy gravelly CLAY. Gravel is angular to subrounded fine to coarse of mudstone, coal and rare red shale.		9	
		4.00 - 4.45	B							10	
		4.00 - 4.45	D							11	
		4.00	SPT	N=15 (3,2/2,4,4,5)						12	
	5.00 - 5.45	U					MADE GROUND: Firm to stiff medium strength dark grey slightly sandy gravelly CLAY. Gravel is angular to subrounded fine to coarse of mudstone, coal and rare red shale.		13		
	5.50	D							14		
	6.50 - 6.95	D		6.50	129.93				15		
	6.50	SPT	N=14 (2,2/3,3,4,4)						16		
	8.00 - 8.45	D					MADE GROUND: Firm to stiff medium strength dark grey slightly sandy gravelly CLAY. Gravel is angular to subrounded fine to coarse of mudstone, coal and rare red shale.		17		
	8.00	SPT	N=18 (3,4/3,3,4,8)						18		
	9.50 - 9.95	D		9.50	126.93				19		
	9.50	SPT	N=27 (2,3/3,7,9,8)						20		
	11.00 - 11.45	D		11.00	125.43		MADE GROUND: Medium dense dark grey slightly sandy slightly clayey GRAVEL. Gravel is angular to subrounded fine to medium of mudstone and coal.		21		
	11.00	SPT	N=28 (3,4/8,7,7,6)						22		

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
19.02	200	1.50 10.50	200 150								

Remarks

1. No visual or olfactory evidence of hydrocarbons. 2. Groundwater encountered at 7.50m and 9.00m.





5 John Charles Way
Leeds
LS12 6QA

Cable Percussion Log

Project Name: Plot 2, Rockingham, Birdwell		Client: Gregory Projects Ltd		Date: 03/06/2021 - 04/06/2021	
Location: Barnsley		Contractor: Central Alliance		Co-ords: E435288.03 N400713.85	
Project No. : 5419		Crew Name: CT & LT		Drilling Equipment: Dando 2000	
Borehole Number BH105	Hole Type CP	Level 136.43m AoD	Logged By BKW	Scale 1:60	Page Number Sheet 2 of 2

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		13.00 - 13.45 13.00	D SPT	N=22 (5,5/5,5,6,6)	13.00	123.43		MADE GROUND: Medium dense dark grey slightly sandy slightly clayey GRAVEL. Gravel is angular to subrounded fine to medium of mudstone and coal.	13
		14.50 - 14.95 14.50	D SPT	N=18 (3,4/5,3,5,5)	14.50	121.93		MADE GROUND: Stiff high strength dark grey slightly sandy gravelly CLAY. Gravel is angular to subangular fine to coarse of mudstone and coal.	14
		16.00 - 16.45 16.00	D SPT	N=27 (3,3/4,5,8,10)	16.00	120.43		MADE GROUND: Dark grey slightly clayey gravelly fine to coarse SAND. Gravel is angular to subangular fine to medium of mudstone and coal.	15
		17.50 - 17.95 17.50	D SPT	N=50 (3,10/50 for 265mm)				MADE GROUND: Stiff high strength dark grey slightly sandy gravelly CLAY. Gravel is angular to subangular fine to medium of mudstone and coal.	16
		18.70 - 19.15 18.70	D SPT	N=50 (10,10/50 for 170mm)	18.70 19.02	117.73 117.41		At 17.50m: Possible boulder.	17
								Extremely weak grey distinctly weathered MUDSTONE.	18
								End of Borehole at 19.02m	19
									20
									21
									22
									23
									24

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
19.02	200	1.50 10.50	200 150								

Remarks	1. No visual or olfactory evidence of hydrocarbons. 2. Groundwater encountered at 7.50m and 9.00m.	
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5 John Charles Way
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Cable Percussion Log

Project Name: Plot 2, Rockingham, Birdwell

Client: Gregory Projects Ltd

Date: 02/06/2021

Location: Barnsley

Contractor: Central Alliance

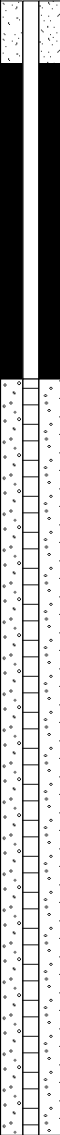
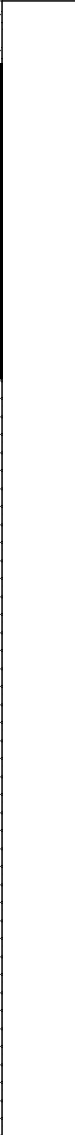
Co-ords: E435349.18 N400729.03

Project No. : 5419

Crew Name: CT & LT

Drilling Equipment: Dando 2000

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH106	CP	135.66m AoD	BKW	1:60	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20 - 1.00	B		0.50	135.16		MADE GROUND: Firm grey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium of mudstone.	1
		1.20 - 1.65 1.20 - 1.65 1.20	B D SPT	N=12 (4,5/3,3,3,3)	1.60	134.06		MADE GROUND: Stiff dark grey very gravelly CLAY. Gravel is subangular to subrounded fine to coarse of mudstone and coal.	
		2.00 - 2.45 2.00 - 2.45 2.00	B D SPT	N=46 (4,2/3,5,12,26)				MADE GROUND: Medium dense dark grey slightly sandy slightly clayey GRAVEL. Gravel is angular to subrounded fine to medium of mudstone and coal.	2
		3.00 - 3.45 3.00 - 3.45 3.00	B D SPT	N=31 (13,11/7,7,6,11)	3.00	132.66		MADE GROUND: Stiff high strength brownish grey slightly sandy gravelly CLAY with low cobble content. Gravel is subangular to subrounded fine to coarse of mudstone and sandstone. Cobbles are angular of mudstone and sandstone.	
		4.00 - 4.45 4.00 - 4.45 4.00	B D SPT	N=15 (2,2/3,4,4,4)					4
		5.00 - 5.45 5.50	U D						
		6.50 - 6.95 6.50	D SPT	N=14 (3,4/4,3,3,4)	6.50	129.16		MADE GROUND: Stiff medium strength grey gravelly CLAY with low cobble content. Gravel is subangular to subrounded fine to coarse of mudstone and coal with rare sandstone and pyrite. Cobbles are subangular of mudstone.	7
		8.00 - 8.45 8.00	D SPT	N=50 (5,7/50 for 215mm)	8.00	127.66		MADE GROUND: Grey slightly sandy GRAVEL with a low cobble content. Gravel is angular to subangular medium to coarse of mudstone. Boulders and/or cobbles of mudstone encountered. Slow drilling.	
		9.00 - 9.45 9.00	D SPT	N=50 (10,13/50 for 190mm)	9.34	126.32			9
								End of Borehole at 9.34m	
									10
									11
									12

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
9.34	200	1.50	200	2.60 8.60	3.00 9.00	01:00 01:00	Chisel Chisel				

Remarks

1. No visual or olfactory evidence of hydrocarbons. 2. No groundwater encountered.





5 John Charles Way
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Cable Percussion Log

Project Name: Plot 2, Rockingham, Birdwell

Client: Gregory Projects Ltd

Date: 25/05/2021

Location: Barnsley

Contractor: Central Alliance

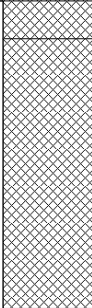
Co-ords: E435325.03 N400652.71

Project No. : 5419

Crew Name: CT & LT

Drilling Equipment: Dando 2000

Borehole Number	Hole Type	Level	Logged By	Scale	Page Number
BH107	CP	139.22m AoD	BKW	1:60	Sheet 1 of 1

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30 - 1.00	B		0.30	138.93		MADE GROUND: Soft dark grey slightly gravelly CLAY with rootlets. Gravel is subangular to subrounded fine to coarse of mudstone and rare coal. (Reworked topsoil)	
		1.20 - 1.65 1.20 - 1.65 1.20	B D SPT	N=40 (10,10/11,10,9,10)				MADE GROUND: Soft grey slightly sandy slightly gravelly CLAY with medium cobble content. Gravel is subangular to subrounded fine to coarse of mudstone, sandstone and rare coal. Cobbles are subangular of mudstone.	1
		2.00 - 2.45 2.00	D SPT	N=50 (3,5/50 for 285mm)	2.44	136.78		From 2.00m: cobbles and boulders. Slow drilling.	2
								End of Borehole at 2.44m	3
									4
									5
									6
									7
									8
									9
									10
									11
									12

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
2.44	200	2.00	2	2.14	2.44	01:00	Chisel				

Remarks

1. No visual or olfactory evidence of hydrocarbons. 2. No groundwater encountered.





5 John Charles Way
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LS12 6QA

Cable Percussion Log

Project Name: Plot 2, Rockingham, Birdwell		Client: Gregory Projects Ltd		Date: 26/05/2021 - 28/05/2021	
Location: Barnsley		Contractor: Central Alliance		Co-ords: E435330.29 N400654.40	
Project No. : 5419		Crew Name: CT & LT		Drilling Equipment: Dando 2000	
Borehole Number BH107A	Hole Type CP	Level 139.46m AoD	Logged By BKW	Scale 1:60	Page Number Sheet 1 of 2

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20 - 1.00	B		0.20	139.26		MADE GROUND: Soft grey slightly gravelly CLAY with rootlets. Gravel is subangular to subrounded fine to coarse of mudstone and rare coal. (Reworked topsoil)	
		1.20 - 1.65	B					MADE GROUND: Firm to stiff high strength dark grey slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse of mudstone and rare coal.	1
		1.20 - 1.65	D						
		1.20	SPT	N=36 (8,10/10,8,8,10)					
		2.00 - 2.45	B						2
		2.00 - 2.45	D						
		2.00	SPT	N=50 (4,3/50 for 227mm)	2.70	136.76			
		3.00 - 3.45	B					MADE GROUND: Medium dense dark grey sandy clayey GRAVEL. Gravel is subangular to subrounded fine to coarse of mudstone and coal with rare red shale.	3
		3.00 - 3.45	D						
		3.00	SPT	N=19 (4,4/5,4,5,5)					
		4.00 - 4.45	B						4
		4.00 - 4.45	D						
		4.00	SPT	N=30 (4,5/6,5,10,9)					
		5.00 - 5.45	U						5
		5.50	D						6
		6.50 - 6.95	D						7
		6.50	SPT	N=18 (3,5/5,5,4,4)					
		8.00 - 8.45	U						8
		8.50	D						9
		9.50 - 9.95	D						10
		9.50	SPT	N=21 (5,6/6,5,5,5)					
		11.00 - 11.45	D						11
		11.00	SPT	N=13 (3,3/2,3,4,4)					12

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
20.80	200	3.00 19.50	200 150	2.40	2.70	01:00	Chisel				

Remarks

1. No visual or olfactory evidence of hydrocarbons. 2. Groundwater encountered at 2.70m, 14.20m and 19.00m.





5 John Charles Way
Leeds
LS12 6QA

Cable Percussion Log

Project Name: Plot 2, Rockingham, Birdwell

Client: Gregory Projects Ltd

Date: 26/05/2021 - 28/05/2021

Location: Barnsley

Contractor: Central Alliance

Co-ords: E435330.29 N400654.40

Project No. : 5419

Crew Name: CT & LT

Drilling Equipment: Dando 2000

Borehole Number BH107A	Hole Type CP	Level 139.46m AoD	Logged By BKW	Scale 1:60	Page Number Sheet 2 of 2
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		12.50 - 12.95 12.50	D SPT	N=23 (5,7/7,5,6,5)				MADE GROUND: Medium dense dark grey sandy clayey GRAVEL. Gravel is subangular to subrounded fine to coarse of mudstone and coal with rare red shale.	13
		14.00 - 14.45 14.00	D SPT	N=31 (7,9/8,8,7,8)					14
		16.00 - 16.45 16.00	D SPT	N=38 (5,8/8,9,11,10)					15
		17.50 - 17.95 17.50	D SPT	N=27 (6,6/7,6,6,8)					16
		19.00 - 19.45 19.00	D SPT	N=30 (6,6/7,9,7,7)					17
		20.50 - 20.95 20.50	D SPT	N=50 (25 for 135mm/50 for 160mm)	20.50 20.69	118.96 118.78		Extremely weak partially unweathered grey MUDSTONE with coal laminae and traces of pyrite. End of Borehole at 20.80m	18
		20.70	D						19
									20
									21
									22
									23
									24

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
20.80	200	3.00 19.50	200 150	2.40	2.70	01:00	Chisel				

Remarks

1. No visual or olfactory evidence of hydrocarbons. 2. Groundwater encountered at 2.70m, 14.20m and 19.00m.



Cable Percussion Log

Project Name: Plot 2, Rockingham, Birdwell

Client: Gregory Projects Ltd

Date: 28/05/2021 - 01/06/2021

Location: Barnsley

Contractor: Central Alliance

Co-ords: E435383.50 N400697.90

Project No. : 5419

Crew Name: CT & LT

Drilling Equipment: Dando 2000

Borehole Number BH108		Hole Type CP		Level 137.12m AoD		Logged By BKW		Scale 1:60		Page Number Sheet 1 of 2	
Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
		Depth (m)	Type	Results							
		0.30 - 1.00	B		0.30	136.82		MADE GROUND: Soft grey slightly gravelly CLAY with rootlets. Gravel is subangular to subrounded fine to coarse of mudstone and rare coal. (Reworked topsoil)			
	1.20 - 1.65 1.20 - 1.65 1.20	B D SPT	N=37 (10,10/9,10,9,9)					MADE GROUND: Stiff high strength grey slightly gravelly CLAY with low cobble content. Gravel is subangular to subrounded fine to coarse of mudstone. Cobbles are angular of mudstone.	1		
	2.00 - 2.45 2.00 - 2.45 2.00	B D SPT	N=25 (4,3/5,6,8,6)						2		
	3.00 - 3.45 3.00 - 3.45 3.00	B D SPT	N=21 (3,4/4,5,6,6)					3			
	4.00 - 4.45 4.00 - 4.45 4.00	B D SPT	N=16 (2,2/3,4,4,5)	4.30	132.82		MADE GROUND: Stiff high strength dark grey and grey slightly sandy gravelly CLAY. Gravel is subangular to subrounded fine to coarse of mudstone and coal.	4			
	5.00 - 5.45 5.00 - 5.45 5.00	B D SPT	N=50 (10,12/50 for 275mm)	4.70	132.42		MADE GROUND: Firm to stiff grey and brownish grey slightly sandy gravelly CLAY with low cobble content. Gravel is subangular to subrounded fine to medium of mudstone and rare coal and sandstone. Cobbles are angular of mudstone.	5			
	6.50 - 6.95 6.50	D SPT	N=10 (2,3/3,2,2,3)	6.50	130.62		MADE GROUND: Medium dense grey slightly sandy clayey GRAVEL. Gravel is angular to subangular fine to coarse of mudstone and rare coal.	6			
	8.00 - 8.45 8.00	D SPT	N=11 (2,2/2,3,3,3)				MADE GROUND: Dense dark grey slightly sandy clayey GRAVEL. Gravel is angular to subangular fine to coarse of mudstone, coal and rare red shale.	7			
	9.50 - 9.95 10.00	U D		9.80	127.32			8			
	11.00 - 11.45 11.00	D SPT	N=46 (10,12/12,10,14,10)					9			
										10	
										11	
									12		
Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
19.42	200	1.50	200	4.70 19.40	5.00 19.60	01:00 00:30	Chisel Chisel				
Remarks											
1. No visual or olfactory evidence of hydrocarbons. 2. No groundwater encountered.											



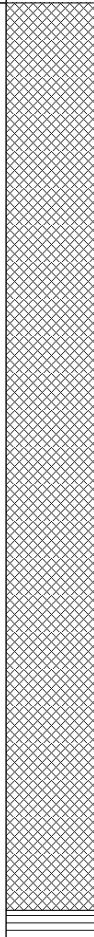
Cable Percussion Log

Date: 28/05/2021 - 01/06/2021

Co-ords: E435383.50 N400697.90

Drilling Equipment: Dando 2000

Page Number
Sheet 2 of 2

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		12.50 - 12.95 12.50	D SPT	N=24 (6,4/6,6,6,6)				MADE GROUND: Dense dark grey slightly sandy clayey GRAVEL. Gravel is angular to subangular fine to coarse of mudstone, coal and rare red shale. Below 12.50m: Gravel is medium dense.	13
		14.00 - 14.45 14.00	D SPT	N=29 (6,5/8,7,7,7)				14	
		15.50 - 15.95 15.50	D SPT	N=32 (4,6/6,7,9,10)				15	
		17.00 - 17.45 17.50	U D					17	
		19.00 - 19.45 19.00	D SPT	N=50 (6,10/50 for 265mm)				19	
					19.20 19.42	117.92 117.70	   Extremely weak distinctly weathered grey MUDSTONE. End of Borehole at 19.42m	21	
								22	
								23	
								24	

Hole Diameter		Casing Diameter		Chiselling				Inclination and Orientation			
Depth Base	Diameter	Depth Base	Diameter	Depth Top	Depth Base	Duration	Tool	Depth Top	Depth Base	Inclination	Orientation
19.42	200	1.50	200	4.70	5.00	01:00	Chisel				
				19.40	19.60	00:30	Chisel				

1. No visual or olfactory evidence of hydrocarbons. 2. No groundwater encountered.





Appendix C Chemical Analysis Certificates and HazWasteOnline Waste Classification



STATISTICAL ASSESSMENT OF CHEMICAL ANALYSIS

The results of the chemical analysis have been assessed in accordance with CL:AIRE (Contaminated Land: Applications in Real Environments) 'Guidance on Comparing Soil Contamination Data with a Critical Concentration' published by the CIEH, May 2008.

This guidance provides a statistical approach to objectively evaluate the evidence for and against particular propositions/hypothesis and has the useful attribute of enabling decision makers to reach conclusions about the available evidence, with at least some understanding of the validity of the results.

The guidance approaches this in the context of assessing the results from two different perspectives, the Planning Scenario and Part 2A.

When assessing in terms of the Planning Scenario, the key question would be 'can we confidently say that the level of contamination on this land is low relative to some appropriate measure of risk?' Under Part 2A, the question would be 'can we confidently say that the level of contamination is high relative to some appropriate measure of risk?'

These questions are addressed through the use of formal hypothesis – the "Null Hypothesis" and the "Alternative Hypothesis".

This assessment will be carried out in accordance with the Planning Scenario, where the aim is to demonstrate 'suitability for use'. The Null Hypothesis is that the level of contamination is the same as, or higher than the critical concentration/GAC. The Alternative Hypothesis is that the level of contamination is lower than the critical concentration/GAC. Under Part 2A the opposite set of propositions are applicable.

By convention, the Null Hypothesis is the starting proposition against which the key question, as expressed by the Alternative Hypothesis, can be tested.

The assessment of the results relies on there being a normal distribution of results for a particular contaminant and that the data set under consideration is representative of the particular material which is being assessed. If more than one dataset is present, then the hypothesis should be applied individually for each data set.

Under the Planning Scenario, the statistical test is used to demonstrate that there is a 95% probability that the true population mean falls below the critical concentration/GAC.

Appropriate data sets must be created to enable the statistical testing to be carried out and three key elements must be considered prior to statistical analysis. These are as follows:

- Dealing with non-detects;
- Understanding the statistical distribution of data; and
- Dealing with outliers.

The results can then be assessed, and the results will be compared against the following:

- Sample Mean – if the sample mean of the data set is in excess of the GAC then the Upper Confidence Limit of the true population mean will be higher than the critical concentration.
- 95% of the Upper Confidence Limit.
- One Sample T Test (parametric test) carried out at the 95% confidence level.

On the basis of these tests, the validity of the Null Hypothesis can be assessed.



Certificate of Analysis

Certificate Number 21-11256

Issued: 04-Jun-21

Client JPG (Leeds) LTD
Civil & Structural Engineers
5 John Charles Way
Leeds
LS12 6QA

Our Reference 21-11256

Client Reference 5419

Order No (not supplied)

Contract Title Birdwell-5419

Description 2 Soil samples.

Date Received 27-May-21

Date Started 27-May-21

Date Completed 04-Jun-21

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

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

Approved By

Adam Fenwick
Contracts Manager



Summary of Chemical Analysis

Soil Samples

Our Ref 21-11256

Client Ref 5419

Contract Title Birdwell-5419

Lab No	1853800	1853801
Sample ID	BH104	BH104
Depth	5.70	6.50
Other ID		
Sample Type	SOIL	SOIL
Sampling Date	25/05/2021	25/05/2021
Sampling Time	n/s	n/s

Test	Method	LOD	Units		
Metals					
Arsenic	DETSC 2301#	0.2	mg/kg	30	25
Cadmium	DETSC 2301#	0.1	mg/kg	< 0.1	< 0.1
Chromium	DETSC 2301#	0.15	mg/kg	8.4	5.3
Copper	DETSC 2301#	0.2	mg/kg	49	50
Lead	DETSC 2301#	0.3	mg/kg	22	21
Mercury	DETSC 2325#	0.05	mg/kg	0.11	0.07
Nickel	DETSC 2301#	1	mg/kg	27	18
Selenium	DETSC 2301#	0.5	mg/kg	1.1	1.3
Zinc	DETSC 2301#	1	mg/kg	56	50
Inorganics					
pH	DETSC 2008#		pH	8.9	9.8
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1
Organic matter	DETSC 2002#	0.1	%	8.3	4.4
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	290	140
Petroleum Hydrocarbons					
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	0.37	
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	< 10	
EPH (C10-C40)	DETSC 3311#	10	mg/kg		< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	
MTBE	DETSC 3321	0.01	mg/kg	< 0.01	

Summary of Chemical Analysis

Soil Samples

Our Ref 21-11256

Client Ref 5419

Contract Title Birdwell-5419

Lab No	1853800	1853801
Sample ID	BH104	BH104
Depth	5.70	6.50
Other ID		
Sample Type	SOIL	SOIL
Sampling Date	25/05/2021	25/05/2021
Sampling Time	n/s	n/s

Test	Method	LOD	Units		
PAHs					
Naphthalene	DETSC 3303#	0.03	mg/kg	0.16	0.34
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.08	0.11
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	0.24	0.45
Phenols					
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	0.4	0.4
VOCs					
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01

Summary of Chemical Analysis

Soil Samples

Our Ref 21-11256

Client Ref 5419

Contract Title Birdwell-5419

Lab No	1853800	1853801
Sample ID	BH104	BH104
Depth	5.70	6.50
Other ID		
Sample Type	SOIL	SOIL
Sampling Date	25/05/2021	25/05/2021
Sampling Time	n/s	n/s

Test	Method	LOD	Units		
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	0.03	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	0.01	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	0.06	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01

Summary of Asbestos Analysis Soil Samples

Our Ref 21-11256

Client Ref 5419

Contract Title Birdwell-5419

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1853800	BH104 5.70	SOIL	NAD	none	Darryl Fletcher
1853801	BH104 6.50	SOIL	NAD	none	Darryl Fletcher

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 21-11256
 Client Ref 5419
 Contract Birdwell-5419

Containers Received & Deviating Samples

Lab No	Sample ID	Date		Holding time exceeded for tests	Inappropriate container for tests
		Sampled	Containers Received		
1853800	BH104 5.70 SOIL	25/05/21	GJ 250ml, GJ 60ml, PT 1L		
1853801	BH104 6.50 SOIL	25/05/21	GJ 250ml, GJ 60ml, PT 1L		

Key: G-Glass P-Plastic J-Jar T-Tub

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

Soil Analysis Notes

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

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

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

Disposal

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

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

End of Report



Certificate of Analysis

Certificate Number 21-12124

Issued: 18-Jun-21

Client JPG (Leeds) LTD
Civil & Structural Engineers
5 John Charles Way
Leeds
LS12 6QA

Our Reference 21-12124

Client Reference 5419

Order No (not supplied)

Contract Title Birdwell-5419

Description 11 Soil samples, 6 Leachate samples.

Date Received 09-Jun-21

Date Started 09-Jun-21

Date Completed 18-Jun-21

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

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

Approved By

Adam Fenwick
Contracts Manager



Summary of Chemical Analysis

Soil Samples

Our Ref 21-12124

Client Ref 5419

Contract Title Birdwell-5419

Lab No	1859774	1859775	1859776	1859777	1859778	1859779	1859780
Sample ID	TP101	TP102	TP103	TP104	TP105	TP106	TP106
Depth	0.00-0.20	1.50-1.70	0.10-0.20	0.20-0.40	0.80-1.00	0.10-0.30	1.10-1.25
Other ID							
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	07/06/2021	07/06/2021	07/06/2021	07/06/2021	07/06/2021	07/06/2021	07/06/2021
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units							
Metals										
Arsenic	DETSC 2301#	0.2	mg/kg	6.1	17	30	9.6	2.4	48	13
Cadmium	DETSC 2301#	0.1	mg/kg	0.7	< 0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chromium	DETSC 2301#	0.15	mg/kg	170	13	18	14	13	16	15
Chromium, Hexavalent	DETSC 2204*	1	mg/kg		< 1.0		< 1.0	< 1.0		< 1.0
Copper	DETSC 2301#	0.2	mg/kg	120	31	42	53	16	42	31
Lead	DETSC 2301#	0.3	mg/kg	100	30	22	18	5.8	19	16
Mercury	DETSC 2325#	0.05	mg/kg	0.16	0.07	< 0.05	< 0.05	0.05	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	24	18	29	36	29	35	29
Selenium	DETSC 2301#	0.5	mg/kg	0.8	< 0.5	0.7	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	320	58	71	62	32	75	71
Inorganics										
pH	DETSC 2008#		pH	10.0	4.8	7.1	7.0	6.6	7.5	6.9
Calorific Value	DETSC 5008	1	MJ/kg	< 1.0	2.3	2.3	< 1.0	< 1.0	2.3	
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Organic matter	DETSC 2002#	0.1	%	3.6	6.1	3.6	4.0	0.7	3.4	2.1
Ammoniacal Nitrogen as N	DETSC 2119#	0.5	mg/kg		6.5		6.4	3.5		4.5
Chloride	DETSC 2055	0.001	g/kg		0.01		0.00	0.01		0.01
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	45	140	1400	140	50	260	82
Sulphide	DETSC 2024*	10	mg/kg		52		20	< 10		< 10
Sulphate as SO4, Total	DETSC 2321#	100	mg/kg		2010		745	319		696
PAHs										
Naphthalene	DETSC 3303#	0.03	mg/kg	0.14	0.20	0.05	0.04	0.08	0.05	0.05
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.15	0.08	< 0.03	< 0.03	0.04	< 0.03	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	0.12	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.06	0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Pyrene	DETSC 3303#	0.03	mg/kg	0.05	0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	0.04	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.03	0.04	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	0.40	0.51	< 0.10	< 0.10	0.12	< 0.10	< 0.10
Phenols										
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3

Summary of Chemical Analysis

Soil Samples

Our Ref 21-12124

Client Ref 5419

Contract Title Birdwell-5419

Lab No	1859781	1859782	1859783	1859784
Sample ID	TP107	TP107	TP108	TP109
Depth	0.00-0.25	3.10-3.30	0.40-0.50	0.20-0.30
Other ID				
Sample Type	SOIL	SOIL	SOIL	SOIL
Sampling Date	07/06/2021	07/06/2021	07/06/2021	07/06/2021
Sampling Time	n/s	n/s	n/s	n/s

Test	Method	LOD	Units				
Metals							
Arsenic	DETSC 2301#	0.2	mg/kg	45	29	4.8	6.6
Cadmium	DETSC 2301#	0.1	mg/kg	< 0.1	0.1	< 0.1	< 0.1
Chromium	DETSC 2301#	0.15	mg/kg	9.6	14	14	19
Chromium, Hexavalent	DETSC 2204*	1	mg/kg			< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	28	49	19	37
Lead	DETSC 2301#	0.3	mg/kg	14	42	11	15
Mercury	DETSC 2325#	0.05	mg/kg	0.11	< 0.05	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	18	23	31	38
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	27	70	35	87
Inorganics							
pH	DETSC 2008#		pH	6.8	5.8	6.7	7.1
Calorific Value	DETSC 5008	1	MJ/kg	< 1.0	8.9	< 1.0	< 1.0
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Organic matter	DETSC 2002#	0.1	%	1.0	8.7	1.3	1.4
Ammoniacal Nitrogen as N	DETSC 2119#	0.5	mg/kg			3.6	5.3
Chloride	DETSC 2055	0.001	g/kg			0.01	0.01
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	2000	1300	89	710
Sulphide	DETSC 2024*	10	mg/kg			< 10	32
Sulphate as SO4, Total	DETSC 2321#	100	mg/kg			297	2670
PAHs							
Naphthalene	DETSC 3303#	0.03	mg/kg	0.05	0.16	0.06	0.06
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.13	0.07	0.03
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.07	< 0.03	< 0.03
Pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.06	< 0.03	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	0.03	< 0.03	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	< 0.10	0.42	0.13	< 0.10
Phenols							
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	< 0.3	< 0.3

