GEOENVIRONMENTAL GROUND INVESTIGATION

Barugh Green Road Roundabout
Barnsley West

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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	29 October 2020	First Issue	Information	JAM	JBW
P02	04 March 2021	Updated appendices to the latest drawings	Information	JAM	JBW

EXECUTIVE SUMMARY

Site Address	Barugh Green Road Roundabout - Barnsley West
NGR	Approximate NGR 431567, 407938.
Current Site Use & Proposed Development	The site consists of arable and grazing land in the south and Barugh Green Road and Cannon Way in the north. The southern part of the site has been historically opencast for coal. It is proposed to redevelop the site with a new roundabout, which will provide access to the larger proposed Barnsley West development site.
Previous Reports & Investigation	A desk study report and a coal mining risk assessment for the new roundabout has been prepared by JPG, which should be read in conjunction with this report. Additionally, a desk study report, three coal mining risk assessments and a preliminary geoenvironmental ground investigation report has been prepared by JPG for the larger proposed Barnsley West development site.
Fieldwork	Fieldwork comprised the drilling of five rotary open hole boreholes and the excavation of five trial pits. Samples of soil were obtained and submitted for chemical and geotechnical analysis. Gas and groundwater monitoring wells were installed in three selected boreholes. The installations have been monitored for gas/groundwater on three occasions.
Ground and Groundwater Conditions	The ground conditions comprise reworked topsoil over locally made ground and/or reworked colliery spoil, overlying natural strata consisting of firm residual soil and interbedded mudstone, sandstone and coal seams. The depth to the base of Craven I OCCS was proven at 8.90m bgl and 8.80m bgl in BGR_BH101 and BGR_BH102, respectively. Below the base of the opencast the Top Haigh Moor coal seam was encountered between 21.60m bgl and 22.30m bgl (0.70m thick) in BGR_BH101. No coal seams were recorded by the driller in BGR_BH102. The Top Haigh Moor coal seam was not encountered in the boreholes BGR_BH103 to BGR_BH105. Outwith the highwall of Craven I OCCS, a very shallow coal seam, the Thin coal seam, was recorded between 1.70m bgl and 2.20m bgl (0.50m thick) in BGR_BH105 in the west of the proposed roundabout. This coal seam was absent in BGR_BH103 and BGR_BH104. The Swallow Wood coal seam was encountered at depths of between 7.20m bgl in the west (BGR_BH105) and 10.00m bgl in the centre of the proposed roundabout (BGR_BH103), with thicknesses ranging between 0.10m (BGR_BH103) and 0.30m (BGR_BH104). No evidence of underground coal workings was encountered in any of the boreholes. Groundwater was encountered in the trial pits within the shallow colliery spoil. Perched groundwater was noted in BGR_TP101 and BGR_TP102 at 3.30m bgl and 3.10m bgl with moderate and slight flows, respectively. The majority of rotary open holed boreholes encountered groundwater strikes from depths between 5.00m bgl to 14.90m bgl.
Geotechnical and Engineering Assessment	Updated Coal Mining Risk Assessment – Based on the proven depths and thicknesses of the encountered coal seams, no mitigation measures with regard to coal mining are considered necessary with the exception of the deep made ground associated with the backfilled OCCS. Ground improvement will be required where deep made ground and the highwall are present. Roads, Pavements and Hardstanding Surfaces - Laboratory CBR values for the cohesive colliery spoil and cohesive residual soils are typically >5%. It is recommended that a preliminary design CBR of 3% is adopted for pavement design for the re-engineered colliery spoil and natural strata, assuming any soft/loose spots at formation level are removed and replaced with properly compacted granular fill. It is likely that for adoptable highways 3m of colliery spoil will be re-engineered below the footprint and two layers of geogrid to be placed at the base, no greater than 300mm apart, and below all services. Earthworks - The colliery spoil and natural cohesive strata are generally considered suitable for re-use in earthworks, if lighter compaction efforts are used. It is proposed to cut the site to a desired formation level of approximately 85m AOD. It is proposed to turn-over and re-engineer the colliery spoil to a depth of no less than 3.00m. Over the buried highwall it is proposed that the turn-over and re-compact is stepped at intervals of 4.00m horizontally and 0.50m vertically. 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. Excavations - It is proposed to cut the site to a desired formation level of approximately 85m AOD, any excavations through the uncompacted colliery spoil and natural ground are likely to be unstable over the construction period and temporary side support is likely to be required Good working practice with respect to drainage of excavations and formations will be required to protect materials. Any excavation for structural foundations must be covered without delay with blinding concrete to prevent softening by water. Control of Groundwater - The groundwater monitoring and site investigation have indicated shallow depths to groundwater during the summer months within the backfilled opencast and natural strata. Slight to moderate inflows into trial pits, BGR_TP101 and BGR_TP102 were recorded during the site investigation. Control of groundwater and surface water control will be required as part of the earthworks. 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. Obstructions – Half of the proposed roundabout is open farmland, while the other half is the existing carriageway. Consequently there is a limited potential for near surface obstructions. However, it is noted that the colliery spoil materials do contain cobbles and boulders from the historically excavated bedrock material. Allowance should be made for the excavation and processing of the cobbles and boulders, the existing

	carriageway materials and the shallow bedrock for re-use in the earthworks. In addition, breakers will be required for excavations in this area. Chemical Attack on Buried Concrete - It is recommended that concrete should be designed to Aggressive Chemical Environment for Concrete (ACEC) Design Sulphate Class DS-1 and ACEC Class AC-2z.
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 PAH species. • Hazardous ground gases. 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. Highway Workers and Highway 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. Classification of Materials for Disposal Off-Site – Six samples (two of topsoil and four of colliery spoil) were classified as non-hazardous using HazWasteOnline™. The laboratory certificates and assessment should be forwarded to the landfill operator to confirm this classification and provide a price for disposal should soils be removed from site.
Hazardous Gas	Ground Gas Risk – Based on the gas results, in accordance with BS8485:2015, the site is classified as Characteristic Situation (CS) 2 due to concentrations of carbon dioxide of >5% v/v. This is consistent with the ground gas risk assessment carried out for the wider Barnsley West site. However, it should be noted the proposed development includes a roundabout without any proposed enclosed spaces and so the ground gas regime needs only to be considered during the construction phase. 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 Strata Sterling Barnsley West Limited to carry out a geoenvironmental ground investigation for a proposed roundabout on Barugh Green Road.

1.2 Objectives

The objective of the geoenvironmental 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 the fee proposal from August 2019 and included the following works:

- Rotary open hole boreholes within the backfilled opencast in order to confirm the depth to competent bedrock and outwith the boundaries of the opencast to investigate the extent of any possible shallow underground workings.
- Standard Penetration Tests (SPTs) to be carried out in rotary boreholes.
- Ground gas and groundwater monitoring wells to be installed within three boreholes.
- 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.
- Groundwater monitoring to be carried out on four occasions in order to establish the groundwater regime.
- Chemical analysis of soil samples in order to determine the concentrations of potential contamination on the site and classify selected materials for disposal off-site; and
- Geotechnical testing to classify materials and inform earthworks, foundations/pavement design and chemical testing to assess the Aggressive Chemical Environment for Concrete classification.
- In addition to the fee proposal from August 2019, ground gas monitoring is to be carried out on three occasions.
- A description of the ground investigation works carried out, i.e. factual reporting.
- Assessment of potential contaminants.
- A qualitative (Tier 1) 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 material for re-use in earthworks.
- Engineering assessment to include recommendations with respect to earthworks and foundations 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; and
- Presentation of the findings in a tabular non-technical summary.

1.4 Location

The site is located approximately 3.3km to the north west of Barnsley town centre. The approximate centre of the site is located at NGR 431567, 407938.

The site is located approximately 1km to the east of the M1 motorway, on the A635 Barugh Green Road. The site includes the junction between Cannon Way and Barugh Green Road. A site location plan is presented as Figure 1 in Appendix A.

1.5 Site Description and Topography

The site is irregular in shape and occupies an area of approximately 0.58 hectares. Ground levels are approximately 90m AOD in the south generally falling to approximately 85m AOD in the north. Barugh Green Road falls gently from the west to the east.

The site generally consists of arable and grazing land in the south and Barugh Green Road and Cannon Way in the north. An overgrown ditch with barbwire fence separates Barugh Green Road from the farmland.

Claycliffe Business Park lies to the north of the site, with the Metro Trading Estate to the north east. Residential properties and Tudor Rose Nurseries are present to the south east. The arable and grazing land extends beyond the southern boundary. Residential housing is located beyond the south-western boundary.

1.6 Development Proposals

It is proposed to redevelop the site with a new roundabout. The development will provide access to the larger proposed Barnsley West development site.

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

- Fore Consulting. General Arrangement. Barnsley West, Barugh Green Road Roundabout. Job/Dwg No: 9014-A1-100-P-001. Revision E. Dated 30 November 2020 for Strata Sterling Barnsley West Ltd.

1.7 Previous Reports

A geoenvironmental desk study report and a coal mining risk assessment specific to the site of the new roundabout have been prepared by JPG, which are referenced below:

- JPG (Leeds) Limited. Geoenvironmental Desk Study Report. Barugh Green Road Roundabout, Barnsley West. Report Ref. 4848-JPG-ZZ-XX-RP-G-0602-S2-P01. Dated December 2019 for Strata Sterling Barnsley West Limited.
- JPG (Leeds) Limited. Coal Mining Risk Assessment and Coal Recovery Report. Barugh Green Road Roundabout, Barnsley West. Report Ref. 4848-JPG-XX-XX-RP-G-0607-S2-P01. Dated December 2019 for Strata Sterling Barnsley West Limited.

The desk study report includes a summary of potential geotechnical and environmental issues and should be read in conjunction with this report.

Note: the roundabout specific Coal Mining Risk Assessment and Coal Recovery Report was updated to P02 on completion of the intrusive investigation detailed in this report.

Additionally, a geoenvironmental desk study report, three coal mining risk assessments and a preliminary geoenvironmental ground investigation report for the wider Barnsley West site have been prepared by JPG, which are referenced below:

- JPG (Leeds) Limited. Geoenvironmental Desk Study Report. Barnsley West. Report Ref. JBW/DS/4848.v3. Revision dated March 2021 for Strata Sterling Barnsley West Limited.
- JPG (Leeds) Limited. Coal Mining Risk Assessment and Coal Recovery Report. Residential Development (Remainder of Site), Barnsley West. Report Ref. 4848-JPG-Z1-XX-RP-G-1101-S2-P02. Revision dated March 2021 for Strata Sterling Barnsley West Limited.
- JPG (Leeds) Limited. Coal Mining Risk Assessment and Coal Recovery Report. Employment Land, Barnsley West. Report Ref. 4848-JPG-Z2-XX-RP-G-1102-S2-P02. Revision dated March 2021 for Strata Sterling Barnsley West Limited.
- JPG (Leeds) Limited. Coal Mining Risk Assessment and Coal Recovery Report. Proposed Residential Development (Pogmoor), Barnsley West. Report Ref. 4848-JPG-Z3-XX-RP-G-1103-S1-P02. Revision dated March 2021 for Strata Sterling Barnsley West Limited.
- JPG (Leeds) Limited. Preliminary Geoenvironmental Ground Investigation. Barnsley West. Report Ref. 4848-JPG-SW-XX-RP-G-0603-S2-P02. Revision dated March 2021 for Strata Sterling Barnsley West Limited.

As part of the JPG Desk Study report, dated July 2019, a review of the following Eastwood & Partners Consulting Engineers report was carried out. This report is referenced below:

- Eastwood and Partners Consulting Engineers. Geotechnical and Geo-Environmental Site Appraisal Commentary. Barnsley West. Report Ref. 36284. Dated 4 October 2013 for Strata.

1.8 Limitations

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

2.0 FIELDWORK

The intrusive investigation was designed to provide a preliminary assessment of the properties of the opencast backfill (Craven I), potential underground coal workings below highwalls and elsewhere in the vicinity of the proposed roundabout, and the general ground, groundwater and hazardous gas conditions at the site.

The exploratory holes targeted the historical Craven I opencast coal site (OCCS) and the areas outside the opencast highwalls.

The rationale behind each exploratory location is summarised in Table 2.0 below.

Table 2.0 – Exploratory Hole Rationale

Potential Issue	Exploratory Holes
Information on the historical OCCS, including depth to competent bedrock/base of the opencast.	BGR_BH101 and BGR_BH102
Combined gas/groundwater monitoring wells were installed in selected boreholes.	BGR_BH101 to BGR_BH103
Information on potential underground coal workings	BGR_BH101 to BGR_BH105
Information on shallow ground conditions in the OCCS and proposed cut areas.	BGR_TP101 to BGR_TP105
Information on the OCCS highwall.	BGR_TP104

It was not possible to carry out any ground investigations on the northern third of the proposed roundabout due to the existing Barugh Green highway and associated public footpaths.

2.1 Fieldwork

The fieldwork was carried out from 4 June to 10 June 2020. The works undertaken are summarised in Table 2.1 below.

Table 2.1 – Summary of Ground Investigation Works

Investigation Method	No of Positions	Maximum Depth (m bgl)	Monitoring Wells	Monitoring
Trial Pits.	5	3.40	-	-
Rotary Open Hole Boreholes.	5	30.00	3 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 Allied Exploration and Geotechnics Limited and part-time supervision from JPG.

In situ standard penetration tests (SPTs) were performed in the colliery spoil and weathered bedrock within the rotary boreholes. The results are included on the exploratory hole logs provided in Appendix B.

2.2 Surveying

The exploratory locations were set out using a hand-held GPS unit. As-built locations were surveyed using a Leica GPS unit (accuracy +/- 10mm) and transferred onto the survey drawing.

3.0 LABORATORY TESTING

3.1 Chemical Analysis

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

- Assess the concentrations of contaminants within any made ground on the site, including the colliery spoil.
- Provide information on the solubility of contaminants and therefore the potential for impact on controlled waters.

In addition, selected samples of made ground and near surface natural soils 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, water soluble chloride, total sulphate, total sulphide and ammoniacal nitrogen.
- Organochlorine pesticides, organophosphorus pesticides and triazine herbicides.

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

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

3.2 Geotechnical Testing

In situ standard penetration tests (SPT) were performed in the colliery spoil and weathered bedrock within the rotary boreholes. The results are presented on the exploratory hole records provided in Appendix B.

Laboratory geotechnical testing was carried out by Allied Exploration and Geotechnics Limited in County Durham, in order to determine the physical characteristics of the made ground and 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) to determine the compaction properties of the soils.
- California Bearing Ratio (CBR) test (2.5kg rammer) to determine the bearing characteristics of the proposed fill material.
- pH and 2:1 water soluble sulphate.

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 and the JPG preliminary ground investigation.

4.2 Ground Conditions

The published information indicates that the southern part of the proposed roundabout is underlain by infilled ground associated with the historical opencast coal site (OCCS) Craven I.

No superficial deposits are recorded on the site.

The bedrock geology predominantly comprises Pennine Middle Coal Measures strata of mudstone, siltstone, sandstone and coal seams, generally dipping 3 to 5 degrees to the northeast.

A fault, trending north east to south west with downthrown strata on the south-eastern side, is shown to cut through the western extent of the roundabout. The sandstone of the Haigh Moor Rock is shown to encroach onto the site on the upthrown side of the fault. The dip of the Haigh Moor Rock is indicated to be approximately 4 degrees.

The following coal seams are anticipated to be present at shallow depth (<30m) below the site (youngest to oldest):

- Thin coal (recorded thickness = 0.38m).
- Swallow Wood Coal (recorded thickness = 0.30m to 1.15m).
- Top Haigh Moor (recorded thickness = 0.69m to 1.19m).
- Low Haigh Moor (recorded thickness = 0.43m to 1.02m).

The ground conditions across the proposed roundabout were found to comprise a general covering of reworked topsoil over locally made ground and/or reworked colliery spoil, overlying natural strata comprising residual soils, extremely weak mudstone, sandstone and coal seams of the Pennine Middle Coal Measures.

Reworked topsoil, generally comprising soft, light brown, sandy, slightly gravelly clay with rootlets and gravel of tile, brick, mudstone and sandstone, was found to be between 0.10m (BGR_TP104) and 0.50m (BGR_TP101) thick.

Made ground colliery spoil was encountered beneath the reworked topsoil in the central and southern third of the proposed roundabout. The made ground generally comprised:

- Cohesive Made Ground: Soft and firm grey slightly sandy gravelly clay with cobbles. The gravel and cobbles are generally of sandstone, mudstone, coal and brick.

The made ground was encountered to depths of 0.50m bgl (BGR_TP103) in the east and 8.90m bgl (BGR_BH101) in the south. The made ground is considered to be representative of reworked natural deposits in the form of colliery spoil. It can be considered that the made ground outwith Craven I OCCS is also colliery spoil. The made ground was found to comprise gravels and cobbles of sandstone, mudstone, coal and brick.

The depth to the base of Craven I OCCS was proven at 8.90m bgl and 8.80m bgl in BGR_BH101 and BGR_BH102, respectively. This is consistent with the information gathered in the preliminary ground investigation for the wider site area.

The buried highwall of Craven I was encountered in BGR_TP104, in the western half of the central third of the proposed roundabout. The highwall drops from approximately 0.40m in the north to 1.30mm in the south of the trial pit. A series of the sketches have been provided with the exploratory hole logs attached in the Appendix B.

Underlying the made ground, natural strata comprising firm, orange brown, mottled grey, slightly sandy, slightly gravelly clay with a low cobble content and occasionally partially decomposed plant matter was encountered. This stratum is considered representative of residual soil of the Pennine Middle Coal Measures Formation. The residual soils were encountered to depths of between 1.40m bgl (BGR_BH105) and 2.50m bgl (BGR_TP105).

Bedrock comprised extremely weak, grey and black, thinly laminated mudstone, overlying interbedded mudstone, sandstone and coal seams of the Pennine Middle Coal Measures Formation.

4.3 Coal Mining Investigation

Five rotary open hole boreholes were drilled as part of the ground investigation to assess the potential for underground coal workings beneath the opencast, the highwall and outwith the opencast. The coal mining investigation boreholes are summarised in Table 4.3 below.

Table 4.3 – Assessment of Coal Mining Boreholes

Borehole Ref.	Ground Level (m AOD)	Depth to Bedrock Strata (m bgl)	Borehole Final Depth (m bgl)	Coal Seams Encountered & Thickness (m bgl to m bgl) (m)	Comments
BGR_BH101	88.334	8.90	30.00	21.60 – 22.30 (0.70) - THM	Coal seam is likely to represent the Top Haigh Moor (THM) encountered beneath Craven I OCCS. Sufficient rock cover over seam.
BGR_BH102	87.748	8.80	24.00	NR	Driller records bedrock strata throughout.
BGR_BH103	87.204	1.90	30.00	10.00 – 10.10 (0.10) - SW	Coal seam is likely to represent the Swallow

Borehole Ref.	Ground Level (m AOD)	Depth to Bedrock Strata (m bgl)	Borehole Final Depth (m bgl)	Coal Seams Encountered & Thickness (m bgl to m bgl) (m)	Comments
					Wood (SW). Sufficient rock cover over the SW.
BGR_BH104	86.125	1.70	24.00	8.80 – 9.10 (0.30) - SW	Coal seam is likely to represent the Swallow Wood (SW). Sufficient rock cover over the SW.
BGR_BH105	87.932	1.40	24.00	1.70 – 2.20 (0.50) – T 7.20 – 7.40 (0.20) - SW	Coal seams are likely to represent the Thin (T) coal seam and the SW. Insufficient rock cover over the Thin seam but there is sufficient cover between the Thin seam and the SW.

NR – Not Recorded

As stated above, BGR_BH101 and BGR_BH102 were drilled within Craven I OCCS. Below the base of the opencast the Top Haigh Moor coal seam was encountered between 21.60m bgl and 22.30m bgl (0.70m thick) in BGR_BH101. However, no coal seams were recorded by the driller in BGR_BH102, this borehole was drilled to a depth of 24.00m bgl. The Top Haigh Moor coal seam was not encountered in the boreholes BGR_BH103 to BGR_BH105.

BGR_BH103, BGR_BH104 and BGR_BH105 were drilled outwith the highwall of Craven I OCCS. A very shallow coal seam, the Thin coal seam, was recorded between 1.70m bgl and 2.20m bgl (0.50m thick) in BGR_BH105 in the west of the proposed roundabout. This coal seam was absent in BGR_BH103 and BGR_BH104.

The Swallow Wood coal seam was encountered at depths of between 7.20m bgl in the west (BGR_BH105) and 10.00m bgl in the centre of the proposed roundabout (BGR_BH103), with thicknesses ranging between 0.10m (BGR_BH103) and 0.30m (BGR_BH104).

No evidence of underground coal workings was encountered in any of the boreholes.

4.4 In Situ Testing

The results of the Standard Penetration Tests (SPTs) in the colliery spoil and residual soils, which were carried out in the rotary boreholes, have been plotted against depth. The results have been corrected in accordance with the energy ratio of the testing equipment. The plots are presented as Figure 2 in Appendix A and the SPT data (uncorrected) is included on the exploratory hole logs contained in Appendix B.

The SPT data shows a spread of N-values which indicate the colliery spoil has medium dense to very dense/ medium to very high strength conditions. The SPT N-values show an increase with depth. SPT N-values within the shallow natural strata, mudstone and sandstone, indicate dense to very dense conditions.

4.5 Laboratory Testing

Eight samples of natural ground (residual soil and bedrock of the Pennine Middle Coal Measures Formation), five samples of colliery spoil and one sample of topsoil 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.

Nine samples were submitted for moisture content testing and four samples were also submitted for Atterberg Limit testing. The results are summarised in Table 4.5.1 below.

Table 4.5.1 – Summary of Moisture Content and Atterberg Limit Testing

Material	Moisture Content (%)		Atterberg Limits - Plasticity Index (%)	
	No of samples	Range	No of samples	Range
Cohesive Topsoil	1	17.1	-	-
Cohesive Colliery Spoil	3	14.2 – 20.5	-	-
Cohesive residual soil – Pennine Middle Coal Measures	3	15.9 – 18.0	3	20 - 22
Extremely weak mudstone – Pennine Middle Coal Measures	2	10.3 – 11.1	-	-

All four samples were prepared using the natural method in accordance with BS1377:Part 2:1990, therefore the material passing through the 0.425mm sieve cannot be recorded. Therefore, modified plasticity indices cannot be calculated.

The moisture content in the topsoil was 17.1%. Typical moisture contents in the cohesive colliery spoil ranged between 14.2% and 20.5%. Typical moisture contents in the natural ground ranged between 10.3% and 18%. A plot of Moisture Content versus Depth (m bgl) is presented as Figure 3 in Appendix A.

Typical Atterberg Limit tests in the cohesive residual soils gave plasticity indices which ranged between 20% to 22%. The results of the Atterberg limits tests in the residual soil indicate the materials to be of intermediate plasticity.

One sample of cohesive colliery spoil and two samples of cohesive residual soil 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 4.5.2 below.

Table 4.5.2 – 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*
BGR_TP101	1.50	Cohesive colliery spoil	2.5kg	13.4	1.94	13.8	OK, 12 – 17.2%
			4.5kg	13.9	2.11	9.0	Too Wet, 7.9 – 13%
BGR_TP103	1.50	Cohesive Residual Soil	2.5kg	17.1	1.79	16	Too Dry, 17.5 – 20.9%
			4.5kg	18.5	1.97	11.5	Too Wet, 12.5 – 16.7%
BGR_TP105	2.00	Cohesive Residual Soil	2.5kg	16.4	1.83	15.5	OK, 15.5 – 19.7%
			4.5kg	16.6	2.04	10.8	Too Wet, 10.3 – 14.5%

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

The results table indicates a range of moisture content for which >95% of maximum dry density and < 5% air voids can be achieved. Based on the test results, the cohesive colliery spoil and cohesive residual soil is generally considered to be suitable for re-use on site in its current condition, if lighter compaction efforts are used, as illustrated by the 2.5kg rammer. However, there is the possibility the natural cohesive strata may be too dry for compaction as seen in the sample from BGR_TP103 (2.5kg rammer) and may require wetting.