Summary of Chemical Analysis

Leachate Samples

Our Ref 21-12124

Client Ref 5419

Contract Title Birdwell-5419

Lab No	1859785	1859786	1859787	1859788	1859789	1859790
Sample ID	TP102	TP104	TP106	TP107	TP108	TP109
Depth	1.50-1.70	0.20-0.40	0.10-0.30	0.00-0.25	0.40-0.50	0.20-0.30
Other ID						
Sample Type	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE	LEACHATE
Sampling Date	07/06/2021	07/06/2021	07/06/2021	07/06/2021	07/06/2021	07/06/2021
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
Preparation									
NRA Leachate Preparation	DETSC 1009*			Y	Y	Y	Y	Y	Y
Metals									
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.43	0.18	< 0.16	0.20	< 0.16	< 0.16
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
Copper, Dissolved	DETSC 2306	0.4	ug/l	0.4	< 0.4	< 0.4	< 0.4	< 0.4	< 0.4
Lead, Dissolved	DETSC 2306	0.09	ug/l	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09	< 0.09
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.85	0.37	< 0.25	< 0.25	< 0.25	< 0.25
Zinc, Dissolved	DETSC 2306	1.3	ug/l	< 1.3	< 1.3	< 1.3	2.4	3.5	1.5
Inorganics									
pH	DETSC 2008		pH	6.1	6.4	6.3	6.1	5.9	6.3
Cyanide, Free	DETSC 2130	20	ug/l	< 20	< 20	< 20	< 20	< 20	< 20
Sulphate as SO4	DETSC 2055	0.1	mg/l	37	1.4	2.0	32	29	0.66
PAHs									
Naphthalene	DETSC 3304	0.05	ug/l	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	DETSC 3304	0.01	ug/l	0.03	0.01	0.02	< 0.01	< 0.01	< 0.01
Pyrene	DETSC 3304	0.01	ug/l	0.03	0.01	0.02	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	DETSC 3304	0.01	ug/l	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	DETSC 3304	0.01	ug/l	0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l	0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETSC 3304	0.01	ug/l	0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAH Total	DETSC 3304	0.2	ug/l	0.21	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Phenols									
Total Phenol	DETSC 3451*	0.5	ug/l	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50

Summary of Asbestos Analysis

Soil Samples

Our Ref 21-12124

Client Ref 5419

Contract Title Birdwell-5419

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1859775	TP102 1.50-1.70	SOIL	NAD	none	Emma Stacey
1859777	TP104 0.20-0.40	SOIL	NAD	none	Emma Stacey
1859781	TP107 0.00-0.25	SOIL	NAD	none	Emma Stacey
1859784	TP109 0.20-0.30	SOIL	NAD	none	Emma Stacey

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 21-12124
Client Ref 5419
Contract Birdwell-5419

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1859774	TP101 0.00-0.20 SOIL	07/06/21	GJ 250ml, GJ 60ml, PT 1L		
1859775	TP102 1.50-1.70 SOIL	07/06/21	GJ 250ml, GJ 60ml, PT 1L		
1859776	TP103 0.10-0.20 SOIL	07/06/21	GJ 250ml, GJ 60ml, PT 1L		
1859777	TP104 0.20-0.40 SOIL	07/06/21	GJ 250ml, GJ 60ml, PT 1L		
1859778	TP105 0.80-1.00 SOIL	07/06/21	GJ 250ml, GJ 60ml, PT 1L		
1859779	TP106 0.10-0.30 SOIL	07/06/21	GJ 250ml, GJ 60ml, PT 1L		
1859780	TP106 1.10-1.25 SOIL	07/06/21	GJ 250ml, GJ 60ml, PT 1L		
1859781	TP107 0.00-0.25 SOIL	07/06/21	GJ 250ml, GJ 60ml, PT 1L		
1859782	TP107 3.10-3.30 SOIL	07/06/21	GJ 250ml, GJ 60ml, PT 1L		
1859783	TP108 0.40-0.50 SOIL	07/06/21	GJ 250ml, GJ 60ml, PT 1L		
1859784	TP109 0.20-0.30 SOIL	07/06/21	GJ 250ml, GJ 60ml, PT 1L		
1859785	TP102 1.50-1.70 LEACHATE	07/06/21	GJ 250ml, GJ 60ml, PT 1L		
1859786	TP104 0.20-0.40 LEACHATE	07/06/21	GJ 250ml, GJ 60ml, PT 1L		
1859787	TP106 0.10-0.30 LEACHATE	07/06/21	GJ 250ml, GJ 60ml, PT 1L		
1859788	TP107 0.00-0.25 LEACHATE	07/06/21	GJ 250ml, GJ 60ml, PT 1L		
1859789	TP108 0.40-0.50 LEACHATE	07/06/21	GJ 250ml, GJ 60ml, PT 1L		
1859790	TP109 0.20-0.30 LEACHATE	07/06/21	GJ 250ml, GJ 60ml, PT 1L		

Key: G-Glass P-Plastic J-Jar T-Tub

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Soil Analysis Notes

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

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

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

Disposal

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

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

End of Report



Certificate of Analysis

Certificate Number 21-12919

Issued: 25-Jun-21

Client JPG (Leeds) LTD
Civil & Structural Engineers
5 John Charles Way
Leeds
LS12 6QA

Our Reference 21-12919

Client Reference 5419

Order No (not supplied)

Contract Title Birdwell-5419

Description 3 Water samples.

Date Received 18-Jun-21

Date Started 18-Jun-21

Date Completed 25-Jun-21

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

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

Approved By

Adam Fenwick
Contracts Manager



Summary of Chemical Analysis

Water Samples

Our Ref 21-12919

Client Ref 5419

Contract Title Birdwell-5419

Lab No	1864313	1864314	1864315
Sample ID	BH101	BH104	BH105
Depth	4.00	4.00	8.00
Other ID			
Sample Type	WATER	WATER	WATER
Sampling Date	16/06/2021	16/06/2021	16/06/2021
Sampling Time	n/s	n/s	n/s

Test	Method	LOD	Units			
Metals						
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	1.1	1.2	2.2
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	0.03	0.19
Chromium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	< 0.25	< 0.25
Copper, Dissolved	DETSC 2306	0.4	ug/l	1.2	1.8	< 0.4
Lead, Dissolved	DETSC 2306	0.09	ug/l	< 0.09	< 0.09	< 0.09
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	5.1	7.5	480
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.41	0.34	0.76
Zinc, Dissolved	DETSC 2306	1.3	ug/l	1.7	1.6	140
Inorganics						
pH	DETSC 2008		pH	7.5	7.2	6.3
Cyanide, Free Low Level	DETSC 2131	0.1	ug/l	0.5	0.4	< 0.1
Sulphate as SO4	DETSC 2055	0.1	mg/l	48	740	23000
PAHs						
Naphthalene	DETSC 3304	0.05	ug/l	< 0.05	0.05	< 0.05
Acenaphthylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Acenaphthene	DETSC 3304	0.01	ug/l	0.01	0.01	< 0.01
Fluorene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Phenanthrene	DETSC 3304	0.01	ug/l	0.01	0.02	< 0.01
Anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	0.02	< 0.01
Pyrene	DETSC 3304	0.01	ug/l	< 0.01	0.04	< 0.01
Benzo(a)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Chrysene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01
PAH Total	DETSC 3304	0.2	ug/l	< 0.20	< 0.20	< 0.20
Phenols						
Total Phenol	DETSC 3451*	0.5	ug/l	< 0.50	< 0.50	< 0.50

Information in Support of the Analytical Results

Our Ref 21-12919
 Client Ref 5419
 Contract Birdwell-5419

Containers Received & Deviating Samples

Lab No	Sample ID	Date		Containers Received	Holding time exceeded for tests	Inappropriate container for tests
		Sampled				
1864313	BH101 4.00 WATER	16/06/21		GB 1L, PB 1L	pH/Cond/TDS (1 days)	
1864314	BH104 4.00 WATER	16/06/21		GB 1L, PB 1L	pH/Cond/TDS (1 days)	
1864315	BH105 8.00 WATER	16/06/21		GB 1L, PB 1L	pH/Cond/TDS (1 days)	

Key: G-Glass P-Plastic B-Bottle

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Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :- Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

End of Report



Certificate of Analysis

Certificate Number 21-13808

Issued: 12-Jul-21

Client JPG (Leeds) LTD
Civil & Structural Engineers
5 John Charles Way
Leeds
LS12 6QA

Our Reference 21-13808

Client Reference (not supplied)

Order No (not supplied)

Contract Title BIRDWELL - 5419

Description One Water sample.

Date Received 01-Jul-21

Date Started 01-Jul-21

Date Completed 12-Jul-21

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

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

Approved By

Adam Fenwick
Contracts Manager



2139

Summary of Chemical Analysis

Water Samples

Our Ref 21-13808

Client Ref

Contract Title BIRDWELL - 5419

Lab No	1869556
Sample ID	BH105
Depth	12.00
Other ID	
Sample Type	WATER
Sampling Date	29/06/2021
Sampling Time	1300

Test	Method	LOD	Units	
Metals				
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	1.6
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25
Copper, Dissolved	DETSC 2306	0.4	ug/l	< 0.4
Lead, Dissolved	DETSC 2306	0.09	ug/l	< 0.09
Magnesium, Dissolved	DETSC 2306	0.02	mg/l	4800
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	300
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.69
Zinc, Dissolved	DETSC 2306	1.3	ug/l	290
Inorganics				
pH	DETSC 2008		pH	5.9
Cyanide, Free Low Level	DETSC 2131	0.1	ug/l	< 0.1
Sulphate as SO4	DETSC 2055	0.1	mg/l	49
Sulphide	DETSC 2208	10	ug/l	11
PAHs				
Naphthalene	DETSC 3304	0.05	ug/l	0.18
Acenaphthylene	DETSC 3304	0.01	ug/l	< 0.01
Acenaphthene	DETSC 3304	0.01	ug/l	0.02
Fluorene	DETSC 3304	0.01	ug/l	0.03
Phenanthrene	DETSC 3304	0.01	ug/l	0.13
Anthracene	DETSC 3304	0.01	ug/l	0.02
Fluoranthene	DETSC 3304	0.01	ug/l	0.01
Pyrene	DETSC 3304	0.01	ug/l	0.02
Benzo(a)anthracene	DETSC 3304	0.01	ug/l	< 0.01
Chrysene	DETSC 3304	0.01	ug/l	< 0.01
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	< 0.01
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l	< 0.01
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01
Benzo(g,h,i)perylene	DETSC 3304	0.01	ug/l	0.02
PAH Total	DETSC 3304	0.2	ug/l	0.47
Phenols				
Total Phenol	DETSC 3451*	0.5	ug/l	< 0.50

Information in Support of the Analytical Results

Our Ref 21-13808
Client Ref
Contract BIRDWELL - 5419

Containers Received & Deviating Samples

Lab No	Sample ID	Date		Containers Received	Holding time exceeded for tests	Inappropriate container for tests
		Sampled				
1869556	BH105 12.00 WATER	29/06/21		GB 1L x2, GV x2, PB 1L x2	pH/Cond/TDS (1 days)	
Key: G-Glass P-Plastic B-Bottle V-Vial						
DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.						

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-
Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

End of Report

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)



M3X55-MDLJP-H4XXQ

To aid the reviewer, the laboratory results, assumptions and justifications managed by the classifier are highlighted in **pale yellow**.

Job name

5419

Description/Comments

Project

5419

Site

Classified by

Name: **John Parkinson**
 Date: **12 Aug 2021 14:59 GMT**
 Telephone: **0113 263 1155**
 Company: **JPG (LEEDS) Ltd**
5 John Charles Way
Leeds
LS12 6QA

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:

CERTIFIED

Course

Hazardous Waste Classification

Date

11 Mar 2020

Next 3 year Refresher due by Mar 2023

Job summary

#	Sample name	Depth [m]	Classification Result	Hazard properties	Page
1	TP101	0.00-0.20	Non Hazardous		2
2	TP102	1.50-1.70	Non Hazardous		4
3	TP103	0.10-0.20	Non Hazardous		6
4	TP104	0.20-0.40	Non Hazardous		8
5	TP105	0.80-1.00	Non Hazardous		10
6	TP106	0.10-0.30	Non Hazardous		12
7	TP106[2]	1.10-1.25	Non Hazardous		14
8	TP107	0.00-0.25	Non Hazardous		16
9	TP107[2]	3.10-3.30	Non Hazardous		18
10	TP108	0.40-0.50	Non Hazardous		20
11	TP109	0.20-0.30	Non Hazardous		22
12	BH104	5.70	Non Hazardous		24
13	BH104[2]	6.50	Non Hazardous		26

Related documents

#	Name	Description
1	JPG WASTE STREAM V21	waste stream template used to create this Job

Report

Created by: John Parkinson

Created date: 12 Aug 2021 14:59 GMT

Appendices

	Page
Appendix A: Classifier defined and non CLP determinands	28
Appendix B: Rationale for selection of metal species	29
Appendix C: Version	29

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)
0.00-0.20 m	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3	6.1	mg/kg	1.32	8.054	mg/kg	0.000805 %		
2	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0	0.7	mg/kg	1.142	0.8	mg/kg	0.00008 %		
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		170	mg/kg	1.462	248.464	mg/kg	0.0248 %		
4	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1	120	mg/kg	1.126	135.107	mg/kg	0.0135 %		
5	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	100	mg/kg	1.56	155.982	mg/kg	0.01 %	
6	mercury { mercury(II) sulfide }	215-696-3	1344-48-5		0.16	mg/kg	1.16	0.186	mg/kg	0.0000186 %		
7	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7	24	mg/kg	2.976	71.43	mg/kg	0.00714 %		
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8			0.8	mg/kg	1.405	1.124	mg/kg	0.000112 %		
9	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9	320	mg/kg	2.774	887.727	mg/kg	0.0888 %		
10	pH		PH		10	pH		10	pH	10pH		
11	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 }	006-007-00-5			<0.1	mg/kg	1.884	<0.188	mg/kg	<0.0000188 %		<LOD
12	naphthalene	601-052-00-2	202-049-5	91-20-3	0.14	mg/kg		0.14	mg/kg	0.000014 %		
13	acenaphthylene	205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
14	acenaphthene	201-469-6	83-32-9		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
15	fluorene	201-695-5	86-73-7		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
16	phenanthrene	201-581-5	85-01-8		0.15	mg/kg		0.15	mg/kg	0.000015 %		

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
17	anthracene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		204-371-1	120-12-7							
18	fluoranthene				0.06 mg/kg		0.06 mg/kg	0.000006 %		
		205-912-4	206-44-0							
19	pyrene				0.05 mg/kg		0.05 mg/kg	0.000005 %		
		204-927-3	129-00-0							
20	benzo[a]anthracene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
	601-033-00-9	200-280-6	56-55-3							
21	chrysene				0.04 mg/kg		0.04 mg/kg	0.000004 %		
	601-048-00-0	205-923-4	218-01-9							
22	benzo[b]fluoranthene				0.03 mg/kg		0.03 mg/kg	0.000003 %		
	601-034-00-4	205-911-9	205-99-2							
23	benzo[k]fluoranthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
	601-036-00-5	205-916-6	207-08-9							
24	benzo[a]pyrene; benzo[def]chrysene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
	601-032-00-3	200-028-5	50-32-8							
25	indeno[123-cd]pyrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		205-893-2	193-39-5							
26	dibenz[a,h]anthracene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
	601-041-00-2	200-181-8	53-70-3							
27	benzo[ghi]perylene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		205-883-8	191-24-2							
28	phenol				<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
	604-001-00-2	203-632-7	108-95-2							
29	asbestos				0.001 mg/kg		0.001 mg/kg	0.0000001 %		
	650-013-00-6	-----	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5							
Total:								0.145 %		

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: TP102

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
TP102	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)
1.50-1.70 m	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				17	mg/kg	1.32	22.446	mg/kg	0.00224 %		
	033-003-00-0	215-481-4	1327-53-3									
2	cadmium { cadmium oxide }				<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<LOD
	048-002-00-0	215-146-2	1306-19-0									
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				13	mg/kg	1.462	19	mg/kg	0.0019 %		
		215-160-9	1308-38-9									
4	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1	mg/kg	1.923	<1.923	mg/kg	<0.000192 %		<LOD
	024-001-00-0	215-607-8	1333-82-0									
5	copper { dicopper oxide; copper (I) oxide }				31	mg/kg	1.126	34.903	mg/kg	0.00349 %		
	029-002-00-X	215-270-7	1317-39-1									
6	lead { lead chromate }			1	30	mg/kg	1.56	46.794	mg/kg	0.003 %		
	082-004-00-2	231-846-0	7758-97-6									
7	mercury { mercury(II) sulfide }				0.07	mg/kg	1.16	0.0812	mg/kg	0.00000812 %		
		215-696-3	1344-48-5									
8	nickel { nickel chromate }				18	mg/kg	2.976	53.573	mg/kg	0.00536 %		
	028-035-00-7	238-766-5	14721-18-7									
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<0.5	mg/kg	1.405	<0.703	mg/kg	<0.0000703 %		<LOD
	034-002-00-8											
10	zinc { zinc chromate }				58	mg/kg	2.774	160.9	mg/kg	0.0161 %		
	024-007-00-3	236-878-9	13530-65-9									
11	pH				4.8	pH		4.8	pH	4.8 pH		
12	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 }				0.2	mg/kg	1.884	0.377	mg/kg	0.0000377 %		
	006-007-00-5											
13	naphthalene				0.2	mg/kg		0.2	mg/kg	0.00002 %		
	601-052-00-2	202-049-5	91-20-3									
14	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8									
15	acenaphthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		201-469-6	83-32-9									

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
16	fluorene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		201-695-5	86-73-7							
17	phenanthrene				0.08 mg/kg		0.08 mg/kg	0.000008 %		
		201-581-5	85-01-8							
18	anthracene				0.12 mg/kg		0.12 mg/kg	0.000012 %		
		204-371-1	120-12-7							
19	fluoranthene				0.03 mg/kg		0.03 mg/kg	0.000003 %		
		205-912-4	206-44-0							
20	pyrene				0.03 mg/kg		0.03 mg/kg	0.000003 %		
		204-927-3	129-00-0							
21	benzo[a]anthracene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
	601-033-00-9	200-280-6	56-55-3							
22	chrysene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
	601-048-00-0	205-923-4	218-01-9							
23	benzo[b]fluoranthene				0.04 mg/kg		0.04 mg/kg	0.000004 %		
	601-034-00-4	205-911-9	205-99-2							
24	benzo[k]fluoranthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
	601-036-00-5	205-916-6	207-08-9							
25	benzo[a]pyrene; benzo[def]chrysene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
	601-032-00-3	200-028-5	50-32-8							
26	indeno[123-cd]pyrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		205-893-2	193-39-5							
27	dibenz[a,h]anthracene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
	601-041-00-2	200-181-8	53-70-3							
28	benzo[ghi]perylene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		205-883-8	191-24-2							
29	phenol				<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
	604-001-00-2	203-632-7	108-95-2							
30	asbestos				0.001 mg/kg		0.001 mg/kg	0.0000001 %		
	650-013-00-6	-----	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5							
Total:								0.0325 %		

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: TP103

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
TP103	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)
0.10-0.20 m	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3	30	mg/kg	1.32	39.61	mg/kg	0.00396 %		
2	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0	0.1	mg/kg	1.142	0.114	mg/kg	0.0000114 %		
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		18	mg/kg	1.462	26.308	mg/kg	0.00263 %		
4	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1	42	mg/kg	1.126	47.287	mg/kg	0.00473 %		
5	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	22	mg/kg	1.56	34.316	mg/kg	0.0022 %		
6	mercury { mercury(II) sulfide }	215-696-3	1344-48-5		<0.05	mg/kg	1.16	<0.058	mg/kg	<0.0000058 %		<LOD
7	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7	29	mg/kg	2.976	86.312	mg/kg	0.00863 %		
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8			0.7	mg/kg	1.405	0.983	mg/kg	0.0000983 %		
9	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9	71	mg/kg	2.774	196.964	mg/kg	0.0197 %		
10	pH		PH		7.1	pH		7.1	pH	7.1 pH		
11	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 }	006-007-00-5			<0.1	mg/kg	1.884	<0.188	mg/kg	<0.0000188 %		<LOD
12	naphthalene	601-052-00-2	202-049-5	91-20-3	0.05	mg/kg		0.05	mg/kg	0.000005 %		
13	acenaphthylene	205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
14	acenaphthene	201-469-6	83-32-9		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
15	fluorene	201-695-5	86-73-7		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
16	phenanthrene	201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
17	anthracene	204-371-1	120-12-7		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
18	fluoranthene	205-912-4	206-44-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
19	pyrene	204-927-3	129-00-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
20	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
21	chrysene	601-048-00-0	205-923-4	218-01-9	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
22	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
23	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
25	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
27	benzo[ghi]perylene	205-883-8	191-24-2		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
28	phenol	604-001-00-2	203-632-7	108-95-2	<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
29	asbestos	650-013-00-6	-----	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5	0.001 mg/kg		0.001 mg/kg	0.0000001 %		
Total:								0.0421 %		

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: TP104

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
TP104	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)
0.20-0.40 m	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				9.6	mg/kg	1.32	12.675	mg/kg	0.00127 %		
	033-003-00-0	215-481-4	1327-53-3									
2	cadmium { cadmium oxide }				<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<LOD
	048-002-00-0	215-146-2	1306-19-0									
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				14	mg/kg	1.462	20.462	mg/kg	0.00205 %		
		215-160-9	1308-38-9									
4	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1	mg/kg	1.923	<1.923	mg/kg	<0.000192 %		<LOD
	024-001-00-0	215-607-8	1333-82-0									
5	copper { dicopper oxide; copper (I) oxide }				53	mg/kg	1.126	59.672	mg/kg	0.00597 %		
	029-002-00-X	215-270-7	1317-39-1									
6	lead { lead chromate }			1	18	mg/kg	1.56	28.077	mg/kg	0.0018 %		
	082-004-00-2	231-846-0	7758-97-6									
7	mercury { mercury(II) sulfide }				<0.05	mg/kg	1.16	<0.058	mg/kg	<0.0000058 %		<LOD
		215-696-3	1344-48-5									
8	nickel { nickel chromate }				36	mg/kg	2.976	107.146	mg/kg	0.0107 %		
	028-035-00-7	238-766-5	14721-18-7									
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<0.5	mg/kg	1.405	<0.703	mg/kg	<0.0000703 %		<LOD
	034-002-00-8											
10	zinc { zinc chromate }				62	mg/kg	2.774	171.997	mg/kg	0.0172 %		
	024-007-00-3	236-878-9	13530-65-9									
11	pH				7	pH		7	pH	7pH		
12	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 }				<0.1	mg/kg	1.884	<0.188	mg/kg	<0.0000188 %		<LOD
	006-007-00-5											
13	naphthalene				0.04	mg/kg		0.04	mg/kg	0.000004 %		
	601-052-00-2	202-049-5	91-20-3									
14	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8									
15	acenaphthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		201-469-6	83-32-9									

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
16	fluorene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		201-695-5	86-73-7							
17	phenanthrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		201-581-5	85-01-8							
18	anthracene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		204-371-1	120-12-7							
19	fluoranthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		205-912-4	206-44-0							
20	pyrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		204-927-3	129-00-0							
21	benzo[a]anthracene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
	601-033-00-9	200-280-6	56-55-3							
22	chrysene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
	601-048-00-0	205-923-4	218-01-9							
23	benzo[b]fluoranthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
	601-034-00-4	205-911-9	205-99-2							
24	benzo[k]fluoranthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
	601-036-00-5	205-916-6	207-08-9							
25	benzo[a]pyrene; benzo[def]chrysene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
	601-032-00-3	200-028-5	50-32-8							
26	indeno[123-cd]pyrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		205-893-2	193-39-5							
27	dibenz[a,h]anthracene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
	601-041-00-2	200-181-8	53-70-3							
28	benzo[ghi]perylene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		205-883-8	191-24-2							
29	phenol				<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
	604-001-00-2	203-632-7	108-95-2							
30	asbestos				0.001 mg/kg		0.001 mg/kg	0.0000001 %		
	650-013-00-6	-----	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5							
Total:								0.0394 %		

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: TP105

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
TP105	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)
0.80-1.00 m	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				2.4	mg/kg	1.32	3.169	mg/kg	0.000317 %		
	033-003-00-0	215-481-4	1327-53-3									
2	cadmium { cadmium oxide }				<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<LOD
	048-002-00-0	215-146-2	1306-19-0									
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				13	mg/kg	1.462	19	mg/kg	0.0019 %		
		215-160-9	1308-38-9									
4	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1	mg/kg	1.923	<1.923	mg/kg	<0.000192 %		<LOD
	024-001-00-0	215-607-8	1333-82-0									
5	copper { dicopper oxide; copper (I) oxide }				16	mg/kg	1.126	18.014	mg/kg	0.0018 %		
	029-002-00-X	215-270-7	1317-39-1									
6	lead { lead chromate }			1	5.8	mg/kg	1.56	9.047	mg/kg	0.00058 %		
	082-004-00-2	231-846-0	7758-97-6									
7	mercury { mercury(II) sulfide }				0.05	mg/kg	1.16	0.058	mg/kg	0.0000058 %		
		215-696-3	1344-48-5									
8	nickel { nickel chromate }				29	mg/kg	2.976	86.312	mg/kg	0.00863 %		
	028-035-00-7	238-766-5	14721-18-7									
9	selenium { selenium compounds with the exception of cadmium sulfoxide and those specified elsewhere in this Annex }				<0.5	mg/kg	1.405	<0.703	mg/kg	<0.0000703 %		<LOD
	034-002-00-8											
10	zinc { zinc chromate }				32	mg/kg	2.774	88.773	mg/kg	0.00888 %		
	024-007-00-3	236-878-9	13530-65-9									
11	pH				6.6	pH		6.6	pH	6.6 pH		
12	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 }				<0.1	mg/kg	1.884	<0.188	mg/kg	<0.0000188 %		<LOD
	006-007-00-5											
13	naphthalene				0.08	mg/kg		0.08	mg/kg	0.000008 %		
	601-052-00-2	202-049-5	91-20-3									
14	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8									
15	acenaphthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		201-469-6	83-32-9									

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number								
16	fluorene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
		201-695-5	86-73-7								
17	phenanthrene				0.04 mg/kg		0.04 mg/kg	0.000004 %			
		201-581-5	85-01-8								
18	anthracene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
		204-371-1	120-12-7								
19	fluoranthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
		205-912-4	206-44-0								
20	pyrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
		204-927-3	129-00-0								
21	benzo[a]anthracene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
	601-033-00-9	200-280-6	56-55-3								
22	chrysene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
	601-048-00-0	205-923-4	218-01-9								
23	benzo[b]fluoranthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
	601-034-00-4	205-911-9	205-99-2								
24	benzo[k]fluoranthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
	601-036-00-5	205-916-6	207-08-9								
25	benzo[a]pyrene; benzo[def]chrysene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
	601-032-00-3	200-028-5	50-32-8								
26	indeno[123-cd]pyrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
		205-893-2	193-39-5								
27	dibenz[a,h]anthracene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
	601-041-00-2	200-181-8	53-70-3								
28	benzo[ghi]perylene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %			<LOD
		205-883-8	191-24-2								
29	phenol				<0.3 mg/kg		<0.3 mg/kg	<0.00003 %			<LOD
	604-001-00-2	203-632-7	108-95-2								
30	asbestos				0.001 mg/kg		0.001 mg/kg	0.0000001 %			
	650-013-00-6	-----	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5								
Total:									0.0225 %		

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: TP106

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
TP106	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)
0.10-0.30 m	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3	48	mg/kg	1.32	63.376	mg/kg	0.00634 %		
2	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0	<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<LOD
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		16	mg/kg	1.462	23.385	mg/kg	0.00234 %		
4	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1	42	mg/kg	1.126	47.287	mg/kg	0.00473 %		
5	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	19	mg/kg	1.56	29.636	mg/kg	0.0019 %	
6	mercury { mercury(II) sulfide }	215-696-3	1344-48-5		<0.05	mg/kg	1.16	<0.058	mg/kg	<0.0000058 %		<LOD
7	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7	35	mg/kg	2.976	104.169	mg/kg	0.0104 %		
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8			<0.5	mg/kg	1.405	<0.703	mg/kg	<0.0000703 %		<LOD
9	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9	75	mg/kg	2.774	208.061	mg/kg	0.0208 %		
10	pH				7.5	pH		7.5	pH	7.5 pH		
11	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 }	006-007-00-5			<0.1	mg/kg	1.884	<0.188	mg/kg	<0.0000188 %		<LOD
12	naphthalene	601-052-00-2	202-049-5	91-20-3	0.05	mg/kg		0.05	mg/kg	0.000005 %		
13	acenaphthylene	205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
14	acenaphthene	201-469-6	83-32-9		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
15	fluorene	201-695-5	86-73-7		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
16	phenanthrene	201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
17	anthracene	204-371-1	120-12-7		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
18	fluoranthene	205-912-4	206-44-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
19	pyrene	204-927-3	129-00-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
20	benzo[a]anthracene	601-033-00-9	200-280-6		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
21	chrysene	601-048-00-0	205-923-4		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
22	benzo[b]fluoranthene	601-034-00-4	205-911-9		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
23	benzo[k]fluoranthene	601-036-00-5	205-916-6		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
25	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
27	benzo[ghi]perylene	205-883-8	191-24-2		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
28	phenol	604-001-00-2	203-632-7		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
29	asbestos	650-013-00-6	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5		0.001 mg/kg		0.001 mg/kg	0.0000001 %		
Total:								0.0467 %		

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: TP106[2]

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
TP106[2]	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)
1.10-1.25 m	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3	13	mg/kg	1.32	17.164	mg/kg	0.00172 %		
2	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0	<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<LOD
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		15	mg/kg	1.462	21.923	mg/kg	0.00219 %		
4	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0	<1	mg/kg	1.923	<1.923	mg/kg	<0.000192 %		<LOD
5	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1	31	mg/kg	1.126	34.903	mg/kg	0.00349 %		
6	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	16	mg/kg	1.56	24.957	mg/kg	0.0016 %	
7	mercury { mercury(II) sulfide }	215-696-3	1344-48-5		<0.05	mg/kg	1.16	<0.058	mg/kg	<0.0000058 %		<LOD
8	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7	29	mg/kg	2.976	86.312	mg/kg	0.00863 %		
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8			<0.5	mg/kg	1.405	<0.703	mg/kg	<0.0000703 %		<LOD
10	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9	71	mg/kg	2.774	196.964	mg/kg	0.0197 %		
11	pH				6.9	pH		6.9	pH	6.9 pH		
12	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 }	006-007-00-5			<0.1	mg/kg	1.884	<0.188	mg/kg	<0.0000188 %		<LOD
13	naphthalene	601-052-00-2	202-049-5	91-20-3	0.05	mg/kg		0.05	mg/kg	0.000005 %		
14	acenaphthylene	205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
15	acenaphthene	201-469-6	83-32-9		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
16	fluorene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		201-695-5	86-73-7							
17	phenanthrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		201-581-5	85-01-8							
18	anthracene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		204-371-1	120-12-7							
19	fluoranthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		205-912-4	206-44-0							
20	pyrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		204-927-3	129-00-0							
21	benzo[a]anthracene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
	601-033-00-9	200-280-6	56-55-3							
22	chrysene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
	601-048-00-0	205-923-4	218-01-9							
23	benzo[b]fluoranthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
	601-034-00-4	205-911-9	205-99-2							
24	benzo[k]fluoranthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
	601-036-00-5	205-916-6	207-08-9							
25	benzo[a]pyrene; benzo[def]chrysene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
	601-032-00-3	200-028-5	50-32-8							
26	indeno[123-cd]pyrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		205-893-2	193-39-5							
27	dibenz[a,h]anthracene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
	601-041-00-2	200-181-8	53-70-3							
28	benzo[ghi]perylene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		205-883-8	191-24-2							
29	phenol				<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
	604-001-00-2	203-632-7	108-95-2							
30	asbestos				0.001 mg/kg		0.001 mg/kg	0.0000001 %		
	650-013-00-6	-----	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5							
Total:								0.0377 %		

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: TP107

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
TP107	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)
0.00-0.25 m	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3	45	mg/kg	1.32	59.415	mg/kg	0.00594 %		
2	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0	<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<LOD
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		9.6	mg/kg	1.462	14.031	mg/kg	0.0014 %		
4	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1	28	mg/kg	1.126	31.525	mg/kg	0.00315 %		
5	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	14	mg/kg	1.56	21.837	mg/kg	0.0014 %		
6	mercury { mercury(II) sulfide }	215-696-3	1344-48-5		0.11	mg/kg	1.16	0.128	mg/kg	0.0000128 %		
7	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7	18	mg/kg	2.976	53.573	mg/kg	0.00536 %		
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8			<0.5	mg/kg	1.405	<0.703	mg/kg	<0.0000703 %		<LOD
9	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9	27	mg/kg	2.774	74.902	mg/kg	0.00749 %		
10	pH				6.8	pH		6.8	pH	6.8 pH		
11	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 }	006-007-00-5			<0.1	mg/kg	1.884	<0.188	mg/kg	<0.0000188 %		<LOD
12	naphthalene	601-052-00-2	202-049-5	91-20-3	0.05	mg/kg		0.05	mg/kg	0.000005 %		
13	acenaphthylene	205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
14	acenaphthene	201-469-6	83-32-9		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
15	fluorene	201-695-5	86-73-7		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
16	phenanthrene	201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
17	anthracene	204-371-1	120-12-7		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
18	fluoranthene	205-912-4	206-44-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
19	pyrene	204-927-3	129-00-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
20	benzo[a]anthracene	601-033-00-9	200-280-6		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
21	chrysene	601-048-00-0	205-923-4		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
22	benzo[b]fluoranthene	601-034-00-4	205-911-9		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
23	benzo[k]fluoranthene	601-036-00-5	205-916-6		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
25	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
27	benzo[ghi]perylene	205-883-8	191-24-2		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
28	phenol	604-001-00-2	203-632-7		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
29	asbestos	650-013-00-6	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5		0.001 mg/kg		0.001 mg/kg	0.0000001 %		
Total:								0.0249 %		

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: TP107[2]

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
TP107[2]	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)
3.10-3.30 m	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3	29	mg/kg	1.32	38.289	mg/kg	0.00383 %		
2	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0	0.1	mg/kg	1.142	0.114	mg/kg	0.0000114 %		
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }	215-160-9	1308-38-9		14	mg/kg	1.462	20.462	mg/kg	0.00205 %		
4	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1	49	mg/kg	1.126	55.169	mg/kg	0.00552 %		
5	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	42	mg/kg	1.56	65.512	mg/kg	0.0042 %		
6	mercury { mercury(II) sulfide }	215-696-3	1344-48-5		<0.05	mg/kg	1.16	<0.058	mg/kg	<0.0000058 %		<LOD
7	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7	23	mg/kg	2.976	68.454	mg/kg	0.00685 %		
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8			<0.5	mg/kg	1.405	<0.703	mg/kg	<0.0000703 %		<LOD
9	zinc { zinc chromate }	024-007-00-3	236-878-9	13530-65-9	70	mg/kg	2.774	194.19	mg/kg	0.0194 %		
10	pH				5.8	pH		5.8	pH	5.8 pH		
11	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 }	006-007-00-5			<0.1	mg/kg	1.884	<0.188	mg/kg	<0.0000188 %		<LOD
12	naphthalene	601-052-00-2	202-049-5	91-20-3	0.16	mg/kg		0.16	mg/kg	0.000016 %		
13	acenaphthylene	205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
14	acenaphthene	201-469-6	83-32-9		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
15	fluorene	201-695-5	86-73-7		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
16	phenanthrene	201-581-5	85-01-8		0.13	mg/kg		0.13	mg/kg	0.000013 %		

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
17	anthracene	204-371-1	120-12-7		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
18	fluoranthene	205-912-4	206-44-0		0.07 mg/kg		0.07 mg/kg	0.000007 %		
19	pyrene	204-927-3	129-00-0		0.06 mg/kg		0.06 mg/kg	0.000006 %		
20	benzo[a]anthracene	601-033-00-9	200-280-6		0.03 mg/kg		0.03 mg/kg	0.000003 %		
21	chrysene	601-048-00-0	205-923-4		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
22	benzo[b]fluoranthene	601-034-00-4	205-911-9		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
23	benzo[k]fluoranthene	601-036-00-5	205-916-6		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
25	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
27	benzo[ghi]perylene	205-883-8	191-24-2		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
28	phenol	604-001-00-2	203-632-7		<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
29	asbestos	650-013-00-6	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5		0.001 mg/kg		0.001 mg/kg	0.0000001 %		
Total:								0.0421 %		

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: TP108

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
TP108	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)
0.40-0.50 m	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				4.8	mg/kg	1.32	6.338	mg/kg	0.000634 %		
	033-003-00-0	215-481-4	1327-53-3									
2	cadmium { cadmium oxide }				<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<LOD
	048-002-00-0	215-146-2	1306-19-0									
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				14	mg/kg	1.462	20.462	mg/kg	0.00205 %		
		215-160-9	1308-38-9									
4	chromium in chromium(VI) compounds { chromium(VI) oxide }				<1	mg/kg	1.923	<1.923	mg/kg	<0.000192 %		<LOD
	024-001-00-0	215-607-8	1333-82-0									
5	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									
6	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									
7	mercury { mercury(II) sulfide }				<0.05	mg/kg	1.16	<0.058	mg/kg	<0.0000058 %		<LOD
		215-696-3	1344-48-5									
8	nickel { nickel chromate }				31	mg/kg	2.976	92.264	mg/kg	0.00923 %		
	028-035-00-7	238-766-5	14721-18-7									
9	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<0.5	mg/kg	1.405	<0.703	mg/kg	<0.0000703 %		<LOD
	034-002-00-8											
10	zinc { zinc chromate }				35	mg/kg	2.774	97.095	mg/kg	0.00971 %		
	024-007-00-3	236-878-9	13530-65-9									
11	pH				6.7	pH		6.7	pH	6.7 pH		
12	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 }				<0.1	mg/kg	1.884	<0.188	mg/kg	<0.0000188 %		<LOD
	006-007-00-5											
13	naphthalene				0.06	mg/kg		0.06	mg/kg	0.000006 %		
	601-052-00-2	202-049-5	91-20-3									
14	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8									
15	acenaphthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		201-469-6	83-32-9									

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
16	fluorene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		201-695-5	86-73-7							
17	phenanthrene				0.07 mg/kg		0.07 mg/kg	0.000007 %		
		201-581-5	85-01-8							
18	anthracene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		204-371-1	120-12-7							
19	fluoranthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		205-912-4	206-44-0							
20	pyrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		204-927-3	129-00-0							
21	benzo[a]anthracene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
	601-033-00-9	200-280-6	56-55-3							
22	chrysene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
	601-048-00-0	205-923-4	218-01-9							
23	benzo[b]fluoranthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
	601-034-00-4	205-911-9	205-99-2							
24	benzo[k]fluoranthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
	601-036-00-5	205-916-6	207-08-9							
25	benzo[a]pyrene; benzo[def]chrysene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
	601-032-00-3	200-028-5	50-32-8							
26	indeno[123-cd]pyrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		205-893-2	193-39-5							
27	dibenz[a,h]anthracene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
	601-041-00-2	200-181-8	53-70-3							
28	benzo[ghi]perylene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		205-883-8	191-24-2							
29	phenol				<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
	604-001-00-2	203-632-7	108-95-2							
30	asbestos				0.001 mg/kg		0.001 mg/kg	0.0000001 %		
	650-013-00-6	-----	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5							
Total:								0.0252 %		

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: TP109

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
TP109	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)
0.20-0.30 m	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		arsenic { arsenic trioxide }				6.6	mg/kg	1.32	8.714	mg/kg	0.000871 %		
		033-003-00-0	215-481-4	1327-53-3									
2		cadmium { cadmium oxide }				<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<LOD
		048-002-00-0	215-146-2	1306-19-0									
3		chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				19	mg/kg	1.462	27.77	mg/kg	0.00278 %		
			215-160-9	1308-38-9									
4		chromium in chromium(VI) compounds { chromium(VI) oxide }				<1	mg/kg	1.923	<1.923	mg/kg	<0.000192 %		<LOD
		024-001-00-0	215-607-8	1333-82-0									
5		copper { dicopper oxide; copper (I) oxide }				37	mg/kg	1.126	41.658	mg/kg	0.00417 %		
		029-002-00-X	215-270-7	1317-39-1									
6		lead { lead chromate }			1	15	mg/kg	1.56	23.397	mg/kg	0.0015 %		
		082-004-00-2	231-846-0	7758-97-6									
7		mercury { mercury(II) sulfide }				<0.05	mg/kg	1.16	<0.058	mg/kg	<0.0000058 %		<LOD
			215-696-3	1344-48-5									
8		nickel { nickel chromate }				38	mg/kg	2.976	113.098	mg/kg	0.0113 %		
		028-035-00-7	238-766-5	14721-18-7									
9		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<0.5	mg/kg	1.405	<0.703	mg/kg	<0.0000703 %		<LOD
		034-002-00-8											
10		zinc { zinc chromate }				87	mg/kg	2.774	241.351	mg/kg	0.0241 %		
		024-007-00-3	236-878-9	13530-65-9									
11		pH				7.1	pH		7.1	pH	7.1 pH		
				PH									
12		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 }				<0.1	mg/kg	1.884	<0.188	mg/kg	<0.0000188 %		<LOD
		006-007-00-5											
13		naphthalene				0.06	mg/kg		0.06	mg/kg	0.000006 %		
		601-052-00-2	202-049-5	91-20-3									
14		acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-917-1	208-96-8									
15		acenaphthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-469-6	83-32-9									

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
16	fluorene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		201-695-5	86-73-7							
17	phenanthrene				0.03 mg/kg		0.03 mg/kg	0.000003 %		
		201-581-5	85-01-8							
18	anthracene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		204-371-1	120-12-7							
19	fluoranthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		205-912-4	206-44-0							
20	pyrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		204-927-3	129-00-0							
21	benzo[a]anthracene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
	601-033-00-9	200-280-6	56-55-3							
22	chrysene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
	601-048-00-0	205-923-4	218-01-9							
23	benzo[b]fluoranthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
	601-034-00-4	205-911-9	205-99-2							
24	benzo[k]fluoranthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
	601-036-00-5	205-916-6	207-08-9							
25	benzo[a]pyrene; benzo[def]chrysene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
	601-032-00-3	200-028-5	50-32-8							
26	indeno[123-cd]pyrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		205-893-2	193-39-5							
27	dibenz[a,h]anthracene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
	601-041-00-2	200-181-8	53-70-3							
28	benzo[ghi]perylene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
		205-883-8	191-24-2							
29	phenol				<0.3 mg/kg		<0.3 mg/kg	<0.00003 %		<LOD
	604-001-00-2	203-632-7	108-95-2							
30	asbestos				0.001 mg/kg		0.001 mg/kg	0.0000001 %		
	650-013-00-6	-----	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5							
Total:								0.0451 %		

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: BH104

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
BH104	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)
5.70 m	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	arsenic { arsenic trioxide }				30	mg/kg	1.32	39.61	mg/kg	0.00396 %		
	033-003-00-0	215-481-4	1327-53-3									
2	cadmium { cadmium oxide }				<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<LOD
	048-002-00-0	215-146-2	1306-19-0									
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }				8.4	mg/kg	1.462	12.277	mg/kg	0.00123 %		
		215-160-9	1308-38-9									
4	copper { dicopper oxide; copper (I) oxide }				49	mg/kg	1.126	55.169	mg/kg	0.00552 %		
	029-002-00-X	215-270-7	1317-39-1									
5	lead { lead chromate }			1	22	mg/kg	1.56	34.316	mg/kg	0.0022 %		
	082-004-00-2	231-846-0	7758-97-6									
6	mercury { mercury(II) sulfide }				0.11	mg/kg	1.16	0.128	mg/kg	0.0000128 %		
		215-696-3	1344-48-5									
7	nickel { nickel chromate }				27	mg/kg	2.976	80.359	mg/kg	0.00804 %		
	028-035-00-7	238-766-5	14721-18-7									
8	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											
9	zinc { zinc chromate }				56	mg/kg	2.774	155.352	mg/kg	0.0155 %		
	024-007-00-3	236-878-9	13530-65-9									
10	pH				8.9	pH		8.9	pH	8.9 pH		
11	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 }				<0.1	mg/kg	1.884	<0.188	mg/kg	<0.0000188 %		<LOD
	006-007-00-5											
12	naphthalene				0.16	mg/kg		0.16	mg/kg	0.000016 %		
	601-052-00-2	202-049-5	91-20-3									
13	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		205-917-1	208-96-8									
14	acenaphthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		201-469-6	83-32-9									
15	fluorene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
		201-695-5	86-73-7									
16	phenanthrene				0.08	mg/kg		0.08	mg/kg	0.000008 %		
		201-581-5	85-01-8									

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
17	anthracene	204-371-1	120-12-7		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
18	fluoranthene	205-912-4	206-44-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
19	pyrene	204-927-3	129-00-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
20	benzo[a]anthracene	601-033-00-9	200-280-6		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
21	chrysene	601-048-00-0	205-923-4		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
22	benzo[b]fluoranthene	601-034-00-4	205-911-9		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
23	benzo[k]fluoranthene	601-036-00-5	205-916-6		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
25	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
27	benzo[ghi]perylene	205-883-8	191-24-2		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
28	phenol	604-001-00-2	203-632-7		0.4 mg/kg		0.4 mg/kg	0.00004 %		
29	asbestos	650-013-00-6	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5		0.001 mg/kg		0.001 mg/kg	0.0000001 %		
Total:								0.0368 %		

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: BH104[2]

✔ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample name:	LoW Code:
BH104[2]	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)
6.50 m	

Hazard properties

None identified

Determinands

Moisture content: 0% No Moisture Correction applied (MC)

#	Determinand	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number					
1	arsenic { arsenic trioxide }							
	033-003-00-0	215-481-4	1327-53-3		25 mg/kg	1.32	33.008 mg/kg	0.0033 %
2	cadmium { cadmium oxide }							
	048-002-00-0	215-146-2	1306-19-0		<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }							
		215-160-9	1308-38-9		5.3 mg/kg	1.462	7.746 mg/kg	0.000775 %
4	copper { dicopper oxide; copper (I) oxide }							
	029-002-00-X	215-270-7	1317-39-1		50 mg/kg	1.126	56.294 mg/kg	0.00563 %
5	lead { lead chromate }			1				
	082-004-00-2	231-846-0	7758-97-6		21 mg/kg	1.56	32.756 mg/kg	0.0021 %
6	mercury { mercury(II) sulfide }							
		215-696-3	1344-48-5		0.07 mg/kg	1.16	0.0812 mg/kg	0.00000812 %
7	nickel { nickel chromate }							
	028-035-00-7	238-766-5	14721-18-7		18 mg/kg	2.976	53.573 mg/kg	0.00536 %
8	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }							
	034-002-00-8				1.3 mg/kg	1.405	1.827 mg/kg	0.000183 %
9	zinc { zinc chromate }							
	024-007-00-3	236-878-9	13530-65-9		50 mg/kg	2.774	138.707 mg/kg	0.0139 %
10	pH							
					9.8 pH		9.8 pH	9.8 pH
11	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 }							
	006-007-00-5				<0.1 mg/kg	1.884	<0.188 mg/kg	<0.0000188 %
12	naphthalene							
	601-052-00-2	202-049-5	91-20-3		0.34 mg/kg		0.34 mg/kg	0.000034 %
13	acenaphthylene							
		205-917-1	208-96-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %
14	acenaphthene							
		201-469-6	83-32-9		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %
15	fluorene							
		201-695-5	86-73-7		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %
16	phenanthrene							
		201-581-5	85-01-8		0.11 mg/kg		0.11 mg/kg	0.000011 %

#	Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number							
17	anthracene	204-371-1	120-12-7		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
18	fluoranthene	205-912-4	206-44-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
19	pyrene	204-927-3	129-00-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
20	benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
21	chrysene	601-048-00-0	205-923-4	218-01-9	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
22	benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
23	benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
24	benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
25	indeno[123-cd]pyrene	205-893-2	193-39-5		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
26	dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
27	benzo[ghi]perylene	205-883-8	191-24-2		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
28	phenol	604-001-00-2	203-632-7	108-95-2	0.4 mg/kg		0.4 mg/kg	0.00004 %		
29	asbestos	650-013-00-6	-----	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5	0.001 mg/kg		0.001 mg/kg	0.0000001 %		
Total:								0.0314 %		

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

Appendix A: Classifier defined and non CLP determinands

■ **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

■ **mercury(II) sulfide** (EC Number: 215-696-3, CAS Number: 1344-48-5)

Description/Comments: Data from ECHA's C&L and SDS Sigma Aldrich V6 dated 17/9/2019 Threshold for EUH031 based on calculation method in WM3 Box C12.1

Data source: <https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/8530>

Data source date: 14 May 2020

Hazard Statements: EUH031 >= 1 % , EUH031 , Skin Sens. 1 H317 , STOT RE 2 H373

■ **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**

CLP index number: 006-007-00-5

Description/Comments: Conversion factor based on a worst case compound: sodium cyanide

Data source: Commission Regulation (EC) No 790/2009 - 1st Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP1)

Additional Hazard Statement(s): EUH032 >= 0.2 %

Reason for additional Hazards Statement(s):

14 Dec 2015 - EUH032 >= 0.2 % hazard statement sourced from: WM3, Table C12.2

■ **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

■ **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

■ **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

■ **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

■ **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

■ **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

▪ **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

▪ **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

▪ **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

Appendix B: Rationale for selection of metal species

arsenic {arsenic trioxide}

Worst case CLP species based on hazard statements/molecular weight and low solubility. Industrial sources include: flame retardants in electrical apparatus, textiles and coatings.

cadmium {cadmium oxide}

Reasonable case CLP species based on hazard statements/molecular weight, very low solubility in water. Industrial sources include: electroplating baths, electrodes for storage batteries, catalysts, ceramic glazes, phosphors, pigments and nematocides.

chromium in chromium(III) compounds {chromium(III) oxide (worst case)}

Reasonable case species based on hazard statements/molecular weight. Industrial sources include: tanning, pigment in paint, inks and glass.

copper {dicopper oxide; copper (I) oxide}

Reasonable case CLP species based on hazard statements/molecular weight and insolubility in water. Industrial sources include: oxidised copper metal, brake pads, pigments, antifouling paints, fungicide. (edit as required) Worse case copper sulphate is very soluble and likely to have been leached away if ever present and/or not enough soluble sulphate detected.

lead {lead chromate}

Worst case CLP species based on hazard statements/molecular weight.

mercury {mercury(II) sulfide}

Worst case CLP species based on hazard statements/molecular weight.

nickel {nickel chromate}

Worst case CLP species based on hazard statements/molecular weight.

selenium {selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex}

Harmonised group entry used as most reasonable case. Pigment cadmium sulphoselenide not likely to be present in this soil. No evidence for the other CLP entries: sodium selenite, nickel II selenite and nickel selenide, to be present in this soil.

zinc {zinc chromate}

Worst case CLP species based on hazard statements/molecular weight.

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}

Harmonised group entry used as most reasonable case as complex cyanides and those specified elsewhere in the annex are not likely to be present in this soil: [Note conversion factor based on a worst case compound: sodium cyanide]

chromium in chromium(VI) compounds {chromium(VI) oxide}

Worst case CLP species based on hazard statements/molecular weight. Industrial sources include: production stainless steel, electroplating, wood preservation, anti-corrosion agents or coatings, pigments

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.1, May 2018
HazWasteOnline Classification Engine Version: 2021.222.4848.9214 (10 Aug 2021)
HazWasteOnline Database: 2021.222.4848.9214 (10 Aug 2021)

This classification utilises the following guidance and legislation:

WM3 v1.1 - Waste Classification - 1st Edition v1.1 - May 2018

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 2019 - UK: 2019 No. 720 of 27th March 2019

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

POPs Regulation 2019 - Regulation (EU) 2019/1021 of 20 June 2019



Appendix D Geotechnical Testing Results



LABORATORY REPORT



4043

Contract Number: PSL21/4697

Report Date: 30 June 2021
Client's Reference: 5419
Client Name: JPG Leeds
5 John Charles Way
Leeds
West Yorkshire
LS12 6QD

For the attention of: Ben Whitaker

Contract Title: Birdwell
Date Received: 10/6/2021
Date Commenced: 10/6/2021
Date Completed: 30/6/2021

Notes: Opinions and Interpretations are outside the UKAS Accreditation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

A Watkins
(Director)

R Berriman
(Quality Manager)

S Royle
(Laboratory Manager)

L Knight
(Assistant Laboratory Manager)


S Eyre
(Senior Technician)

T Watkins
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Page 1 of

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
TP102	-	D	1.50	1.70	Brown mottled grey gravelly very sandy CLAY.
TP101	-	D	0.80	1.00	Grey gravelly very sandy CLAY.
TP103	-	D	0.40	0.60	Grey gravelly very sandy CLAY.
TP104	-	D	0.20	0.40	Light brown slightly gravelly very sandy CLAY.
TP108	-	D	1.20	1.40	Grey gravelly very sandy CLAY.
TP107	-	D	2.40	2.60	Brown gravelly very sandy CLAY.
TP105	-	D	1.20	1.40	Grey gravelly very sandy CLAY.
TP106	-	D	1.30	1.40	Brown gravelly very sandy CLAY.
TP109	-	D	1.00	1.20	Grey gravelly very sandy CLAY.
BH102	3	B	1.50	2.00	Grey very sandy very clayey GRAVEL.
BH104	3	B	1.20	1.65	Grey very gravelly very sandy CLAY.
BH105	3	B	1.20	1.65	Grey very gravelly very sandy CLAY.
BH108	3	B	1.20	1.65	Grey very gravelly very sandy CLAY.
BH101	11	B	4.00	4.45	Dark grey gravelly very sandy CLAY.
BH103	5	B	2.00	2.45	Grey very gravelly very sandy CLAY.
BH106	7	B	3.00	3.45	Brown very gravelly very sandy CLAY.
BH107A	3	B	1.20	1.65	Grey very gravelly very sandy CLAY.
BH102	1	B	0.20	1.00	Grey very gravelly very sandy CLAY.
BH105	9	B	4.00	4.45	Grey very gravelly very sandy CLAY.



4043

PSL
Professional Soils Laboratory

Birdwell

Contract No:

PSL21/4697

Client Ref:

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
BH108	9	B	4.00	4.45	Grey mottled brown very gravelly very sandy CLAY.
BH104	5	B	2.00	2.45	Grey very gravelly very sandy CLAY.
BH105	-	UT	2.00	2.45	Grey very sandy CLAY.
BH101	-	UT	3.00	3.45	Grey very sandy CLAY.
BH101	-	UT	5.00	5.45	Grey gravelly very sandy CLAY.
BH102	-	UT	4.00	4.45	Grey gravelly very sandy CLAY.
BH103	-	UT	6.50	6.95	Grey gravelly very sandy CLAY.
BH104	-	UT	8.00	8.45	Grey gravelly very sandy CLAY.
BH105	-	UT	5.00	5.45	Grey gravelly very sandy CLAY.
BH106	-	UT	5.00	5.45	Grey gravelly very sandy CLAY.
BH107A	-	UT	5.00	5.45	Grey gravelly very sandy CLAY.
BH108	-	UT	9.50	9.95	Grey gravelly very sandy CLAY.



4043

PSL

Professional Soils Laboratory

Birdwell

Contract No:

PSL21/4697

Client Ref:

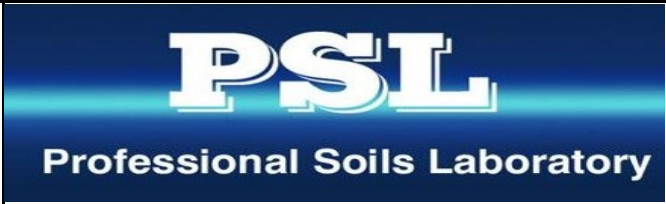
SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

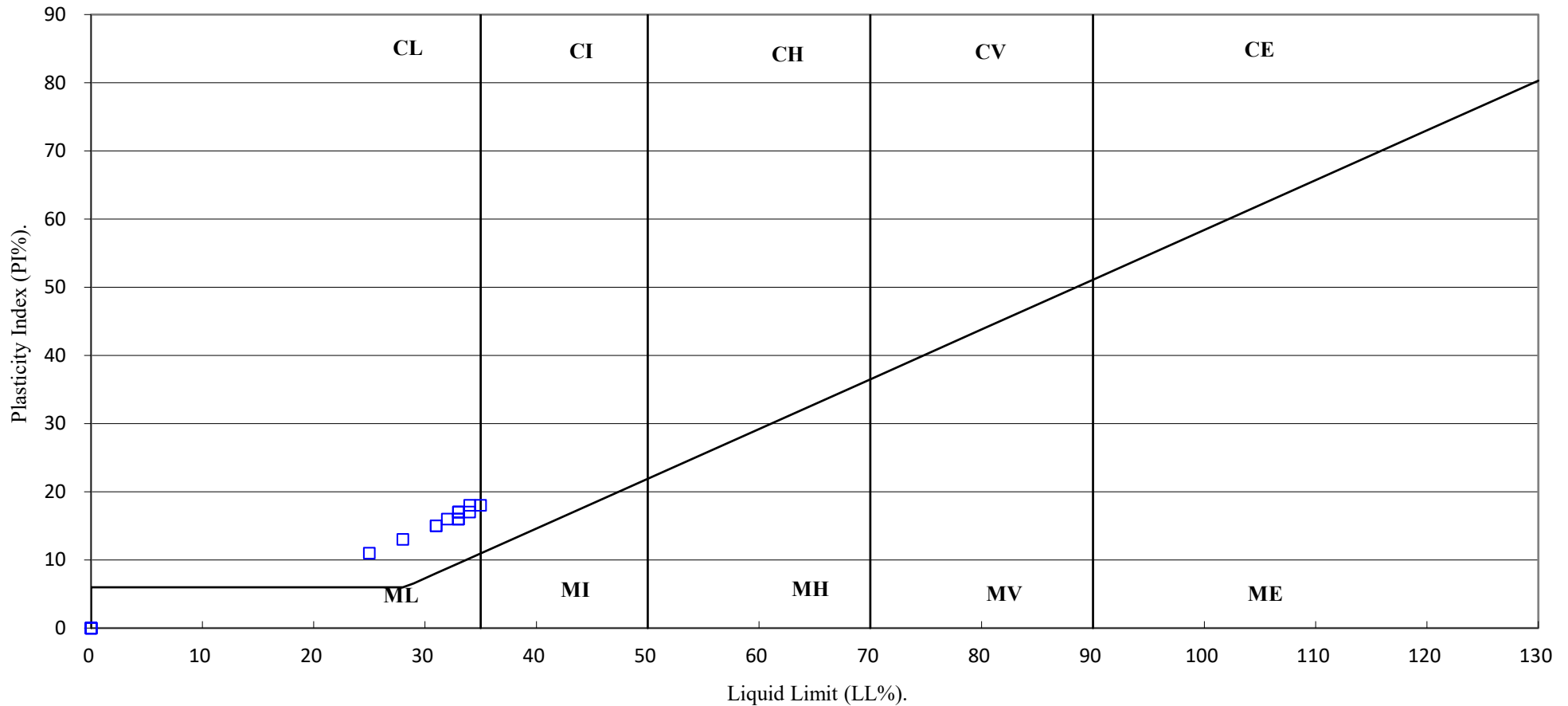
Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content % Clause 3.2	Linear Shrinkage % Clause 6.5	Particle Density Mg/m ³ Clause 8.2	Liquid Limit % Clause 4.3/4	Plastic Limit % Clause 5.3	Plasticity Index % Clause 5.4	Passing .425mm %	Remarks
TP102	-	D	1.50	1.70	18			33	16	17	72	Low Plasticity CL
TP101	-	D	0.80	1.00	12			33	16	17	50	Low Plasticity CL
TP103	-	D	0.40	0.60	13			33	17	16	62	Low Plasticity CL
TP104	-	D	0.20	0.40	11			31	16	15	80	Low Plasticity CL
TP108	-	D	1.20	1.40	11			33	17	16	71	Low Plasticity CL
TP107	-	D	2.40	2.60	18			34	17	17	78	Low Plasticity CL
TP105	-	D	1.20	1.40	14			25	14	11	77	Low Plasticity CL
TP106	-	D	1.30	1.40	14			31	16	15	79	Low Plasticity CL
TP109	-	D	1.00	1.20	11			28	15	13	82	Low Plasticity CL
BH102	3	B	1.50	2.00	16		2.65	32	16	16	36	Low Plasticity CL
BH104	3	B	1.20	1.65	20		2.65	33	16	17	54	Low Plasticity CL
BH105	3	B	1.20	1.65	18		2.66	35	17	18	62	Intermediate Plasticity CI
BH108	3	B	1.20	1.65	14		2.63	34	16	18	51	Low Plasticity CL

SYMBOLS : NP : Non Plastic

* : Liquid Limit and Plastic Limit Wet Sieved.