If larger compaction efforts are used on the cohesive colliery spoil and cohesive residual soil, as illustrated by the use of the 4.5kg rammer, the material can be considered unsuitable for re-use on site in its current condition as it may be too wet to compact effectively. Therefore, care should be taken on site when selecting the compaction methods.

Three samples were also submitted for laboratory California Bearing Ratio (CBR) testing. The results are summarised in Table 4.5.3 below.

Table 4.5.3 – Summary of California Bearing Ratio Results

Exp. Hole	Depth (m bgl)	Material	Compaction Conditions	As Received Moisture Content (%)	CBR Value (%)		Average CBR (%)
					Sample Top	Sample Base	
BGR_TP104	1.50	Cohesive residual soil	2.5kg	18.9	13.1	15.7	-
BGR_TP105	0.50	Cohesive colliery spoil	2.5kg	11.1	32.3	32.2	32.25
BGR_TP105	2.00	Cohesive residual soil	2.5kg	17.2	7.2	9.4	-

The laboratory CBR results for the cohesive residual soil generally show a lower CBR value compared to the cohesive colliery spoil. The CBR values for samples compacted using a 2.5kg rammer ranged between 7.2% and 32.3%. All the CBR results were greater than 5%.

Six geotechnical samples were submitted for pH testing and sulphate (water soluble) testing. The results are summarised in Table 4.5.4 below.

Table 4.5.4 – Summary of chemical analysis testing.

Exp. Hole	Depth (m bgl)	Material	pH	Sulphate Aqueous Extract as SO4 (mg/l)
BGR_TP101	0.10	Cohesive Topsoil	6.7	16
BGR_TP101	1.00	Cohesive Colliery Spoil	7.2	22
BGR_TP102	2.00	Cohesive Colliery Spoil	7.8	54
BGR_TP103	1.00	Cohesive Residual Soil	7.7	56
BGR_TP104	2.00	Extremely weak mudstone – Pennine Middle Coal Measures	7.2	16
BGR_TP105	1.50	Cohesive Residual Soil	7.3	24

4.6 Groundwater

During the site investigation, groundwater was encountered in the trial pits within the shallow colliery spoil. Perched groundwater was noted in BGR_TP101 and BGR_TP102 at 3.30m bgl and 3.10m bgl with moderate and slight flows, respectively. Groundwater was not encountered in the shallow natural ground within the trial pits located outwith the opencast highwall.

The majority of rotary open holed boreholes encountered groundwater strikes from depths between 5.00m bgl to 14.90m bgl.

Monitoring wells were installed in three of the boreholes. Two of the installations (BGR_BH101 and BGR_BH102) were sealed within the opencast backfill. The installation in BGR_BH103 was sealed within the shallow bedrock.

A summary of the monitored groundwater levels is presented in Table 4.6.1 (groundwater level - m bgl) and 4.6.2 (groundwater elevation - m AOD) below.

Table 4.6.1 – Summary of Recorded Groundwater Levels (m bgl)

Location	Water level during monitoring (m bgl)				
	Pipe	12/06/2020	03/08/2020	13/08/2020	28/08/2020
BGR_BH101	50mm	2.57	2.68	2.80	1.54
BGR_BH102	50mm	2.00	2.15	2.28	1.45
BGR_BH103	50mm	2.20	2.48	1.55	1.20

m bgl – metres below ground level

Table 4.6.2 – Summary of Recorded Groundwater Levels (m AOD)

Location	Water level during monitoring (m AOD)				
	Pipe	12/06/2020	03/08/2020	13/08/2020	28/08/2020
BGR_BH101	50mm	85.764	85.654	85.534	86.794
BGR_BH102	50mm	85.748	85.598	85.468	86.298
BGR_BH103	50mm	85.004	84.724	85.654	86.004

m AOD – metres above ordnance datum

Groundwater monitoring has been carried out on four occasions during which the levels have stayed mostly consistent. Water levels in BGR_BH101 and BGR_BH102 were lower at the time of the first three visits but increased on the final visit, whereas the water level in BGR_BH103 increased on the third and final visit.

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.

4.7 Ground Gas

Ground gas monitoring has been undertaken on three 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 redevelop part of the existing carriageway on Barugh Green Road to create a four-exit roundabout. The development will provide access to the larger proposed Barnsley West development site.

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

- Fore Consulting. General Arrangement. Barnsley West, Barugh Green Road Roundabout. Job/Dwg No: 9014-A1-100-P-001. Revision E. Dated 30 November 2020 for Strata Sterling Barnsley West Ltd.

5.2 Updated Coal Mining Risk Assessment

The coal mining risk assessment prepared for the site by JPG in December 2019 under reference 4848-JPG-XX-XX-RP-G-0607-S2-P01 has been updated to reflect the findings of the recent ground investigation. The updated report is referenced 4848-JPG-XX-XX-RP-G-0607-S2-P02 and dated March 2021.

Based on the proven depths and thicknesses of the two persistent coal seams, the Swallow Wood coal seam and the Top Haigh Moor coal seam, they pose a very low risk to the surface instability of the site at this location. The Thin coal seam, encountered at shallow depth in BGR_BH101, is within influencing distance of the surface. However, no workings were encountered during the ground investigation. Additionally, based on the cut and fill drawing, referenced below and copied in Appendix A, the Thin seam is likely to be removed during the earthworks.

- JPG (Leeds) Ltd. Barugh Green Road Roundabout, Cut/Fill Analysis. Barnsley West, Barnsley/ Dwg Ref. 4848-JPG-SW-00-DR-C-1601-S4-P04. Revision dated 02 February 2021.

Based on the above information, no mitigation measures with regard to coal mining are considered necessary with the exception of the deep made ground associated with the backfilled OCCS. Ground improvement will be required where deep made ground and the highwall are present. This is outlines in Sections 5.3 and 5.4 below.

5.3 Roads, Pavements and Hardstanding Surfaces

The structural design of a road or hard standing is based on the strength of the subgrade, which is assessed using the California Bearing Ratio (CBR).

Laboratory CBR values for the cohesive colliery spoil and cohesive residual soil are typically >5%. It is recommended that a preliminary design CBR of 3% is adopted for pavement design for the re-engineered colliery spoil and natural strata.

Formations should be proof rolled and any areas of soft/loose or otherwise deleterious materials should be excavated, i.e. any areas where soft clayey soils are present, and replaced with a properly compacted granular fill.

It is likely that for adoptable highways (Section 38 and Section 278), the local authority will require 3.00m of colliery spoil to be re-engineered below the footprint and two layers of geogrid to be placed at the base, no greater than 300mm apart, and below all services, with an overlap of a minimum 5.00m either side of the confirmed location of the highwall.

5.4 Earthworks

Based on the laboratory results, the colliery spoil and natural cohesive strata are generally considered suitable for re-use in earthworks, if lighter compaction efforts are used. However, there is the possibility that the cohesive natural strata is too dry for compaction. If larger compaction efforts are used, the cohesive colliery spoil and cohesive natural strata may be too wet to compact effectively.

Once the site has been cut to the desired formation level (approximately 85m AOD), based on the JPG earthworks specification and the cut and fill analysis drawing, which is referenced below and contained in Appendix A, it is proposed to turn-over and re-engineer the natural soils and/or colliery spoil at stepped intervals that shall not exceed 2.00m horizontally and no more than 0.50m vertically.

- JPG (Leeds) Ltd. Barugh Green Road Roundabout, Cut/Fill Analysis. Barnsley West, Barnsley/ Dwg Ref. 4848-JPG-SW-00-DR-C-1601-S4-P04. Revision dated 02 February 2021.

If any filling is required, proper selection and control will be required as part of the works 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.

An earthworks specification specific to the roundabout development has been prepared by JPG under reference 4848-JPG-XX-XX-SP-G-0605-S4-P01.

5.5 Excavations

It is proposed to cut the site to a desired formation level of approximately 85m AOD, any excavations through the uncompacted colliery spoil and natural ground are likely to be unstable over the construction period and temporary side support is likely to be required.

Perched groundwater has been encountered at shallow depth within the colliery spoil and could potentially be encountered in excavations.

Any coal encountered in excavations should be removed under an incidental agreement with the Coal Authority.

Good working practice with respect to drainage of excavations and formations will be required to protect materials. Any excavation 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 1.20m 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.

5.6 Control of Groundwater

The groundwater monitoring and site investigation have indicated shallow depths to groundwater during the summer months within the backfilled opencast and natural strata. Slight to moderate inflows into trial pits, BGR_TP101 and BGR_TP102 were recorded during the site investigation. Control of groundwater and surface water control will be required as part of the earthworks.

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.

5.7 Obstructions

Half of the proposed roundabout is open farmland, while the other half is the existing carriageway. Consequently, there is a limited potential for near surface obstructions. However, it is noted that the colliery spoil materials do contain cobbles and boulders from the historically excavated bedrock material. An allowance for excavation and processing of this over-sized material for re-use on site should be made.

As part of the earthworks, allowance may need to be made for the excavation and processing of the existing carriageway materials and the shallow bedrock for re-use in the earthworks. In addition, breakers will be required for excavations in this area.

5.8 Chemical Attack on Buried Concrete

Laboratory testing has been undertaken on samples of the topsoil, colliery spoil and natural ground to determine the sulphate content and acidity and hence the concrete class required for buried concrete.

Laboratory testing in the topsoil and the colliery spoil recorded water-soluble sulphate contents ranging between 14mg/l and 66mg/l and pH values between 6.2 and 7.8.

In the natural strata, recorded water-soluble sulphate contents of 16mg/l and 56mg/l and pH values of 7.2 and 7.7.

Foundations are likely to come into contact with both the made ground and underlying natural ground. On this basis it is recommended that concrete should be designed to Aggressive Chemical Environment for Concrete (ACEC) Design Sulphate Class DS-1 and ACEC Class AC-2z. 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) 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 roundabout site by JPG and is reported as:

- JPG (Leeds) Ltd. Geoenvironmental Desk Study Report. Barugh Green Road Roundabout, Barnsley West. Ref. 4848-JPG-ZZ-XX-RP-G-0602-S2-P01, dated December 2019.

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
No standards currently exist in the UK which provides threshold values for potential contamination in groundwater. Alternative guidance is therefore used, against which the significance of potential contaminants can be assessed.

The results of the leachate analyses will be compared to the same standards as for groundwater.

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. a roundabout, 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. An outline of the methodology of the statistical analysis is presented in Appendix C.

In total, six samples, two of topsoil and four of the colliery spoil, 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 below.

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)	8.23	3.60 – 14	No
Cadmium	190(1)	0.12	<0.10 – 0.20	No
Chromium	8,600(1)	18.67	12 – 22	No
Hexavalent Chromium	33(1)	<1	<1	No
Copper	68,000(1)	32.33	19 – 39	No
Lead	2,330(2)	20.57	9.40 – 35	No
Mercury	1,100(1)	0.05	<0.05	No
Nickel	980(1)	29	19 – 38	No
Selenium	12,000(1)	<0.50	<0.50	No
Zinc	730,000(1)	83.83	56 – 100	No
Cyanide (free)	34(3)	0.12	<0.10 – 0.20	No
Total Phenols	440(1)	0.33	<0.30 – 0.50	No
Naphthalene	190 f (1)	<0.10	<0.10	No
Acenaphthylene	83,000 (1)	<0.10	<0.10	No
Acenaphthene	84,000 (1)	<0.10	<0.10	No
Fluorene	63,000 (1)	<0.10	<0.10	No
Phenanthrene	22,000 (1)	<0.10	<0.10	No
Anthracene	520,000 (1)	<0.10	<0.10	No
Fluoranthene	23,000 (1)	0.12	<0.10 – 0.20	No
Pyrene	54,000 (1)	0.12	<0.10 – 0.20	No
Benzo(a)anthracene	170 (1)	<0.10	<0.10	No
Chrysene	350 (1)	<0.10	<0.10	No

Benzo(b)fluoranthene	44 (1)	<0.10	<0.10	No
Benzo(k)fluoranthene	1,200 (1)	<0.10	<0.10	No
Benzo(a)pyrene	35 (1)	0.10	<0.10 – 0.10	No
Indeno(1,2,3-c,d)pyrene	500 (1)	<0.10	<0.10	No
Dibenzo(a,h)anthracene	3.5 (1)	<0.10	<0.10	No
Benzo(g,h,i)perylene	3,900 (1)	<0.10	<0.10	No

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

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

One sample was submitted for analysis for organochlorine pesticides, organophosphorus pesticides and triazine herbicides. No elevated concentrations of pesticides or herbicides were detected above their respective laboratory limits of detection.

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

Calorific value (CV) tests were carried out on two samples of colliery spoil. Soils with a CV of greater than 10MJ/kg are almost certainly combustible. Soils with values below 2MJ/kg are unlikely to burn. Both samples recorded a CV of less than 2MJ/kg (<1Mj/kg) and therefore the colliery spoil made ground is unlikely to burn.

6.4 Evaluation of Controlled Waters Analysis

Three samples of colliery spoil were submitted for leachability analysis. The result for each determinand was compared directly against their respective GAC. The results are summarised in Table 6.4.1 below.

Table 6.4.1 – Summary of Leachability Results

Determinand	GAC (µg/l)	BGR_TP101 (1.20m)	BGR_TP104 (0.20m)	BGR_TP105 (0.20m)
Arsenic	50 (1)	<0.16	0.17	1.50
Cadmium	5 (1)	<0.03	<0.03	<0.03
Chromium	50 (1)	<0.25	<0.25	1.30
Copper	2,000 (1)	<0.40	0.40	3.60
Lead	10 (1)	<0.09	<0.09	0.19
Mercury	1 (1)	<0.01	<0.01	<0.01
Nickel	20 (1)	<0.50	<0.50	<0.50
Selenium	10 (1)	<0.25	<0.25	0.38
Zinc	5,000 (1)*	<1.30	<1.30	<1.30
pH	6.5 – 9.5 (1)	8.6	8.4	8.2
Cyanide Free	50 (1)	<20.00	<20.00	<20.00
Sulphate	250,000 (1)	3.90	2.90	2.30
Naphthalene	4.24 (2)	<0.05	<0.05	<0.05
Anthracene	0.193 (2)	0.02	0.02	<0.01
Fluoranthene	0.0122 (2)	0.07	0.07	<0.01
Benzo(a)pyrene	0.01 (1)	<0.01	0.07	<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)	0.15	0.53	0.04
Phenol	14.9 (2)	<100	<100	<100

(1) Water Supply (Water Quality) Regulations 2000.
*Historical 1989 Threshold Value.
(2) Water Framework Directive 2015, Surface Water, Maximum Threshold Value.

Two slightly elevated concentration of potentially leachable fluoranthene and the sum of benzo(b)fluoranthene, benzo(k)fluoranthene, indeno(1,2,3-c,d)pyrene and benzo(g,h,i)perylene and one slightly elevated concentration of potentially leachable benzo(a)pyrene was recorded within BGR_TP101 and BGR_TP102.

It is noted that the limit of detection for phenol is above the laboratory limit of detection.

6.5 Evaluation of Hazardous Gases

Based on the desk study information and ground conditions encountered, i.e. reworked topsoil overlying natural and/or made ground colliery spoil with shallow coal seams also present, it is considered that there is 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 three of the rotary open hole boreholes.

Ground gas monitoring has been undertaken on three 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:

- No methane concentrations were recorded during any of the three visits.
- Carbon dioxide has been recorded in all of the monitoring wells, maximum steady concentrations ranged between 1.1% v/v and 7.9% v/v.
- Reduced oxygen concentrations (i.e. <16% v/v) were recorded in all of the monitoring visits in BGR_BH101. The lowest recording being 5.7% v/v.
- A maximum peak and steady flow of 5.0l/hr and 1.4l/hr was recorded in BGR_BH103 during the final visit.

Two of the monitoring visits were carried out during periods of regionally steady atmospheric pressure, the remaining one was carried out during periods of regionally rising atmospheric pressure. Barometric pressures during the monitoring period ranged between 993mB and 999mB.

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 (CO_2) of 7.9% v/v was recorded in BGR_BH101 during the third monitoring visit. The other two visits identified carbon dioxide above 5% v/v within the same borehole. During the first visit, BGR_BH102 recorded a peak concentration of carbon dioxide as 8.0% v/v, however the concentration dropped significantly to 0.1% v/v after several minutes and stayed consistently low for the remainder of the visits. BGR_BH101 is sealed within the opencast backfill. Therefore, the source of the carbon dioxide is considered to be the colliery spoil.

Based on the maximum steady concentration of CO_2 and the maximum steady flow. The Gas Screening Value (GSV) for carbon dioxide is 0.1106 l/hr. Based on this result, and the elevated concentrations (>5% v/v) of CO_2 recorded on the site, the site would be classified as Characteristic Situation (CS) 2 in accordance with BS8485:2015.

This is consistent with the ground gas risk assessment carried out for the wider Barnsley West development site. However, it should be noted that this proposed development includes a roundabout without any proposed enclosed spaces and so the ground gas regime needs only to be considered during the construction phase.

6.9 Radon Risks

The site is located in a radon affected area with between 1% and 3% of properties above the action level. Based on this information, no radon protective measures are required in the construction of new dwellings or extensions in these areas.

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:

- Slightly elevated concentrations of potentially leachable PAH species.
- Hazardous ground gases.

Pathways
Based on the available information and the proposed development of the site with a roundabout and associated highways, the following potential exposure pathways will require consideration, both during the development works and on completion of the construction.

- Leaching/migration of potential contaminants from soil into groundwater and surface water via groundwater and surface water flow.
- Inhalation of hazardous ground gases.

Receptors
The potential receptors are considered to be:

- Highway construction workers and future highway maintenance workers involved in excavations, e.g. foundations or where services are being installed or repaired following development.
- The underlying bedrock strata, i.e. Secondary A Aquifer; and,
- Nearby surface waters, i.e. streams/drainage channels on and adjacent to the site.

6.11 Source – Pathway – Receptor Linkages

Based on the above potential sources, pathways and receptors, the following linkage assessments have been considered. A conceptual site model illustrating the pollutant linkages at the site is presented as Figure 4 in Appendix A and discussed below.

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

Highway Workers and Future Highway Maintenance Workers
Based on the sources of potential contamination which have been identified on the site, there is a risk to highway workers and highway 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).

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 potentially leachable PAH species 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.
- There are two 'Inland Rivers' on the site. These appear to be related to agricultural drainage channels.
- The shallow ground comprises soft to firm cohesive colliery soil and firm cohesive residual soil overlying coal measures bedrock strata. The cohesive residual soil and colliery spoil will limit the downward migration of potential contaminants to the underlying Secondary A Aquifer.
- There are no active groundwater abstraction licences within 1km of the site. The site does not lie within an Environment Agency Groundwater Source Protection Zone.
- The nature of the proposed development comprises hard cover and associated surface water drainage. The hard cover will form a barrier to the downward migration of rainwater and therefore reduce the potential for infiltration and leaching of potential contaminants.

Based on the factors above, i.e. the presence of cohesive residual soil and colliery spoil, which will act as a barrier to limit the downward migration of potential contaminants and absence of significant water receptors, it is concluded that there are no plausible linkages to controlled water receptors. Therefore, the risk to controlled waters is considered to be low.

Buildings and Services
Recommendations with respect to the chemical attack on buried concrete are given section 5.8.

6.12 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.

Highway Workers and Highway 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.

6.13 Classification of Materials for Disposal Off-Site

Six samples, two of topsoil and four of the colliery spoil, were assessed using HazWasteOnline^{tm} 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^{tm}, is presented 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.

J Morley
B.Sc. (Hons.), M.Sc., F.G.S
For and on behalf of JPG (Leeds) Limited

Appendix A Figures/Drawings

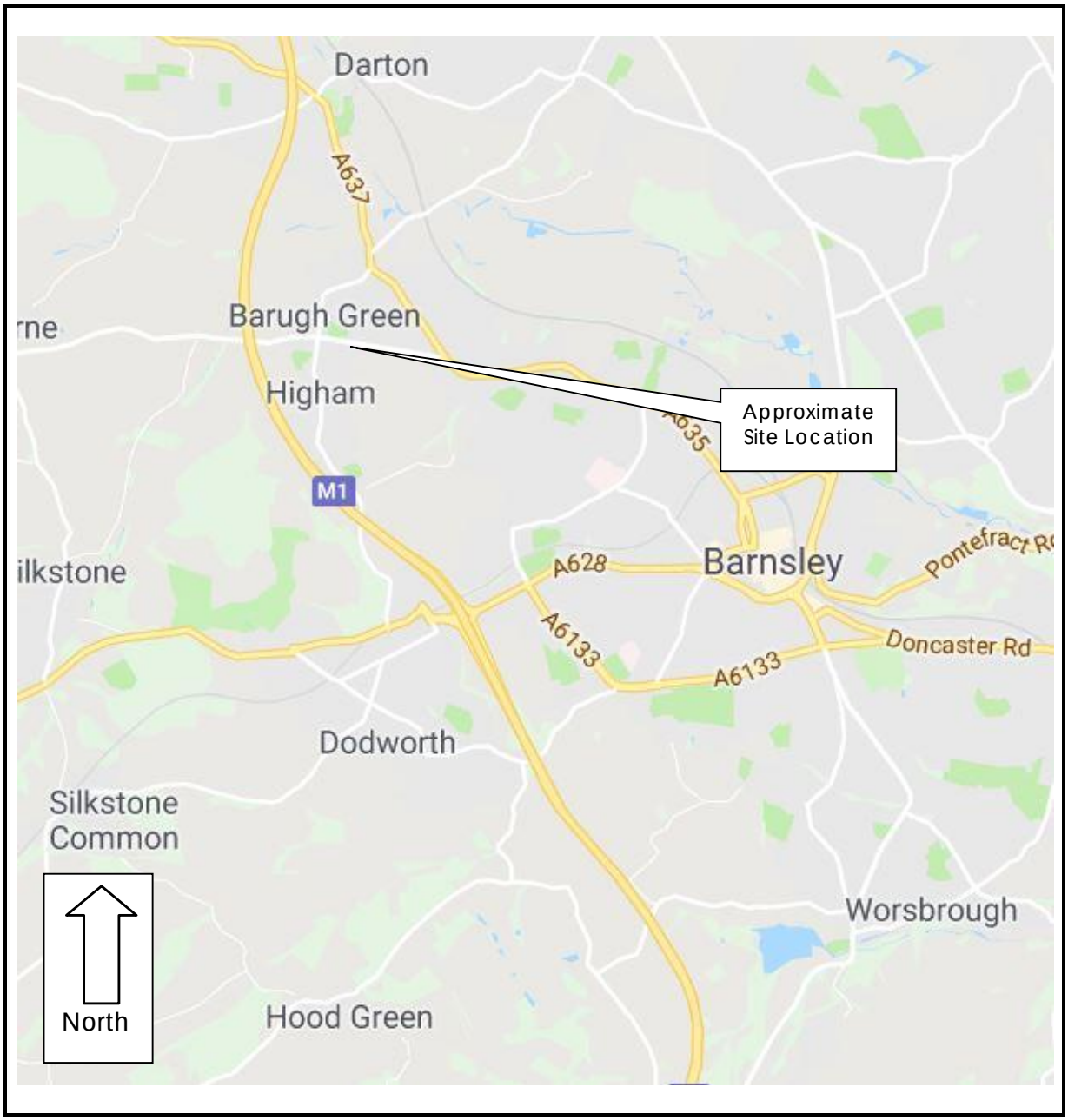


Figure 1 – Site Location Plan	
Site	Barugh Green Road Roundabout - Barnsley West
Client	Strata Sterling Barnsley West Ltd
Job Number	4848
Scale	NTS

Figure 2: SPT N Value vs Depth (m bgl)