		Birdwell	Contract No:
			PSL21/4697
			Client Ref:

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.



4043

PSL

Professional Soils Laboratory

Birdwell

Contract No:

PSL21/4697

Client Ref:

SUMMARY OF LABORATORY HAND VANES

(BS1377 : PART 7 : 1990)

[illegible]

* This test is out of our UKAS scope



Birdwell

Contract No:

PSL21/4697

Client Ref:

PARTICLE SIZE DISTRIBUTION TEST

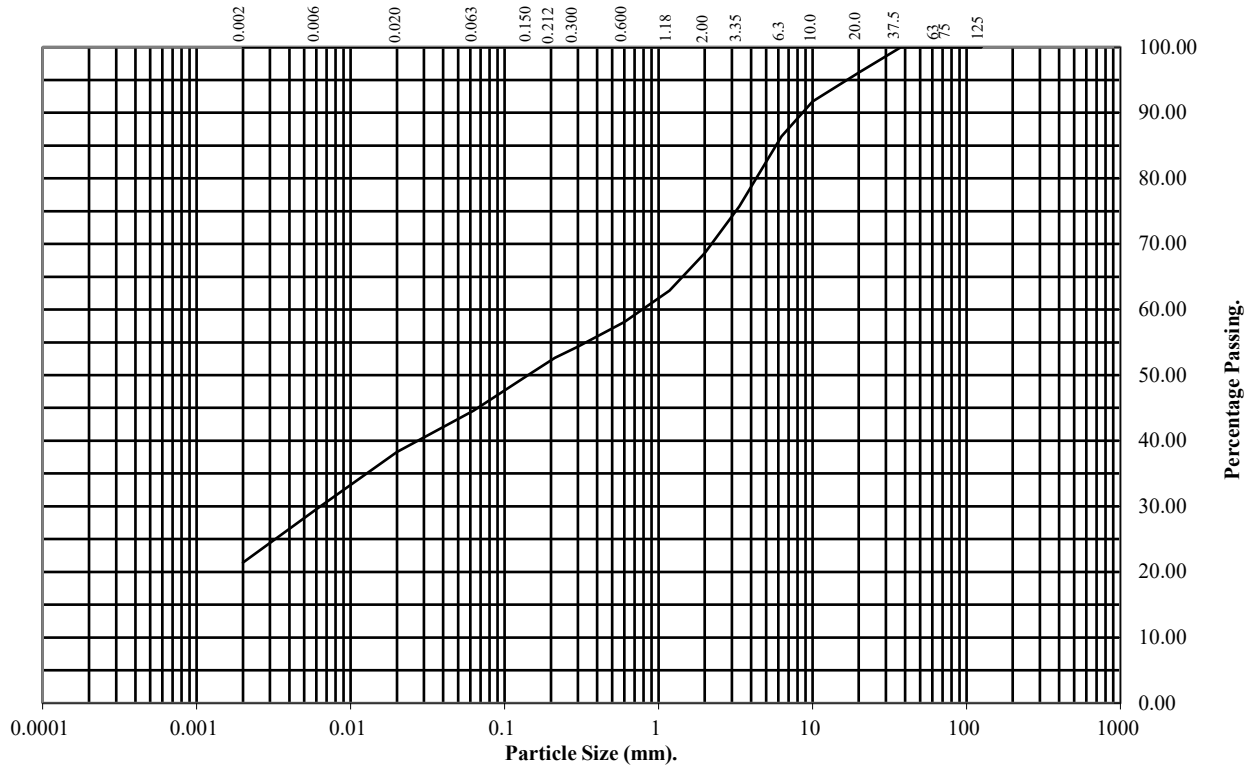
BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number: BH102 Top Depth (m): 0.20

Sample Number: 1 Base Depth(m): 1.00

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	96
10	92
6.3	86
3.35	76
2	69
1.18	63
0.6	58
0.3	54
0.212	53
0.15	50
0.063	45

Particle Diameter	Percentage Passing
0.02	38
0.006	30
0.002	21

Soil Fraction	Total Percentage
Cobbles	0
Gravel	31
Sand	24
Silt	24
Clay	21

Remarks:

See Summary of Soil Descriptions



PSL
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Birdwell

Contract No:
PSL21/4697
Client Ref:

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

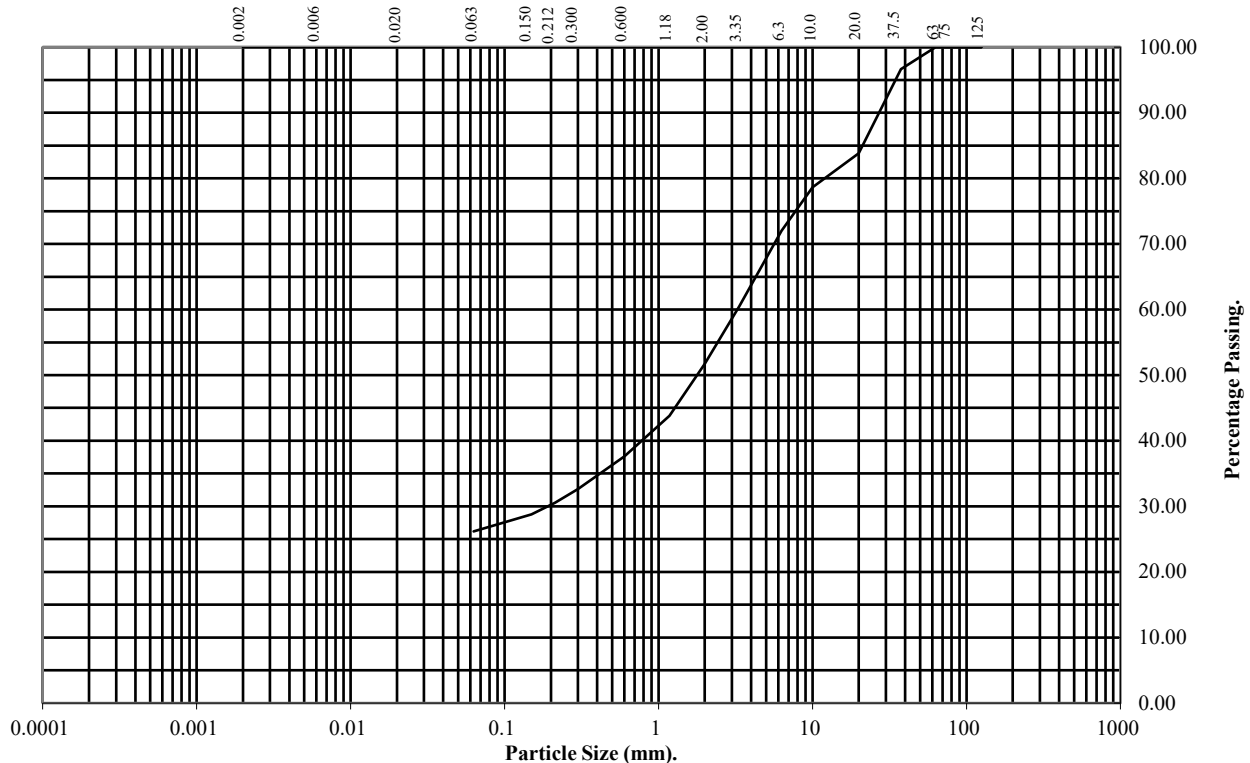
Hole Number: BH102

Top Depth (m): 1.50

Sample Number: 3

Base Depth(m): 2.00

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	97
20	84
10	79
6.3	72
3.35	61
2	52
1.18	44
0.6	38
0.3	33
0.212	31
0.15	29
0.063	26

Soil Fraction	Total Percentage
Cobbles	0
Gravel	48
Sand	26
Silt/Clay	26

Remarks:

See Summary of Soil Descriptions



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Client Ref:

PARTICLE SIZE DISTRIBUTION TEST

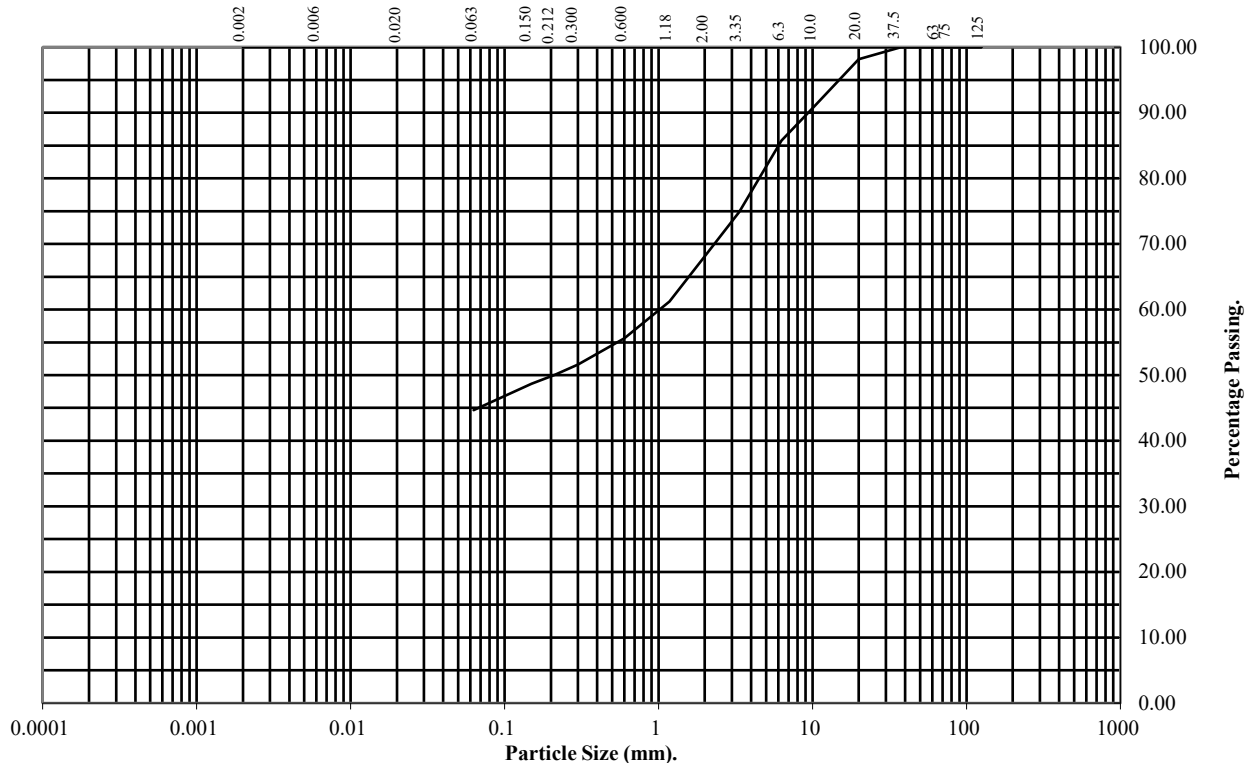
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: BH104 Top Depth (m): 1.20

Sample Number: 3 Base Depth(m): 1.65

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	98
10	91
6.3	86
3.35	75
2	68
1.18	61
0.6	56
0.3	52
0.212	50
0.15	49
0.063	45

Soil Fraction	Total Percentage
Cobbles	0
Gravel	32
Sand	23
Silt/Clay	45

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

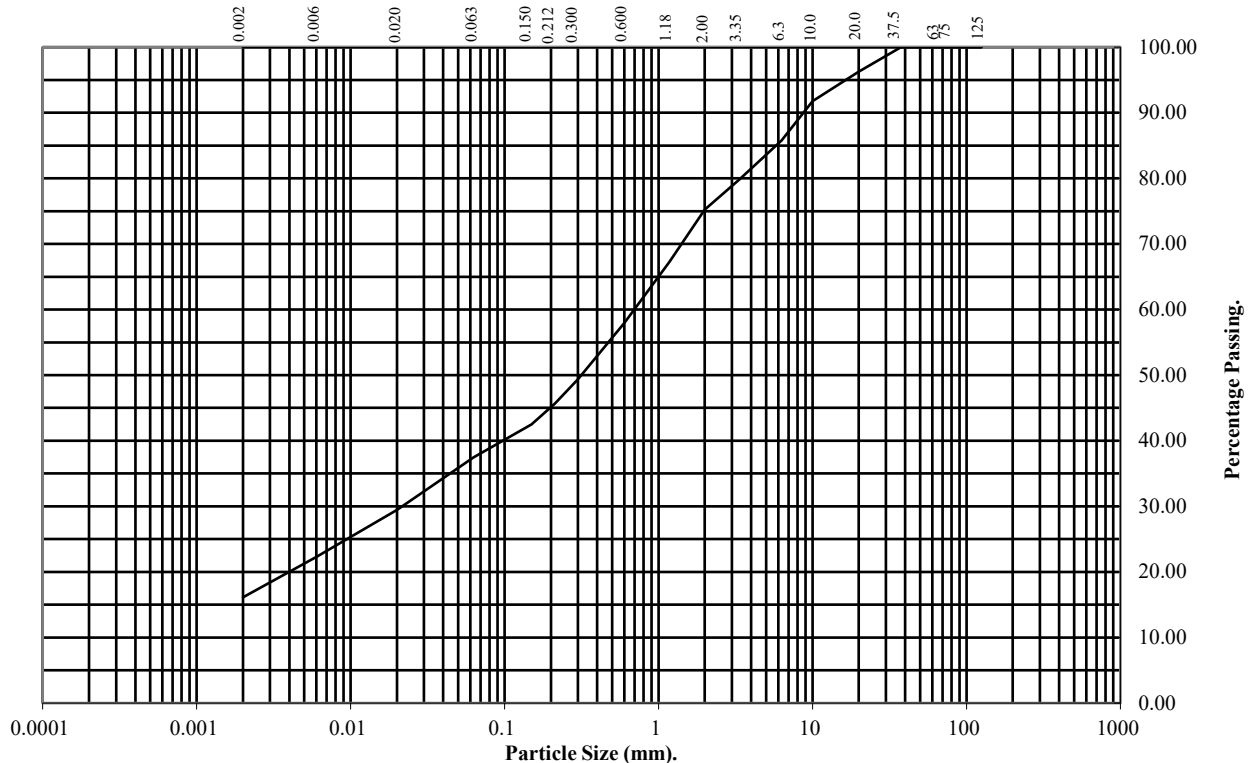
BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number: BH104 Top Depth (m): 2.00

Sample Number: 5 Base Depth(m): 2.45

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	96
10	92
6.3	86
3.35	80
2	75
1.18	67
0.6	58
0.3	49
0.212	46
0.15	42
0.063	37

Particle Diameter	Percentage Passing
0.02	29
0.006	22
0.002	16

Soil Fraction	Total Percentage
Cobbles	0
Gravel	25
Sand	38
Silt	21
Clay	16

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

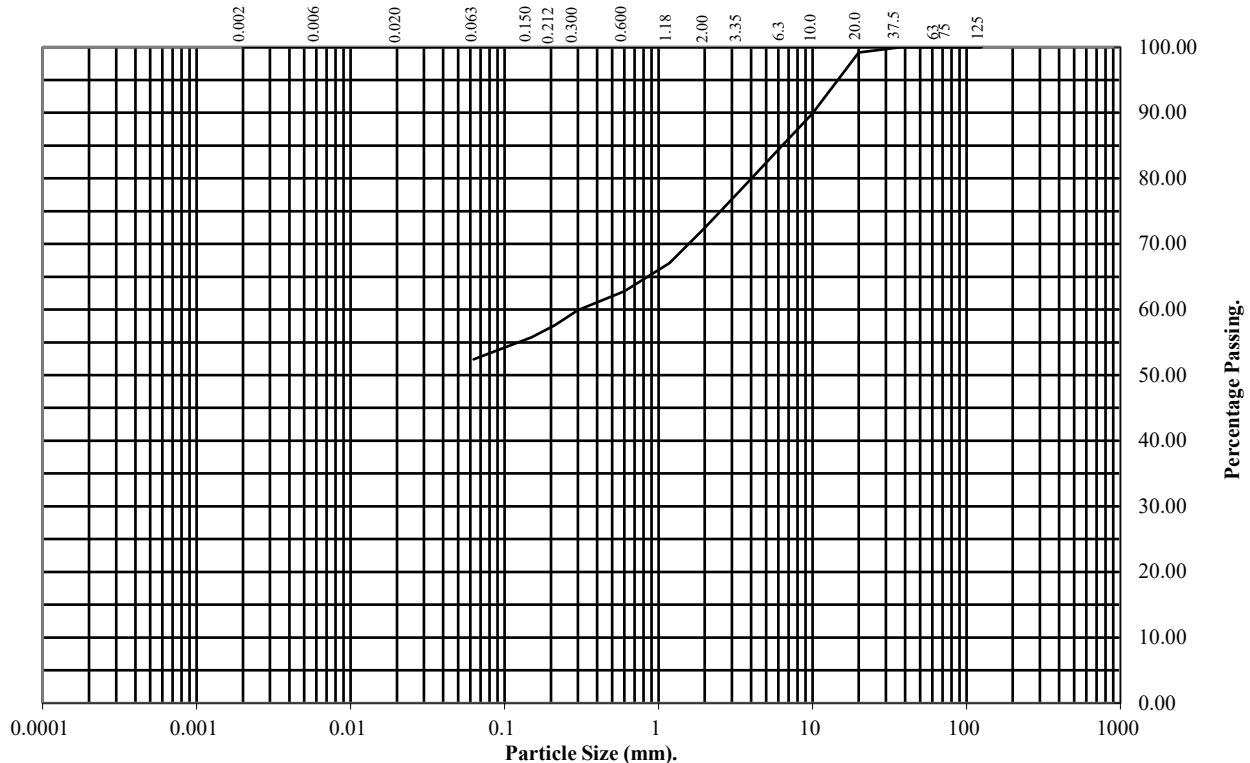
Hole Number: BH105

Top Depth (m): 1.20

Sample Number: 3

Base Depth(m): 1.65

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	99
10	90
6.3	85
3.35	78
2	72
1.18	67
0.6	63
0.3	60
0.212	58
0.15	56
0.063	52

Soil Fraction	Total Percentage
Cobbles	0
Gravel	28
Sand	20
Silt/Clay	52

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

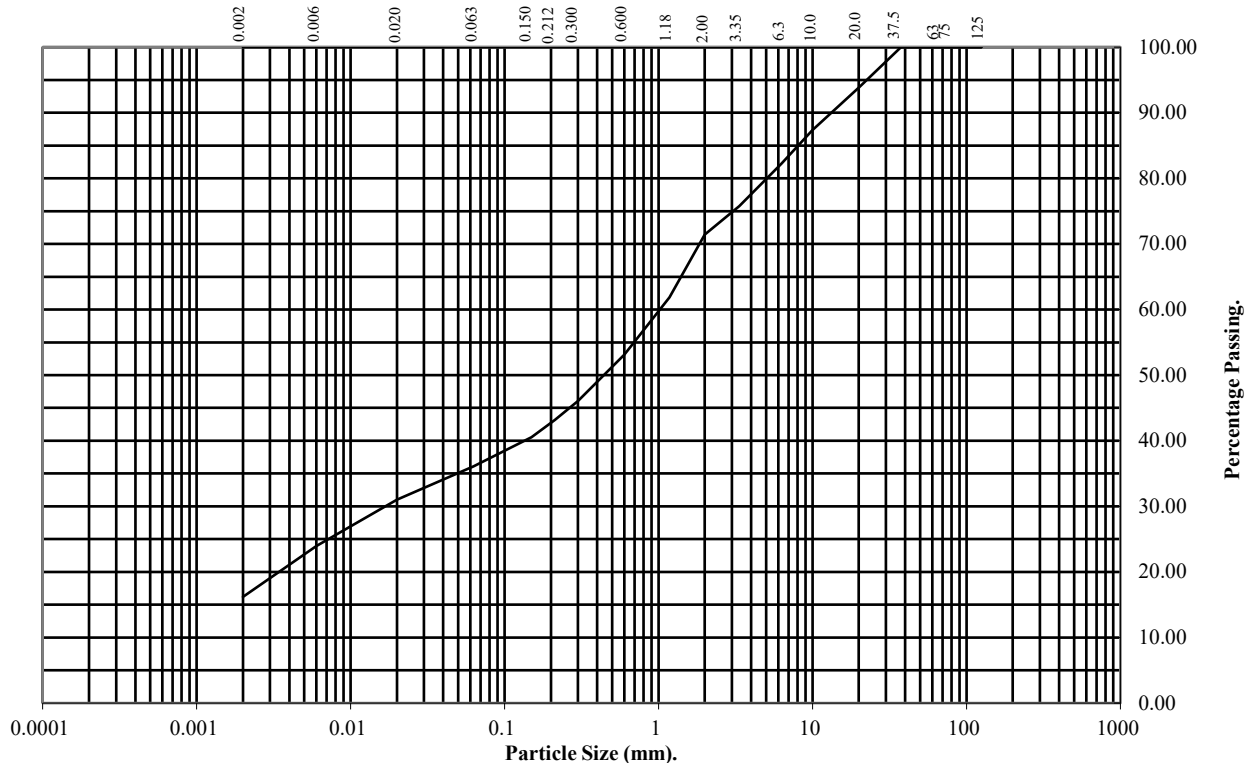
BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number: BH105 Top Depth (m): 4.00

Sample Number: 9 Base Depth(m): 4.45

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	94
10	87
6.3	82
3.35	76
2	71
1.18	62
0.6	53
0.3	46
0.212	43
0.15	41
0.063	36

Particle Diameter	Percentage Passing
0.02	31
0.006	24
0.002	16

Soil Fraction	Total Percentage
Cobbles	0
Gravel	29
Sand	35
Silt	20
Clay	16

Remarks:
See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

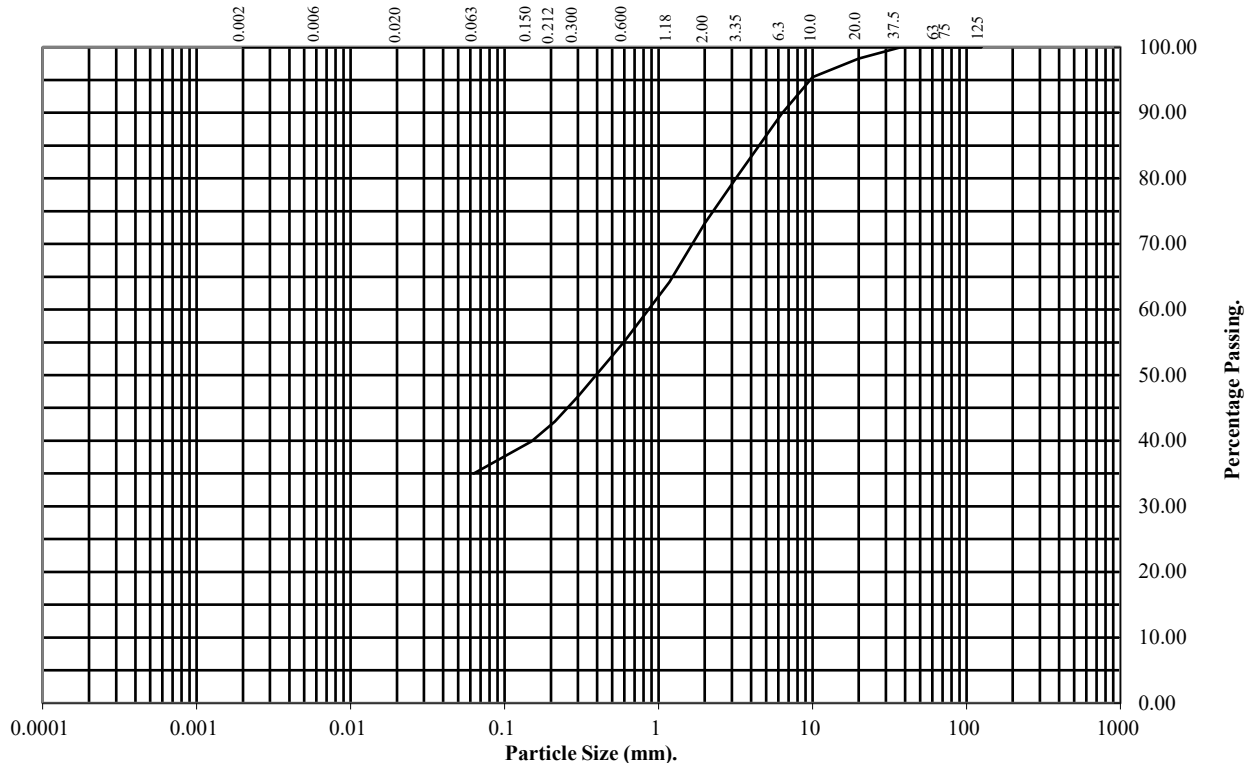
Hole Number: BH108

Top Depth (m): 1.20

Sample Number: 3

Base Depth(m): 1.65

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	98
10	95
6.3	90
3.35	81
2	73
1.18	64
0.6	55
0.3	47
0.212	43
0.15	40
0.063	35

Soil Fraction	Total Percentage
Cobbles	0
Gravel	27
Sand	38
Silt/Clay	35

Remarks:

See Summary of Soil Descriptions



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Client Ref:

PARTICLE SIZE DISTRIBUTION TEST

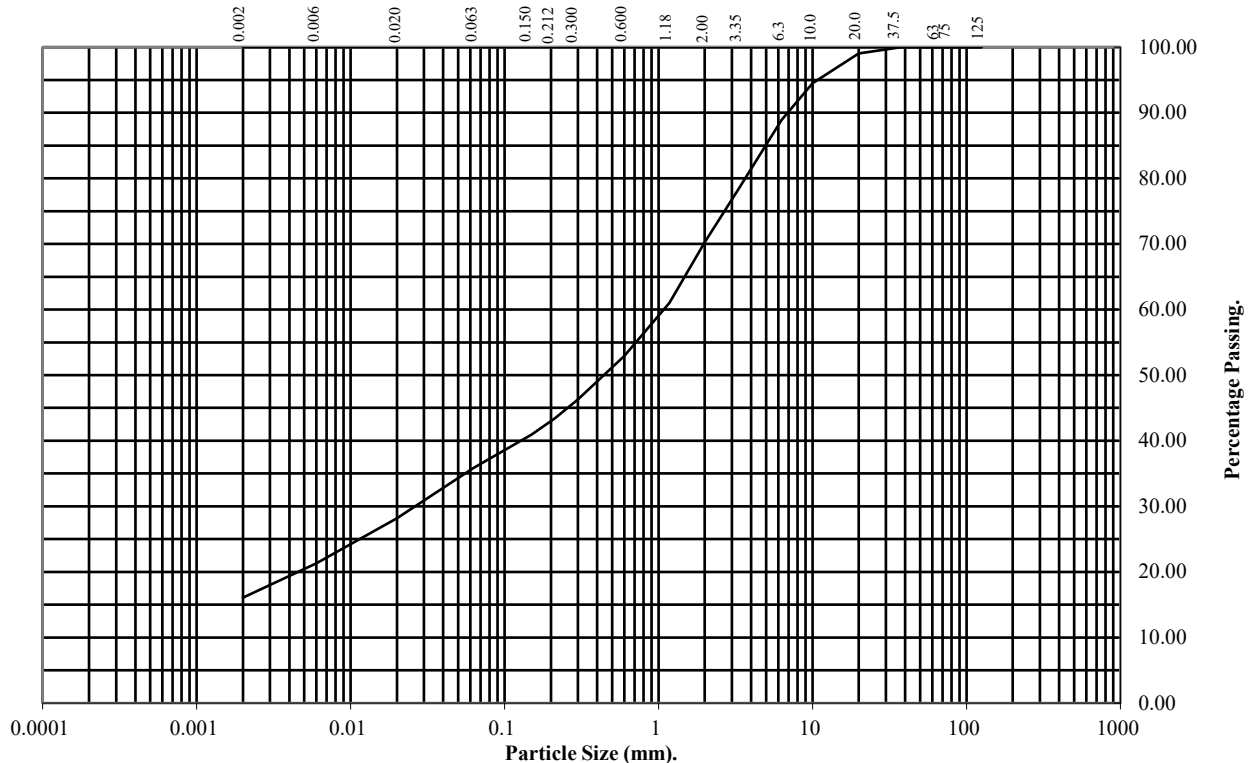
BS1377 : Part 2 : 1990

Wet Sieve & Pipette Analysis, Clause 9.2 & 9.4

Hole Number: BH108 Top Depth (m): 4.00

Sample Number: 9 Base Depth(m): 4.45

Sample Type: B



BS Test Sieve (mm)	Percentage Passing
125	100
75	100
63	100
37.5	100
20	99
10	94
6.3	89
3.35	79
2	70
1.18	61
0.6	53
0.3	46
0.212	43
0.15	41
0.063	36

Particle Diameter	Percentage Passing
0.02	28
0.006	21
0.002	16

Soil Fraction	Total Percentage
Cobbles	0
Gravel	30
Sand	34
Silt	20
Clay	16

Remarks:

See Summary of Soil Descriptions



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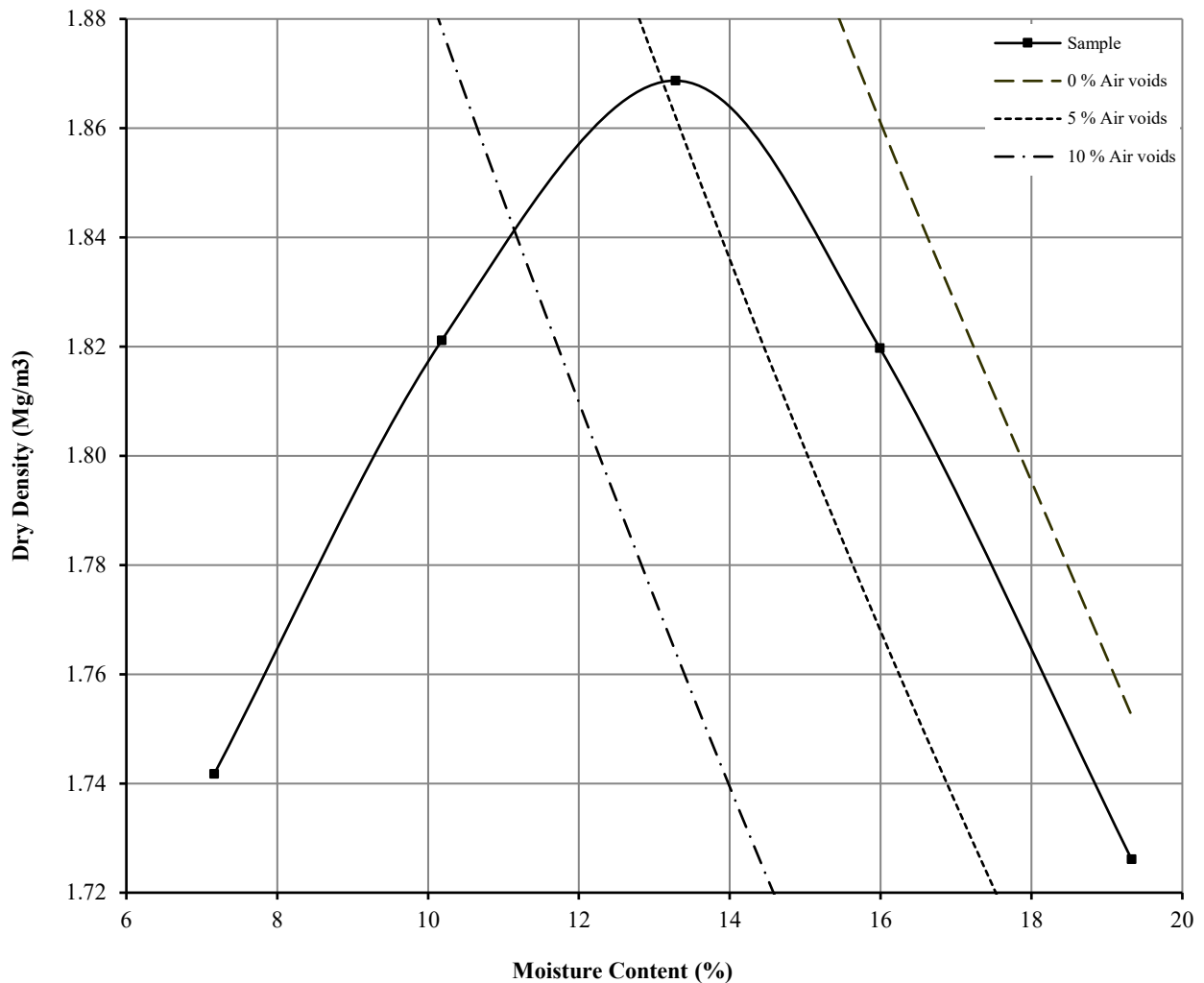
DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : Clause 3.4 : 1990

Hole Number: BH102 Top Depth (m) : 1.50

Sample Number: 3 Base Depth (m) : 2.00

Sample Type: B



Initial Moisture Content:	16	Method of Compaction:	2.5kg	Separate Samples
Particle Density (Mg/m ³):	2.65	Measured	Material Retained on 37.5 mm Test Sieve (%):	3
Maximum Dry Density (Mg/m ³):	1.87		Material Retained on 20.0 mm Test Sieve (%):	13
Optimum Moisture Content (%):	13			
Remarks See summary of soil descriptions				



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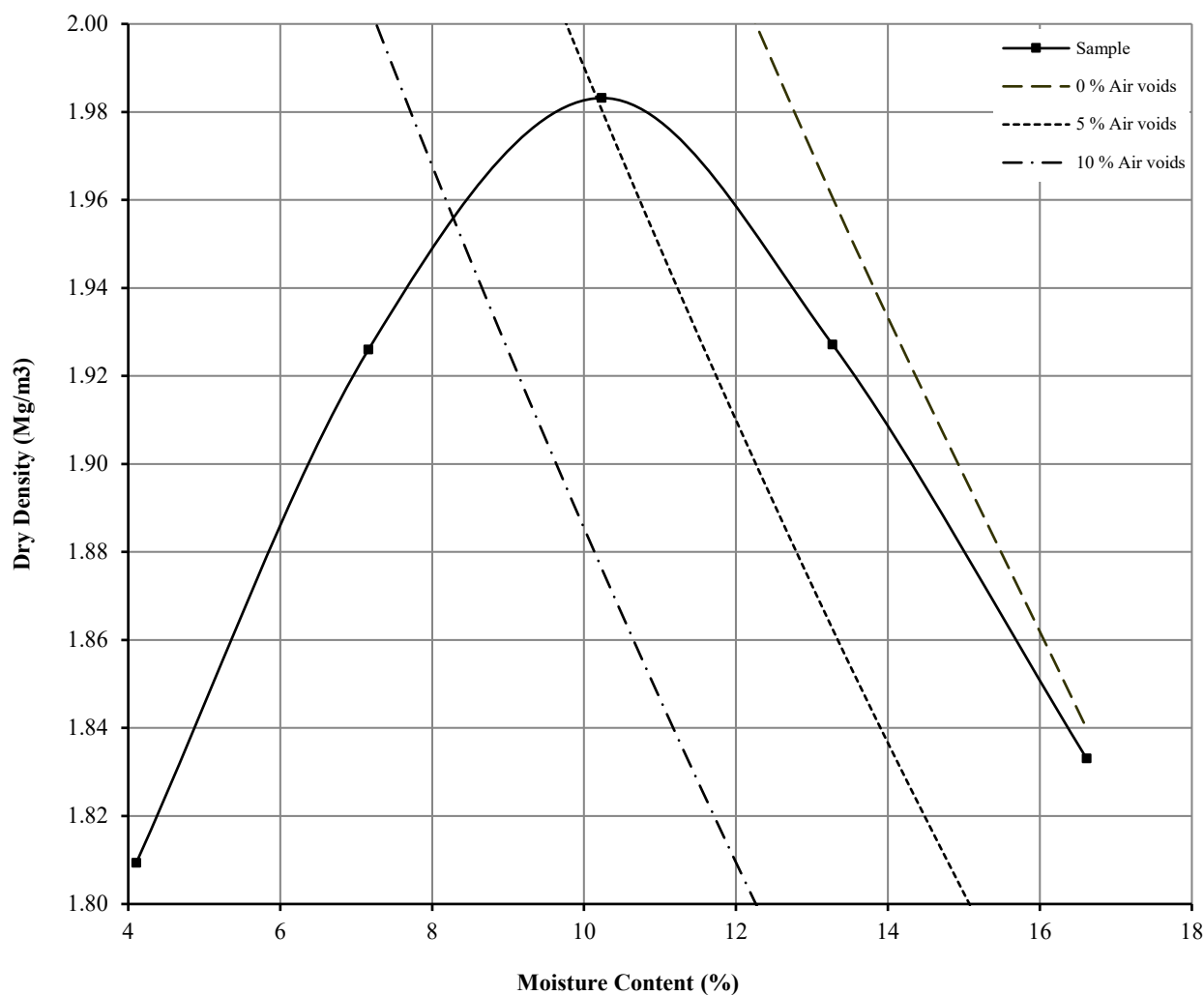
DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : Clause 3.6 : 1990

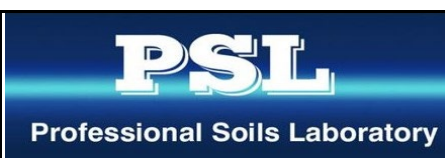
Hole Number: BH102 Top Depth (m) : 1.50

Sample Number: 3 Base Depth (m) : 2.00

Sample Type: B



Initial Moisture Content:	16	Method of Compaction:	4.5kg	Separate Samples
Particle Density (Mg/m ³):	2.65	Measured	Material Retained on 37.5 mm Test Sieve (%):	3
Maximum Dry Density (Mg/m ³):	1.98		Material Retained on 20.0 mm Test Sieve (%):	13
Optimum Moisture Content (%):	10			
Remarks See summary of soil descriptions				



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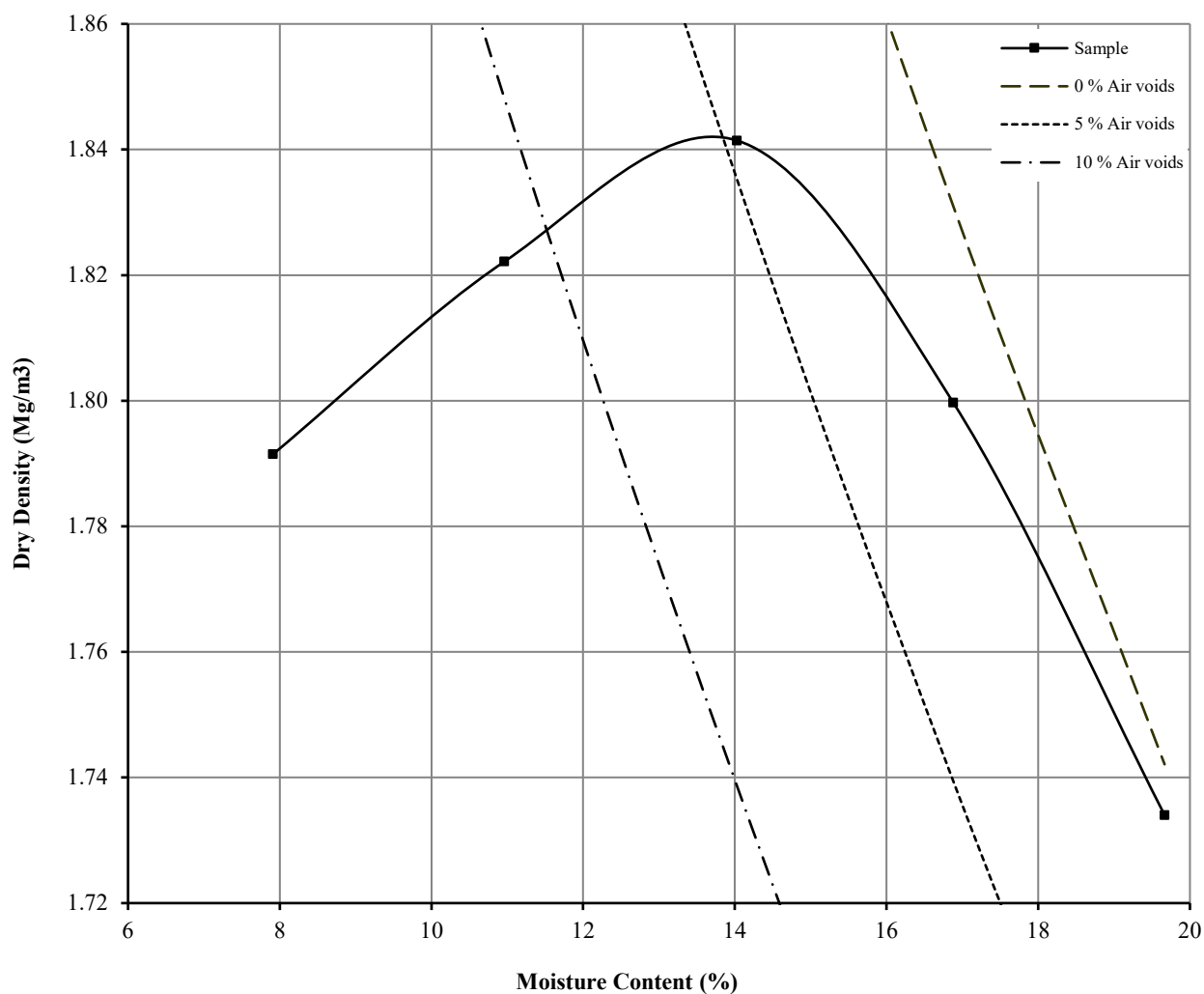
DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : Clause 3.3 : 1990

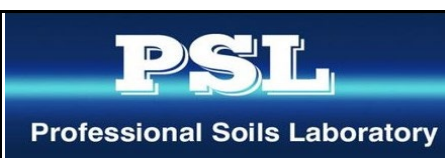
Hole Number: BH104 Top Depth (m) : 1.20

Sample Number: 3 Base Depth (m) : 1.65

Sample Type: B



Initial Moisture Content:	20	Method of Compaction:	2.5kg	Separate Samples
Particle Density (Mg/m ³):	2.65	Measured	Material Retained on 37.5 mm Test Sieve (%):	0
Maximum Dry Density (Mg/m ³):	1.84		Material Retained on 20.0 mm Test Sieve (%):	2
Optimum Moisture Content (%):	14			
Remarks See summary of soil descriptions				



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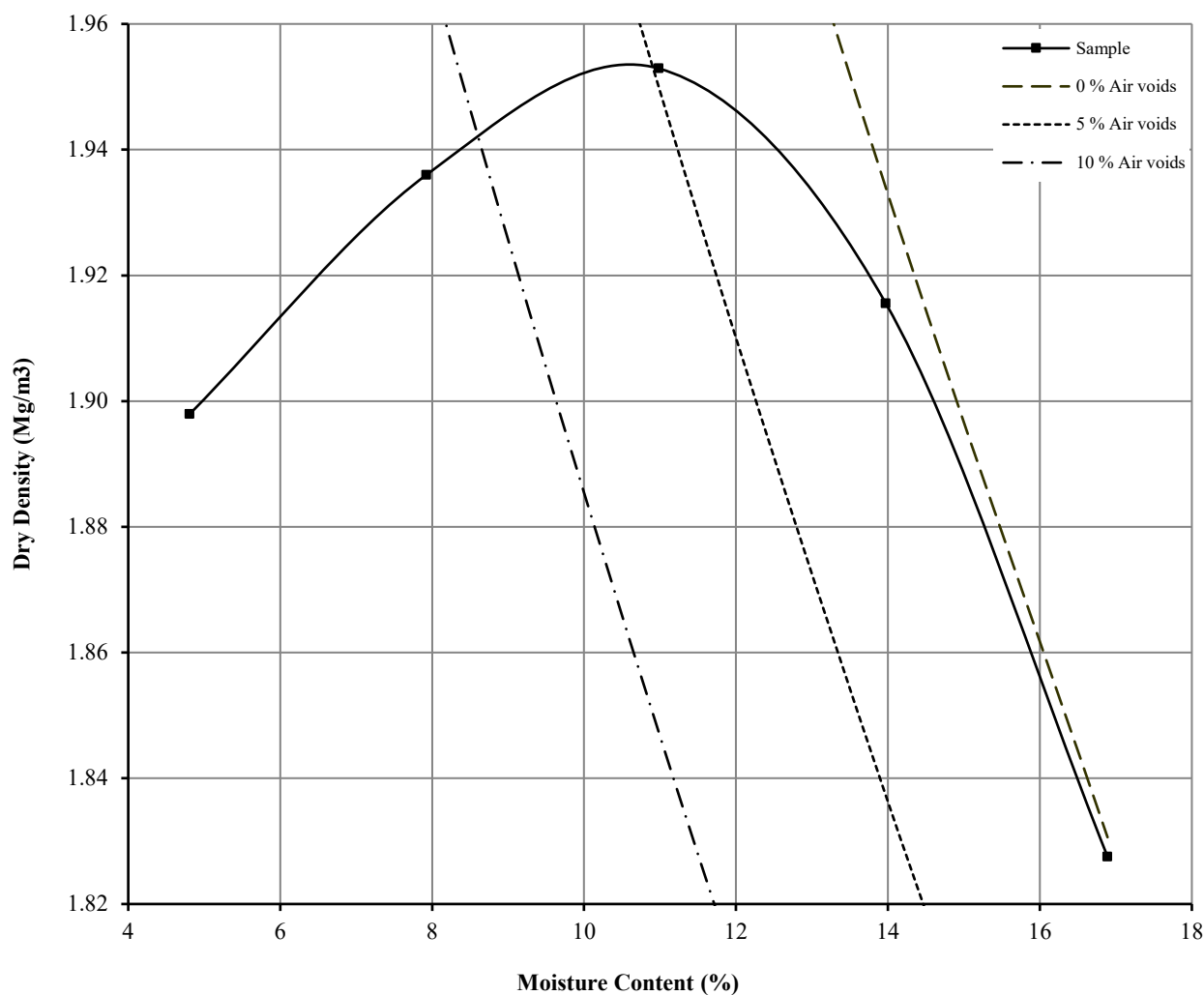
DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : Clause 3.5 : 1990

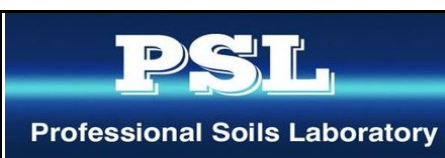
Hole Number: BH104 Top Depth (m) : 1.20

Sample Number: 3 Base Depth (m) : 1.65

Sample Type: B



Initial Moisture Content:	20	Method of Compaction:	4.5kg	Separate Samples
Particle Density (Mg/m ³):	2.65	Measured	Material Retained on 37.5 mm Test Sieve (%):	0
Maximum Dry Density (Mg/m ³):	1.95		Material Retained on 20.0 mm Test Sieve (%):	2
Optimum Moisture Content (%):	11			
Remarks See summary of soil descriptions				



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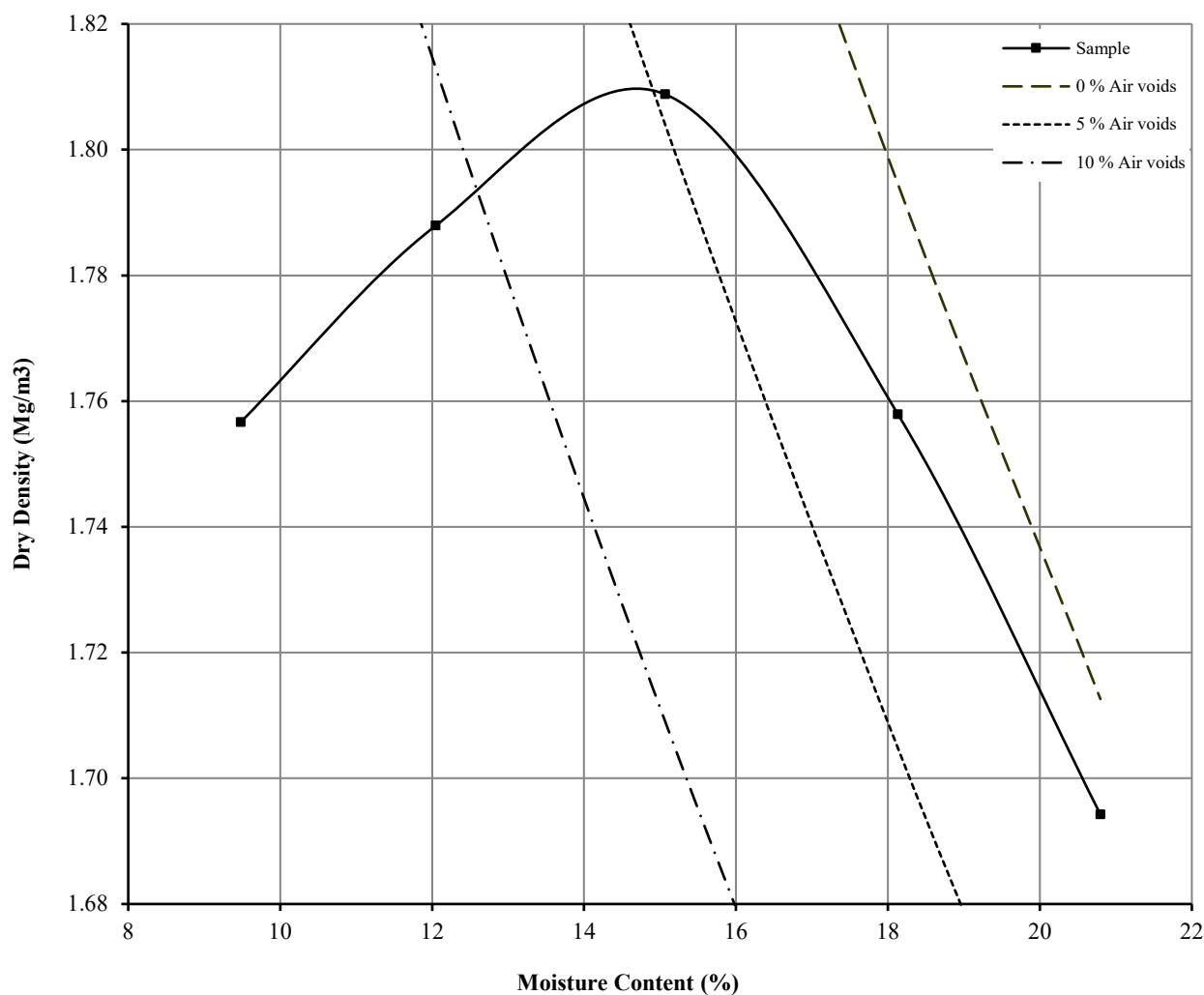
DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : Clause 3.3 : 1990

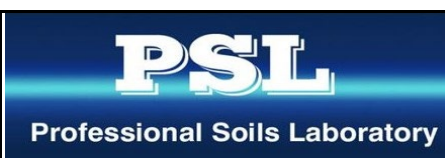
Hole Number: BH105 Top Depth (m) : 1.20

Sample Number: 3 Base Depth (m) : 1.65

Sample Type: B



Initial Moisture Content:	18	Method of Compaction:	2.5kg	Separate Samples
Particle Density (Mg/m ³):	2.66	Measured	Material Retained on 37.5 mm Test Sieve (%):	0
Maximum Dry Density (Mg/m ³):	1.81		Material Retained on 20.0 mm Test Sieve (%):	1
Optimum Moisture Content (%):	15			
Remarks See summary of soil descriptions				



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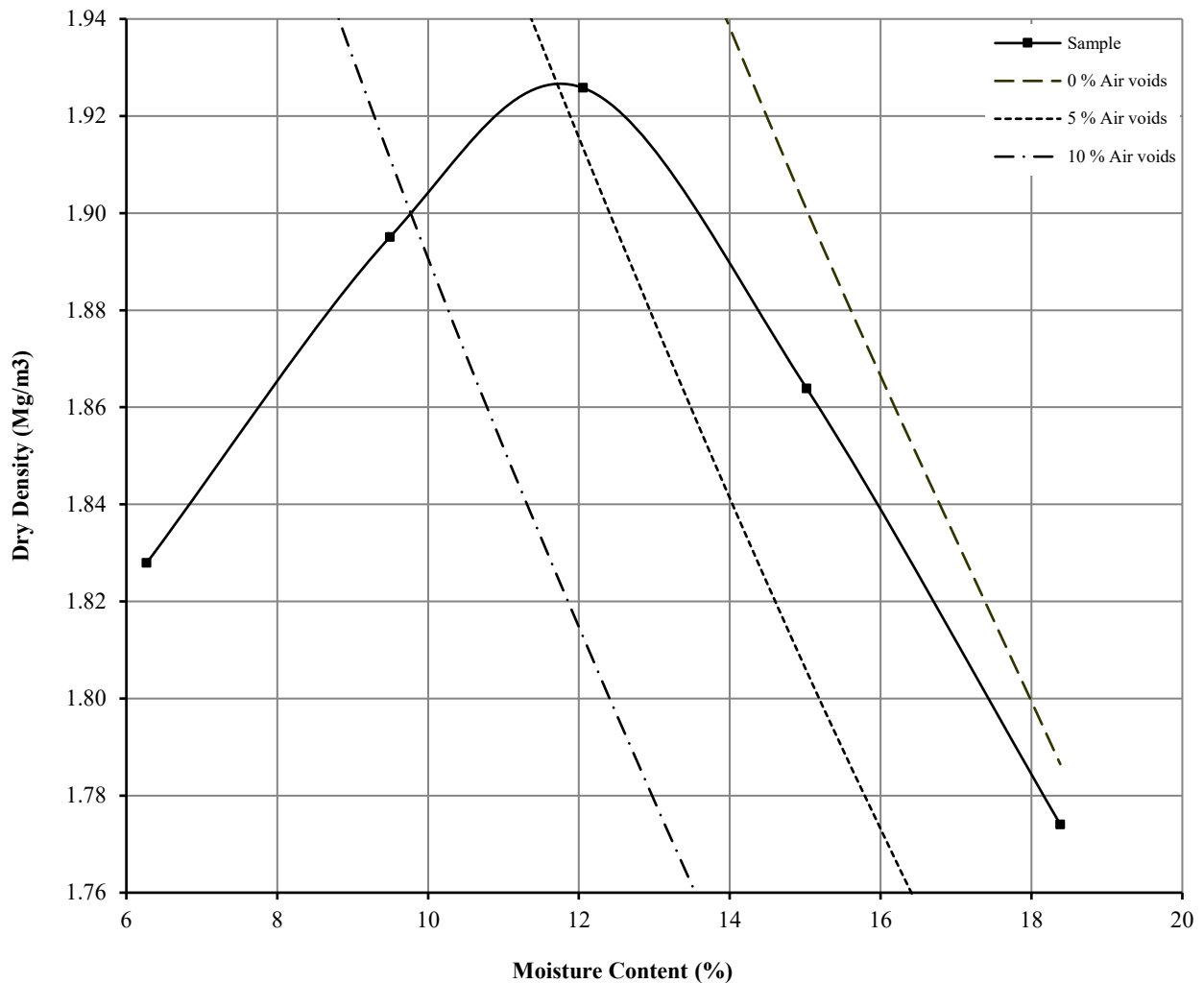
DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : Clause 3.5 : 1990

Hole Number: BH105 Top Depth (m) : 1.20

Sample Number: 3 Base Depth (m) : 1.65

Sample Type: B



Initial Moisture Content:	18	Method of Compaction:	4.5kg	Separate Samples
Particle Density (Mg/m3):	2.66	Measured	Material Retained on 37.5 mm Test Sieve (%):	0
Maximum Dry Density (Mg/m3):	1.93		Material Retained on 20.0 mm Test Sieve (%):	1
Optimum Moisture Content (%):	12			
Remarks See summary of soil descriptions				