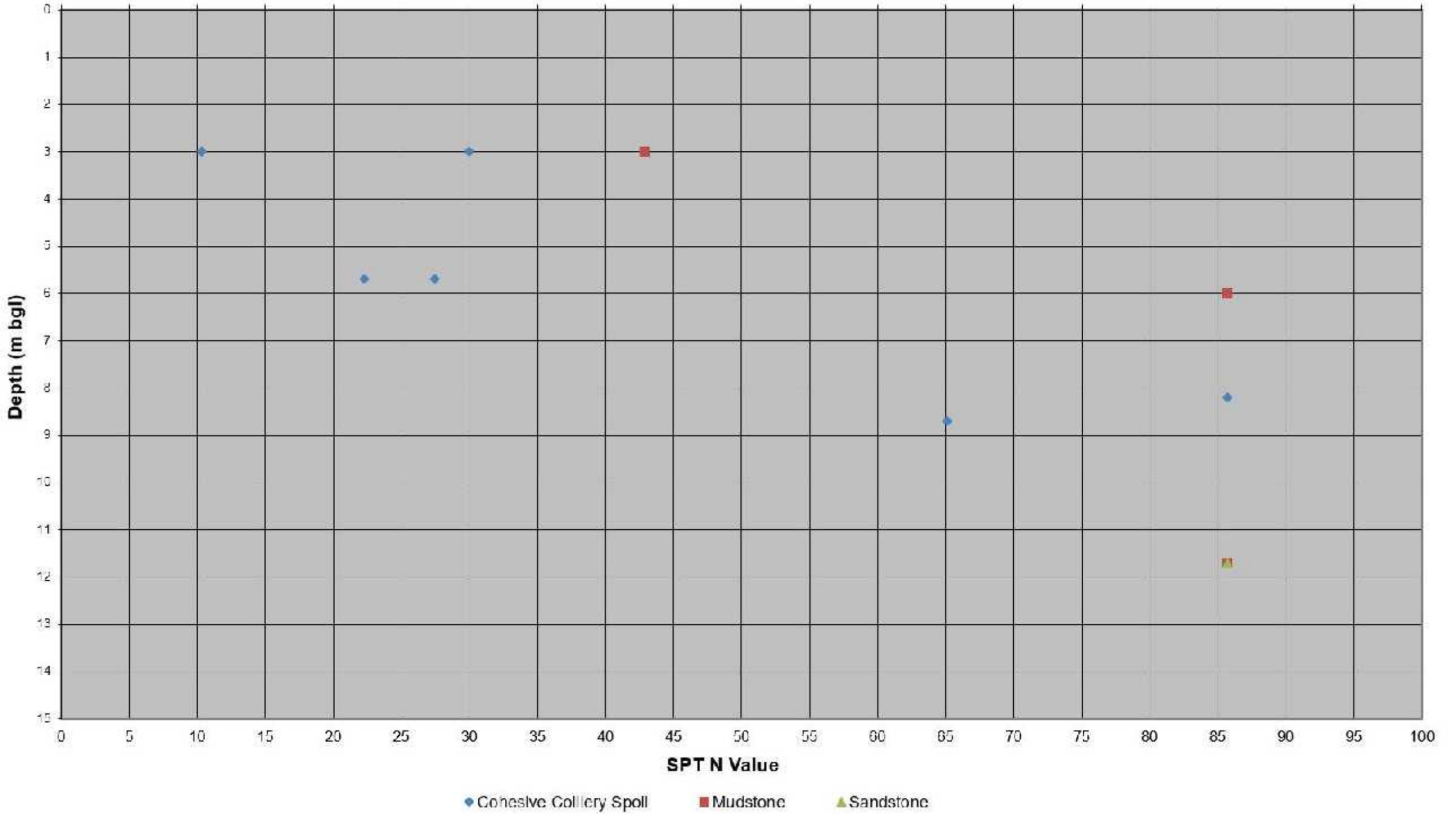
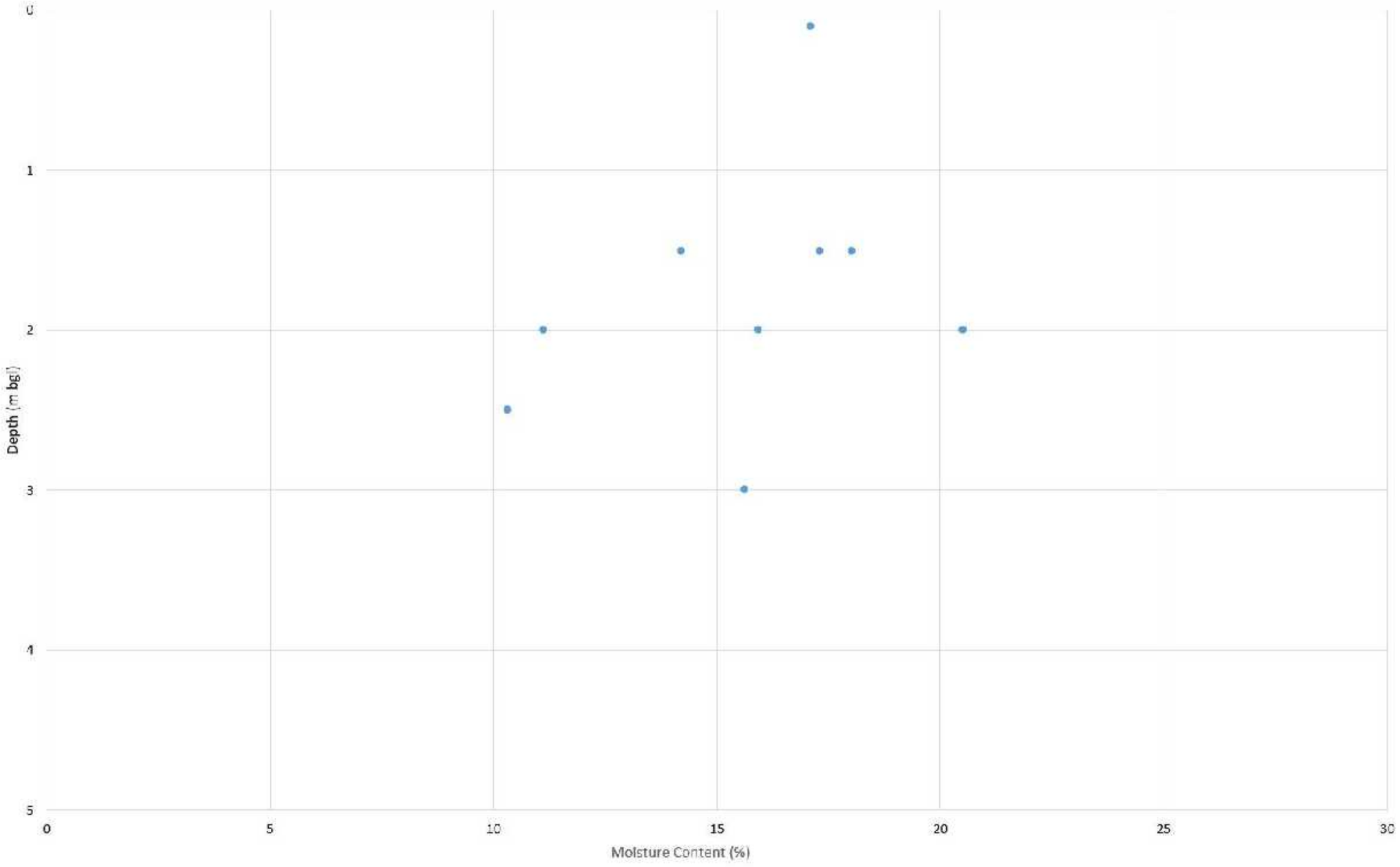


Figure 3: Moisture Content v Depth (m bgl)



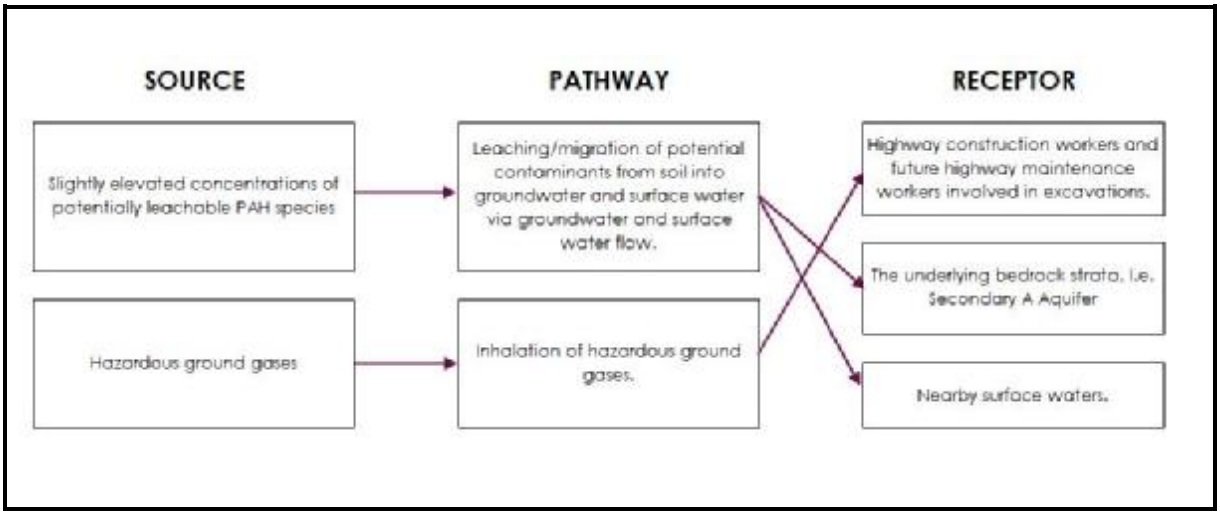


Figure 4 – Conceptual Site Model	
Site	Barugh Green Road Roundabout - Barnsley West
Client	Strata Sterling Barnsley West Ltd
Job Number	4848

DO NOT SCALE

NOTES

GENERAL NOTES

a. THE TOPOGRAPHICAL SURVEY IS BASED ON INFORMATION PRODUCED BY HAYCOCK & TODD, JOB NO. S9417, FILE S9417-3D BARNSLEY WEST.DWG, DATED MAY 2019. THE INFORMATION USED IN PREPARATION OF THIS AND ALL OTHER FORE CONSULTING DESIGNS AND DRAWINGS IS NOT WARRANTED. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ALL SURVEY INFORMATION PROVIDED AND REPORT ANY ANOMALIES TO FORE CONSULTING.

DESIGN NOTES

1. ALL DESIGN AND WORKS TO COMPLY WITH CURRENT VERSION OF THE FOLLOWING DOCUMENTS:
   - DESIGN MANUAL FOR ROADS AND BRIDGES (DMRB);
   - SPECIFICATION FOR HIGHWAY WORKS (SHW);
   - MANUAL FOR STREETS (MFS); AND
   - BARNSLEY METROPOLITAN BOROUGH COUNCIL (BMBC) DESIGN GUIDE AND SPECIFICATION.
2. FOOTPATH GRADIENT AT TACTILE PAVING TO BE A MAXIMUM OF 1:12.
3. EXISTING FENCES, VERGES/SHUBBERY, FOOTWAY, AND OTHER PHYSICAL FEATURES TO BE REMOVED WITHIN THE AREA OF WORKS.
4. ALL KERBS TO BE HB2, EXCEPT DROPPED KERBS AT PEDESTRIAN CROSSING.
5. ALL IRONWORK WITHIN EXTENT OF WORKS TO BE LOWERED / RAISED AS REQUIRED.
6. ALL PROPOSED ROAD MARKINGS TO BE IN ACCORDANCE WITH THE FOLLOWING:
   - TRAFFIC SIGNS REGULATIONS AND GENERAL DIRECTIONS (TSRGD);AND
   - TRAFFIC SIGNS MANUALS CHAPTER 5 - ROAD MARKINGS.
7. BARUGH GREEN RD DESIGN SPEED: 30mph
   CANNON WAY DESIGN SPEED: 30mph
   PROPOSED LINK ROAD DESIGN SPEED: 30mph
8. EARTHWORKS SLOPES TO BE MAXIMUM 1:3.
9. CHANNEL BLOCKS TO BE INSTALLED ALONG ALL THE NEW KERBS.

KEY

- CARRIAGEWAY
- FOOTWAY
- BLOCK PAVING
- GRASS VERGE
- EARTHWORKS/LANDSCAPING

REV	DESCRIPTION	DATE	BY
E	DRAWING UPDATED TO MATCH 3D MODEL	30.11.20	ML
D	CHANGES FOLLOWING COMMENTS	19.08.20	ML
C	CHANGES FOLLOWING COMMENTS	14.07.20	ML
B	CHANGES FOLLOWING COMMENTS	10.07.20	ML
A	CHANGES FOLLOWING COMMENTS	03.12.19	ML

Client:
STRATA STERLING BARNSLEY WEST LTD

Project
BARNSLEY WEST
BARUGH GREEN ROAD ROUNDABOUT

Drawing Title
GENERAL ARRANGEMENT

PRELIMINARY

Fore Consulting Limited
2nd Floor, Queens House
34 Wellington Street
Leeds
LS1 2DE
0113 2460204
enquiries@foreconsulting.co.uk
www.foreconsulting.co.uk

Drawn by	Checked by	Issue Date	Scale	Format
ML	PI	02.04.2019	1:250	A0

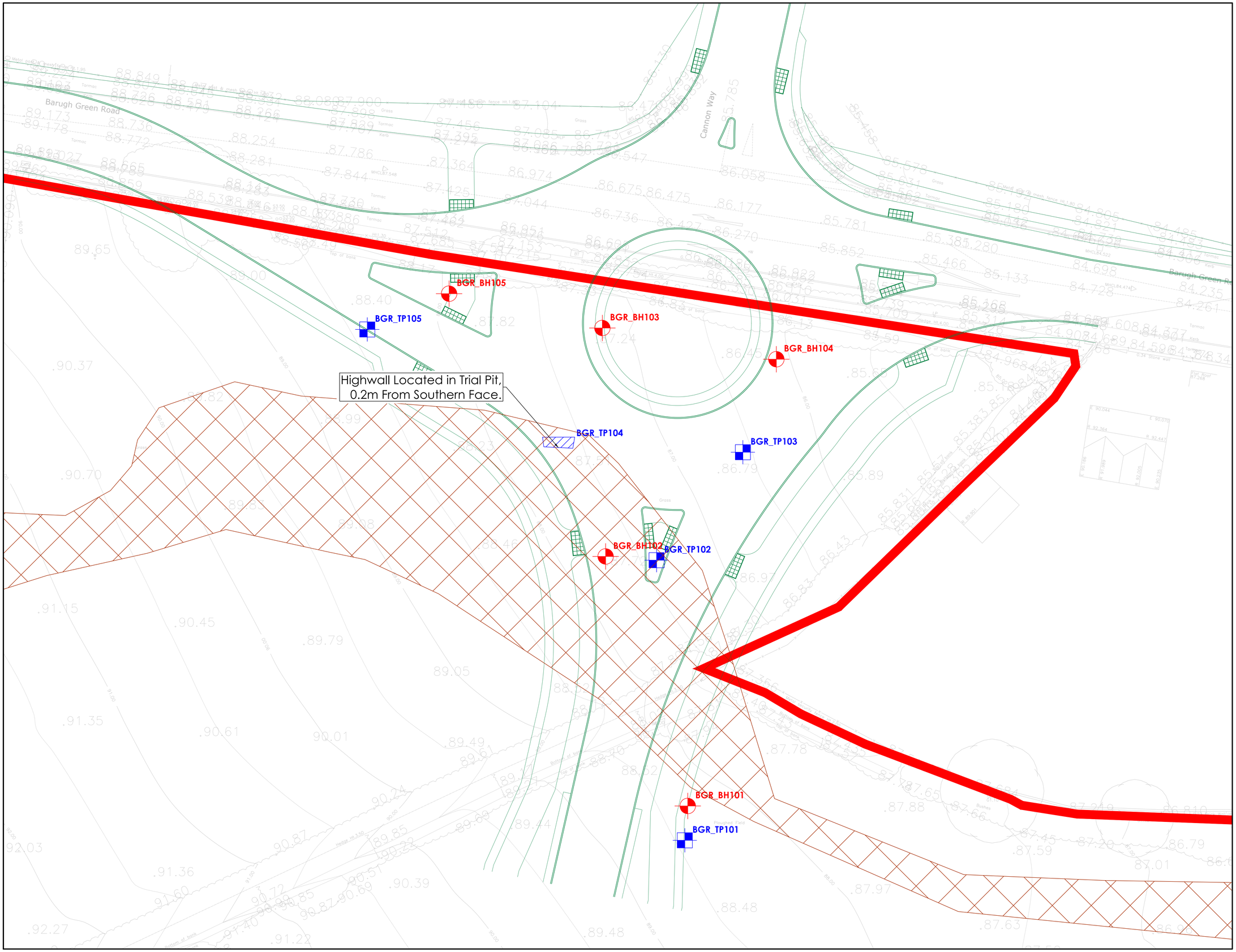
Job Number	Drawing Number	Revision
9014	A1-100-P-001	E

DO NOT SCALE (A1)

NOTES

LEGEND

BGR_BH101	As Built JPG Borehole
BGR_TP101	As Built JPG Trial Pit
BGR_TP104	As Built JPG Trial Pit Locating Highwall



0m 5m 10m

SCALE 1:200

REV	DESCRIPTION	DATE	CHK	BY
P02	GENERAL DRAWING UPDATE.	22.10.20	JAM	LSG
P01	INITIAL ISSUE.	23.06.20	JAM	LSG

Project
BARUGH GREEN ROAD ROUNDABOUT
BARNSLEY WEST

Drawing Title
EXPLORATORY HOLE LOCATION PLAN
(AS BUILT)

INFORMATION ISSUE

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

4848-JPG-SW-XX-DR-G-1100 | S2 | P02

JPG-EXPLORATORY HOLE LOCATION PLAN

SCALE 1:200

DO NOT SCALE (A1)

NOTES

EARTHWORKS NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, M & E CONSULTANTS AND JPG CONSULTANTS DRAWINGS AND REPORTS.
2. ANY DISCREPANCIES SHOULD BE REPORTED TO THE ENGINEER IMMEDIATELY SO THAT CLARIFICATION CAN BE SOUGHT PRIOR TO COMMENCEMENT OF WORKS.
3. JPG PROPOSED EARTHWORKS ANALYSIS IS INDICATIVE ONLY. IT IS BASED ON THIRD PARTY INFORMATION AND THEREFORE JPG DO NOT ACCEPT RESPONSIBILITY FOR VARIATIONS IN THE ACTUAL DEPTH OF SITE STRIP OR ANY OTHER ONSITE EARTHWORKS PARAMETERS THAT MAY EFFECT FINAL CUT AND FILL VOLUMES.
4. ISOPACHYTE COLOUR BANDINGS DENOTE APPROXIMATE CUT AND FILL VOLUMES BETWEEN THE EXISTING SITE STRIP AND PROPOSED FORMATION LEVELS, REFER TO EARTHWORKS ANALYSIS TABLE. ADDITIONAL SITE PREPARATION EARTHWORK VOLUMES HAVE NOT BEEN INCLUDED.
5. AREAS NOT SHADED WITH ISOPACHYTE COLOUR BANDINGS HAVE NOT BEEN INCLUDED IN THE CUT/FILL ANALYSIS.
6. APPROXIMATE EARTHWORKS VOLUMES HAVE BEEN DETERMINED BASED ON THE FOLLOWING CAVEATS;
   - NO BULKING FACTORS HAVE BEEN ACCOUNTED FOR.
   - ARISINGS FROM DRAINAGE AND FOUNDATION EXCAVATIONS HAVE NOT BEEN ACCOUNTED FOR.
   - DEMOLISHED MATERIAL FROM EXISTING BUILDINGS/STRUCTURES HAVE NOT BEEN ACCOUNTED FOR.
7. ANY EARTHWORKS SHOULD BE CARRIED OUT IN ACCORDANCE WITH THE EARTHWORKS SPECIFICATION, JPG DOCUMENT NO. '4848-JPG-XX-XX-SP-G-0605-S4-P01 - EARTHWORKS SPECIFICATION', WHICH INCLUDES THE FOLLOWING POINTS (SALIENT POINTS PRESENTED ONLY, THE EARTHWORKS SPECIFICATION SHOULD BE REFERRED TO):
8. IN AREAS OF COLLIERY SPOIL, ADDITIONAL EXCAVATION AND RE-COMPACTION FOR A LEAST 3.00m BELOW FORMATION LEVEL IS REQUIRED.
9. THE HIGHWALL SHALL BE EXCAVATED FROM THE BASE OF THE ADDITIONAL EXCAVATION AND RE-COMPACTED IN STEPPED INTERVALS THAT SHALL NOT EXCEED 2.00m HORIZONTALLY AND NO MORE THAN 0.50m VERTICALLY.
10. 2NO. LAYERS OF TENSAR TRIAX 160 WITH STONE SURROUND TO BE PLACED, NO GREATER THAN 300mm APART, BELOW ALL SERVICES WITH AN OVERLAP OF A MINIMUM OF 5.00m EITHER SIDE OF THE LOCATED HIGHWALL.
11. FORMATION LEVEL SHOULD BE PROOF ROLLED AND ANY AREAS OF SOFT/LOOSE OR OTHERWISE DELETERIOUS MATERIALS SHOULD BE EXCAVATED AND REPLACED WITH A PROPERLY COMPACTED GRANULAR FILL.
12. PLATE LOAD TESTS WILL BE REQUIRED TO BE CARRIED OUT AT FORMATION LEVEL ON A 25m BY 25m GRID TO DETERMINE THE CBR VALUE OF THE MATERIAL. ANY MATERIALS WHICH DO NOT ACHIEVE A CBR VALUE OF AT LEAST 3% WILL REQUIRE ADDITIONAL COMPACTION. IF AFTER FURTHER COMPACTION A CBR VALUE OF 3% CANNOT BE ACHIEVED, THEN THE MATERIAL WILL REQUIRE REMOVAL AND REPLACEMENT WITH SUITABLE MATERIALS IN ORDER TO ACHIEVE THE REQUIRED CBR VALUE.

EARTHWORKS ANALYSIS

EXISTING SITE STRIP

ALLOW 200mm DEEP SITE STRIP OF EXISTING TOPSOIL.
TOTAL AREA = 3668.959m²
TOTAL VOLUME = 733.792m³
SITE STRIP MATERIAL DEEMED TO BE UNSUITABLE FOR RE-USE AS ENGINEERING FILL.
TOPOGRAPHICAL SURVEY INFORMATION USED IN THE EARTHWORKS ANALYSIS TAKEN FROM: TOPOGRAPHICAL SURVEY PROVIDED BY FORE CONSULTING.

PROPOSED FORMATION LEVELS

DEPTH TO FORMATION AS DESIGNED BY FORE CONSULTING:
CARRIAGEWAY = -710mm
FOOTWAY/CYCLEWAY = -305mm
LANDSCAPING = -150mm

ANALYSIS BETWEEN EXISTING SITE STRIP & PROPOSED FORMATION LEVELS

2D AREA	3668.959m²
CUT	3483.574m³
FILL	32.391m³
NET (SURPLUS)	3451.183m³
MAXIMUM CUT DEPTH	-2.447m
MAXMIUM FILL DEPTH	0.765m

SURFACE LEVEL DATA

MIN. LEVEL	MAX. LEVEL	COLOUR
-3.000m	-2.500m	
-2.500m	-2.000m	
-2.000m	-1.500m	
-1.500m	-1.000m	
-1.000m	-0.500m	
-0.500m	0.000m	
0.000m	0.500m	
0.500m	1.000m	
1.000m	1.500m	
1.500m	2.000m	
2.000m	2.500m	
2.500m	3.000m	

LEGEND

PROPOSED LEVELS AS DESIGNED BY FORE CONSULTING
0.250 DENOTES PROPOSED MAJOR CONTOURS
0.050 DENOTES PROPOSED MINOR CONTOURS
1:40 DENOTES PROPOSED GRADIENTS

HATCHING DENOTES INDICATIVE EXTENTS OF EXCAVATION AND RE-COMPACTION FOR A LEAST 3.00m BELOW FORMATION LEVEL, REFER TO NOTES. APPROXIMATE TURN OVER VOLUME OF 2400 Cu. M.