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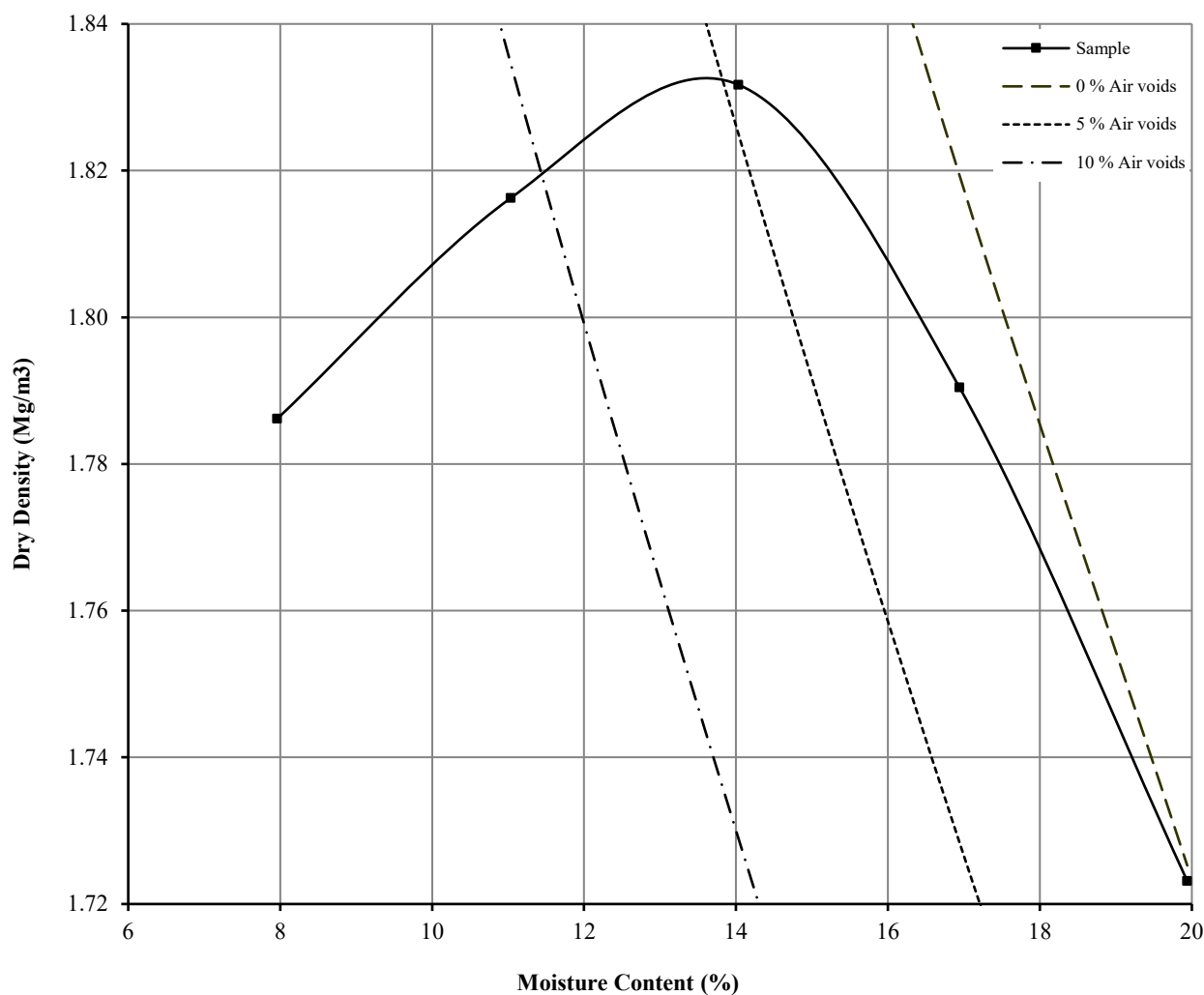
DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : Clause 3.3 : 1990

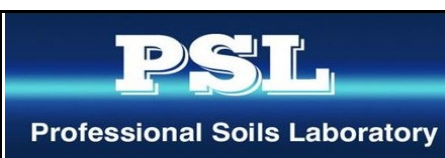
Hole Number: BH108 Top Depth (m) : 1.20

Sample Number: 3 Base Depth (m) : 1.65

Sample Type: B



Initial Moisture Content:	14	Method of Compaction:	2.5kg	Separate Samples
Particle Density (Mg/m ³):	2.63	Measured	Material Retained on 37.5 mm Test Sieve (%):	0
Maximum Dry Density (Mg/m ³):	1.83		Material Retained on 20.0 mm Test Sieve (%):	2
Optimum Moisture Content (%):	14			
Remarks See summary of soil descriptions				



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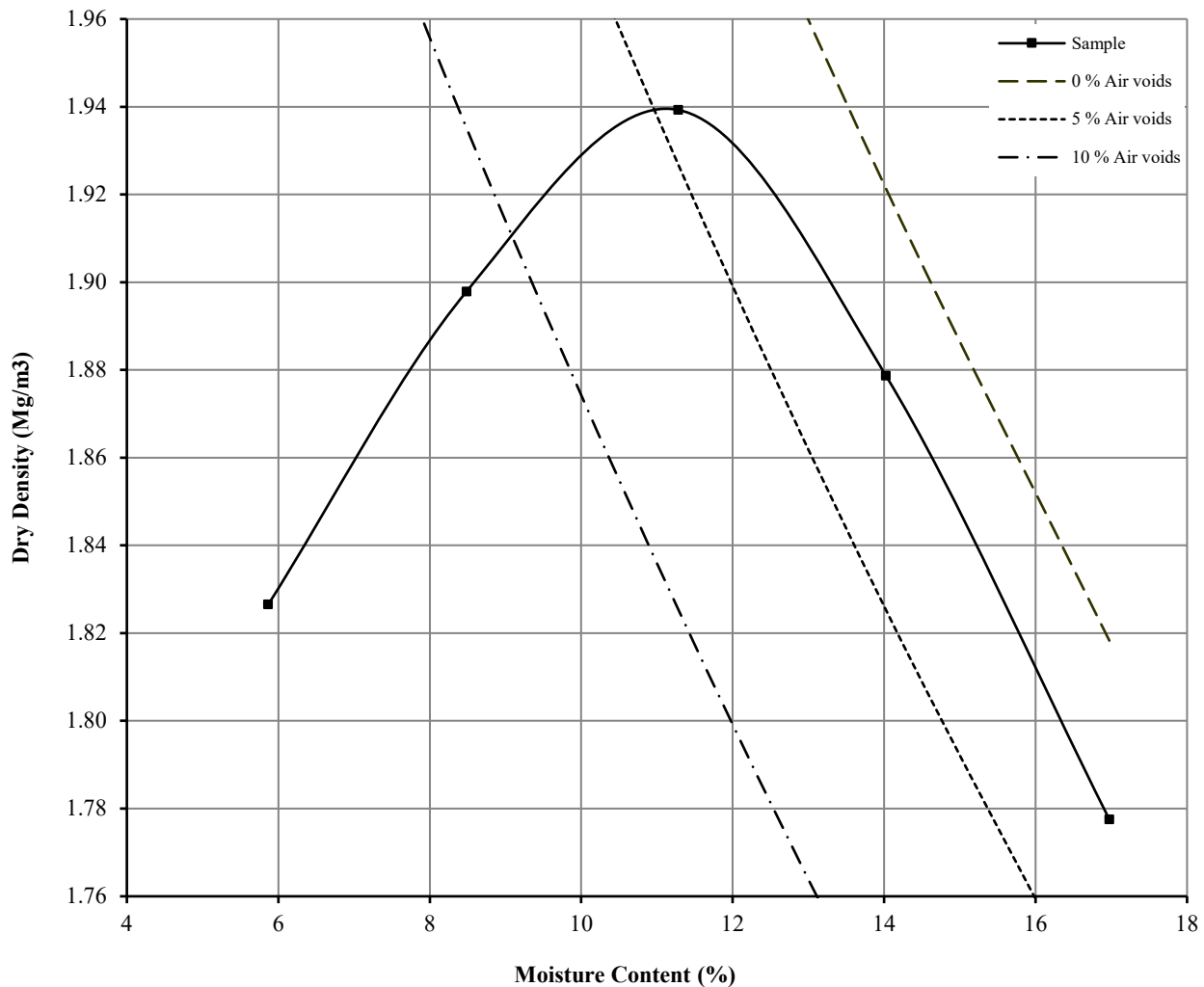
DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : Clause 3.5 : 1990

Hole Number: BH108 Top Depth (m) : 1.20

Sample Number: 3 Base Depth (m) : 1.65

Sample Type: B



Initial Moisture Content:	14	Method of Compaction:	4.5kg	Separate Samples
Particle Density (Mg/m ³):	2.63	Measured	Material Retained on 37.5 mm Test Sieve (%):	0
Maximum Dry Density (Mg/m ³):	1.94		Material Retained on 20.0 mm Test Sieve (%):	2
Optimum Moisture Content (%):	11			
Remarks See summary of soil descriptions				



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CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

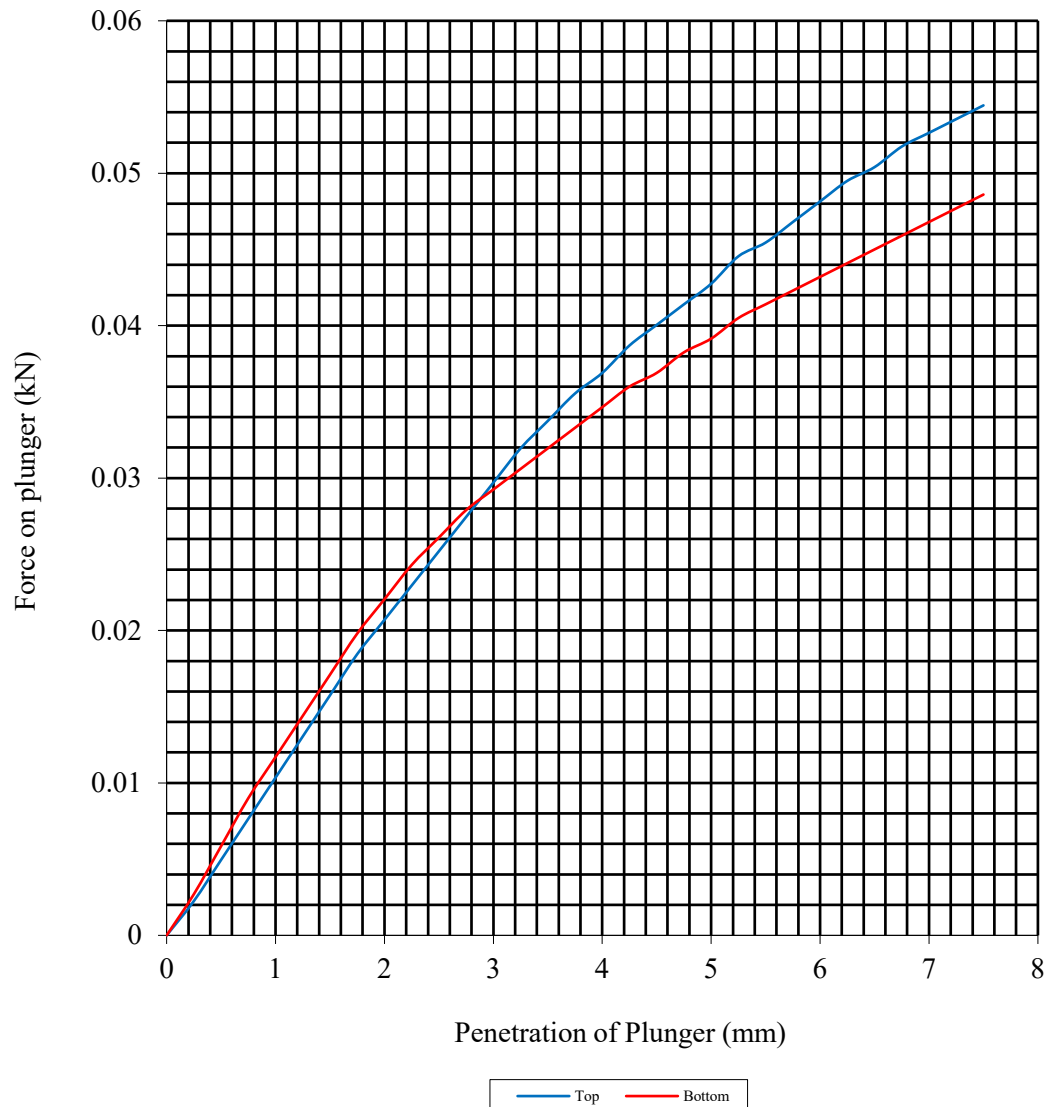
Hole Number: BH101

Top Depth (m): 4.00

Sample Number: 11

Base Depth (m): 4.45

Sample Type: B



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	21	Surcharge Kg:	4.20	Sample Top	21	Sample Top	0.2
Bulk Density Mg/m3:	2.03	Soaking Time hrs	0	Sample Bottom	22	Sample Bottom	0.2
Dry Density Mg/m3:	1.67	Swelling mm:	0.00	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:		11					
Compaction Conditions		2.5kg					



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CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

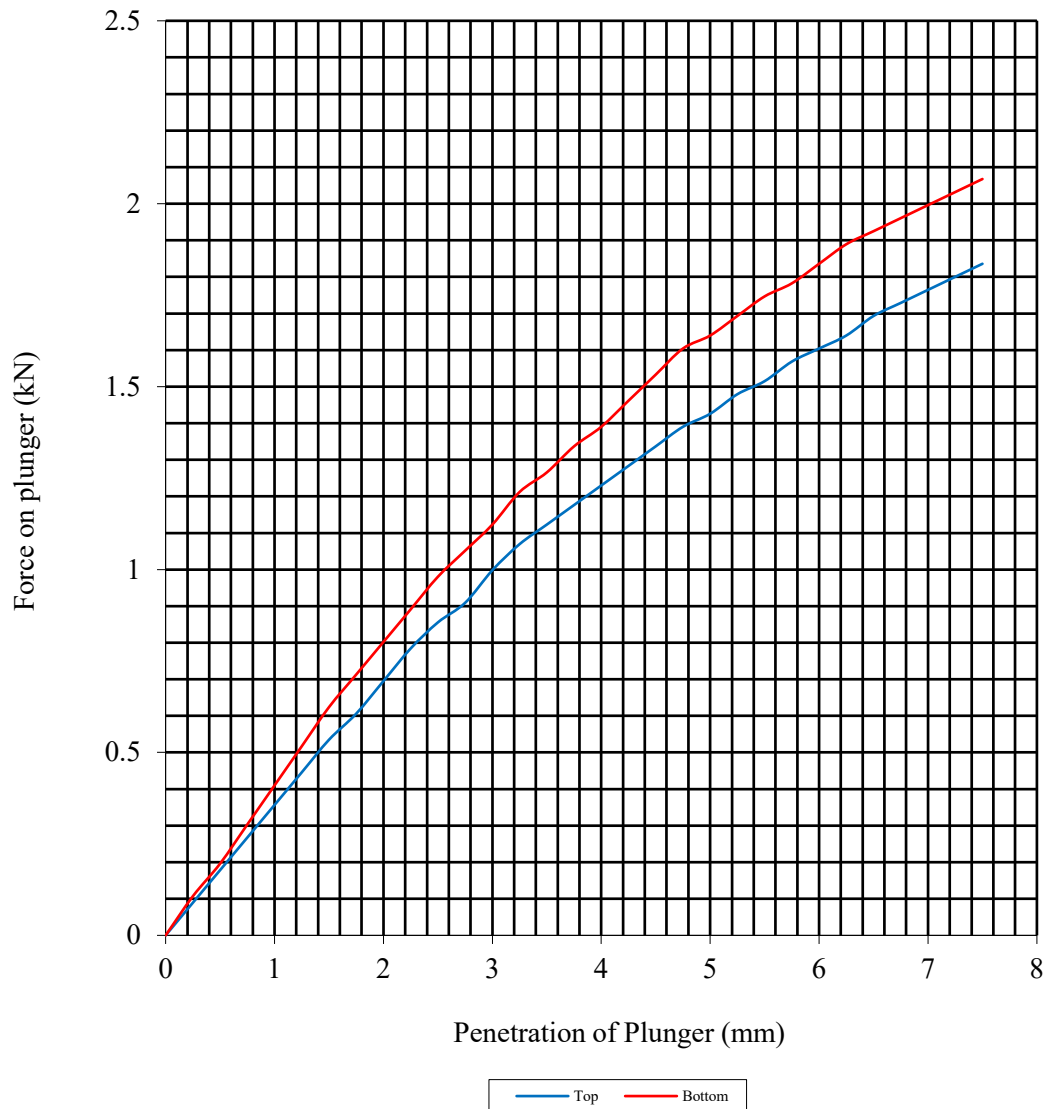
Hole Number: BH103

Top Depth (m): 2.00

Sample Number: 5

Base Depth (m): 2.45

Sample Type: B



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	13	Surcharge Kg:	4.20	Sample Top	13	Sample Top	7.1
Bulk Density Mg/m3:	2.19	Soaking Time hrs	0	Sample Bottom	13	Sample Bottom	8.2
Dry Density Mg/m3:	1.93	Swelling mm:	0.00	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:		17					
Compaction Conditions		2.5kg					



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CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

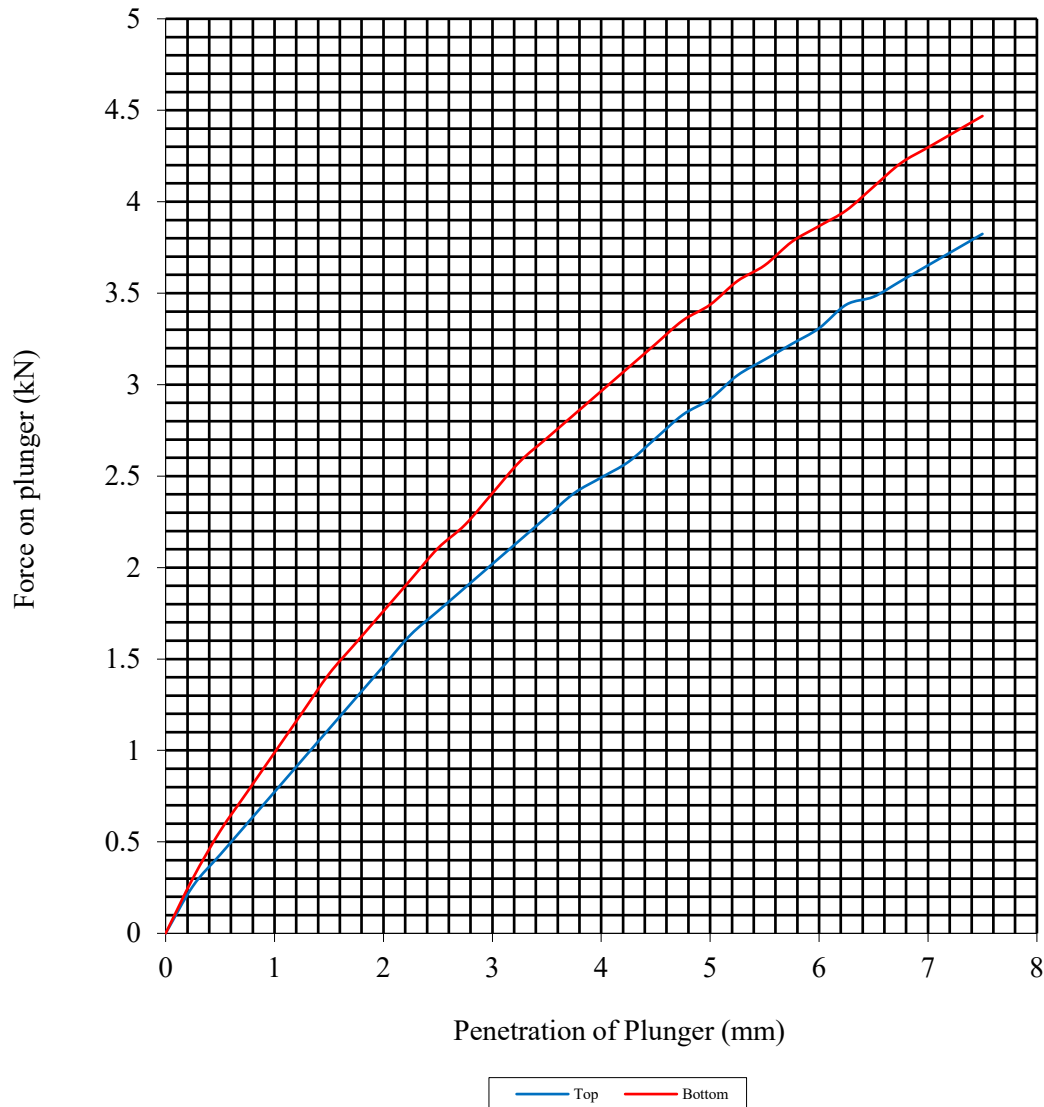
Hole Number: BH105

Top Depth (m): 4.00

Sample Number: 9

Base Depth (m): 4.45

Sample Type: B



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	13	Surcharge Kg:	4.20	Sample Top	13	Sample Top	14.6
Bulk Density Mg/m3:	2.21	Soaking Time hrs	0	Sample Bottom	13	Sample Bottom	17.2
Dry Density Mg/m3:	1.95	Swelling mm:	0.00	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:		6					
Compaction Conditions		2.5kg					



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CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

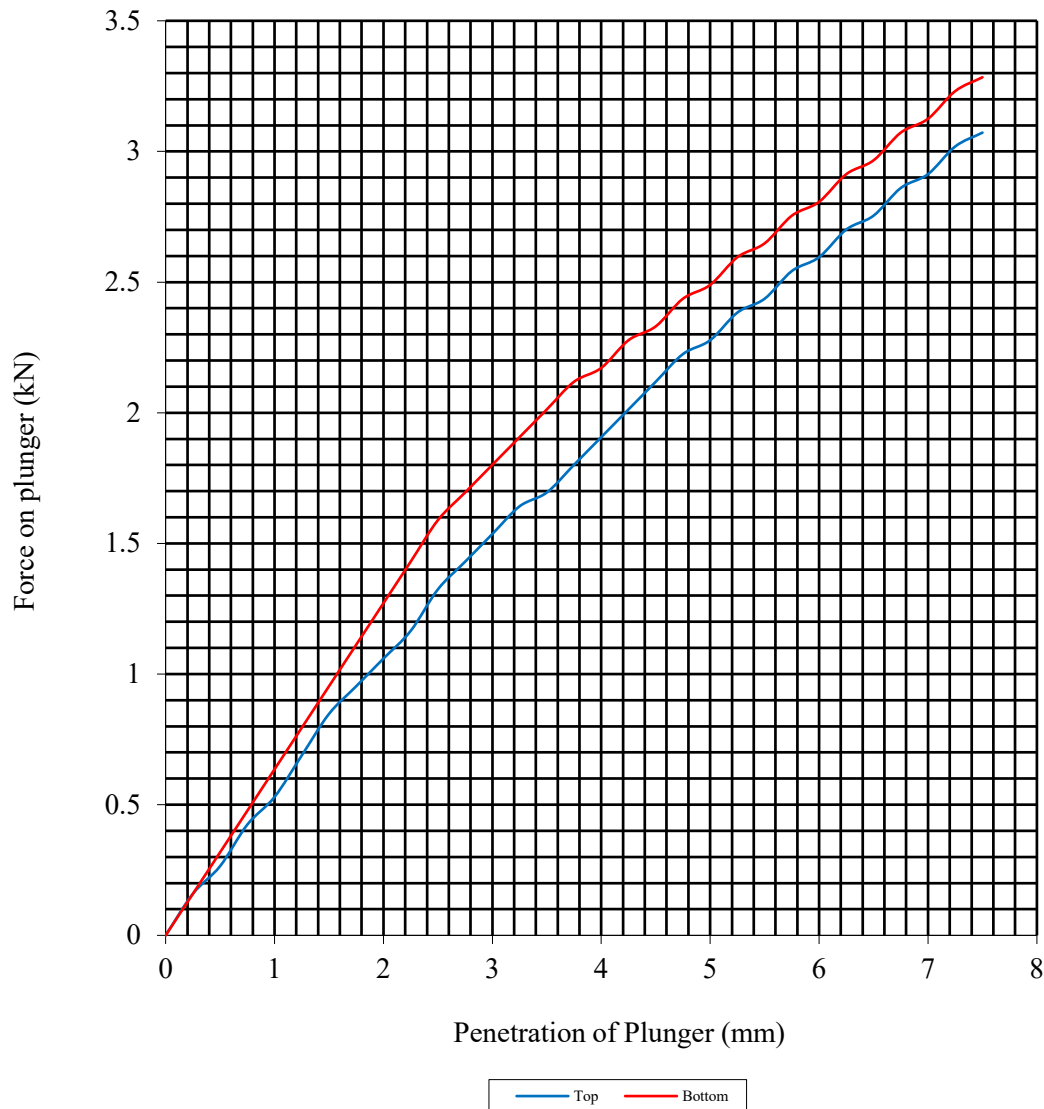
Hole Number: BH106

Top Depth (m): 3.00

Sample Number: 7

Base Depth (m): 3.45

Sample Type: B



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	11	Surcharge Kg:	4.20	Sample Top	12	Sample Top	11.4
Bulk Density Mg/m ³ :	2.22	Soaking Time hrs	0	Sample Bottom	11	Sample Bottom	12.4
Dry Density Mg/m ³ :	1.99	Swelling mm:	0.00	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:			17				
Compaction Conditions		2.5kg					



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Client Ref:

CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

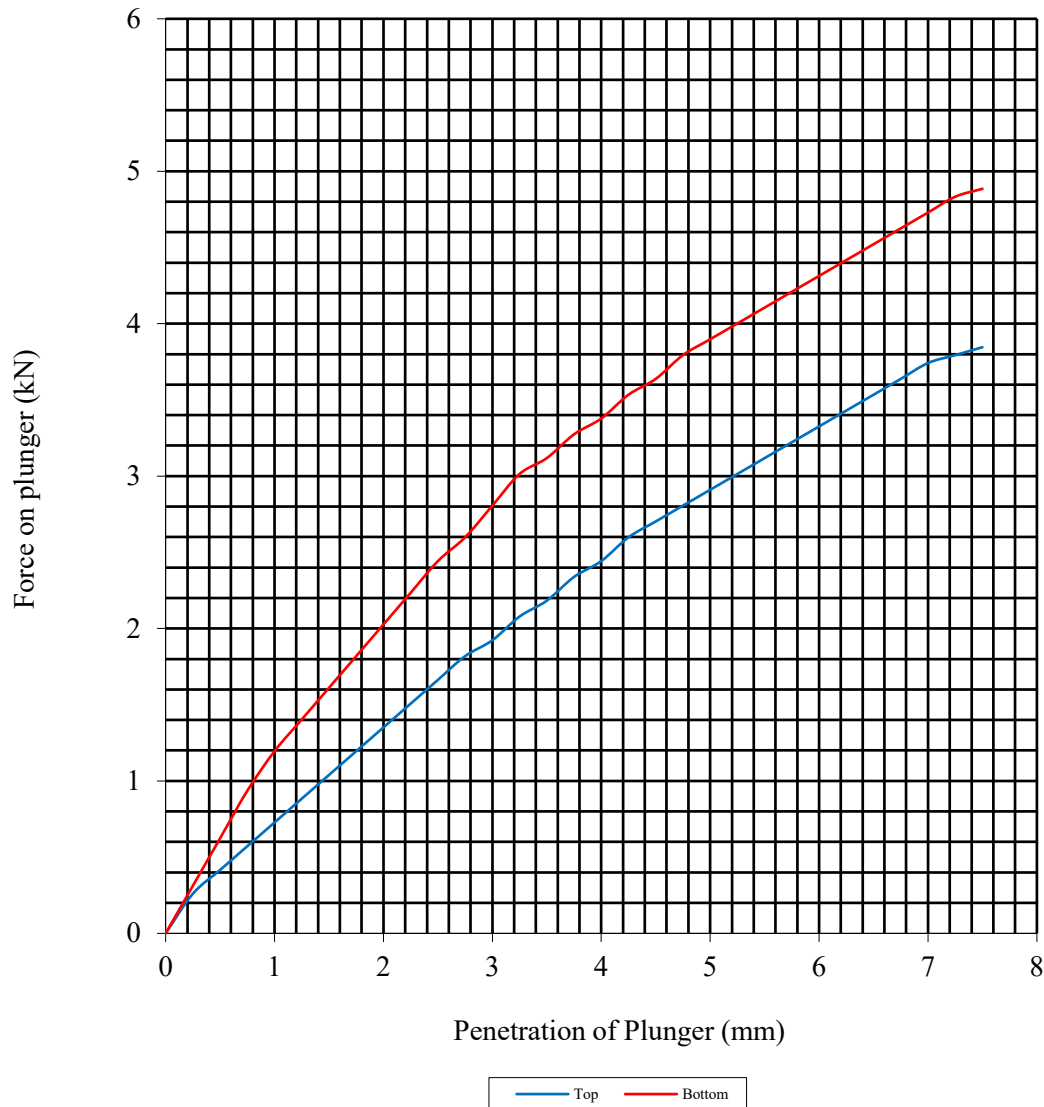
Hole Number: BH107A

Top Depth (m): 1.20

Sample Number: 3

Base Depth (m): 1.65

Sample Type: B



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	12	Surcharge Kg:	4.20	Sample Top	12	Sample Top	14.6
Bulk Density Mg/m3:	2.19	Soaking Time hrs	0	Sample Bottom	12	Sample Bottom	19.5
Dry Density Mg/m3:	1.95	Swelling mm:	0.00	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:		10					
Compaction Conditions		2.5kg					



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CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

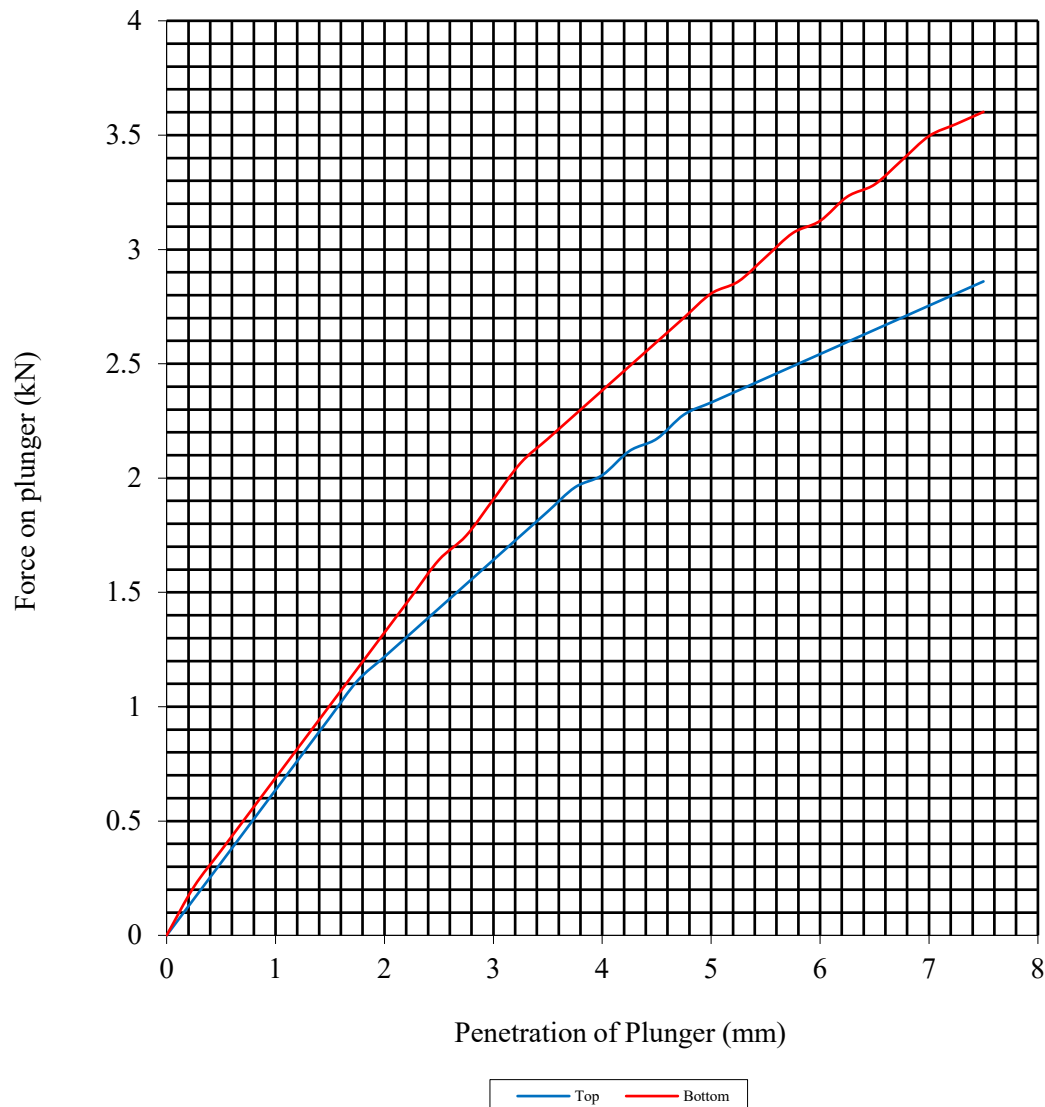
Hole Number: BH108

Top Depth (m): 4.00

Sample Number: 9

Base Depth (m): 4.45

Sample Type: B



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	13	Surcharge Kg:	4.20	Sample Top	13	Sample Top	11.7
Bulk Density Mg/m3:	2.20	Soaking Time hrs	0	Sample Bottom	12	Sample Bottom	14.0
Dry Density Mg/m3:	1.96	Swelling mm:	0.00	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:		1					
Compaction Conditions		2.5kg					



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MOISTURE CONDITION VALUE CALIBRATION

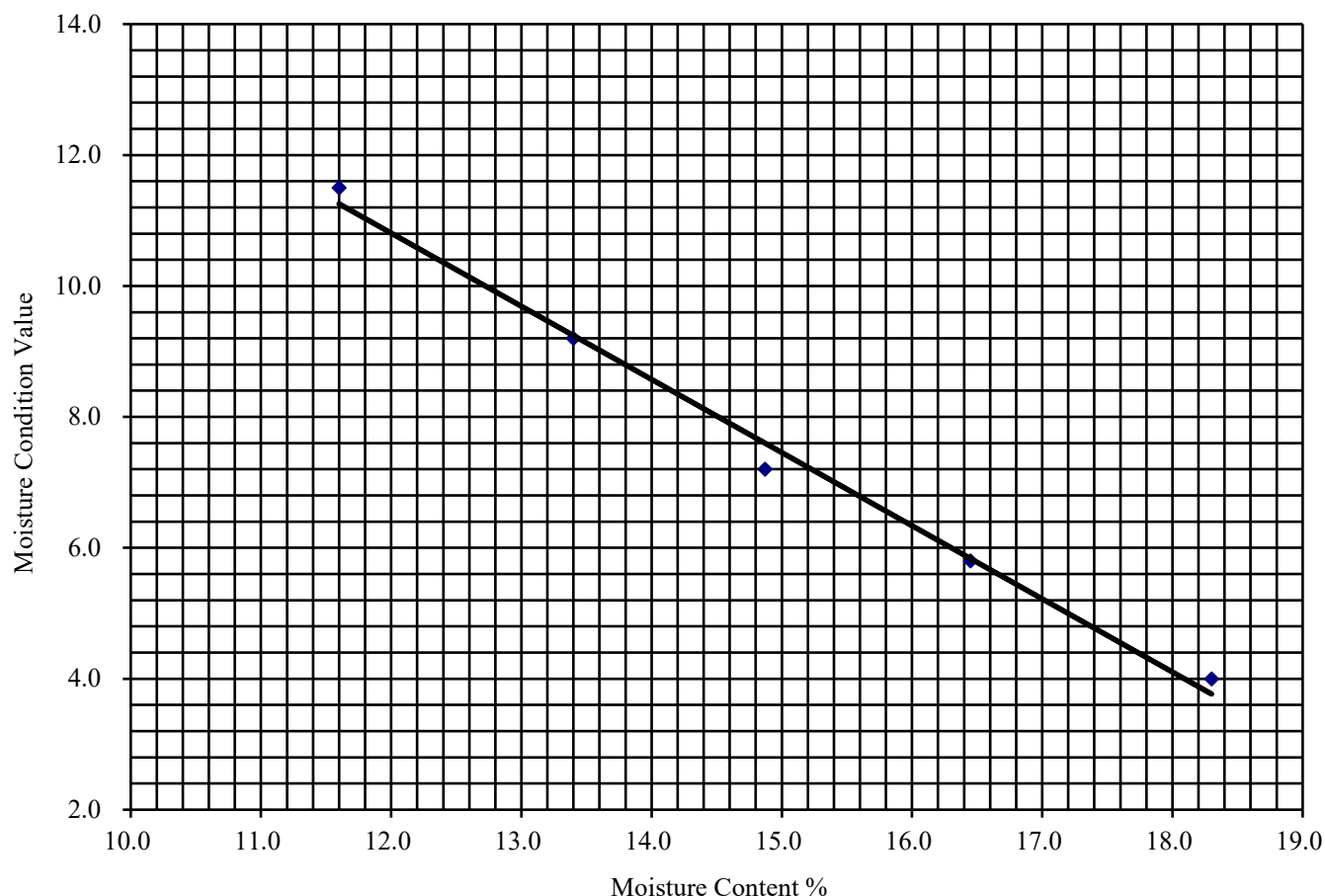
BS1377 : Part 4 : 1990 Clause 5.5

Hole Number: BH102 Top Depth (m): 0.20

Sample Number: 1 Base Depth (m): 1.00

Sample Type: B

Initial Moisture Content (%):	16.5
Single/Separate Samples Tested	Separate
Material Retained on the 20mm BS Test Sieve (%):	4



Test Results.

Test Number	1	2	3	4	5
Moisture Content (%)	11.6	13.4	14.9	16.5	18.3
MCV	11.5	9.2	7.2	5.8	4.0



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MOISTURE CONDITION VALUE CALIBRATION

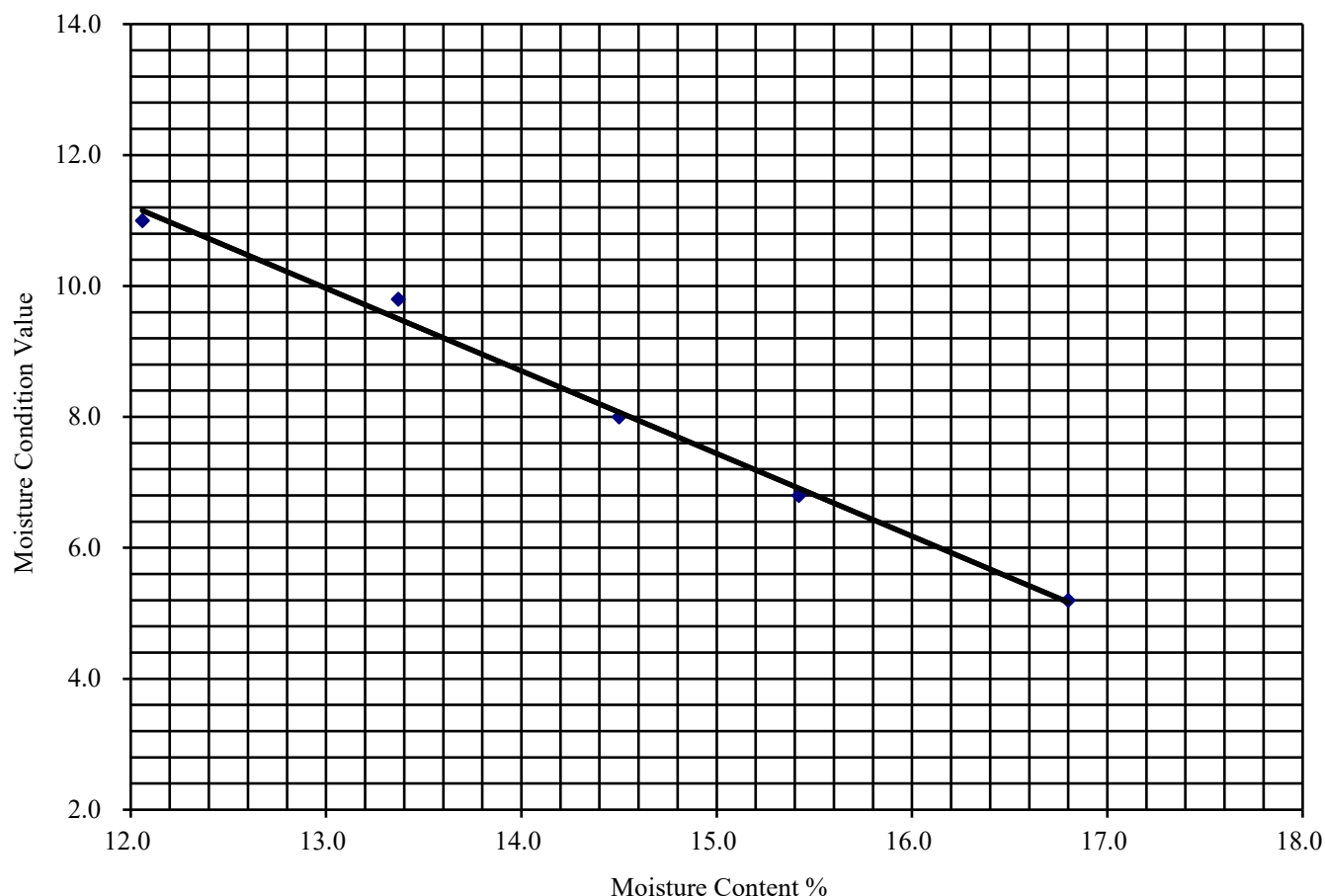
BS1377 : Part 4 : 1990 Clause 5.5

Hole Number: BH104 Top Depth (m): 2.00

Sample Number: 5 Base Depth (m): 2.45

Sample Type: B

Initial Moisture Content (%):	12
Single/Separate Samples Tested	Separate
Material Retained on the 20mm BS Test Sieve (%):	0



Test Results.

Test Number	1	2	3	4	5
Moisture Content (%)	12.1	13.4	14.5	15.4	16.8
MCV	11.0	9.8	8.0	6.8	5.2



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Client Ref:

MOISTURE CONDITION VALUE CALIBRATION

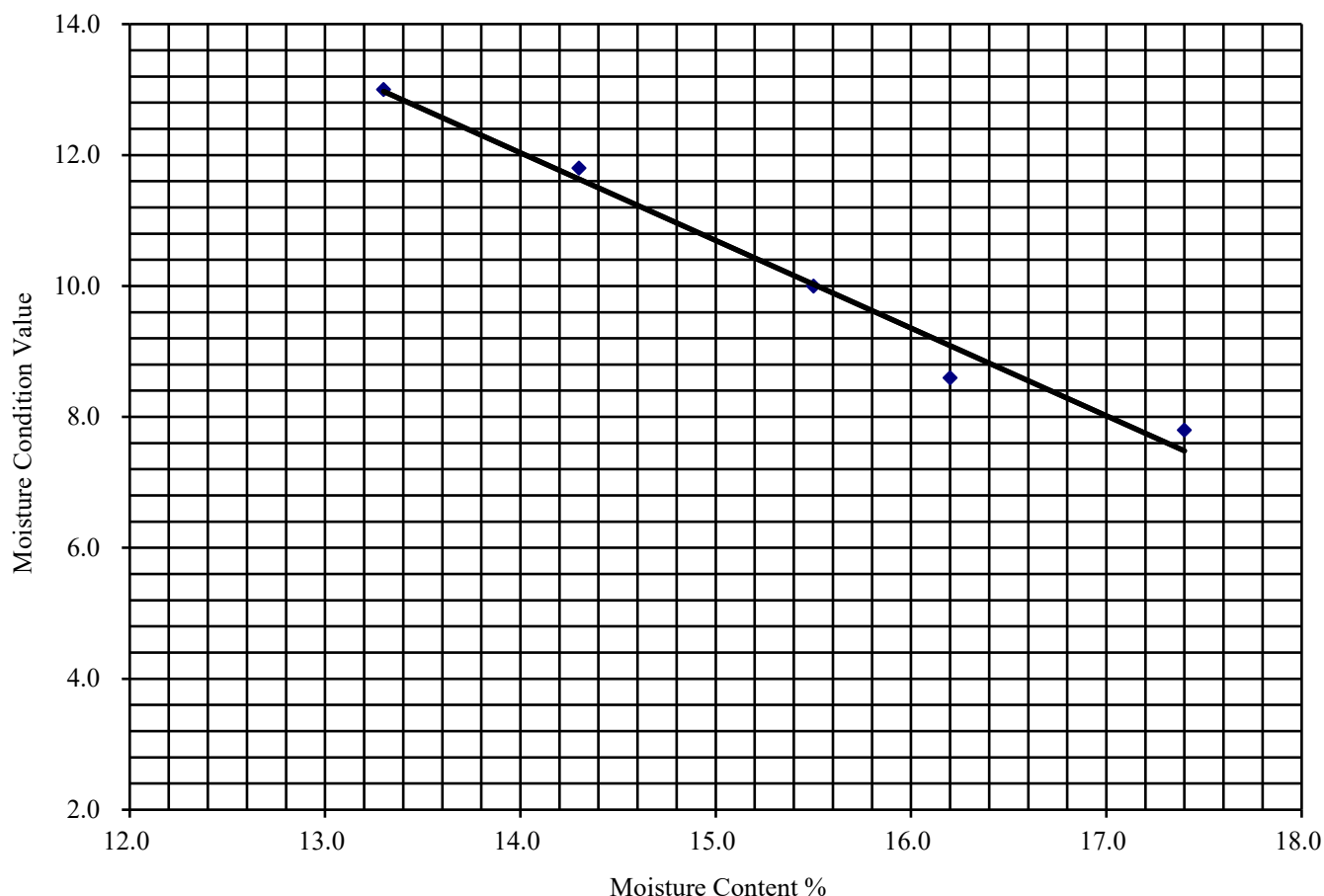
BS1377 : Part 4 : 1990 Clause 5.5

Hole Number: BH105 Top Depth (m): 4.00

Sample Number: 9 Base Depth (m): 4.45

Sample Type: B

Initial Moisture Content (%):	13
Single/Separate Samples Tested	Separate
Material Retained on the 20mm BS Test Sieve (%):	7



Test Results.

Test Number	1	2	3	4	5
Moisture Content (%)	13.3	14.3	15.5	16.2	17.4
MCV	13.0	11.8	10.0	8.6	7.8



PSL
Professional Soils Laboratory

Birdwell

Contract No:
PSL21/4697
Client Ref:

MOISTURE CONDITION VALUE CALIBRATION

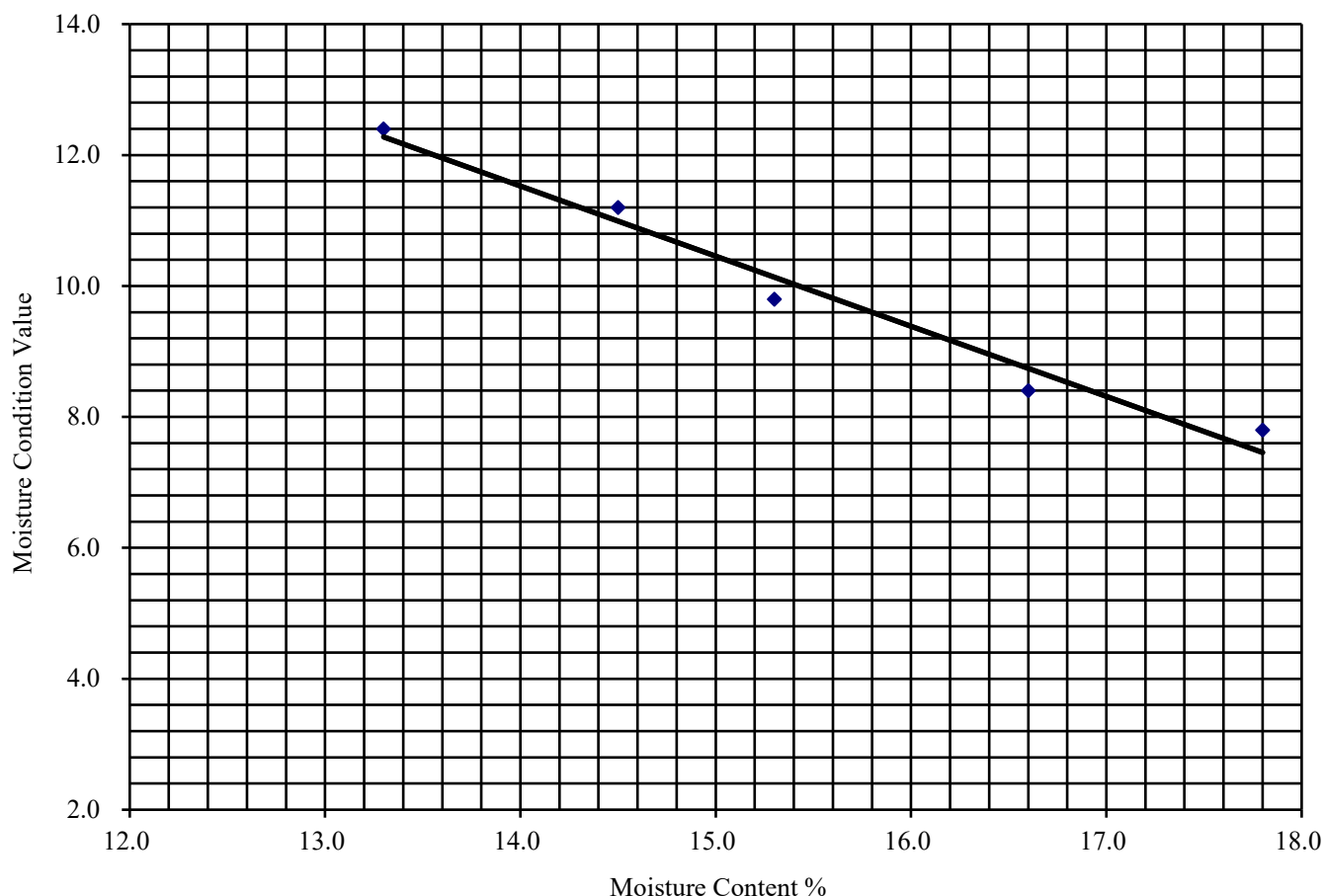
BS1377 : Part 4 : 1990 Clause 5.5

Hole Number: BH108 Top Depth (m): 4.00

Sample Number: 9 Base Depth (m): 4.45

Sample Type: B

Initial Moisture Content (%):	13
Single/Separate Samples Tested	Separate
Material Retained on the 20mm BS Test Sieve (%):	1



Test Results.

Test Number	1	2	3	4	5
Moisture Content (%)	13.3	14.5	15.3	16.6	17.8
MCV	12.4	11.2	9.8	8.4	7.8



PSL
Professional Soils Laboratory

Birdwell

Contract No:
PSL21/4697
Client Ref:

ONE DIMENSIONAL CONSOLIDATION TEST

BS 1377: Part 5: 1990: Clause 3

Hole Number: BH101

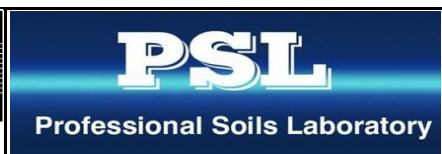
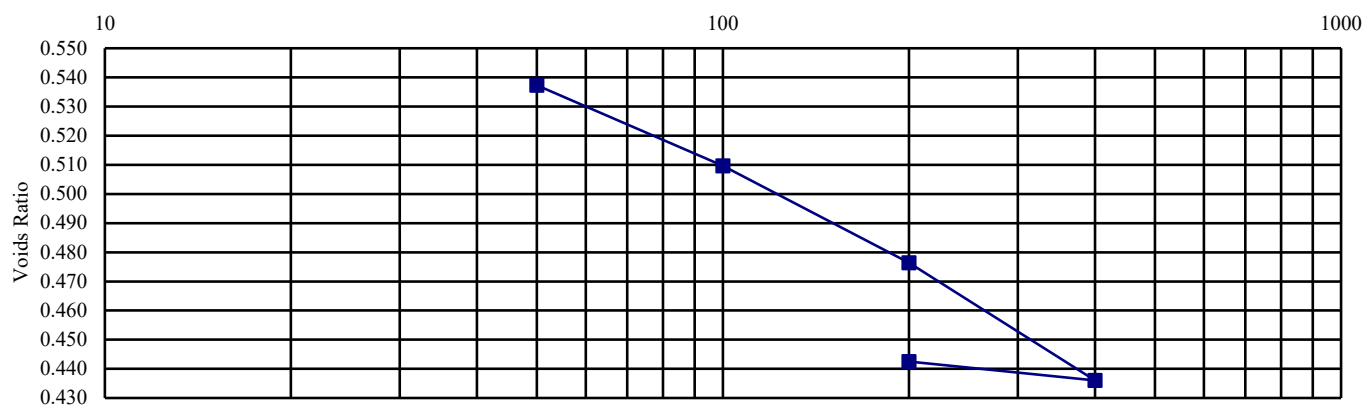
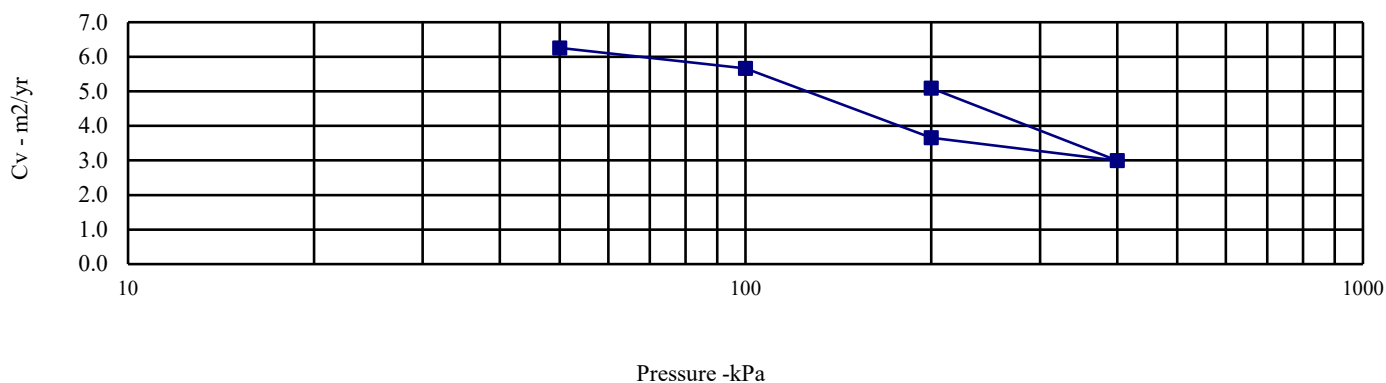
Top Depth (m): 3.00

Sample Number:

Base Depth (m) : 3.45

Sample Type: UT

Initial Conditions		Pressure Range		Mv	Cv	Specimen location	
Moisture Content (%):	17	kPa		m2/MN	m2/yr	within tube:	Top
Bulk Density (Mg/m3):	1.95	0	50	0.722	6.258	Method used to	
Dry Density (Mg/m3):	1.66	50	100	0.360	5.667	determine CV:	T90
Voids Ratio:	0.595	100	200	0.220	3.653	Nominal temperature	
Degree of saturation:	77.8	200	400	0.137	2.996	during test ' C:	20
Height (mm):	19.734	400	200	0.023	5.087	Remarks:	
Diameter (mm)	75.098					See summary of soil descriptions	
Particle Density (Mg/m3):	2.65						
Assumed							



Birdwell

Contract No:
PSL21/4697
Client Ref:

ONE DIMENSIONAL CONSOLIDATION TEST

BS 1377: Part 5: 1990: Clause 3

Hole Number: BH105

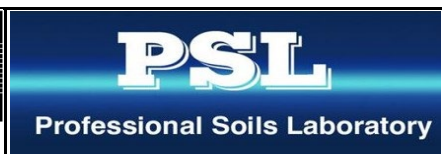
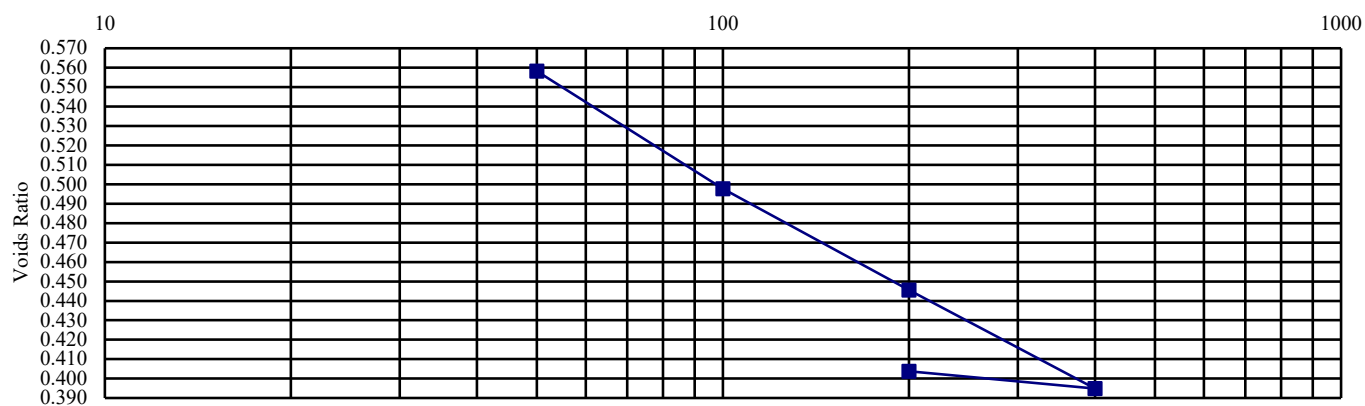
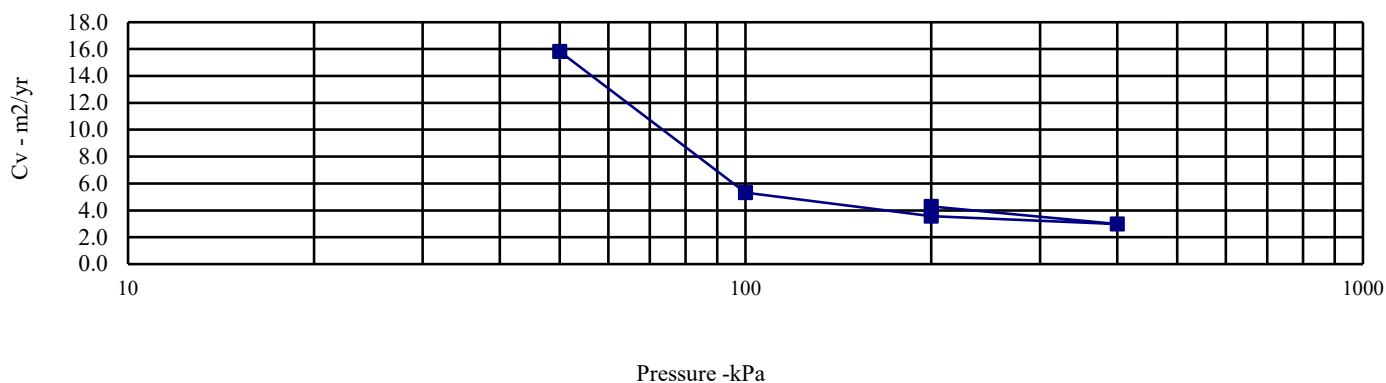
Top Depth (m): 2.00

Sample Number:

Base Depth (m) : 2.45

Sample Type: UT

Initial Conditions		Pressure Range		Mv	Cv	Specimen location	
Moisture Content (%):	17	kPa		m2/MN	m2/yr	within tube:	Top
Bulk Density (Mg/m3):	1.80	0	50	1.956	15.828	Method used to	
Dry Density (Mg/m3):	1.53	50	100	0.775	5.327	determine CV:	T90
Voids Ratio:	0.727	100	200	0.348	3.566	Nominal temperature	
Degree of saturation:	63.0	200	400	0.176	2.982	during test ' C:	20
Height (mm):	19.732	400	200	0.032	4.292	Remarks:	
Diameter (mm)	75.103	See summary of soil descriptions					
Particle Density (Mg/m3):	2.65						
Assumed							



Birdwell

Contract No:
PSL21/4697
Client Ref:



2531



ANALYTICAL TEST REPORT

Contract no: 97349
Contract name: Birdwell
Client reference: PSL21/4697
Clients name: Professional Soils Laboratory
Clients address: 5/7 Hexthorpe Road
Doncaster
DN4 0AR

Samples received: 15 June 2021

Analysis started: 15 June 2021

Analysis completed: 22 June 2021

Report issued: 22 June 2021

Notes: Opinions and interpretations expressed herein are outside the UKAS accreditation scope.
Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.
All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing.
Methods, procedures and performance data are available on request.
Results reported herein relate only to the material supplied to the laboratory.
This report shall not be reproduced except in full, without prior written approval.
Samples will be disposed of 6 weeks from initial receipt unless otherwise instructed.