Conjectured Highwall

Barugh Green Road

P04	TENDER ISSUE.	02.02.21	CPH	OLT
P03	REVISED TO LATEST FORE LAYOUT & LEVELS.	02.02.21	OLT	LSG
P02	ALTERATION TO ROUNDABOUT DESIGN.	06.12.19	CPH	OLT
P01	FIRST DRAFT.	17.06.19	CPH	OLT
REV	DESCRIPTION	DATE	CHK	BY

Project
BARNSLEY WEST

Drawing Title
BARUGH GREEN ROAD ROUNDABOUT
CUT & FILL ANALYSIS

TENDER ISSUE

JPG
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Leeds - 0113 263 1155 | London - 0207 947 4148

4848-JPG-SW-00-DR-C-1601 | S4 | P04

JPG-BARUGH GREEN ROAD - CUT & FILL ANALYSIS
SCALE 1:250

0m 6.25m 12.5m
SCALE 1:250

Appendix B Exploratory Hole Logs

ALLIED EXPLORATION & GEOTECHNICS LIMITED

Head Office: Unit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RG **Tel:** 0191 387 4700 **Fax:** 0191 387 4710
Regional Office: Unit 20 Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL **Tel:** 01772 735 300 **Fax:** 01772 735 999

DRILLHOLE RECORD

Status:- **FINAL**

Project: Barnsley West - Barugh Green Road Roundabout		**Exploratory Hole No.**
Client: JPG (Leeds) Ltd	**Location:** Barugh Green Road, Barnsley E:431537.820 N:407896.964	**BGR_BH101**
Method (Equipment): Rotary Openhole (Comacchio GEO 305)	**Ground Level (m):** 88.334 / **Start Date:** 05/06/2020	**Sheet:** 1 of 4

RUN DETAILS			Water	STRATA					Instrument/ Backfill
Depth & (Core Ø)	TCR (SCR) RQD	Fracture Index		Reduced Level	Legend	Depth (Thickness)	Description: Discontinuity Detail	Description: Main	
		PIT					0.00-1.20m ... inspection pit.	(1) MADE GROUND (Colliery waste and brown clay. Driller notes layer is compact).	
		RO				(8.90)	1.20-30.00m ... rotary openhole drilling.		

Drilling Progress and Water Observations			
Date	Depth	Casing	Water Standing
05/06/2020	0.00	0.00	

Standard Penetration Test		
Depth	Type	Result
3.00	C	N12
5.70	C	N26

Flush		
From - To	Type	Returns (%)
1.20 - 3.00	Air	100
3.00 - 5.70	Air	100
5.70 - 8.70	Air/Mist	100

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.
(3) Water strike at 5.70m and 14.90m BGL.
(4) 50mm diameter slotted standpipe installed between 1.00-4.00m BGL.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: N.V	Logged by: N/A	Contract No. **4250**

Print Date and Time: 04/08/2020 09:53:54

ALLIED EXPLORATION & GEOTECHNICS LIMITED

Head Office: Unit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RG **Tel:** 0191 387 4700 **Fax:** 0191 387 4710
Regional Office: Unit 20 Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL **Tel:** 01772 735 300 **Fax:** 01772 735 999

DRILLHOLE RECORD

Status:- **FINAL**

Project: Barnsley West - Barugh Green Road Roundabout		**Exploratory Hole No.**
Client: JPG (Leeds) Ltd	**Location:** Barugh Green Road, Barnsley E:431537.820 N:407896.964	**BGR_BH101**
Method (Equipment): Rotary Openhole (Comacchio GEO 305)	**Ground Level (m):** 88.334 / **Start Date:** 05/06/2020	**Sheet:** 2 of 4

RUN DETAILS			Water	STRATA					Instrument/ Backfill
Depth & (Core Ø)	TCR (SCR) RQD	Fracture Index		Reduced Level	Legend	Depth (Thickness)	Description: Discontinuity Detail	Description: Main	
				79.43		8.90 (Thickness)		(1) MADE GROUND (Colliery waste and brown clay. Driller notes layer is compact). *(continued)*	
						(1.90)		(1) Grey MUDSTONE.	
				77.53		10.80		(1) Grey SANDSTONE with mudstone interbeds.	
						(7.40)			

Drilling Progress and Water Observations

Date	Depth	Casing	Water Standing

Standard Penetration Test

Depth	Type	Result
8.70	C	76/75mm
11.70	C	100/55mm

Flush

From - To	Type	Returns (%)
8.70 - 11.70	Air/Mist	100
11.70 - 30.00	Air/Mist	100

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.
(3) Water strike at 5.70m and 14.90m BGL.
(4) 50mm diameter slotted standpipe installed between 1.00-4.00m BGL.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: N.V	Logged by: N/A	Contract No. **4250**

Print Date and Time: 04/08/2020 09:53:54

ALLIED EXPLORATION & GEOTECHNICS LIMITED

Head Office: Unit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RG **Tel:** 0191 387 4700 **Fax:** 0191 387 4710
Regional Office: Unit 20 Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL **Tel:** 01772 735 300 **Fax:** 01772 735 999

DRILLHOLE RECORD

Status:- **FINAL**

Project: Barnsley West - Barugh Green Road Roundabout			**Exploratory Hole No.**
Client: JPG (Leeds) Ltd	**Location:** Barugh Green Road, Barnsley E:431537.820 N:407896.964		**BGR_BH101**
Method (Equipment): Rotary Openhole (Comacchio GEO 305)	**Ground Level (m):** 88.334	**Start Date:** 05/06/2020	**Sheet:** 3 of 4

RUN DETAILS				STRATA					
Depth & (Core Ø)	TCR (SCR) RQD	Fracture Index	Water	Reduced Level	Legend	Depth (Thickness)	Description: Discontinuity Detail	Description: Main	Instrument/ Backfill
								(1) Grey SANDSTONE with mudstone interbeds. *(continued)*	
				70.13		18.20			
								(1) Grey MUDSTONE.	
						(3.40)			
				66.73		21.60			
								(1) COAL.	
						(0.70)			
				66.03		22.30			
								(1) Grey SANDSTONE with mudstone interbeds.	

Drilling Progress and Water Observations				Standard Penetration Test			Flush			General Remarks
Date	Depth	Casing	Water Standing	Depth	Type	Result	From - To	Type	Returns (%)	
										(1) Description derived from drillers daily report. (2) Inspection pit dug prior to drilling. (3) Water strike at 5.70m and 14.90m BGL. (4) 50mm diameter slotted standpipe installed between 1.00-4.00m BGL.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: N.V	Logged by: N/A	Contract No. **4250**

Print Date and Time: 04/08/2020 09:53:54

ALLIED EXPLORATION & GEOTECHNICS LIMITED

Head Office: Unit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RG **Tel:** 0191 387 4700 **Fax:** 0191 387 4710
Regional Office: Unit 20 Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL **Tel:** 01772 735 300 **Fax:** 01772 735 999

DRILLHOLE RECORD

Status:- FINAL

Project: Barnsley West - Barugh Green Road Roundabout			**Exploratory Hole No.** BGR_BH101
Client: JPG (Leeds) Ltd	**Location:** Barugh Green Road, Barnsley E:431537.820 N:407896.964		
Method (Equipment): Rotary Openhole (Comacchio GEO 305)	**Ground Level (m):** 88.334	**Start Date:** 05/06/2020	**Sheet:** 4 of 4

RUN DETAILS			Water	STRATA					Instrument/ Backfill
Depth & (Core Ø)	TCR (SCR) RQD	Fracture Index		Reduced Level	Legend	Depth (Thickness)	Description		
							Discontinuity Detail	Main	
						(7.70)		(1) Grey SANDSTONE with mudstone interbeds. *(continued)*	
				58.33		30.00			
								Complete at 30.00m BGL.	

Drilling Progress and Water Observations				Standard Penetration Test			Flush			General Remarks
Date	Depth	Casing	Water Standing	Depth	Type	Result	From - To	Type	Returns (%)	
05/06/2020	30.00	11.50	Dry							(1) Description derived from drillers daily report. (2) Inspection pit dug prior to drilling. (3) Water strike at 5.70m and 14.90m BGL. (4) 50mm diameter slotted standpipe installed between 1.00-4.00m BGL.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: N.V	Logged by: N/A	Contract No. **4250**

Print Date and Time: 04/08/2020 09:53:54

ALLIED EXPLORATION & GEOTECHNICS LIMITED

Head Office: Unit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RG **Tel:** 0191 387 4700 **Fax:** 0191 387 4710
Regional Office: Unit 20 Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL **Tel:** 01772 735 300 **Fax:** 01772 735 999

DRILLHOLE RECORD

Status:- **FINAL**

Project: Barnsley West - Barugh Green Road Roundabout		**Exploratory Hole No.**
Client: JPG (Leeds) Ltd	**Location:** Barugh Green Road, Barnsley E:431528.344 N:407925.762	**BGR_BH102**
Method (Equipment): Rotary Openhole (Comacchio GEO 305)	**Ground Level (m):** 87.748 / **Start Date:** 05/06/2020	**Sheet:** 1 of 3

RUN DETAILS				STRATA					
Depth & (Core Ø)	TCR (SCR) RQD	Fracture Index	Water	Reduced Level	Legend	Depth (Thickness)	Description: Discontinuity Detail	Description: Main	Instrument/ Backfill
		PIT					0.00-1.20m ... inspection pit.	(1) MADE GROUND (Stiff brown gravelly clay with colliery waste).	
		RO				(8.80)	1.20-24.00m ... rotary openhole drilling.		

Drilling Progress and Water Observations			
Date	Depth	Casing	Water Standing
05/06/2020	0.00	0.00	

Standard Penetration Test		
Depth	Type	Result
3.00	C	N35
5.70	C	N32

Flush		
From - To	Type	Returns (%)
1.20 - 3.00	Air	100
3.00 - 5.70	Air	100
5.70 - 8.70	Air	100

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.
(3) 50mm diameter slotted standpipe installed between 4.00-7.00m BGL.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: N.V	Logged by: N/A	Contract No. **4250**

Print Date and Time: 04/08/2020 09:53:56

ALLIED EXPLORATION & GEOTECHNICS LIMITED

Head Office: Unit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RG **Tel:** 0191 387 4700 **Fax:** 0191 387 4710
Regional Office: Unit 20 Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL **Tel:** 01772 735 300 **Fax:** 01772 735 999

DRILLHOLE RECORD

Status:- **FINAL**

Project: Barnsley West - Barugh Green Road Roundabout		**Exploratory Hole No.**
Client: JPG (Leeds) Ltd	**Location:** Barugh Green Road, Barnsley E:431528.344 N:407925.762	**BGR_BH102**
Method (Equipment): Rotary Openhole (Comacchio GEO 305)	**Ground Level (m):** 87.748 / **Start Date:** 05/06/2020	**Sheet:** 2 of 3

RUN DETAILS			Water	STRATA					Instrument/ Backfill
Depth & (Core Ø)	TCR (SCR) RQD	Fracture Index		Reduced Level	Legend	Depth (Thickness)	Description: Discontinuity Detail	Description: Main	
				78.95		8.80		(1) MADE GROUND (Stiff brown gravelly clay with colliery waste). *(continued)*	
						(2.90)		(1) Grey MUDSTONE with sandstone interbeds.	
				76.05		11.70			
						(1.20)		(1) Grey SANDSTONE. (Drillers notes hard).	
				74.85		12.90			
								(1) Grey MUDSTONE with sandstone interbeds.	

Drilling Progress and Water Observations			
Date	Depth	Casing	Water Standing

Standard Penetration Test		
Depth	Type	Result
8.20	C	100/40mm
11.70	C	100/45mm

Flush		
From - To	Type	Returns (%)
8.70 - 11.70	Air	100
11.70 - 24.00	Air/Mist	100

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.
(3) 50mm diameter slotted standpipe installed between 4.00-7.00m BGL.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: N.V	Logged by: N/A	Contract No. **4250**

Print Date and Time: 04/08/2020 09:53:56

ALLIED EXPLORATION & GEOTECHNICS LIMITED

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Regional Office: Unit 20 Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL **Tel:** 01772 735 300 **Fax:** 01772 735 999

DRILLHOLE RECORD

Status:- **FINAL**

Project: Barnsley West - Barugh Green Road Roundabout			**Exploratory Hole No.**
Client: JPG (Leeds) Ltd	**Location:** Barugh Green Road, Barnsley E:431528.344 N:407925.762		**BGR_BH102**
Method (Equipment): Rotary Openhole (Comacchio GEO 305)	**Ground Level (m):** 87.748	**Start Date:** 05/06/2020	**Sheet:** 3 of 3

RUN DETAILS			Water	STRATA					Instrument/ Backfill
Depth & (Core Ø)	TCR (SCR) RQD	Fracture Index		Reduced Level	Legend	Depth (Thickness)	Description		
							Discontinuity Detail	Main	
								(1) Grey MUDSTONE with sandstone interbeds. *(continued)*	
						(11.10)			
				63.75		24.00			

Complete at 24.00m BGL.

Drilling Progress and Water Observations			
Date	Depth	Casing	Water Standing
05/06/2020	24.00	5.50	Dry

Standard Penetration Test		
Depth	Type	Result

Flush		
From - To	Type	Returns (%)

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.
(3) 50mm diameter slotted standpipe installed between 4.00-7.00m BGL.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: N.V	Logged by: N/A	Contract No. **4250**

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DRILLHOLE RECORD

Status:- FINAL

Project: Barnsley West - Barugh Green Road Roundabout			**Exploratory Hole No.** BGR_BH103
Client: JPG (Leeds) Ltd	**Location:** Barugh Green Road, Barnsley E:431527.968 N:407952.126		
Method (Equipment): Rotary Openhole (Comacchio GEO 305)	**Ground Level (m):** 87.204	**Start Date:** 04/06/2020	**Sheet:** 1 of 4

RUN DETAILS			Water	STRATA					Instrument/ Backfill
Depth & (Core Ø)	TCR (SCR) RQD	Fracture Index		Reduced Level	Legend	Depth (Thickness)	Description: Discontinuity Detail	Description: Main	
		PIT				(1.90)	0.00-1.20m ... inspection pit.	(1) Stiff brown gravelly CLAY.	
		RO					1.20-30.00m ... rotary openhole drilling.		
				85.30		1.90		(1) Grey brown MUDSTONE.	
			▼1			(7.90)			

Drilling Progress and Water Observations			
Date	Depth	Casing	Water Standing
04/06/2020	0.00	0.00	

Standard Penetration Test		
Depth	Type	Result
3.00	C	50/75mm
6.00	C	100/50mm

Flush		
From - To	Type	Returns (%)
0.00 - 3.00	Air	100
3.00 - 30.00	Air	100

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.
(3) Water strikes at 5.20m BGL.
(4) 50mm diameter standpipe installed to 7.00m BGL.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: N.V	Logged by: N/A	Contract No. **4250**

Print Date and Time: 04/08/2020 09:53:59

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DRILLHOLE RECORD

Status:- **FINAL**

Project: Barnsley West - Barugh Green Road Roundabout			**Exploratory Hole No.**
Client: JPG (Leeds) Ltd	**Location:** Barugh Green Road, Barnsley E:431527.968 N:407952.126		**BGR_BH103**
Method (Equipment): Rotary Openhole (Comacchio GEO 305)	**Ground Level (m):** 87.204	**Start Date:** 04/06/2020	**Sheet:** 2 of 4

RUN DETAILS				STRATA					
Depth & (Core Ø)	TCR (SCR) RQD	Fracture Index	Water	Reduced Level	Legend	Depth (Thickness)	Description: Discontinuity Detail	Description: Main	Instrument/ Backfill
								(1) Grey brown MUDSTONE. *(continued)*	
				77.40		9.80			
				77.20		10.00		(1) Grey SANDSTONE.	
				77.10		10.10		(1) COAL.	
								(1) Grey MUDSTONE with sandstone interbeds.	
						(7.60)			

Drilling Progress and Water Observations			
Date	Depth	Casing	Water Standing

Standard Penetration Test		
Depth	Type	Result

Flush		
From - To	Type	Returns (%)

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.
(3) Water strikes at 5.20m BGL.
(4) 50mm diameter standpipe installed to 7.00m BGL.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: N.V	Logged by: N/A	Contract No. **4250**

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DRILLHOLE RECORD

Status:- FINAL

Project: Barnsley West - Barugh Green Road Roundabout			**Exploratory Hole No.** BGR_BH103
Client: JPG (Leeds) Ltd	**Location:** Barugh Green Road, Barnsley E:431527.968 N:407952.126		
Method (Equipment): Rotary Openhole (Comacchio GEO 305)	**Ground Level (m):** 87.204	**Start Date:** 04/06/2020	**Sheet:** 3 of 4

RUN DETAILS			Water	STRATA					Instrument/ Backfill
Depth & (Core Ø)	TCR (SCR) RQD	Fracture Index		Reduced Level	Legend	Depth (Thickness)	Description: Discontinuity Detail	Description: Main	
								(1) Grey MUDSTONE with sandstone interbeds. *(continued)*	
				69.50		17.70			
								(1) Grey SANDSTONE.	
						(0.90)			
				68.60		18.60			
								(1) Grey MUDSTONE with sandstone interbeds.	
						(6.70)			

Drilling Progress and Water Observations				Standard Penetration Test			Flush			General Remarks
Date	Depth	Casing	Water Standing	Depth	Type	Result	From - To	Type	Returns (%)	
										(1) Description derived from drillers daily report. (2) Inspection pit dug prior to drilling. (3) Water strikes at 5.20m BGL. (4) 50mm diameter standpipe installed to 7.00m BGL.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: N.V	Logged by: N/A	Contract No. **4250**

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DRILLHOLE RECORD

Status:- FINAL

Project: Barnsley West - Barugh Green Road Roundabout			**Exploratory Hole No.** BGR_BH103
Client: JPG (Leeds) Ltd	**Location:** Barugh Green Road, Barnsley E:431527.968 N:407952.126		
Method (Equipment): Rotary Openhole (Comacchio GEO 305)	**Ground Level (m):** 87.204	**Start Date:** 04/06/2020	**Sheet:** 4 of 4

RUN DETAILS			Water	STRATA					Instrument/ Backfill
Depth & (Core Ø)	TCR (SCR) RQD	Fracture Index		Reduced Level	Legend	Depth (Thickness)	Description: Discontinuity Detail	Description: Main	
				61.90		25.30		(1) Grey MUDSTONE with sandstone interbeds. *(continued)*	
				59.40		(2.50) 27.80		(1) Grey SANDSTONE with thin coal lenses.	
				57.20		(2.20) 30.00		(1) Grey SANDSTONE.	
								Complete at 30.00m BGL.	

Drilling Progress and Water Observations				Standard Penetration Test			Flush			General Remarks
Date	Depth	Casing	Water Standing	Depth	Type	Result	From - To	Type	Returns (%)	
04/06/2020	30.00	3.00	17.80							(1) Description derived from drillers daily report. (2) Inspection pit dug prior to drilling. (3) Water strikes at 5.20m BGL. (4) 50mm diameter standpipe installed to 7.00m BGL.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: N.V	Logged by: N/A	Contract No. **4250**

Print Date and Time: 04/08/2020 09:53:59

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DRILLHOLE RECORD

Status:- **FINAL**

Project: Barnsley West - Barugh Green Road Roundabout		**Exploratory Hole No.**
Client: JPG (Leeds) Ltd	**Location:** Barugh Green Road, Barnsley E:431548.040 N:407948.524	**BGR_BH104**
Method (Equipment): Rotary Openhole (Comacchio GEO 305)	**Ground Level (m):** 86.125 / **Start Date:** 08/06/2020	**Sheet:** 1 of 3

RUN DETAILS			Water	STRATA					Instrument/ Backfill
Depth & (Core Ø)	TCR (SCR) RQD	Fracture Index		Reduced Level	Legend	Depth (Thickness)	Description: Discontinuity Detail	Description: Main	
		PIT					0.00-1.20m ... inspection pit.	(1) Grass over stiff brown gravelly CLAY.	
						(1.70)			
		RO					1.20-24.00m ... rotary openhole drilling.		
				84.43		1.70			
								(1) Grey brown MUDSTONE. (Driller notes weathered).	
			1			(7.10)			

Drilling Progress and Water Observations			
Date	Depth	Casing	Water Standing
08/06/2020	0.00	0.00	

Standard Penetration Test		
Depth	Type	Result
3.00	C	100/30mm

Flush		
From - To	Type	Returns (%)
1.20 - 3.00	Air	100
3.00 - 6.00	Air	100
6.00 - 24.00	Water	100

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.
(3) Water strikes at 4.80m BGL.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: N.V	Logged by: N/A	Contract No. **4250**

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DRILLHOLE RECORD

Status:- FINAL

Project: Barnsley West - Barugh Green Road Roundabout			**Exploratory Hole No.** BGR_BH104
Client: JPG (Leeds) Ltd	**Location:** Barugh Green Road, Barnsley E:431548.040 N:407948.524		
Method (Equipment): Rotary Openhole (Comacchio GEO 305)	**Ground Level (m):** 86.125	**Start Date:** 08/06/2020	**Sheet:** 2 of 3

RUN DETAILS			Water	STRATA					Instrument/ Backfill
Depth & (Core Ø)	TCR (SCR) RQD	Fracture Index		Reduced Level	Legend	Depth (Thickness)	Description: Discontinuity Detail	Description: Main	
				77.33		8.80		(1) Grey brown MUDSTONE. (Driller notes weathered). *(continued)*	
				77.03		9.10		(1) COAL.	
						(3.70)		(1) Grey MUDSTONE.	
				73.33		12.80			
						(1.00)		(1) Grey SANDSTONE. (Driller notes layer is hard).	
				72.33		13.80			
						(2.90)		(1) Grey MUDSTONE.	

Drilling Progress and Water Observations				Standard Penetration Test			Flush			General Remarks
Date	Depth	Casing	Water Standing	Depth	Type	Result	From - To	Type	Returns (%)	
										(1) Description derived from drillers daily report. (2) Inspection pit dug prior to drilling. (3) Water strikes at 4.80m BGL.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: N.V	Logged by: N/A	Contract No. **4250**

Print Date and Time: 04/08/2020 09:54:02

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DRILLHOLE RECORD

Status:- FINAL

Project: Barnsley West - Barugh Green Road Roundabout		**Exploratory Hole No.** BGR_BH104
Client: JPG (Leeds) Ltd	**Location:** Barugh Green Road, Barnsley E:431548.040 N:407948.524	
Method (Equipment): Rotary Openhole (Comacchio GEO 305)	**Ground Level (m):** 86.125 / **Start Date:** 08/06/2020	**Sheet:** 3 of 3

RUN DETAILS			Water	STRATA					Instrument/ Backfill
Depth & (Core Ø)	TCR (SCR) RQD	Fracture Index		Reduced Level	Legend	Depth (Thickness)	Description: Discontinuity Detail	Description: Main	
				69.43		16.70		(1) Grey MUDSTONE. *(continued)*	
				69.03		(0.40) 17.10		(1) Grey SANDSTONE. (Driller notes layer is hard).	
				68.33		(0.70) 17.80		(1) Grey MUDSTONE.	
				62.13		(6.20) 24.00		(1) Grey SANDSTONE with mudstone interbeds.	

Complete at 24.00m BGL.

Drilling Progress and Water Observations				Standard Penetration Test			Flush			General Remarks
Date	Depth	Casing	Water Standing	Depth	Type	Result	From - To	Type	Returns (%)	
08/06/2020	24.00	6.00	0.00							(1) Description derived from drillers daily report. (2) Inspection pit dug prior to drilling. (3) Water strikes at 4.80m BGL.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: N.V	Logged by: N/A	Contract No. **4250**

Print Date and Time: 04/08/2020 09:54:02

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DRILLHOLE RECORD

Status:- FINAL

Project: Barnsley West - Barugh Green Road Roundabout			**Exploratory Hole No.** BGR_BH105
Client: JPG (Leeds) Ltd	**Location:** Barugh Green Road, Barnsley E:431510.283 N:407956.089		
Method (Equipment): Rotary Openhole (Comacchio GEO 305)	**Ground Level (m):** 87.932	**Start Date:** 09/06/2020	**Sheet:** 1 of 3

RUN DETAILS			Water	STRATA					Instrument/ Backfill
Depth & (Core Ø)	TCR (SCR) RQD	Fracture Index		Reduced Level	Legend	Depth (Thickness)	Description: Discontinuity Detail	Description: Main	
		PIT				(1.40)	0.00-1.20m ... inspection pit.	(1) Stiff brown gravelly CLAY.	
		RO		86.53		1.40	1.20-24.00m ... rotary openhole drilling.		
				86.23		1.70		(1) Grey clayey MUDSTONE. (Driller notes layer is weathered).	
				85.73		(0.50) 2.20		(1) COAL.	
								(1) Grey MUDSTONE.	
			1			(5.00)			
				80.73		7.20			
				80.53		7.40		(1) COAL.	
								(1) Grey MUDSTONE with sandstone interbeds.	

Drilling Progress and Water Observations			
Date	Depth	Casing	Water Standing
09/06/2020	0.00	0.00	

Standard Penetration Test		
Depth	Type	Result
3.00	C	100/42mm

Flush		
From - To	Type	Returns (%)
1.20 - 3.00	Air	100
3.00 - 24.00	Air	100

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.
(3) Water strikes at 5.00m BGL.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: N.V	Logged by: N/A	Contract No. **4250**

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DRILLHOLE RECORD

Status:- FINAL

Project: Barnsley West - Barugh Green Road Roundabout			**Exploratory Hole No.** BGR_BH105
Client: JPG (Leeds) Ltd	**Location:** Barugh Green Road, Barnsley E:431510.283 N:407956.089		
Method (Equipment): Rotary Openhole (Comacchio GEO 305)	**Ground Level (m):** 87.932	**Start Date:** 09/06/2020	**Sheet:** 2 of 3

RUN DETAILS			Water	STRATA					Instrument/ Backfill
Depth & (Core Ø)	TCR (SCR) RQD	Fracture Index		Reduced Level	Legend	Depth (Thickness)	Description		
							Discontinuity Detail	Main	
						(10.60)		(1) Grey MUDSTONE with sandstone interbeds. *(continued)*	

Drilling Progress and Water Observations				Standard Penetration Test			Flush			General Remarks
Date	Depth	Casing	Water Standing	Depth	Type	Result	From - To	Type	Returns (%)	
										(1) Description derived from drillers daily report. (2) Inspection pit dug prior to drilling. (3) Water strikes at 5.00m BGL.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: N.V	Logged by: N/A	Contract No. **4250**

Print Date and Time: 04/08/2020 09:54:05

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DRILLHOLE RECORD

Status:- FINAL

Project: Barnsley West - Barugh Green Road Roundabout			**Exploratory Hole No.** BGR_BH105
Client: JPG (Leeds) Ltd	**Location:** Barugh Green Road, Barnsley E:431510.283 N:407956.089		
Method (Equipment): Rotary Openhole (Comacchio GEO 305)	**Ground Level (m):** 87.932	**Start Date:** 09/06/2020	**Sheet:** 3 of 3

RUN DETAILS			Water	STRATA					Instrument/ Backfill
Depth & (Core Ø)	TCR (SCR) RQD	Fracture Index		Reduced Level	Legend	Depth (Thickness)	Description		
							Discontinuity Detail	Main	
								(1) Grey MUDSTONE with sandstone interbeds. *(continued)*	
				69.93		18.00			
								(1) Grey fine grained SANDSTONE. (Driller notes layer is very hard).	
						(2.40)			
				67.53		20.40			
								(1) Grey MUDSTONE.	
						(3.60)			
				63.93		24.00			

Complete at 24.00m BGL.

Drilling Progress and Water Observations			
Date	Depth	Casing	Water Standing
09/06/2020	24.00	3.00	17.10

Standard Penetration Test		
Depth	Type	Result

Flush		
From - To	Type	Returns (%)

General Remarks

(1) Description derived from drillers daily report.
(2) Inspection pit dug prior to drilling.
(3) Water strikes at 5.00m BGL.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: N.V	Logged by: N/A	Contract No. **4250**

Print Date and Time: 04/08/2020 09:54:05

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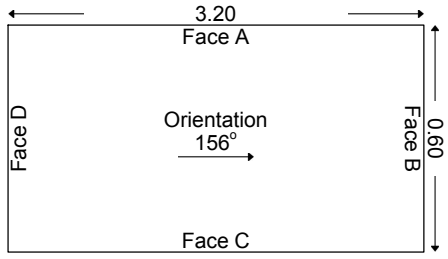
TRIAL PIT RECORD

Status:- **FINAL**

Project: Barnsley West - Barugh Green Road Roundabout			**Exploratory Hole No.**
Client: JPG (Leeds) Ltd	**Location:** Barugh Green Road, Barnsley E:431537.479 N:407893.001		**BGR_TP101**
Method (Equipment): Machine Excavated (JCB 3CX)	**Ground Level (m):** 88.480	**Start Date:** 10/06/2020	**Sheet:** 1 of 4

SAMPLES & TESTS			Water	STRATA			
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	Description
0.10 0.20 0.30	J1 ES2 LB3			87.98		(0.50) 0.50	MADE GROUND (Topsoil consisting of soft light brown sandy slightly gravelly clay with many rootlets. Sand is fine to medium. Gravel is fine subangular and includes tile, brick, sandstone and mudstone). between c.0.00-0.50m BGL ... too gravelly for HSV.
1.00 1.20 1.50	J4 ES5 LB6		1			(2.90)	MADE GROUND (Soft and firm grey slightly sandy slightly gravelly clay with cobbles. Sand is fine to coarse. Gravel is fine to coarse subangular to angular and includes sandstone, mudstone, coal and brick. Cobbles are subangular and include mudstone and sandstone). between c.0.50-3.40m BGL ... no suitable sized material for HSV. at c.1.50m BGL ... with interbeds of clayey sandy gravel sized mudstone. at c.1.90m BGL ... sandstone boulder in Face D and A of pit.
				85.08		3.40	*Terminated at 3.40m BGL - due to boulder obstruction.*

PLAN



GROUNDWATER
Water strike at 3.30m BGL (Moderate Inflow). Water level at 3.30mBGL at end of excavation.

STABILITY
Pit sides and base moderately stable throughout excavation.

ADDITIONAL INFORMATION

Sketch Diagram:	No Sketch Taken	
Photographs:	Yes	See additional sheets.

GENERAL REMARKS
(1) Boulder noted in Face D obstructing excavation extending to scheduled depth.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: *N.V*	Logged by: J. Myall	Contract No. **4250**

Print Date and Time: 04/08/2020 09:54:24

ALLIED EXPLORATION & GEOTECHNICS LIMITED

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TRIAL PIT RECORD

Status:- FINAL

Project: Barnsley West - Barugh Green Road Roundabout			**Exploratory Hole No.** BGR_TP101
Client: JPG (Leeds) Ltd	**Location:** Barugh Green Road, Barnsley E:431537.479 N:407893.001		
Method (Equipment): Machine Excavated (JCB 3CX)	**Ground Level (m):** 88.480	**Start Date:** 10/06/2020	**Sheet:** 2 of 4

Figure BGR_TP101.1
Before Investigation Works

Figure BGR_TP101.2
Short Face

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TRIAL PIT RECORD

Status:- FINAL

Project: Barnsley West - Barugh Green Road Roundabout			**Exploratory Hole No.** BGR_TP101
Client: JPG (Leeds) Ltd	**Location:** Barugh Green Road, Barnsley E:431537.479 N:407893.001		
Method (Equipment): Machine Excavated (JCB 3CX)	**Ground Level (m):** 88.480	**Start Date:** 10/06/2020	**Sheet:** 3 of 4

Figure BGR_TP101.3
Long Face

Figure BGR_TP101.4
Spoil

ALLIED EXPLORATION & GEOTECHNICS LIMITED

Head Office: Unit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RG **Tel:** 0191 387 4700 **Fax:** 0191 387 4710
Regional Office: Unit 20 Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL **Tel:** 01772 735 300 **Fax:** 01772 735 999

TRIAL PIT RECORD

Status:- FINAL

Project: Barnsley West - Barugh Green Road Roundabout			**Exploratory Hole No.** BGR_TP101
Client: JPG (Leeds) Ltd	**Location:** Barugh Green Road, Barnsley E:431537.479 N:407893.001		
Method (Equipment): Machine Excavated (JCB 3CX)	**Ground Level (m):** 88.480	**Start Date:** 10/06/2020	**Sheet:** 4 of 4

Figure BGR_TP101.5
Spoil

Figure BGR_TP101.6
Reinstatement

ALLIED EXPLORATION & GEOTECHNICS LIMITED

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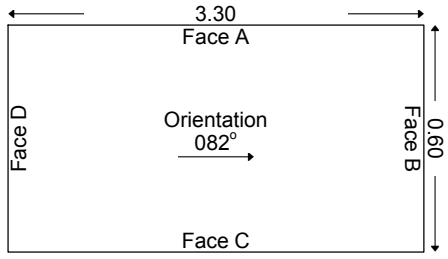
TRIAL PIT RECORD

Status:- FINAL

Project: Barnsley West - Barugh Green Road Roundabout			**Exploratory Hole No.** BGR_TP102
Client: JPG (Leeds) Ltd	**Location:** Barugh Green Road, Barnsley E:431534.224 N:407925.330		
Method (Equipment): Machine Excavated (JCB 3CX)	**Ground Level (m):** 87.458	**Start Date:** 10/06/2020	**Sheet:** 1 of 4

SAMPLES & TESTS			Water	STRATA			
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	Description
0.10 0.20 0.30	J1 ES2 LB3			87.06		(0.40) 0.40	MADE GROUND (Topsoil consisting of soft light brown sandy slightly gravelly clay with many rootlets. Sand is fine to medium. Gravel is fine subangular and includes tile, brick, sandstone and mudstone). between c.0.00-0.40m BGL ... too gravelly for HSV.
							MADE GROUND (Soft and firm grey slightly sandy gravelly clay with low cobble content. Sand is fine to coarse. Gravel is fine to coarse subangular to angular and includes sandstone, mudstone, coal and brick. Cobbles are subangular and include mudstone and sandstone). between c.0.40-3.40m BGL ... no suitable sized material for HSV.
2.00	J4					(3.00)	
2.50	ES5						
3.00	LB6		▼1	84.06		3.40	
							Complete at 3.40m BGL.

PLAN



GROUNDWATER
Water strike at 3.10m BGL (Slight Inflow). Water level at base at end of excavation.

STABILITY
Pit sides and base moderately stable throughout excavation.

ADDITIONAL INFORMATION

Sketch Diagram:	No Sketch Taken	
Photographs:	Yes	See additional sheets.

GENERAL REMARKS

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: *N.V*	Logged by: J. Myall	Contract No. **4250**

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ALLIED EXPLORATION & GEOTECHNICS LIMITED

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TRIAL PIT RECORD

Status:- FINAL

Project: Barnsley West - Barugh Green Road Roundabout			**Exploratory Hole No.** BGR_TP102
Client: JPG (Leeds) Ltd	**Location:** Barugh Green Road, Barnsley E:431534.224 N:407925.330		
Method (Equipment): Machine Excavated (JCB 3CX)	**Ground Level (m):** 87.458	**Start Date:** 10/06/2020	**Sheet:** 2 of 4

Figure BGR_TP102.1
Before Investigation Works

Figure BGR_TP102.2
Short Face

ALLIED EXPLORATION & GEOTECHNICS LIMITED

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TRIAL PIT RECORD

Status:- FINAL

Project: Barnsley West - Barugh Green Road Roundabout			**Exploratory Hole No.** BGR_TP102
Client: JPG (Leeds) Ltd	**Location:** Barugh Green Road, Barnsley E:431534.224 N:407925.330		
Method (Equipment): Machine Excavated (JCB 3CX)	**Ground Level (m):** 87.458	**Start Date:** 10/06/2020	**Sheet:** 3 of 4

Figure BGR_TP102.3
Long Face

Figure BGR_TP102.4
Spoil

ALLIED EXPLORATION & GEOTECHNICS LIMITED

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TRIAL PIT RECORD

Status:- FINAL

Project: Barnsley West - Barugh Green Road Roundabout			**Exploratory Hole No.** BGR_TP102
Client: JPG (Leeds) Ltd	**Location:** Barugh Green Road, Barnsley E:431534.224 N:407925.330		
Method (Equipment): Machine Excavated (JCB 3CX)	**Ground Level (m):** 87.458	**Start Date:** 10/06/2020	**Sheet:** 4 of 4

Figure BGR_TP102.5
Spoil

Figure BGR_TP102.6
Reinstatement

ALLIED EXPLORATION & GEOTECHNICS LIMITED

Head Office: Unit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RG **Tel:** 0191 387 4700 **Fax:** 0191 387 4710
Regional Office: Unit 20 Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL **Tel:** 01772 735 300 **Fax:** 01772 735 999

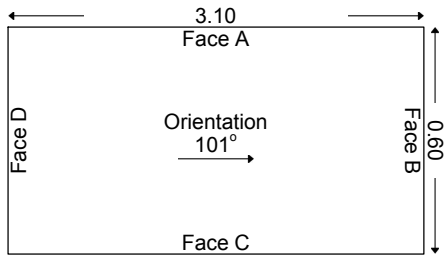
TRIAL PIT RECORD

Status:- **FINAL**

Project: Barnsley West - Barugh Green Road Roundabout			**Exploratory Hole No.**
Client: JPG (Leeds) Ltd	**Location:** Barugh Green Road, Barnsley E:431544.182 N:407937.792		**BGR_TP103**
Method (Equipment): Machine Excavated (JCB 3CX)	**Ground Level (m):** 86.671	**Start Date:** 10/06/2020	**Sheet:** 1 of 4

SAMPLES & TESTS			Water	STRATA			
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	Description
0.10	J1			86.47		0.20	MADE GROUND (Topsoil consisting of soft light brown sandy slightly gravelly clay with many rootlets. Sand is fine to medium. Gravel is fine subangular and includes tile, brick, sandstone and mudstone). between c.0.00-0.20m BGL ... too gravelly for HSV.
0.15	ES2						
0.20	LB3			86.17		0.50	
0.40	ES4						MADE GROUND (Soft and firm grey slightly sandy gravelly clay with low cobble content. Sand is fine to coarse. Gravel is fine to coarse subangular to angular and includes sandstone, mudstone, coal and brick. Cobbles are subangular and include mudstone and sandstone).
1.00	J5					(1.50)	
1.50	LB6						between c.0.20-2.00m BGL ... no suitable sized material for HSV.
				84.67		2.00	Firm orange mottled grey slightly sandy slightly gravelly CLAY of intermediate plasticity with low cobble content. Sand is fine to medium. Gravel is fine subangular and includes sandstone and mudstone. Cobbles are subangular and include sandstone.
						(0.50)	
				84.17		2.50	Extremely weak grey and black thinly laminated MUDSTONE residual. (Recovered as clayey fine to coarse gravel. Gravel is fine to coarse angular).
							Complete at 2.50m BGL.

PLAN



GROUNDWATER
No groundwater inflow observed.

STABILITY
Pit sides and base moderately stable throughout excavation.

ADDITIONAL INFORMATION

Sketch Diagram:	No Sketch Taken	
Photographs:	Yes	See additional sheets.

GENERAL REMARKS

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: N.V	Logged by: J. Myall	Contract No. **4250**

Print Date and Time: 04/08/2020 09:54:35

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Regional Office: Unit 20 Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL **Tel:** 01772 735 300 **Fax:** 01772 735 999

TRIAL PIT RECORD

Status:- FINAL

Project: Barnsley West - Barugh Green Road Roundabout			**Exploratory Hole No.** BGR_TP103
Client: JPG (Leeds) Ltd	**Location:** Barugh Green Road, Barnsley E:431544.182 N:407937.792		
Method (Equipment): Machine Excavated (JCB 3CX)	**Ground Level (m):** 86.671	**Start Date:** 10/06/2020	**Sheet:** 2 of 4

Figure BGR_TP103.1
Before Investigation Works

Figure BGR_TP103.2
Short Face

ALLIED EXPLORATION & GEOTECHNICS LIMITED

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Regional Office: Unit 20 Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL **Tel:** 01772 735 300 **Fax:** 01772 735 999

TRIAL PIT RECORD

Status:- FINAL

Project: Barnsley West - Barugh Green Road Roundabout			**Exploratory Hole No.** BGR_TP103
Client: JPG (Leeds) Ltd	**Location:** Barugh Green Road, Barnsley E:431544.182 N:407937.792		
Method (Equipment): Machine Excavated (JCB 3CX)	**Ground Level (m):** 86.671	**Start Date:** 10/06/2020	**Sheet:** 3 of 4

Figure BGR_TP103.3
Long Face

Figure BGR_TP103.4
Spoil

ALLIED EXPLORATION & GEOTECHNICS LIMITED

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TRIAL PIT RECORD

Status:- FINAL

Project: Barnsley West - Barugh Green Road Roundabout			**Exploratory Hole No.** BGR_TP103
Client: JPG (Leeds) Ltd	**Location:** Barugh Green Road, Barnsley E:431544.182 N:407937.792		
Method (Equipment): Machine Excavated (JCB 3CX)	**Ground Level (m):** 86.671	**Start Date:** 10/06/2020	**Sheet:** 4 of 4

Figure BGR_TP103.5
Spoil

Figure BGR_TP103.6
Reinstatement

ALLIED EXPLORATION & GEOTECHNICS LIMITED

Head Office: Unit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RG **Tel:** 0191 387 4700 **Fax:** 0191 387 4710
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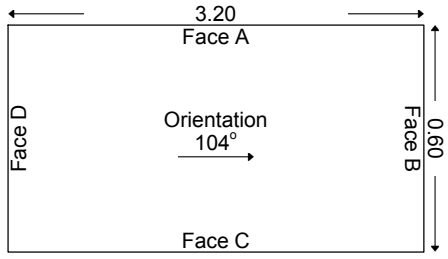
TRIAL PIT RECORD

Status:- **FINAL**

Project: Barnsley West - Barugh Green Road Roundabout			**Exploratory Hole No.**
Client: JPG (Leeds) Ltd	**Location:** Barugh Green Road, Barnsley E:431521.063 N:407939.528		**BGR_TP104**
Method (Equipment): Machine Excavated (JCB 3CX)	**Ground Level (m):** 87.753	**Start Date:** 10/06/2020	**Sheet:** 1 of 5

SAMPLES & TESTS			Water	STRATA			
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	Description
0.05	ES1			87.65		0.10	MADE GROUND (Topsoil consisting of soft light brown sandy slightly gravelly clay with many rootlets. Sand is fine to medium. Gravel is fine subangular and includes tile, brick, sandstone and mudstone).
0.20	ES2			87.35		0.40	between c.0.00-0.40m BGL ... too gravelly for HSV.
1.00	J3					(1.50)	MADE GROUND (Soft and firm grey slightly sandy gravelly clay with low cobble content. Sand is fine to coarse. Gravel is fine to coarse subangular to angular and includes sandstone, mudstone, coal and brick. Cobbles are subangular and include mudstone and sandstone). FACE A - Stratum extends to 1.30m BGL.
1.50	LB4			85.85		1.90	Firm orange mottled grey slightly sandy slightly gravelly CLAY of intermediate plasticity with low cobble content. Sand is fine to medium. Gravel is fine subangular and includes sandstone and mudstone. Cobbles are subangular and include sandstone.
2.00	J5					(0.80)	FACE A - Stratum starts at 1.30m BGL. between c.0.40-1.90m BGL ... no suitable sized material for HSV.
2.50	LB6			85.05		2.70	Extremely weak grey and black thinly laminated MUDSTONE residual. (Recovered as clayey fine to coarse angular gravel). *Complete at 2.70m BGL.*

PLAN



GROUNDWATER
No groundwater inflow observed.

STABILITY
Pit sides and base moderately stable throughout excavation.

ADDITIONAL INFORMATION

Sketch Diagram:	Sketch Taken	
Photographs:	Yes	See additional sheets.

GENERAL REMARKS
(1) Samples taken from Face C of the pit.

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: N.V	Logged by: J. Myall	Contract No. **4250**

Print Date and Time: 04/08/2020 09:54:40

ALLIED EXPLORATION & GEOTECHNICS LIMITED

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Regional Office: Unit 20 Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL **Tel:** 01772 735 300 **Fax:** 01772 735 999

TRIAL PIT RECORD

Status:- **FINAL**

Project: Barnsley West - Barugh Green Road Roundabout			**Exploratory Hole No.** BGR_TP104
Client: JPG (Leeds) Ltd	**Location:** Barugh Green Road, Barnsley E:431521.063 N:407939.528		
Method (Equipment): Machine Excavated (JCB 3CX)	**Ground Level (m):** 87.753	**Start Date:** 10/06/2020	**Sheet:** 2 of 5

Figure BGR_TP104.1
Before Investigation Works

Figure BGR_TP104.2
Short Face

ALLIED EXPLORATION & GEOTECHNICS LIMITED

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TRIAL PIT RECORD

Status:- FINAL

Project: Barnsley West - Barugh Green Road Roundabout			**Exploratory Hole No.** BGR_TP104
Client: JPG (Leeds) Ltd	**Location:** Barugh Green Road, Barnsley E:431521.063 N:407939.528		
Method (Equipment): Machine Excavated (JCB 3CX)	**Ground Level (m):** 87.753	**Start Date:** 10/06/2020	**Sheet:** 3 of 5

Figure BGR_TP104.3
Long Face

Figure BGR_TP104.4
Spoil

ALLIED EXPLORATION & GEOTECHNICS LIMITED

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TRIAL PIT RECORD

Status:- FINAL

Project: Barnsley West - Barugh Green Road Roundabout			**Exploratory Hole No.** BGR_TP104
Client: JPG (Leeds) Ltd	**Location:** Barugh Green Road, Barnsley E:431521.063 N:407939.528		
Method (Equipment): Machine Excavated (JCB 3CX)	**Ground Level (m):** 87.753	**Start Date:** 10/06/2020	**Sheet:** 4 of 5

Figure BGR_TP104.5
Spoil

Figure BGR_TP104.6
Reinstatement

ALLIED EXPLORATION & GEOTECHNICS LIMITED

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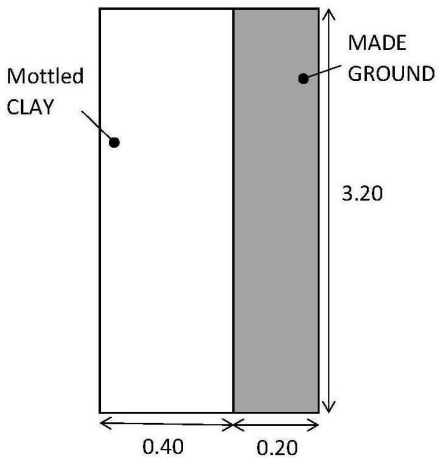
TRIAL PIT RECORD

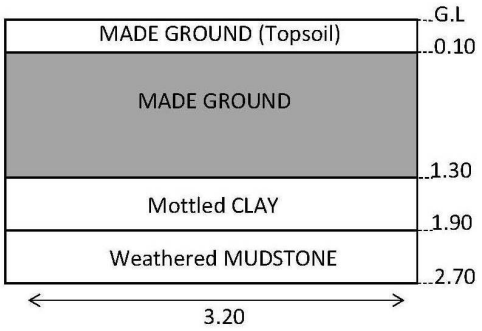
Status:- FINAL

Project: Barnsley West - Barugh Green Road Roundabout			**Exploratory Hole No.** BGR_TP104
Client: JPG (Leeds) Ltd	**Location:** Barugh Green Road, Barnsley E:431521.063 N:407939.528		
Method (Equipment): Machine Excavated (JCB 3CX)	**Ground Level (m):** 87.753	**Start Date:** 10/06/2020	**Sheet:** 5 of 5