Key: U UKAS accredited test
M MCERTS & UKAS accredited test
\$ Test carried out by an approved subcontractor
I/S Insufficient sample to carry out test
N/S Sample not suitable for testing

Approved by:

Rachael Burton
Customer Support Squad Leader

Chemtech Environmental Limited

SOILS

Lab number			97349-1	97349-2	97349-3	97349-4	97349-5	97349-6
Sample id			BH102	BH104	BH105	TP101	TP102	TP103
Depth (m)			1.50-2.00	1.20-1.65	1.20-1.65	0.80-1.00	1.50-1.70	0.40-0.60
Date sampled			-	-	-	-	-	-
Test	Method	Units						
pH	CE004 ^U	units	7.6	6.2	7.2	8.3	6.5	8.0
Chloride (2:1 water soluble)	CE049 ^U	mg/l Cl	-	-	-	12	2.3	5.2
Sulphate (2:1 water soluble)	CE061	mg/l SO ₄	651	1456	385	604	86	1939
Sulphate (total)	CE062	mg/kg SO ₄	1682	3239	1210	1032	353	16100
Sulphur (total)	CE119	mg/kg S	13286	1588	8312	10651	225	9118

Chemtech Environmental Limited

SOILS

Lab number			97349-7	97349-8	97349-9	97349-10	97349-11	97349-12
Sample id			TP104	TP105	TP106	TP107	TP108	TP109
Depth (m)			0.20-0.40	1.20-1.40	1.30-1.40	2.40-2.60	1.20-1.40	1.00-1.20
Date sampled			-	-	-	-	-	-
Test	Method	Units						
pH	CE004 ^U	units	6.9	8.3	7.4	6.7	7.8	7.5
Chloride (2:1 water soluble)	CE049 ^U	mg/l Cl	8.8	-	-	22	1.8	-
Sulphate (2:1 water soluble)	CE061	mg/l SO ₄	518	681	1086	739	572	83
Sulphate (total)	CE062	mg/kg SO ₄	1965	1902	2367	1597	1235	342
Sulphur (total)	CE119	mg/kg S	7630	8334	1000	680	780	600

Chemtech Environmental Limited

METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE004	pH	Based on BS 1377, pH Meter	As received	U	-	units
CE049	Chloride (2:1 water soluble)	Aqueous extraction, IC-COND	Dry	U	1	mg/l Cl
CE061	Sulphate (2:1 water soluble)	Aqueous extraction, ICP-OES	Dry		10	mg/l SO ₄
CE062	Sulphate (total)	Acid extraction, ICP-OES	Dry		100	mg/kg SO ₄
CE119	Sulphur (total)	Acid extraction, ICP-OES	Dry		100	mg/kg S

Chemtech Environmental Limited

DEVIATING SAMPLE INFORMATION

Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

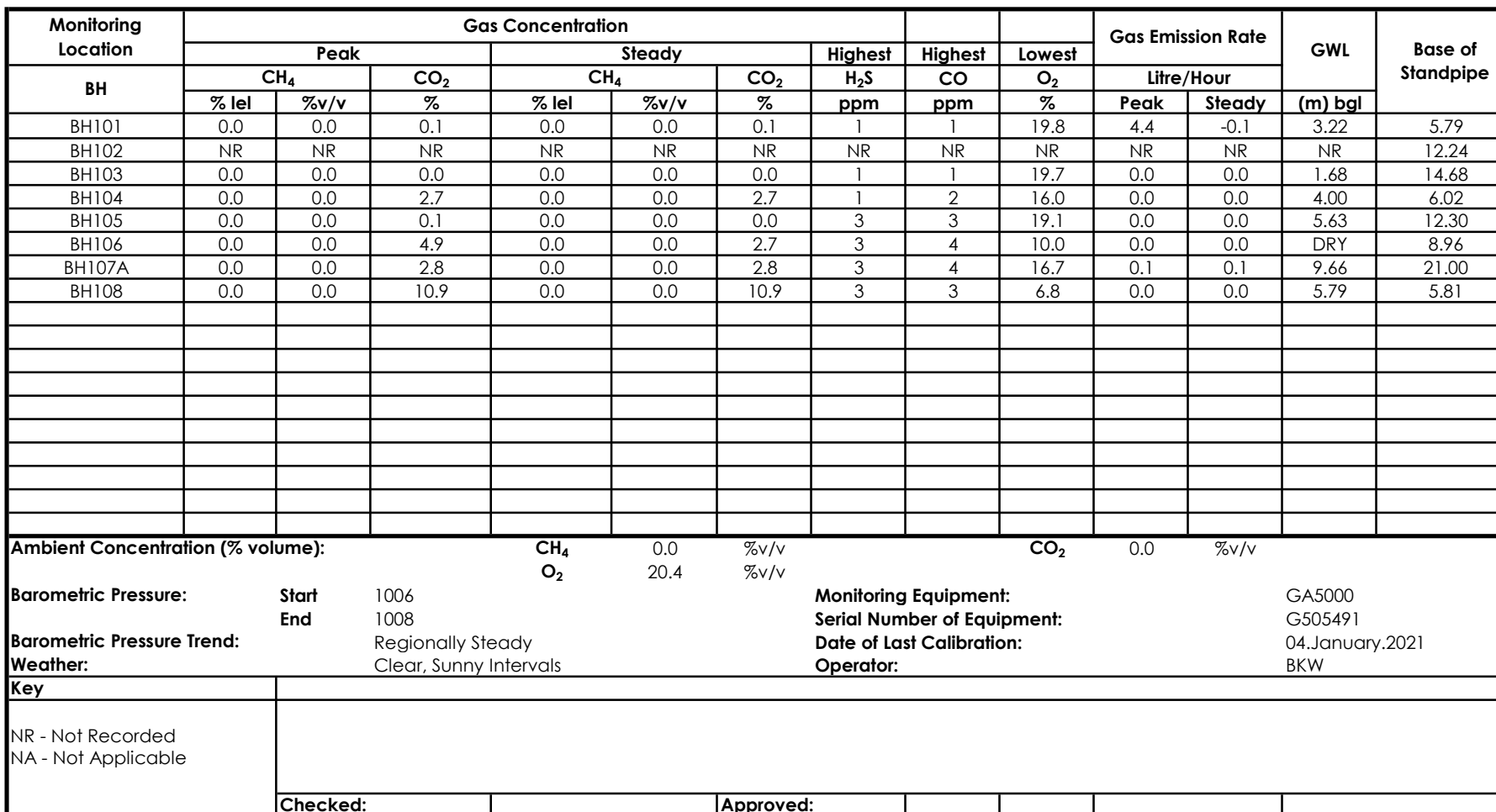
N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
97349-1	BH102	1.50-2.00	Y	All(NSD)
97349-2	BH104	1.20-1.65	Y	All(NSD)
97349-3	BH105	1.20-1.65	Y	All(NSD)
97349-4	TP101	0.80-1.00	Y	All(NSD)
97349-5	TP102	1.50-1.70	Y	All(NSD)
97349-6	TP103	0.40-0.60	Y	All(NSD)
97349-7	TP104	0.20-0.40	Y	All(NSD)
97349-8	TP105	1.20-1.40	Y	All(NSD)
97349-9	TP106	1.30-1.40	Y	All(NSD)
97349-10	TP107	2.40-2.60	Y	All(NSD)
97349-11	TP108	1.20-1.40	Y	All(NSD)
97349-12	TP109	1.00-1.20	Y	All(NSD)

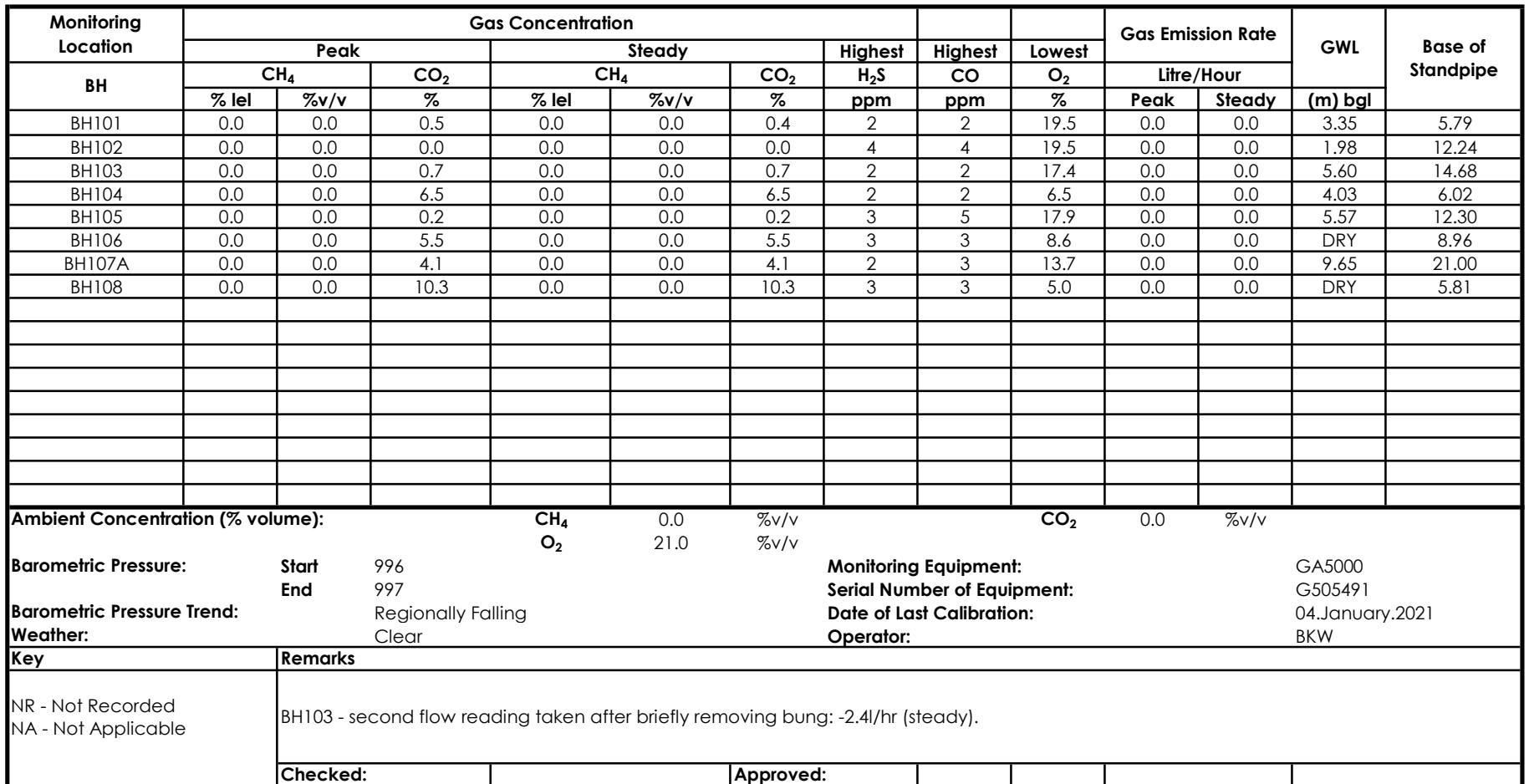


Appendix E Gas and Groundwater Monitoring Results

Site:	Rockingham, Plot 2, Birdwell, Barnsley		
Job No:	5419	Client:	Gregory Projects Limited
Visit No:	1	Date:	08/06/2021



Site:	Rockingham, Plot 2, Birdwell, Barnsley		
Job No:	5419	Client:	Gregory Projects Limited
Visit No:	2	Date:	16/06/2021



Site: Rockingham, Plot 2, Birdwell, Barnsley

Job No: 5419

Client: Gregory Projects Limited

Visit No:

Date: 23/06/2021



Monitoring Location	Gas Concentration									Gas Emission Rate		GWL	Base of Standpipe
	Peak		Steady			Highest	Highest	Lowest					
	CH ₄		CO ₂	CH ₄		CO ₂	H ₂ S	CO	O ₂	Litre/Hour			
BH	% lcl	%v/v	%	% lcl	%v/v	%	ppm	ppm	%	Peak	Steady	(m) bgl	
BH101	0.0	0.0	0.9	0.0	0.0	0.7	0	0	18.4	0.0	0.0	3.65	5.79
BH102	0	0.0	0.0	0.0	0.0	0.0	0	0	20.6	0.0	0.0	2.25	12.24
BH103	0.1	0.1	4.3	0.1	0.1	4.3	0	0	4.9	0.0	0.0	6.20	14.68
BH104	0.0	0.0	2.3	0.0	0.0	2.3	0	0	17.2	0.1	0.1	4.02	6.02
BH105	0.0	0.0	0.2	0.0	0.0	0.2	0	0	19.8	0.0	0.0	5.70	12.30
BH106	0.0	0.0	5.2	0.0	0.0	5.2	1	2	10.7	0.0	0.0	DRY	8.96
BH107A	0.0	0.0	3.0	0.0	0.0	3.0	2	1	16.3	0.0	0.0	9.93	21.00
BH108	0.0	0.0	12.0	0.0	0.0	12.0	1	1	7.9	0.0	0.0	DRY	5.81
Ambient Concentration (% volume):				CH ₄	0.0	%v/v			CO ₂	0.0	%v/v		
				O ₂	20.7	%v/v							
Barometric Pressure:		Start	1008					Monitoring Equipment:				GA5000	
		End	1009					Serial Number of Equipment:				G505491	
Barometric Pressure Trend:		Regionally Steady				Date of Last Calibration:						04.January.2021	
Weather:		Partially Cloudy				Operator:						BKW	
Key		Remarks											
NR - Not Recorded NA - Not Applicable		BH102 - Second flow taken after gas readings. -1.8l/hr peak, -1.0l/hr steady.											
		Checked:					Approved:						

GAS AND GROUNDWATER MONITORING RESULTS

Site: Rockingham, Plot 2, Birdwell, Barnsley
Job No: 5419 **Client:** Gregory Projects Limited
Visit No: 4 **Date:** 29/06/2021



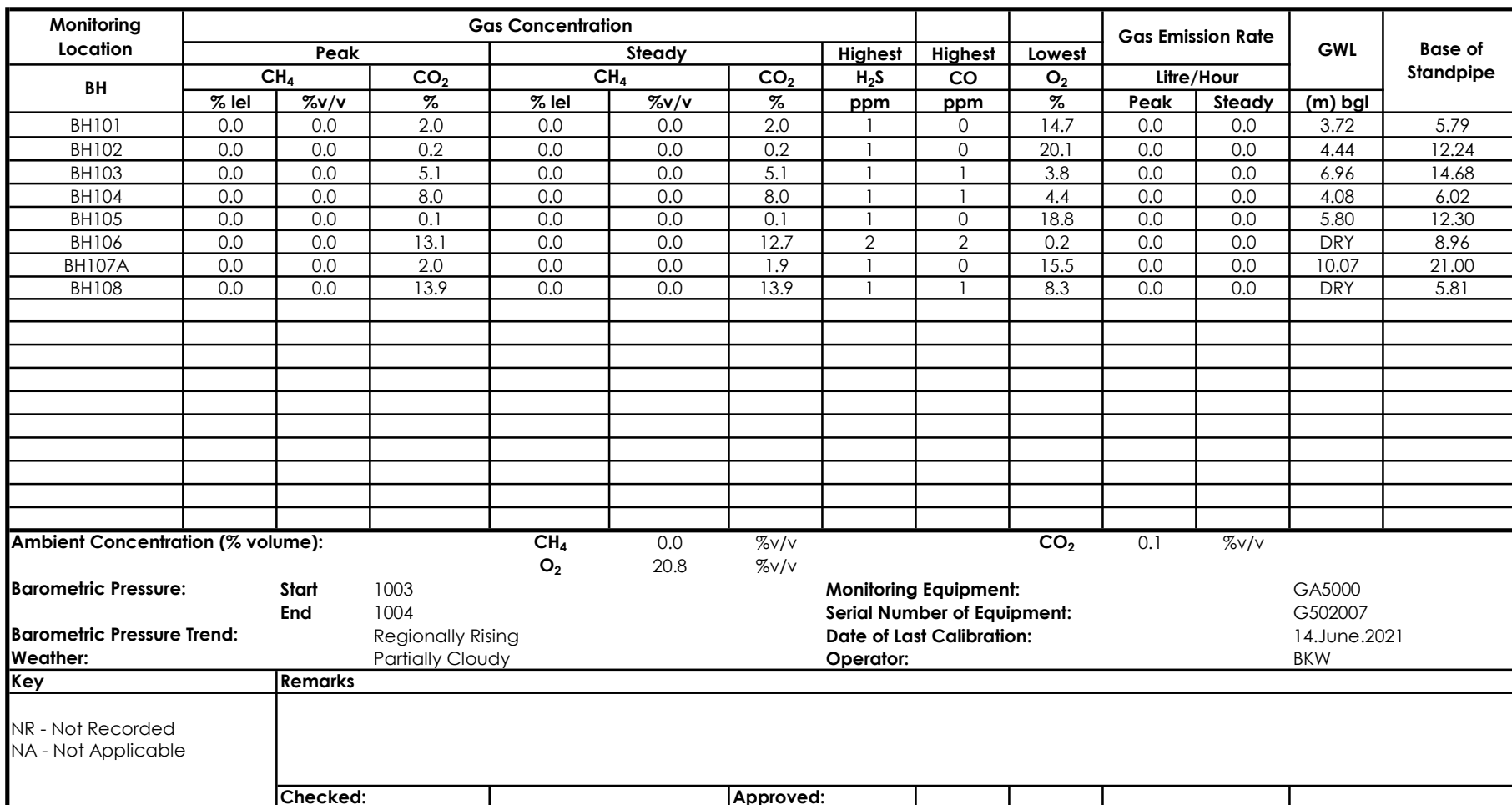
Monitoring Location	Gas Concentration								Gas Emission Rate		GWL	Base of Standpipe	
	Peak		Steady			Highest	Highest	Lowest					
BH	CH ₄		CO ₂	CH ₄		CO ₂	H ₂ S	CO	O ₂	Litre/Hour		(m) bgl	
	% lsl	%v/v	%	% lsl	%v/v	%	ppm	ppm	%	Peak	Steady		
BH101	0.0	0.0	1.3	0.0	0.0	1.3	0	1	17.0	0.0	0.0	3.68	5.79
BH102	0.0	0.0	0.0	0.0	0.0	0.0	0	0	20.8	0.0	0.0	2.67	12.24
BH103	0.0	0.0	4.0	0.0	0.0	4.0	0	1	5.8	0.0	0.0	6.53	14.68
BH104	0.0	0.0	3.8	0.0	0.0	3.8	0	1	14.3	0.0	0.0	4.04	6.02
BH105	0.0	0.0	0.2	0.0	0.0	0.0	1	1	19.3	0.0	0.0	5.70	12.30
BH106	0.0	0.0	7.2	0.0	0.0	7.2	0	2	7.1	0.0	0.0	DRY	8.96
BH107A	0.0	0.0	3.0	0.0	0.0	3.0	1	1	15.8	0.0	0.0	10.05	21.00
BH108	0.0	0.0	12.4	0.0	0.0	12.1	1	1	8.5	0.0	0.0	5.82	5.81
Ambient Concentration (% volume):				CH ₄	0.0	%v/v	CO ₂			0.1	%v/v		
Barometric Pressure:		Start	1001	O ₂	21.0	%v/v	Monitoring Equipment:					GA5000	
		End	1004				Serial Number of Equipment:					G505491	
Barometric Pressure Trend:			Regionally Steady				Date of Last Calibration:					04.January.2021	
Weather:			Clear				Operator:					BKW	
Key		Remarks											
NR - Not Recorded NA - Not Applicable													
		Checked:					Approved:						

Site:	Rockingham, Plot 2, Birdwell, Barnsley		
Job No:	5419	Client:	Gregory Projects Limited
Visit No:	5	Date:	09/07/2021



Monitoring Location	Gas Concentration							Highest	Lowest	Gas Emission Rate		GWL	Base of Standpipe
	Peak		Steady			Highest							
BH	CH ₄		CO ₂	CH ₄		CO ₂	H ₂ S	CO	O ₂	Litre/Hour		(m) bgl	
	% lsl	%v/v	%	% lsl	%v/v	%	ppm	ppm	%	Peak	Steady		
BH101	0.0	0.0	2.0	0.0	0.0	2.0	0	1	15.4	0.0	0.0	3.69	5.79
BH102	4.0	0.2	0.2	2.0	0.1	0.1	0	0	20.9	0.0	0.0	3.34	12.24
BH103	0.0	0.0	5.2	0.0	0.0	5.2	0	0	4.1	0.0	0.0	6.77	14.68
BH104	0.0	0.0	7.7	0.0	0.0	7.7	0	1	4.1	0.0	0.0	4.06	6.02
BH105	0.0	0.0	0.1	0.0	0.0	0.1	1	0	20.1	0.0	0.0	5.77	12.30
BH106	0.0	0.0	12.2	0.0	0.0	12.2	0	1	0.7	0.0	0.0	DRY	8.96
BH107A	0.0	0.0	2.8	0.0	0.0	2.8	1	0	14.0	0.0	0.0	10.05	21.00
BH108	0.0	0.0	11.1	0.0	0.0	11.1	1	1	6.4	0.0	0.0	5.81	5.81
Ambient Concentration (% volume):				CH ₄	0.2	%v/v	CO ₂			0.1	%v/v		
Barometric Pressure:		Start	1005	O ₂	21.1	%v/v	Monitoring Equipment:				GA5000		
		End	1006				Serial Number of Equipment:				G502007		
Barometric Pressure Trend:		Regionally Rising			Date of Last Calibration:				14.June.2021				
Weather:		Partially Cloudy			Operator:				BKW				
Key		Remarks											
NR - Not Recorded NA - Not Applicable													
		Checked:					Approved:						

Site:	Rockingham, Plot 2, Birdwell, Barnsley		
Job No:	5419	Client:	Gregory Projects Limited
Visit No:	6	Date:	13/07/2021



SUMMARY OF GROUND GAS MONITORING

BH NO.	Peak CH4	Peak CH4	Steady CH4	Steady CH4	Peak CO2	Peak CO2	Steady CO2	Steady CO2	H ₂ S	CO	O ₂	O ₂	max limiting	max limiting	Peak Flow	Steady Flow	SWL	SWL
	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	(% v/v)	ppm	ppm	(% v/v)	(% v/v)	bh flow	bh flow	(l/hr)	(l/hr)	(m bgl)	(m bgl)
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MAX	MAX	MIN	MAX	rate for CH4*	rate for CO2**	MAX	MAX	MIN	MAX
BH101	0.0	0.0	0.0	0.0	0.1	2.0	0.1	2.0	2	2	14.7	19.8	0	0	4.4	0.0	3.22	3.72
BH102	0.0	0.2	0.0	0.1	0.0	0.2	0.0	0.2	4	4	19.5	20.9	0	0	0.0	0.0	1.98	4.44
BH103	0.0	0.1	0.0	0.1	0.0	5.2	0.0	5.2	2	2	3.8	19.7	0	0	0.0	0.0	1.68	6.96
BH104	0.0	0.0	0.0	0.0	2.3	8.0	2.3	8.0	2	2	4.1	17.2	0	0.008	0.1	0.1	4.00	4.08
BH105	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.2	3	5	17.9	20.1	0	0	0.0	0.0	5.57	5.80
BH106	0.0	0.0	0.0	0.0	4.9	13.1	2.7	12.7	3	4	0.2	10.7	0	0	0.0	0.0	0.00	0.00
BH107A	0.0	0.0	0.0	0.0	2.0	4.1	1.9	4.1	3	4	13.7	16.7	0	0.0041	0.1	0.1	9.65	10.07
BH108	0.0	0.0	0.0	0.0	10.3	13.9	10.3	13.9	3	3	5.0	8.5	0	0	0.0	0.0	5.79	5.82

* Based of peak CH4 and peak flows.

** Based on steady CO2 and steady flows.

	VISIT 1	VISIT 2	VISIT 3	VISIT 4	VISIT 5	VISIT 6
MB Start	1006	996	1008	1001	1005	1003
MB Finish	1008	997	1009	1004	1006	1004
Pressure Change	Regionally Steady	Regionally Falling	Regionally Steady	Regionally Steady	Regionally Rising	Regionally Rising



Appendix F Notes on Limitations



General

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

JPG (Leeds) Limited accepts no responsibility or liability for:

- a) the consequences of this document being used for any purpose or project other than for which it was commissioned, and
- b) this document to any third party with whom an agreement has not been executed.

Phase I Desk Study Reports

The work undertaken to provide the basis of this report comprised a study of available documented information from a variety of sources (including the Client), together with (where appropriate) a brief walk over inspection of the site and meetings and discussions with relevant authorities and other interested parties. The opinions given in this report have been dictated by the finite data on which they are based and are relevant only to the purpose for which the report was commissioned. The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional information become available which may affect the opinions expressed in this report, JPG (Leeds) Limited reserves the right to review such information and, if warranted, to modify the opinions accordingly.

It should be noted that any risks identified in this report are perceived risks based on the information reviewed; actual risks can only be assessed following a physical investigation of the site.

Phase II Geo-Environmental Investigations

The investigation of the site has been carried out to provide sufficient information concerning the type and degree of contamination, geotechnical characteristics and ground and groundwater conditions to allow a reasonable assessment of the environmental risks together with engineering and development implications. The objectives of the investigation have been limited to establishing the risks associated with potential human targets, building materials, the environment (including adjacent land), and to surface and groundwater.

The amount of exploratory work and chemical testing undertaken has necessarily been restricted by the short timescale available, and the locations of exploratory holes have been restricted to the areas unoccupied by the building(s) on the site and by buried services. A more comprehensive investigation may be required if the site is to be redeveloped as, in addition to risk assessment, a number of important engineering and environmental issues may need to be resolved.

For these reasons if costs have been included in relation to site remediation these must be considered as tentative only and must, in any event, be confirmed by a qualified quantity surveyor.

The exploratory holes undertaken, which investigate only a small volume of the ground in relation to the size of the site, can only provide a general indication of site conditions. The opinions provided and recommendations given in this report are based on the ground conditions apparent at the site of each of the exploratory holes. There may be exceptional ground conditions elsewhere on the site which have not been disclosed by this investigation and which have therefore not been taken into account in this report.

The comments made on groundwater conditions are based on observations made at the time that site work was carried out. It should be noted that groundwater levels will vary owing to seasonal, tidal and weather-related effects.

The number of sampling points and the methods of sampling and testing do not preclude the existence of localised "hotspots" of contamination where concentrations may be significantly higher than those actually encountered.

The risk assessment and opinions provided, inter alia, take into consideration currently available guidance values relating to acceptable contamination concentrations; no liability can be accepted for the retrospective effects of any future changes or amendments to these values.

The scope of the investigation was selected on the basis of the specific development proposed by the Client and may be inappropriate to another form of development or scheme.

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