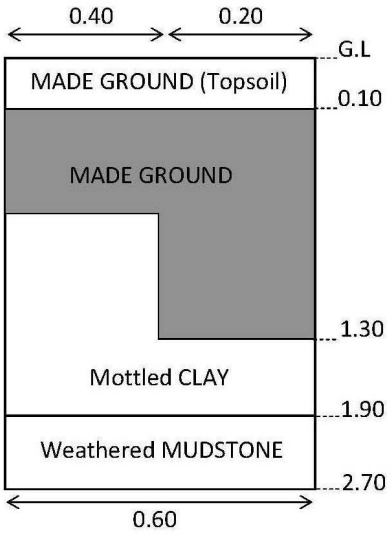
Plan View



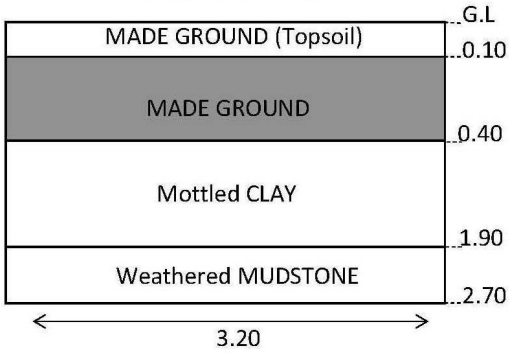
Cross-Section – Face A



Cross-Section – Face D



Cross-Section – Face C



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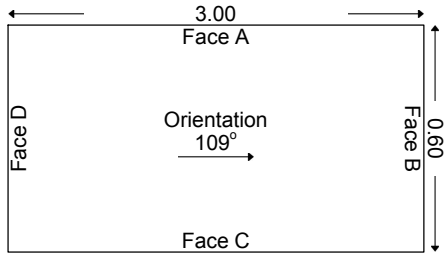
TRIAL PIT RECORD

Status:- **FINAL**

Project: Barnsley West - Barugh Green Road Roundabout			**Exploratory Hole No.**
Client: JPG (Leeds) Ltd	**Location:** Barugh Green Road, Barnsley E:431500.846 N:407951.961		**BGR_TP105**
Method (Equipment): Machine Excavated (JCB 3CX)	**Ground Level (m):** 88.426	**Start Date:** 10/06/2020	**Sheet:** 1 of 4

SAMPLES & TESTS			Water	STRATA			
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thickness)	Description
0.10 0.20 0.40 0.50	ES1 ES2 J3 LB4			88.28		0.15 (0.75)	MADE GROUND (Topsoil consisting of soft light brown sandy slightly gravelly clay with many rootlets. Sand is fine to medium. Gravel is fine subangular and includes tile, brick, sandstone and mudstone). between c.0.00-0.40m BGL ... too gravelly for HSV.
				87.53		0.90	MADE GROUND (Soft and firm grey slightly sandy gravelly clay with cobbles. Sand is fine to coarse. Gravel is fine to coarse subangular to angular and includes sandstone, mudstone, coal and brick. Cobbles are subangular and include mudstone and sandstone). between c.0.40-1.90m BGL ... no suitable sized material for HSV.
1.50 2.00	J5 LB6					(1.60)	Firm grey slightly sandy gravelly CLAY of intermediate plasticity with occasional partially decomposed plant matter. Sand is fine to coarse. Gravel is fine to coarse angular and includes mudstone. between c.0.90-1.70m BGL ... coal in gravel component of clay.
				85.93		2.50	
				85.73		2.70	Extremely weak grey and black thinly laminated MUDSTONE residual. (Recovered as fine to coarse angular gravel). *Complete at 2.70m BGL.*

PLAN



GROUNDWATER
No groundwater inflow observed.

STABILITY
Pit sides and base moderately stable throughout excavation.

ADDITIONAL INFORMATION

Sketch Diagram:	No Sketch Taken	
Photographs:	Yes	See additional sheets.

GENERAL REMARKS

All dimensions in metres Scale 1:50	For explanation of symbols and abbreviations see Key Sheets	Checked by: *N.V*	Logged by: J. Myall	Contract No. **4250**

Print Date and Time: 04/08/2020 09:54:49

ALLIED EXPLORATION & GEOTECHNICS LIMITED

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Regional Office: Unit 20 Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL **Tel:** 01772 735 300 **Fax:** 01772 735 999

TRIAL PIT RECORD

Status:- **FINAL**

Project: Barnsley West - Barugh Green Road Roundabout			**Exploratory Hole No.**
Client: JPG (Leeds) Ltd	**Location:** Barugh Green Road, Barnsley E:431500.846 N:407951.961		**BGR_TP105**
Method (Equipment): Machine Excavated (JCB 3CX)	**Ground Level (m):** 88.426	**Start Date:** 10/06/2020	**Sheet:** 2 of 4

Figure BGR_TP105.1
Before Investigation Works

Figure BGR_TP105.2
Short Face

ALLIED EXPLORATION & GEOTECHNICS LIMITED

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TRIAL PIT RECORD

Status:- FINAL

Project: Barnsley West - Barugh Green Road Roundabout			**Exploratory Hole No.** BGR_TP105
Client: JPG (Leeds) Ltd	**Location:** Barugh Green Road, Barnsley E:431500.846 N:407951.961		
Method (Equipment): Machine Excavated (JCB 3CX)	**Ground Level (m):** 88.426	**Start Date:** 10/06/2020	**Sheet:** 3 of 4

Figure BGR_TP105.3
Long Face

Figure BGR_TP105.4
Spoil

ALLIED EXPLORATION & GEOTECHNICS LIMITED

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TRIAL PIT RECORD

Status:- FINAL

Project: Barnsley West - Barugh Green Road Roundabout			**Exploratory Hole No.** BGR_TP105
Client: JPG (Leeds) Ltd	**Location:** Barugh Green Road, Barnsley E:431500.846 N:407951.961		
Method (Equipment): Machine Excavated (JCB 3CX)	**Ground Level (m):** 88.426	**Start Date:** 10/06/2020	**Sheet:** 4 of 4

Figure BGR_TP105.5
Spoil

Figure BGR_TP105.6
Reinstatement

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	20-10661-3
	28-Jul-20
Client	Allied Exploration & Geotechnics Limited Unit 25 Stella Gill Industrial Estate Pelton Fell DH2 2RG
Our Reference	20-10661-3
Client Reference	4250
Order No	(not supplied)
Contract Title	Barnsley West Roundabout
Description	11 Soil samples, 6 Leachate samples.
Date Received	17-Jun-20
Date Started	17-Jun-20
Date Completed	28-Jul-20
Test Procedures	Identified by prefix DETSn (details on request).
Notes	**This report supersedes 20-10661-3, amendments.** 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

MCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

UKAS TESTING
2139

Summary of Chemical Analysis
Matrix Descriptions

Our Ref 20-10661-3
Client Ref 4250
Contract Title Barnsley West Roundabout

Sample ID	Other ID	Depth	Lab No	Completed	Matrix Description
BGR_TP101	5	1.2	1685126	16/07/2020	Dark brown gravelly, sandy CLAY
BGR_TP102	2	0.2	1685127	16/07/2020	Dark brown gravelly, sandy CLAY including some rootlets
BGR_TP102	5	2.5	1685128	16/07/2020	Dark brown sandy CLAY
BGR_TP103	2	0.15	1685129	16/07/2020	Dark sandy CLAY including some rootlets
BGR_TP104	2	0.2	1685130	16/07/2020	Dark brown gravelly, sandy CLAY
HCR_TP101	1	0.05	1685131	16/07/2020	Dark brown gravelly, very sandy CLAY including some rootlets
HCR_TP102	3	0.3	1685132	16/07/2020	Dark brown sandy CLAY
HCR_TP103	1	0.05	1685133	16/07/2020	Dark brown gravelly, very sandy CLAY
HCR_TP104	5	0.8	1685134	16/07/2020	Dark brown gravelly, sandy CLAY
HCR_TP105	3	0.3	1685135	16/07/2020	Dark brown sandy CLAY

Summary of Chemical Analysis

Soil Samples

Our Ref 20-10661-3
Client Ref 4250
Contract Title Barnsley West Roundabout

			Lab No	1685126	1685127	1685128	1685129
			Sample ID	BGR_TP101	BGR_TP102	BGR_TP102	BGR_TP103
			Depth	1.20	0.20	2.50	0.15
			Other ID	5	2	5	2
			Sample Type	ES	ES	ES	ES
			Sampling Date	10/06/2020	10/06/2020	10/06/2020	10/06/2020
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Metals							
Arsenic	DETSC 2301#	0.2	mg/kg	5.7	7.9	3.6	9.8
Cadmium	DETSC 2301#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	0.1
Chromium	DETSC 2301#	0.15	mg/kg	19	18	12	21
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0			
Copper	DETSC 2301#	0.2	mg/kg	35	35	19	35
Lead	DETSC 2301#	0.3	mg/kg	16	18	9.4	27
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	36	34	24	23
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	97	90	56	81
Inorganics							
pH	DETSC 2008#		pH	7.1	7.1	7.5	6.4
Calorific Value	DETSC 5008	1	MJ/kg	< 1.0			
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	0.1
Organic matter	DETSC 2002#	0.1	%	1.6	1.8	0.8	3.7
Ammoniacal Nitrogen as N	DETSC 2119#	0.5	mg/kg	4.2			
Chloride Aqueous Extract	DETSC 2055	1	mg/l	4.4			
Chloride	DETSC 2055	1	mg/kg				
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	25	27	66	21
Sulphide	DETSC 2024*	10	mg/kg	16			
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.01			
Sulphate as SO4, Total	DETSC 2321#	100	mg/kg				

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 20-10661-3
Client Ref 4250
Contract Title Barnsley West Roundabout

			Lab No	1685126	1685127	1685128	1685129
			Sample ID	BGR_TP101	BGR_TP102	BGR_TP102	BGR_TP103
			Depth	1.20	0.20	2.50	0.15
			Other ID	5	2	5	2
			Sample Type	ES	ES	ES	ES
			Sampling Date	10/06/2020	10/06/2020	10/06/2020	10/06/2020
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
PAHs							
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
PAH Total	DETSC 3301	1.6	mg/kg	< 1.6	< 1.6	< 1.6	< 1.6
Phenols							
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	0.3	< 0.3	0.3
OCPs							
alpha-BHC	DETSC 3441*	0.1	mg/kg		< 0.1		
gamma-BHC (Lindane)	DETSC 3441*	0.1	mg/kg		< 0.1		
beta-BHC	DETSC 3441*	0.1	mg/kg		< 0.1		
delta-BHC	DETSC 3441*	0.1	mg/kg		< 0.1		
Heptachlor	DETSC 3441*	0.1	mg/kg		< 0.1		
Aldrin	DETSC 3441*	0.1	mg/kg		< 0.1		
Heptachlor epoxide	DETSC 3441*	0.1	mg/kg		< 0.1		
gamma-Chlordane	DETSC 3441*	0.1	mg/kg		< 0.1		
Endosulphan I & Alpha-chlorodane	DETSC 3441*	0.1	mg/kg		< 0.1		
4,4-DDE	DETSC 3441*	0.1	mg/kg		< 0.1		
Dieldrin	DETSC 3441*	0.1	mg/kg		< 0.1		
Endrin	DETSC 3441*	0.1	mg/kg		< 0.1		
Endosulphan II & 4,4-DDD	DETSC 3441*	0.1	mg/kg		< 0.1		
Endrin aldehyde	DETSC 3441*	0.1	mg/kg		< 0.1		
4,4-DDT	DETSC 3441*	0.1	mg/kg		< 0.1		
Endosulphan sulphate	DETSC 3441*	0.1	mg/kg		< 0.1		
Methoxychlor	DETSC 3441*	0.1	mg/kg		< 0.1		
Endrin ketone	DETSC 3441*	0.1	mg/kg		< 0.1		
OPPs							

Summary of Chemical Analysis

Soil Samples

Our Ref 20-10661-3
Client Ref 4250
Contract Title Barnsley West Roundabout

			Lab No	1685126	1685127	1685128	1685129
			Sample ID	BGR_TP101	BGR_TP102	BGR_TP102	BGR_TP103
			Depth	1.20	0.20	2.50	0.15
			Other ID	5	2	5	2
			Sample Type	ES	ES	ES	ES
			Sampling Date	10/06/2020	10/06/2020	10/06/2020	10/06/2020
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Dichlorvos	DETSC 3443*	0.1	mg/kg		< 0.1		
Mevinphos	DETSC 3443*	0.1	mg/kg		< 0.1		
Demeton-O	DETSC 3443*	0.1	mg/kg		< 0.1		
Ethoprop	DETSC 3443*	0.1	mg/kg		< 0.1		
Naled	DETSC 3443*	0.1	mg/kg		< 0.1		
Phorate	DETSC 3443*	0.1	mg/kg		< 0.1		
Demeton-S	DETSC 3443*	0.1	mg/kg		< 0.1		
Diazinon	DETSC 3443*	0.1	mg/kg		< 0.1		
Disulfoton	DETSC 3443*	0.1	mg/kg		< 0.1		
Methylparathion	DETSC 3443*	0.1	mg/kg		< 0.1		
Ronnel	DETSC 3443*	0.1	mg/kg		< 0.1		
Fenthion	DETSC 3443*	0.1	mg/kg		< 0.1		
Chlopyrifos	DETSC 3443*	0.1	mg/kg		< 0.1		
Trichlorinate	DETSC 3443*	0.1	mg/kg		< 0.1		
Merphos	DETSC 3443*	0.1	mg/kg		< 0.1		
Stirofos	DETSC 3443*	0.1	mg/kg		< 0.1		
Tokuthion	DETSC 3443*	0.1	mg/kg		< 0.1		
Fensulfothion	DETSC 3443*	0.1	mg/kg		< 0.1		
Bolstar	DETSC 3443*	0.1	mg/kg		< 0.1		
Azinphos methyl	DETSC 3443*	0.1	mg/kg		< 0.1		
Coumaphos	DETSC 3443*	0.1	mg/kg		< 0.1		
Triazines							
Atraton	DETSC 3445*	0.1	mg/kg		< 0.1		
Prometon	DETSC 3445*	0.1	mg/kg		< 0.1		
Simazine	DETSC 3445*	0.1	mg/kg		< 0.1		
Atrazine	DETSC 3445*	0.1	mg/kg		< 0.1		
Propazine	DETSC 3445*	0.1	mg/kg		< 0.1		
Terbuthylazine	DETSC 3445*	0.1	mg/kg		< 0.1		
Secbumeton	DETSC 3445*	0.1	mg/kg		< 0.1		
Symetryn	DETSC 3445*	0.1	mg/kg		< 0.1		
Ametryn	DETSC 3445*	0.1	mg/kg		< 0.1		
Prometryne	DETSC 3445*	0.1	mg/kg		< 0.1		
Terbutryn	DETSC 3445*	0.1	mg/kg		< 0.1		

Summary of Chemical Analysis

Soil Samples

Our Ref 20-10661-3
Client Ref 4250
Contract Title Barnsley West Roundabout

			Lab No	1685130	1685131	1685132	1685133
			Sample ID	BGR_TP104	HCR_TP101	HCR_TP102	HCR_TP103
			Depth	0.20	0.05	0.30	0.05
			Other ID	2	1	3	1
			Sample Type	ES	ES	ES	ES
			Sampling Date	10/06/2020	09/06/2020	09/06/2020	09/06/2020
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Metals							
Arsenic	DETSC 2301#	0.2	mg/kg	8.4	19	18	24
Cadmium	DETSC 2301#	0.1	mg/kg	< 0.1	0.4	0.1	0.3
Chromium	DETSC 2301#	0.15	mg/kg	20	20	22	23
Chromium, Hexavalent	DETSC 2204*	1	mg/kg			< 1.0	
Copper	DETSC 2301#	0.2	mg/kg	39	51	40	40
Lead	DETSC 2301#	0.3	mg/kg	18	58	35	54
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	0.12	0.05	0.10
Nickel	DETSC 2301#	1	mg/kg	38	20	26	22
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	0.6	< 0.5	1.0
Zinc	DETSC 2301#	1	mg/kg	100	130	100	110
Inorganics							
pH	DETSC 2008#		pH	7.2	5.8	6.9	6.0
Calorific Value	DETSC 5008	1	MJ/kg			< 1.0	
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	0.3	< 0.1	0.2
Organic matter	DETSC 2002#	0.1	%	1.6	1.7	3.4	6.8
Ammoniacal Nitrogen as N	DETSC 2119#	0.5	mg/kg			1.2	
Chloride Aqueous Extract	DETSC 2055	1	mg/l			19	
Chloride	DETSC 2055	1	mg/kg				
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	14	240	310	91
Sulphide	DETSC 2024*	10	mg/kg			< 10	
Sulphate as SO4, Total	DETSC 2321#	0.01	%			0.14	
Sulphate as SO4, Total	DETSC 2321#	100	mg/kg				

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 20-10661-3
Client Ref 4250
Contract Title Barnsley West Roundabout

			Lab No	1685130	1685131	1685132	1685133
			Sample ID	BGR_TP104	HCR_TP101	HCR_TP102	HCR_TP103
			Depth	0.20	0.05	0.30	0.05
			Other ID	2	1	3	1
			Sample Type	ES	ES	ES	ES
			Sampling Date	10/06/2020	09/06/2020	09/06/2020	09/06/2020
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
PAHs							
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1	0.2	0.3	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	0.5	0.5	0.1
Pyrene	DETSC 3301	0.1	mg/kg	< 0.1	0.4	0.4	0.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	0.3	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
PAH Total	DETSC 3301	1.6	mg/kg	< 1.6	< 1.6	< 1.6	< 1.6
Phenols							
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	1.0	< 0.3	0.5
OCPs							
alpha-BHC	DETSC 3441*	0.1	mg/kg				< 0.1
gamma-BHC (Lindane)	DETSC 3441*	0.1	mg/kg				< 0.1
beta-BHC	DETSC 3441*	0.1	mg/kg				< 0.1
delta-BHC	DETSC 3441*	0.1	mg/kg				< 0.1
Heptachlor	DETSC 3441*	0.1	mg/kg				< 0.1
Aldrin	DETSC 3441*	0.1	mg/kg				< 0.1
Heptachlor epoxide	DETSC 3441*	0.1	mg/kg				< 0.1
gamma-Chlordane	DETSC 3441*	0.1	mg/kg				< 0.1
Endosulphan I & Alpha-chlorodane	DETSC 3441*	0.1	mg/kg				< 0.1
4,4-DDE	DETSC 3441*	0.1	mg/kg				< 0.1
Dieldrin	DETSC 3441*	0.1	mg/kg				< 0.1
Endrin	DETSC 3441*	0.1	mg/kg				< 0.1
Endosulphan II & 4,4-DDD	DETSC 3441*	0.1	mg/kg				< 0.1
Endrin aldehyde	DETSC 3441*	0.1	mg/kg				< 0.1
4,4-DDT	DETSC 3441*	0.1	mg/kg				< 0.1
Endosulphan sulphate	DETSC 3441*	0.1	mg/kg				< 0.1
Methoxychlor	DETSC 3441*	0.1	mg/kg				< 0.1
Endrin ketone	DETSC 3441*	0.1	mg/kg				< 0.1
OPPs							

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Summary of Chemical Analysis

Soil Samples

Our Ref 20-10661-3
Client Ref 4250
Contract Title Barnsley West Roundabout

			Lab No	1685130	1685131	1685132	1685133
			Sample ID	BGR_TP104	HCR_TP101	HCR_TP102	HCR_TP103
			Depth	0.20	0.05	0.30	0.05
			Other ID	2	1	3	1
			Sample Type	ES	ES	ES	ES
			Sampling Date	10/06/2020	09/06/2020	09/06/2020	09/06/2020
			Sampling Time	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**				
Dichlorvos	DETSC 3443*	0.1	mg/kg				< 0.1
Mevinphos	DETSC 3443*	0.1	mg/kg				< 0.1
Demeton-O	DETSC 3443*	0.1	mg/kg				< 0.1
Ethoprop	DETSC 3443*	0.1	mg/kg				< 0.1
Naled	DETSC 3443*	0.1	mg/kg				< 0.1
Phorate	DETSC 3443*	0.1	mg/kg				< 0.1
Demeton-S	DETSC 3443*	0.1	mg/kg				< 0.1
Diazinon	DETSC 3443*	0.1	mg/kg				< 0.1
Disulfoton	DETSC 3443*	0.1	mg/kg				< 0.1
Methylparathion	DETSC 3443*	0.1	mg/kg				< 0.1
Ronnel	DETSC 3443*	0.1	mg/kg				< 0.1
Fenthion	DETSC 3443*	0.1	mg/kg				< 0.1
Chlopyrifos	DETSC 3443*	0.1	mg/kg				< 0.1
Trichlorinate	DETSC 3443*	0.1	mg/kg				< 0.1
Merphos	DETSC 3443*	0.1	mg/kg				< 0.1
Stirofos	DETSC 3443*	0.1	mg/kg				< 0.1
Tokuthion	DETSC 3443*	0.1	mg/kg				< 0.1
Fensulfothion	DETSC 3443*	0.1	mg/kg				< 0.1
Bolstar	DETSC 3443*	0.1	mg/kg				< 0.1
Azinphos methyl	DETSC 3443*	0.1	mg/kg				< 0.1
Coumaphos	DETSC 3443*	0.1	mg/kg				< 0.1
Triazines							
Atraton	DETSC 3445*	0.1	mg/kg				< 0.1
Prometon	DETSC 3445*	0.1	mg/kg				< 0.1
Simazine	DETSC 3445*	0.1	mg/kg				< 0.1
Atrazine	DETSC 3445*	0.1	mg/kg				< 0.1
Propazine	DETSC 3445*	0.1	mg/kg				< 0.1
Terbuthylazine	DETSC 3445*	0.1	mg/kg				< 0.1
Secbumeton	DETSC 3445*	0.1	mg/kg				< 0.1
Symetryn	DETSC 3445*	0.1	mg/kg				< 0.1
Ametryn	DETSC 3445*	0.1	mg/kg				< 0.1
Prometryne	DETSC 3445*	0.1	mg/kg				< 0.1
Terbutryn	DETSC 3445*	0.1	mg/kg				< 0.1

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 20-10661-3
Client Ref 4250
Contract Title Barnsley West Roundabout

			Lab No	1685134	1685135	1695438
			Sample ID	HCR_TP104	HCR_TP105	BGR_TP105
			Depth	0.80	0.30	0.20
			Other ID	5	3	2
			Sample Type	ES	ES	ES
			Sampling Date	09/06/2020	09/06/2020	07/07/2020
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Metals						
Arsenic	DETSC 2301#	0.2	mg/kg	17	12	14
Cadmium	DETSC 2301#	0.1	mg/kg	0.1	0.1	0.2
Chromium	DETSC 2301#	0.15	mg/kg	19	18	22
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0		< 1.0
Copper	DETSC 2301#	0.2	mg/kg	34	27	31
Lead	DETSC 2301#	0.3	mg/kg	18	25	35
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	36	23	19
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	95	78	79
Inorganics						
pH	DETSC 2008#		pH	7.3	7.0	6.2
Calorific Value	DETSC 5008	1	MJ/kg	1.3		< 1.0
Cyanide, Free	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	0.2
Organic matter	DETSC 2002#	0.1	%	3.3	2.1	3.7
Ammoniacal Nitrogen as N	DETSC 2119#	0.5	mg/kg	2.7		5.0
Chloride Aqueous Extract	DETSC 2055	1	mg/l	6.8		
Chloride	DETSC 2055	1	mg/kg			6.3
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	180	270	17
Sulphide	DETSC 2024*	10	mg/kg	36		16
Sulphate as SO4, Total	DETSC 2321#	0.01	%	0.05		
Sulphate as SO4, Total	DETSC 2321#	100	mg/kg			787

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 20-10661-3
Client Ref 4250
Contract Title Barnsley West Roundabout

			Lab No	1685134	1685135	1695438
			Sample ID	HCR_TP104	HCR_TP105	BGR_TP105
			Depth	0.80	0.30	0.20
			Other ID	5	3	2
			Sample Type	ES	ES	ES
			Sampling Date	09/06/2020	09/06/2020	07/07/2020
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
PAHs						
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	0.2
Pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	0.2
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1
PAH Total	DETSC 3301	1.6	mg/kg	< 1.6	< 1.6	< 1.6
Phenols						
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3	< 0.3	0.5
OCPs						
alpha-BHC	DETSC 3441*	0.1	mg/kg			
gamma-BHC (Lindane)	DETSC 3441*	0.1	mg/kg			
beta-BHC	DETSC 3441*	0.1	mg/kg			
delta-BHC	DETSC 3441*	0.1	mg/kg			
Heptachlor	DETSC 3441*	0.1	mg/kg			
Aldrin	DETSC 3441*	0.1	mg/kg			
Heptachlor epoxide	DETSC 3441*	0.1	mg/kg			
gamma-Chlordane	DETSC 3441*	0.1	mg/kg			
Endosulphan I & Alpha-chlorodane	DETSC 3441*	0.1	mg/kg			
4,4-DDE	DETSC 3441*	0.1	mg/kg			
Dieldrin	DETSC 3441*	0.1	mg/kg			
Endrin	DETSC 3441*	0.1	mg/kg			
Endosulphan II & 4,4-DDD	DETSC 3441*	0.1	mg/kg			
Endrin aldehyde	DETSC 3441*	0.1	mg/kg			
4,4-DDT	DETSC 3441*	0.1	mg/kg			
Endosulphan sulphate	DETSC 3441*	0.1	mg/kg			
Methoxychlor	DETSC 3441*	0.1	mg/kg			
Endrin ketone	DETSC 3441*	0.1	mg/kg			
OPPs						

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis

Soil Samples

Our Ref 20-10661-3
Client Ref 4250
Contract Title Barnsley West Roundabout

			Lab No	1685134	1685135	1695438
			Sample ID	HCR_TP104	HCR_TP105	BGR_TP105
			Depth	0.80	0.30	0.20
			Other ID	5	3	2
			Sample Type	ES	ES	ES
			Sampling Date	09/06/2020	09/06/2020	07/07/2020
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Dichlorvos	DETSC 3443*	0.1	mg/kg			
Mevinphos	DETSC 3443*	0.1	mg/kg			
Demeton-O	DETSC 3443*	0.1	mg/kg			
Ethoprop	DETSC 3443*	0.1	mg/kg			
Naled	DETSC 3443*	0.1	mg/kg			
Phorate	DETSC 3443*	0.1	mg/kg			
Demeton-S	DETSC 3443*	0.1	mg/kg			
Diazinon	DETSC 3443*	0.1	mg/kg			
Disulfoton	DETSC 3443*	0.1	mg/kg			
Methylparathion	DETSC 3443*	0.1	mg/kg			
Ronnel	DETSC 3443*	0.1	mg/kg			
Fenthion	DETSC 3443*	0.1	mg/kg			
Chlopyrifos	DETSC 3443*	0.1	mg/kg			
Trichlorinate	DETSC 3443*	0.1	mg/kg			
Merphos	DETSC 3443*	0.1	mg/kg			
Stirofos	DETSC 3443*	0.1	mg/kg			
Tokuthion	DETSC 3443*	0.1	mg/kg			
Fensulfothion	DETSC 3443*	0.1	mg/kg			
Bolstar	DETSC 3443*	0.1	mg/kg			
Azinphos methyl	DETSC 3443*	0.1	mg/kg			
Coumaphos	DETSC 3443*	0.1	mg/kg			
Triazines						
Atraton	DETSC 3445*	0.1	mg/kg			
Prometon	DETSC 3445*	0.1	mg/kg			
Simazine	DETSC 3445*	0.1	mg/kg			
Atrazine	DETSC 3445*	0.1	mg/kg			
Propazine	DETSC 3445*	0.1	mg/kg			
Terbuthylazine	DETSC 3445*	0.1	mg/kg			
Secbumeton	DETSC 3445*	0.1	mg/kg			
Symetryn	DETSC 3445*	0.1	mg/kg			
Ametryn	DETSC 3445*	0.1	mg/kg			
Prometryne	DETSC 3445*	0.1	mg/kg			
Terbutryn	DETSC 3445*	0.1	mg/kg			

Summary of Chemical Analysis

Leachate Samples

Our Ref 20-10661-3
Client Ref 4250
Contract Title Barnsley West Roundabout

			Lab No	1685136	1685137	1685138
			Sample ID	BGR_TP101	BGR_TP104	HCR_TP102
			Depth	1.20	0.20	0.30
			Other ID	5	2	3
			Sample Type	ES	ES	ES
			Sampling Date	10/06/2020	10/06/2020	09/06/2020
			Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**			
Preparation						
NRA Leachate Preparation	DETSC 1009*			Y	Y	Y
Metals						
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	< 0.16	0.17	0.17
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	< 0.25	< 0.25
Chromium, Hexavalent	DETSC 2203	7	ug/l	< 7.0		< 7.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	< 0.4	0.4	0.8
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	< 0.5	< 0.5	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	< 0.25	0.25
Zinc, Dissolved	DETSC 2306	1.3	ug/l	< 1.3	< 1.3	< 1.3
Inorganics						
pH	DETSC 2008		pH	8.6	8.4	8.6
Cyanide, Free	DETSC 2130	20	ug/l	< 20	< 20	< 20
Sulphate as SO4	DETSC 2055	0.1	mg/l	3.9	2.9	120
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	0.02	0.07	< 0.01
Fluorene	DETSC 3304	0.01	ug/l	0.02	0.06	< 0.01
Phenanthrene	DETSC 3304	0.01	ug/l	0.11	0.13	0.05
Anthracene	DETSC 3304	0.01	ug/l	0.02	0.02	0.05
Fluoranthene	DETSC 3304	0.01	ug/l	0.07	0.07	0.02
Pyrene	DETSC 3304	0.01	ug/l	0.05	0.07	0.02
Benzo(a)anthracene	DETSC 3304	0.01	ug/l	0.01	0.03	< 0.01
Chrysene	DETSC 3304	0.01	ug/l	0.03	0.10	< 0.01
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	0.03	0.10	< 0.01
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	0.01	0.03	< 0.01
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	< 0.01	0.07	< 0.01
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l	< 0.01	0.17	< 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	0.10	0.23	< 0.01
PAH Total	DETSC 3304	0.2	ug/l	0.51	1.2	< 0.20
Phenols						
Phenol - Monohydric	DETSC 2130	100	ug/l	< 100	< 100	< 100

Key: * -not accredited. n/s -not supplied.

Summary of Chemical Analysis

Leachate Samples

Our Ref 20-10661-3
Client Ref 4250
Contract Title Barnsley West Roundabout

	Lab No	1685139	1685140	1695439
	Sample ID	HCR_TP104	HCR_TP105	BGR_TP105
	Depth	0.80	0.30	0.20
	Other ID	5	3	2
	Sample Type	ES	ES	ES
	Sampling Date	09/06/2020	09/06/2020	07/07/2020
	Sampling Time	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**	
Preparation				
NRA Leachate Preparation	DETSC 1009*			Y	Y	Y
Metals				
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.22	< 0.16	1.5
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	< 0.25	1.3
Chromium, Hexavalent	DETSC 2203	7	ug/l	< 7.0		< 7.0
Copper, Dissolved	DETSC 2306	0.4	ug/l	< 0.4	1.2	3.6
Lead, Dissolved	DETSC 2306	0.09	ug/l	< 0.09	< 0.09	0.19
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	0.5	< 0.5	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.33	< 0.25	0.38
Zinc, Dissolved	DETSC 2306	1.3	ug/l	< 1.3	1.8	< 1.3
Inorganics				
pH	DETSC 2008		pH	7.8	7.9	8.2
Cyanide, Free	DETSC 2130	20	ug/l	< 20	< 20	< 20
Sulphate as SO4	DETSC 2055	0.1	mg/l	21	29	2.3
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	0.13	0.08	0.01
Anthracene	DETSC 3304	0.01	ug/l	0.02	< 0.01	< 0.01
Fluoranthene	DETSC 3304	0.01	ug/l	0.07	0.06	< 0.01
Pyrene	DETSC 3304	0.01	ug/l	0.06	0.05	< 0.01
Benzo(a)anthracene	DETSC 3304	0.01	ug/l	0.03	0.02	< 0.01
Chrysene	DETSC 3304	0.01	ug/l	0.06	0.04	< 0.01
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	0.06	0.04	< 0.01
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	0.02	0.02	< 0.01
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	0.04	0.02	< 0.01
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l	< 0.01	0.07	< 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	0.15	0.10	< 0.01
PAH Total	DETSC 3304	0.2	ug/l	0.69	0.54	< 0.20
Phenols				
Phenol - Monohydric	DETSC 2130	100	ug/l	< 100	< 100	< 100

Key: * -not accredited. n/s -not supplied.

Summary of Asbestos Analysis

Soil Samples

Our Ref 20-10661-3
Client Ref 4250
Contract Title Barnsley West Roundabout

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1685126	BGR_TP101 5 1.20	SOIL	NAD	none	Colin Patrick
1685128	BGR_TP102 5 2.50	SOIL	NAD	none	Colin Patrick
1685129	BGR_TP103 2 0.15	SOIL	NAD	none	Colin Patrick
1685132	HCR_TP102 3 0.30	SOIL	NAD	none	Colin Patrick
1685133	HCR_TP103 1 0.05	SOIL	NAD	none	Colin Patrick
1685134	HCR_TP104 5 0.80	SOIL	NAD	none	Colin Patrick
1685135	HCR_TP105 3 0.30	SOIL	NAD	none	Colin Patrick
1695438	BGR_TP105 2 0.20	SOIL	NAD	none	D Wilkinson

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 20-10661-3
Client Ref 4250
Contract Barnsley West Roundabout

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1685126	BGR_TP101 1.20 SOIL	10/06/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2	Ammonia (3 days)	
1685127	BGR_TP102 0.20 SOIL	10/06/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1685128	BGR_TP102 2.50 SOIL	10/06/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1685129	BGR_TP103 0.15 SOIL	10/06/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1685130	BGR_TP104 0.20 SOIL	10/06/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1685131	HCR_TP101 0.05 SOIL	09/06/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2	pH + Conductivity (7 days)	
1685132	HCR_TP102 0.30 SOIL	09/06/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2	Ammonia (3 days), pH + Conductivity (7 days)	
1685133	HCR_TP103 0.05 SOIL	09/06/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2	pH + Conductivity (7 days)	
1685134	HCR_TP104 0.80 SOIL	09/06/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2	Ammonia (3 days), pH + Conductivity (7 days)	
1685135	HCR_TP105 0.30 SOIL	09/06/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2	pH + Conductivity (7 days)	
1685136	BGR_TP101 1.20 LEACHATE	10/06/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1685137	BGR_TP104 0.20 LEACHATE	10/06/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1685138	HCR_TP102 0.30 LEACHATE	09/06/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1685139	HCR_TP104 0.80 LEACHATE	09/06/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1685140	HCR_TP105 0.30 LEACHATE	09/06/20	GJ 250ml x2, GJ 60ml x2, PT 1L x2		
1695438	BGR_TP105 0.20 SOIL	07/07/20	GJ 250ml x2, GJ 60ml x2, PT 500ml x3		
1695439	BGR_TP105 0.20 LEACHATE	07/07/20	GJ 250ml x2, GJ 60ml x2, PT 500ml x3		

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

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

Waste Classification Report

6QWZR-H48MX-A739A

Job name

4848 Barugh Green Road Roundabout

Description/Comments

Project

4848

Site

Related Documents

#	Name	Description
None		

Waste Stream Template

JPG WASTE STREAM V21

Classified by

Name:
John Parkinson
Date:
22 Oct 2020 10:37 GMT
Telephone:
0113 263 1155

Company:
JPG (LEEDS) Ltd
5 John Charles Way
Leeds
LS12 6QA

HazWasteOnline™ Training Record:

Course	Date
Hazardous Waste Classification	11 Sep 2017
Advanced Hazardous Waste Classification	11 Mar 2020

Report

Created by: John Parkinson
Created date: 22 Oct 2020 10:37 GMT

Job summary

#	Sample Name	Depth [m]	Classification Result	Hazard properties	Page
1	BGR_TP101	1.20	Non Hazardous		2
2	BGR_TP102	0.20	Non Hazardous		4
3	BGR_TP102[2]	2.50	Non Hazardous		6
4	BGR_TP103	0.15	Non Hazardous		8
5	BGR_TP104	0.20	Non Hazardous		10
6	BGR_TP105	0.20	Non Hazardous		12

Classification of sample: BGR_TP101

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

Sample details

Sample Name:
BGR_TP101
Sample Depth:
1.20 m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

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

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		5.7	mg/kg	1.32	7.526	mg/kg	0.000753 %		
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		19	mg/kg	1.462	27.77	mg/kg	0.00278 %		
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		35	mg/kg	1.126	39.406	mg/kg	0.00394 %		
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		36	mg/kg	2.976	107.146	mg/kg	0.0107 %		
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		97	mg/kg	2.774	269.092	mg/kg	0.0269 %		
11	pH			PH		7.1	pH		7.1	pH	7.1 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		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**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									
14		acenaphthylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-917-1	208-96-8									
15		acenaphthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-469-6	83-32-9									
16		fluorene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-695-5	86-73-7									
17		phenanthrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-581-5	85-01-8									
18		anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			204-371-1	120-12-7									
19		fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-912-4	206-44-0									
20		pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			204-927-3	129-00-0									
21		benzo[a]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-033-00-9	200-280-6	56-55-3									
22		chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-048-00-0	205-923-4	218-01-9									
23		benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-034-00-4	205-911-9	205-99-2									
24		benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-036-00-5	205-916-6	207-08-9									
25		benzo[a]pyrene; benzo[def]chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-032-00-3	200-028-5	50-32-8									
26		indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-893-2	193-39-5									
27		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
28		benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**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									
										Total:	0.0472 %		

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 Deteminand - 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: BGR_TP102

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

Sample details

Sample Name:
BGR_TP102
Sample Depth:
0.20 m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

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

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		7.9	mg/kg	1.32	10.431	mg/kg	0.00104 %		
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		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		35	mg/kg	1.126	39.406	mg/kg	0.00394 %		
5	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	18	mg/kg	1.56	28.077	mg/kg	0.0018 %		
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		34	mg/kg	2.976	101.193	mg/kg	0.0101 %		
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		90	mg/kg	2.774	249.673	mg/kg	0.025 %		
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		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
13	acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
14	acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**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									
15	●	fluorene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-695-5	86-73-7									
16	●	phenanthrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-581-5	85-01-8									
17	●	anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			204-371-1	120-12-7									
18	●	fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-912-4	206-44-0									
19	●	pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			204-927-3	129-00-0									
20		benzo[a]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-032-00-3	200-028-5	50-32-8									
25	●	indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
27	●	benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-883-8	191-24-2									
28		phenol				0.3	mg/kg		0.3	mg/kg	0.00003 %		
		604-001-00-2	203-632-7	108-95-2									
										Total:	0.0448 %		

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 Deteminand - 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: BGR_TP102[2]

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

Sample details

Sample Name:
BGR_TP102[2]
Sample Depth:
2.50 m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

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

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		3.6 mg/kg	1.32	4.753 mg/kg	0.000475 %		
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		12 mg/kg	1.462	17.539 mg/kg	0.00175 %		
4	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		19 mg/kg	1.126	21.392 mg/kg	0.00214 %		
5	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	9.4 mg/kg	1.56	14.662 mg/kg	0.00094 %		
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		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				<0.5 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		56 mg/kg	2.774	155.352 mg/kg	0.0155 %		
10	pH			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		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
13	acenaphthylene		205-917-1	208-96-8		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<LOD
14	acenaphthene		201-469-6	83-32-9		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<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									
15		fluorene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-695-5	86-73-7									
16		phenanthrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-581-5	85-01-8									
17		anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			204-371-1	120-12-7									
18		fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-912-4	206-44-0									
19		pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			204-927-3	129-00-0									
20		benzo[a]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**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									
										Total:	0.0283 %		

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 Deteminand - 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: BGR_TP103

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

Sample details

Sample Name:
BGR_TP103
Sample Depth:
0.15 m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

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

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		9.8	mg/kg	1.32	12.939	mg/kg	0.00129 %		
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		21	mg/kg	1.462	30.693	mg/kg	0.00307 %		
4	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		35	mg/kg	1.126	39.406	mg/kg	0.00394 %		
5	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	27	mg/kg	1.56	42.115	mg/kg	0.0027 %		
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		81	mg/kg	2.774	224.706	mg/kg	0.0225 %		
10	pH			PH		6.4	pH		6.4	pH	6.4 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		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
13	acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
14	acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**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									
15		fluorene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-695-5	86-73-7									
16		phenanthrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-581-5	85-01-8									
17		anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			204-371-1	120-12-7									
18		fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-912-4	206-44-0									
19		pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			204-927-3	129-00-0									
20		benzo[a]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-883-8	191-24-2									
28		phenol				0.3	mg/kg		0.3	mg/kg	0.00003 %		
		604-001-00-2	203-632-7	108-95-2									
										Total:	0.0406 %		

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 Deteminand - 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: BGR_TP104

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

Sample details

Sample Name:
BGR_TP104
Sample Depth:
0.20 m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

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

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	arsenic { arsenic trioxide }	033-003-00-0	215-481-4	1327-53-3		8.4	mg/kg	1.32	11.091	mg/kg	0.00111 %		
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		20	mg/kg	1.462	29.231	mg/kg	0.00292 %		
4	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		39	mg/kg	1.126	43.91	mg/kg	0.00439 %		
5	lead { lead chromate }	082-004-00-2	231-846-0	7758-97-6	1	18	mg/kg	1.56	28.077	mg/kg	0.0018 %		
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		38	mg/kg	2.976	113.098	mg/kg	0.0113 %		
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		100	mg/kg	2.774	277.415	mg/kg	0.0277 %		
10	pH			PH		7.2	pH		7.2	pH	7.2 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		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
13	acenaphthylene		205-917-1	208-96-8		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
14	acenaphthene		201-469-6	83-32-9		<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**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									
15		fluorene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-695-5	86-73-7									
16		phenanthrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-581-5	85-01-8									
17		anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			204-371-1	120-12-7									
18		fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-912-4	206-44-0									
19		pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			204-927-3	129-00-0									
20		benzo[a]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-033-00-9	200-280-6	56-55-3									
21		chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-048-00-0	205-923-4	218-01-9									
22		benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-034-00-4	205-911-9	205-99-2									
23		benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-036-00-5	205-916-6	207-08-9									
24		benzo[a]pyrene; benzo[def]chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-032-00-3	200-028-5	50-32-8									
25		indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-893-2	193-39-5									
26		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
27		benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**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									
										Total:	0.0496 %		

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 Deteminand - 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: BGR_TP105

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

Sample details

Sample Name:
BGR_TP105
Sample Depth:
0.20 m

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

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 }		14 mg/kg	1.32	18.485 mg/kg	0.00185 %		
	033-003-00-0 / 215-481-4 / 1327-53-3							
2	cadmium { cadmium oxide }		0.2 mg/kg	1.142	0.228 mg/kg	0.0000228 %		
	048-002-00-0 / 215-146-2 / 1306-19-0							
3	chromium in chromium(III) compounds { chromium(III) oxide (worst case) }		22 mg/kg	1.462	32.154 mg/kg	0.00322 %		
	/ 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	35 mg/kg	1.56	54.594 mg/kg	0.0035 %		
	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 }		19 mg/kg	2.976	56.549 mg/kg	0.00565 %		
	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 }		79 mg/kg	2.774	219.158 mg/kg	0.0219 %		
	024-007-00-3 / 236-878-9 / 13530-65-9							
11	pH		6.2 pH		6.2 pH	6.2 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 }		0.2 mg/kg	1.884	0.377 mg/kg	0.0000377 %		
	006-007-00-5 / /							
13	naphthalene		<0.1 mg/kg		<0.1 mg/kg	<0.00001 %		<**LOD**
	601-052-00-2 / 202-049-5 / 91-20-3							

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
14		acenaphthylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-917-1	208-96-8									
15		acenaphthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-469-6	83-32-9									
16		fluorene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-695-5	86-73-7									
17		phenanthrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			201-581-5	85-01-8									
18		anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			204-371-1	120-12-7									
19		fluoranthene				0.2	mg/kg		0.2	mg/kg	0.00002 %		
			205-912-4	206-44-0									
20		pyrene				0.2	mg/kg		0.2	mg/kg	0.00002 %		
			204-927-3	129-00-0									
21		benzo[a]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-033-00-9	200-280-6	56-55-3									
22		chrysene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-048-00-0	205-923-4	218-01-9									
23		benzo[b]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-034-00-4	205-911-9	205-99-2									
24		benzo[k]fluoranthene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-036-00-5	205-916-6	207-08-9									
25		benzo[a]pyrene; benzo[def]chrysene				0.1	mg/kg		0.1	mg/kg	0.00001 %		
		601-032-00-3	200-028-5	50-32-8									
26		indeno[123-cd]pyrene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-893-2	193-39-5									
27		dibenz[a,h]anthracene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
		601-041-00-2	200-181-8	53-70-3									
28		benzo[ghi]perylene				<0.1	mg/kg		<0.1	mg/kg	<0.00001 %		<**LOD**
			205-883-8	191-24-2									
29		phenol				0.5	mg/kg		0.5	mg/kg	0.00005 %		
		604-001-00-2	203-632-7	108-95-2									
										Total:	0.0402 %		

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 Deteminand - 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)

Conversion factor: 1.462
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)

Conversion factor: 1.16
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.

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

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]

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.1, May 2018
HazWasteOnline Classification Engine Version: 2020.289.4500.8764 (15 Oct 2020)
HazWasteOnline Database: 2020.290.4501.8765 (16 Oct 2020)

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 Wastes 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
POPs Regulation 2004 - Regulation 850/2004/EC of 29 April 2004
1st ATP to POPs Regulation - Regulation 756/2010/EU of 24 August 2010
2nd ATP to POPs Regulation - Regulation 757/2010/EU of 24 August 2010

Appendix D Geotechnical Testing Results

ALLIED EXPLORATION & GEOTECHNICS LIMITED

Head Office: Unit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RG - Tel: 0191 3874700 Fax: 0191 3874710
Regional Office: Unit 20 Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL – Tel: 01722 735 300 Fax: 01722 735 999

LABORATORY REPORT CERTIFICATE

UKAS TESTING
1367

Contract Title: Barnsley West Roundabouts

AEG Reference: 4250

Client Address: JPG (Leeds) Ltd
5 John Charles Way
Leeds
LS12 6QA

We certify that Laboratory testing was carried out on samples from the above contract in accordance with techniques outlined in BS 1377: 1990, BS EN ISO 17892:2014 or other appropriate standards as quoted. The samples were received from June 2020 and the following results, given on the attached enclosures, were obtained.

The tests carried out are indicated in the attached table showing the enclosure number and the total number of pages.

For and on behalf of Allied Exploration & Geotechnics Limited

- ☐ Nick Vater (Managing Director)
- ☐ Kevin Warriner (HSE & Quality Director)
- ☑ Michelle Selkirk (Laboratory Manager)

Signed _____ Date: 06 July 2020

Tests marked not UKAS accredited in this certificate are not included in the UKAS accreditation schedule for our laboratory. Any opinions and interpretations expressed herein are outside the scope of the laboratory's UKAS accreditation.

Please note the material was derived from samples taken outside the control of the laboratory.

LABORATORY REPORT CERTIFICATE

ENCLOSURES

Enclosure Number	Description	UKAS Accredited	Reference	No. of Pages
0	Laboratory Report Certificate	N/A		3
1	Sample Description Sheets	N/A		2
2	Moisture Content	Yes	BS 1377 Part 2 1990 (BS EN ISO 17892-1:2014)	1
2	Plasticity Index and Moisture Content	Yes	BS 1377 Part 2 1990 (BS EN ISO 17892-1:2014)	1
3	Particle Size Distribution Sieving	Yes	BS 1377 Part 2 1990	4
3	Particle Size Distribution Sedimentation	No	BS 1377 Part 2 1990	4
4	Determination of Sulphate and pH (Tested externally)	No	See DETS certificates	3
5	Determination of Dry Density/Moisture Content Relationship	Yes	BS 1377 Part 4 1990	12
6	Determination of California Bearing Ratio	Yes	BS 1377 Part 4 1990	6

LABORATORY REPORT CERTIFICATE

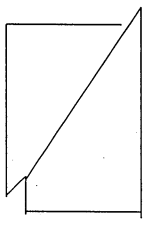
ABBREVIATIONS

All the abbreviations used on the laboratory certificates are given below:

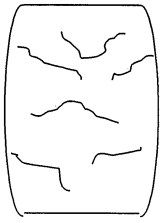
Br	Brittle	**PSD**	Particle Size Distribution by sieve analysis
C	Compound	**SB**	Shear Box
CBR	California Bearing Ratio	**SED**	Sedimentation Analysis
CDT	Consolidated Drained Triaxial	**SO4**	Sulphate (total, water extract, groundwater)
CL	Chloride content (water or soil)	**CP2**	Dry Density/Moisture Content 2.5kg rammer
US	Unsuitable sample for test	**CP4**	As above using 4.5kg rammer
UUT	Undrained Unconsolidated Triaxial	**CPV**	As above using vibrating hammer
HSV	Vane Test	**CUT**	Consolidated Undrained Triaxial
IS	Insufficient sample for test	**R**	Remoulded
LOI	Loss On Ignition	**U**	Undisturbed
M	Multi-stage testing	**MC**	Moisture Content
MCV	Moisture Content Value	**PL**	Point Load
NAT	Natural preparation method	**NMC**	Natural (or as received) moisture content
P	Plastic	**PFH**	Permeability Falling Head Method
OED	Oedometer	**PTXL**	Permeability in Triaxial Cell
OMC	Optimum Moisture Content	**ORG**	Organic content
B	Large disturbed (bulk) sample	**PD**	Particle Density (SG)
J	Small disturbed (jar) sample	**PI**	Liquid limit, plastic limit and plasticity index

Typical Mode of Failure for Triaxial Testing

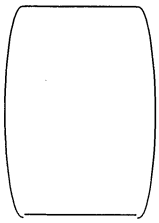
Brittle



Compound



Plastic



ALLIED EXPLORATION & GEOTECHNICS LIMITED

Head Office: Unit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RG - **Tel:** 0191 387 4700 **Fax:** 0191 387 4710
Regional Office: Unit 20, Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL - **Tel:** 01772 735 300 **Fax:** 01772 735 999

LABORATORY SAMPLE DESCRIPTION SHEET

Exploratory Hole No.	Sample Depth (m)	ID	Description	Laboratory Tests/Remarks
BGR_TP101	0.10	J1	Brown slightly sandy slightly gravelly CLAY with occasional rootlets.	MC BRE
BGR_TP101	1.00	J4	Grey slightly sandy slightly gravelly CLAY.	MC PI(IS for LL) BRE
BGR_TP101	1.50	LB6	Brown clayey sandy GRAVEL of mudstone.	MC CP2 CP4
BGR_TP102	2.00	J4	Grey slightly sandy slightly gravelly CLAY. Gravel includes mudstone.	MC BRE
BGR_TP102	3.00	LB6	Grey/brown slightly sandy gravelly CLAY.	MC PSD SED
BGR_TP103	1.00	J5	Brown slightly sandy slightly gravelly CLAY of intermediate plasticity.	MC PI BRE
BGR_TP103	1.50	LB6	Orange brown with grey veinig slightly sandy gravelly CLAY. Gravel includes mudstone.	MC CP2 CP4
BGR_TP104	1.00	J3	Grey with orange mottling CLAY of intermediate plasticity.	MC PI
BGR_TP104	1.50	LB4	Brown with grey mottling slightly sandy slightly gravelly CLAY.	MC PSD SED CBR
BGR_TP104	2.00	J5	Brown slightly sandy gravelly CLAY. Gravel includes mudstone.	MC BRE
BGR_TP104	2.50	LB6	Brown clayey slightly sandy GRAVEL of mudstone.	MC US for CP2 and CP4
BGR_TP105	0.50	LB4	Grey brown mottled slightly sandy slightly gravelly CLAY. Gravel includes mudstone.	CBR
BGR_TP105	1.50	J5	Grey silty slightly sandy CLAY of intermediate plasticity.	MC PI BRE
BGR_TP105	2.00	LB6	Grey mottled slightly sandy CLAY.	CP2 CP4 CBR
HCR_TP101	0.50	LB3	Brown slightly sandy gravelly CLAY.	MC PSD SED
HCR_TP101	2.00	J4	Grey slightly sandy slightly gravelly CLAY.	MC BRE
HCR_TP102	1.00	J5	Grey sandy slightly gravelly CLAY of low plasticity.	MC PI BRE
HCR_TP102	1.50	LB6	Grey slightly sandy gravelly CLAY with a low cobble content. Gravel includes mudstone.	CBR
HCR_TP103	0.20	J2	Friable brown slightly sandy sightly gravelly CLAY.	MC BRE
HCR_TP103	3.00	J5	Grey slightly sandy gravelly CLAY. Gravel includes weathered mudstone.	MC PI(IS for LL) BRE
HCR_TP103	3.50	LB6	Grey slightly sandy gravelly CLAY. Gravel includes mudstone.	MC CP2 CP4

Contract Title :- **Barnsley West Roundabouts**

Client :- **JPG (Leeds) Ltd**

Signed :- MSeal

Name :- [illegible]

Date of issue :- 06/07/2020

Certificate No :- SD/4250/1

AEG Contract No. :- **4250**

UKAS TESTING 1367

ALLIED EXPLORATION & GEOTECHNICS LIMITED

Head Office: Unit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RG - **Tel:** 0191 387 4700 **Fax:** 0191 387 4710
Regional Office: Unit 20, Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL - **Tel:** 01772 735 300 **Fax:** 01772 735 999

LABORATORY SAMPLE DESCRIPTION SHEET

Exploratory Hole No.	Sample Depth (m)	ID	Description	Laboratory Tests/Remarks
HCR_TP104	1.00	LB6	Grey slightly sandy slightly gravelly CLAY.	CBR
HCR_TP104	3.50	J7	Brown with grey mottling slightly sandy slightly gravelly CLAY of intermediate plasticity.	MC PI BRE
HCR_TP104	3.60	B8	Orange brown with grey mottling slightly sandy slightly gravelly CLAY. Gravel includes mudstone.	MC CP2 CP4
HCR_TP105	0.40	LB4	Brown sandy slightly gravelly CLAY.	CBR
HCR_TP105	2.50	J5	Grey slightly sandy gravelly CLAY of low plasticity.	MC PI BRE
HCR_TP105	3.00	LB6	Grey slightly sandy gravelly CLAY. Gravel includes mudstone.	MC CP2 CP4
HCR_TP105	3.60	B8	Brown and grey mottled slightly sandy slightly gravelly CLAY.	MC PSD SED

Contract Title :- Barnsley West Roundabouts	Client :- JPG (Leeds) Ltd

Signed :-	Name :-	Page 2 of 2	
Date of issue :- 06/07/2020	Certificate No :- SD/4250/2	AEG Contract No. :- 4250	UKAS TESTING 1367

ALLIED EXPLORATION & GEOTECHNICS LIMITED

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MOISTURE CONTENT CERTIFICATE

BS 1377 : Part 2 : Clause 3.2

Exploratory Hole No.	Sample Depth (m)	Sample ID	Specific Depth (m)	Moisture Content (%)	Date Tested	Remarks
BGR_TP101	0.10	J1	0.10	17.1	23/06/2020	
BGR_TP101	1.50	LB6	1.50	14.2	23/06/2020	
BGR_TP102	2.00	J4	2.00	20.5	23/06/2020	
BGR_TP102	3.00	LB6	3.00	15.6	22/06/2020	
BGR_TP103	1.50	LB6	1.50	17.3	24/06/2020	
BGR_TP104	1.50	LB4	1.50	18.0	22/06/2020	
BGR_TP104	2.00	J5	2.00	11.1	23/06/2020	
BGR_TP104	2.50	LB6	2.50	10.3	23/06/2020	
BGR_TP105	2.00	LB6	2.00	15.9	25/06/2020	
HCR_TP101	0.50	LB3	0.50	12.2	22/06/2020	
HCR_TP101	2.00	J4	2.00	14.4	23/06/2020	
HCR_TP103	0.20	J2	0.20	15.1	23/06/2020	
HCR_TP103	3.50	LB6	3.50	15.0	23/06/2020	
HCR_TP104	3.60	B8	3.60	21.1	24/06/2020	
HCR_TP105	3.60	B8	3.60	25.5	22/06/2020	

For description of sample please refer to the Laboratory Sample Description Sheet

Contract Title :-	Client :-
Barnsley West Roundabouts	JPG (Leeds) Ltd

Signed :-	Name :-		Page 1 of 1
Date of issue :- 06/07/2020	Certificate No :- MC/4250/1	AEG Contract No. :- **4250**	

UKAS TESTING 1367

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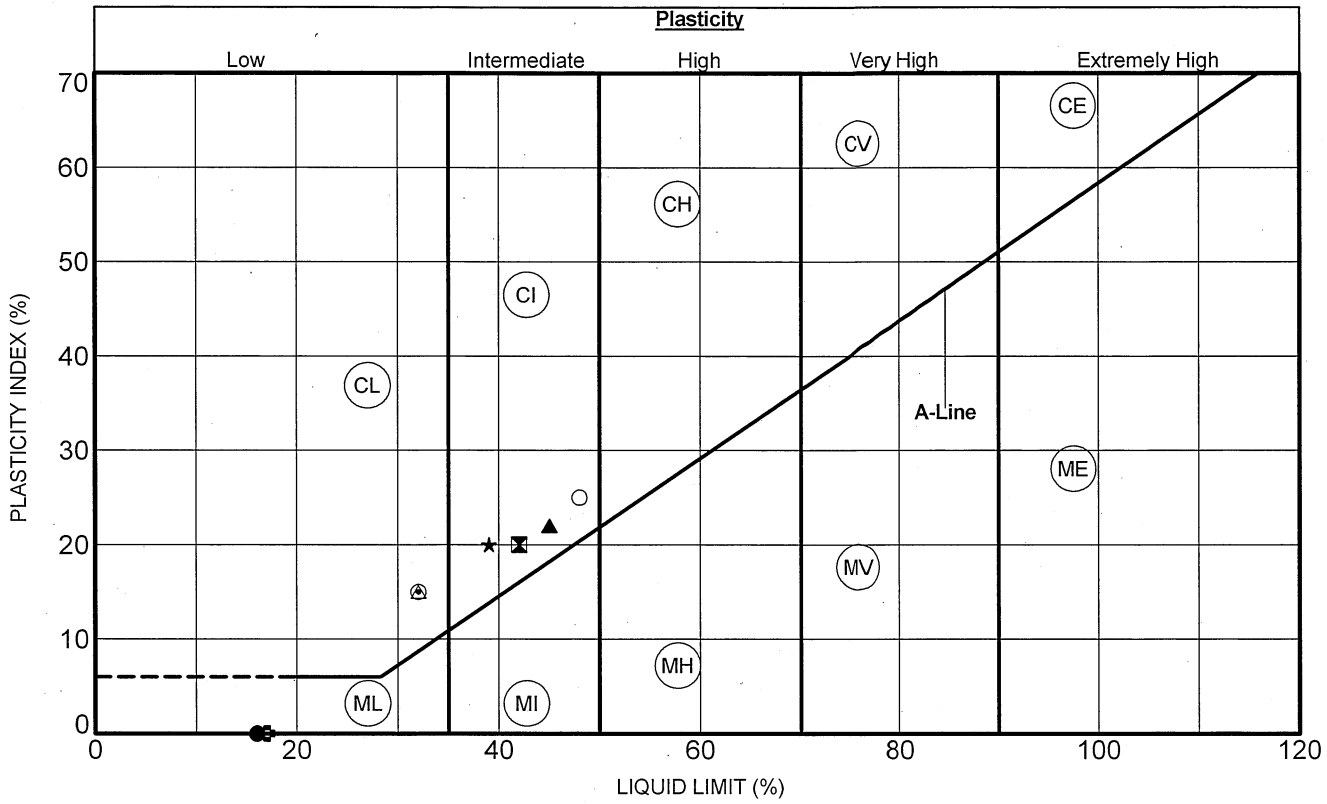
ATTERBERG LIMITS & NATURAL MOISTURE CONTENT

Test Method :- BS 1377 : Part 2 : Clause 3.2, 4.1 to 4.4 & 5 : 1990



Exploratory Hole No.	Depth (m)	Sample Type/Ref.	Specific Depth (m)	LL	PL	PI	I_L	Preparation Method	<0.425mm (%)	m/c (%)	Date Tested
●BGR_TP101	1.00	J4	1.00	16	16	0		Natural		19.0	23/06/2020
⧓BGR_TP103	1.00	J5	1.00	42	22	20	-0.35	Natural		15.1	23/06/2020
▲BGR_TP104	1.00	J3	1.00	45	23	22	-0.09	Natural		21.0	23/06/2020
★BGR_TP105	1.50	J5	1.50	39	19	20	-0.24	Natural		14.3	23/06/2020
⊙HCR_TP102	1.00	J5	1.00	32	17	15	0.02	Natural		17.3	23/06/2020
✿HCR_TP103	3.00	J5	3.00	17	17	0		Natural		14.1	23/06/2020
○HCR_TP104	3.50	J7	3.50	48	23	25	-0.14	Natural		19.6	23/06/2020
△HCR_TP105	2.50	J5	2.50	32	17	15	-0.05	Natural		16.3	23/06/2020

For description of sample please refer to the Laboratory Sample Description Sheet. # = Insufficient for 4 point PI
If sample is prepared in the natural state we are unable to determine % retained on the 0.425mm test sieve.

Contract Title :-	Client :-
Barnsley West Roundabouts	JPG (Leeds) Ltd

Signed :-	Name :-	Page 1 of 1
Date of issue :- 01/07/2020	Certificate No :- PI/4250/1	AEG Contract No. :- **4250**

UKAS TESTING 1367

ALLIED EXPLORATION & GEOTECHNICS LIMITED

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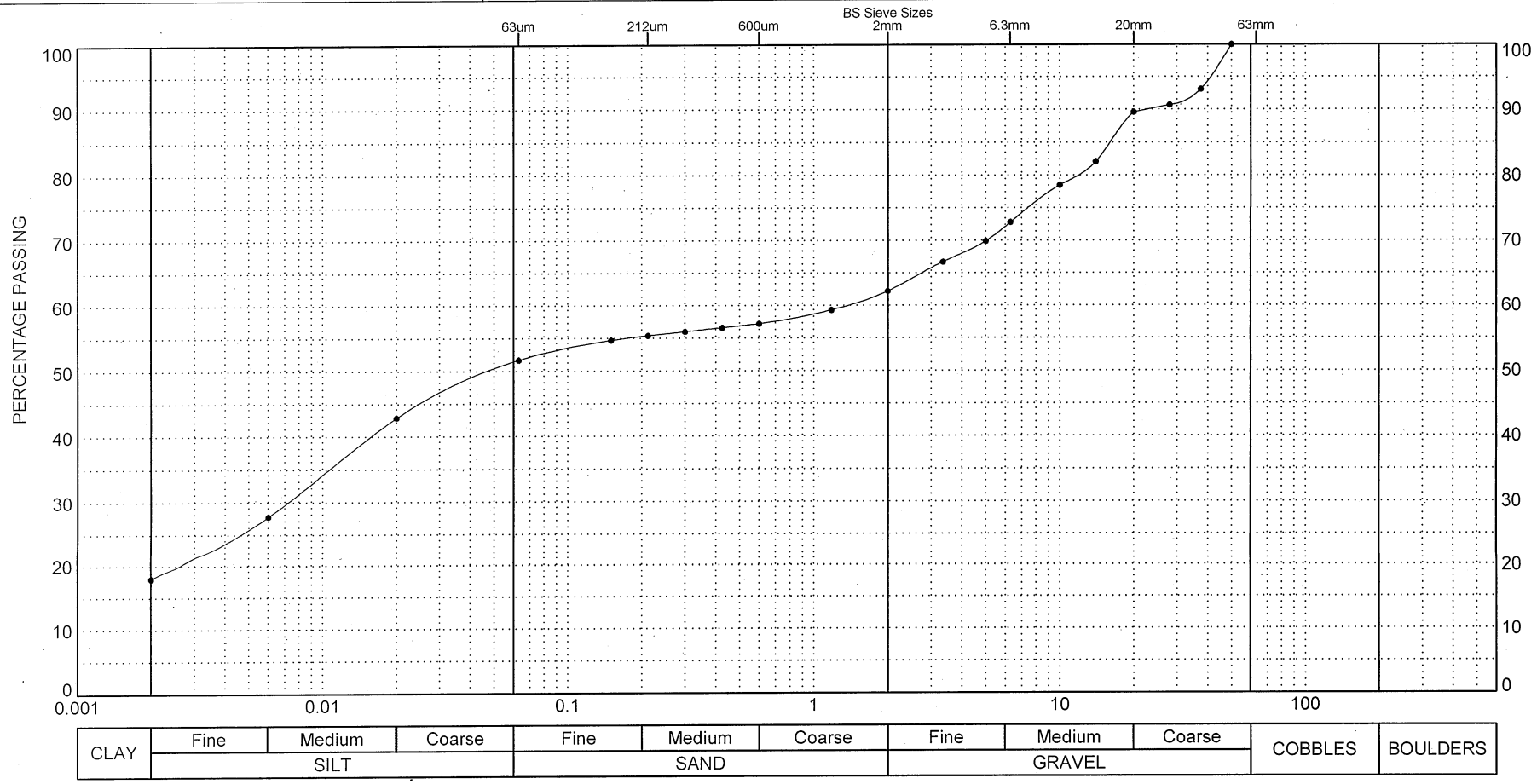
Regional Office: Unit 20, Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL - Tel: 01772 735 300 Fax: 01772 735 999

PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990

Exploratory Hole No :- **BGR_TP102**	Depth (m) :- **3.00**	Sample Type & No :- **LB6**	Specific Depth (m) :- **3.00**	Date Tested :- **22/06/2020**



Sieve Size (mm)	Passing (%)
50	100.0
37.5	93.1
28	90.7
20	89.6
14	82.1
10	78.5
6.3	72.8
5	69.9
3.35	66.7
2	62.2
1.18	59.3
0.6	57.2
0.425	56.6
0.3	56.0
0.212	55.4
0.15	54.7
0.063	51.7
0.02	42.9
0.006	27.8
0.002	17.9

For description of sample please refer to the Laboratory Sample Description Sheet

Date of issue :-	Certificate No :-	Signed :-	Name :-	Page 1 of 1
01/07/2020	PSD/4250/BGR_TP102/LB6/3.00			

Client :-	Contract Title :-	AEG Contract No :-
JPG (Leeds) Ltd	Barnsley West Roundabouts	4250

UKAS TESTING 1367

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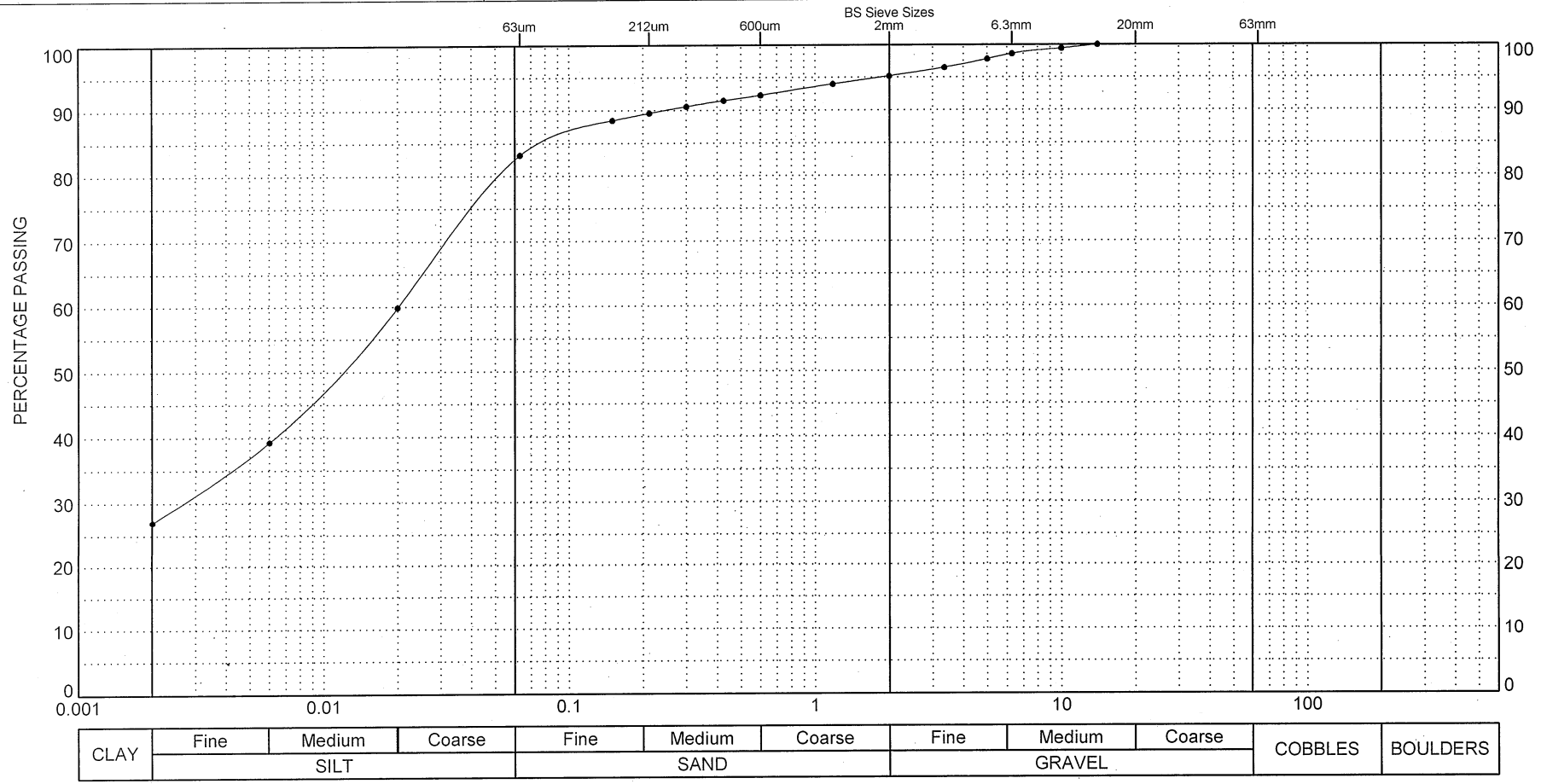
PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990

Exploratory Hole No :- **BGR_TP104**	Depth (m) :- **1.50**	Sample Type & No :- **LB4**	Specific Depth (m) :- **1.50**	Date Tested :- **22/06/2020**



Sieve Size (mm)	Passing (%)
14	100.0
10	99.4
6.3	98.6
5	97.8
3.35	96.5
2	95.2
1.18	94.0
0.6	92.3
0.425	91.5
0.3	90.6
0.212	89.6
0.15	88.5
0.063	83.2
0.02	59.9
0.006	39.3
0.002	27.0

For description of sample please refer to the Laboratory Sample Description Sheet

Date of issue :-	Certificate No :-	Signed :-	Name :-	Page 1 of 1
01/07/2020	PSD/4250/BGR_TP104/LB4/1.50	MSOP	[illegible]	

Client :-	Contract Title :-	AEG Contract No :-
JPG (Leeds) Ltd	Barnsley West Roundabouts	4250

UKAS TESTING 1367

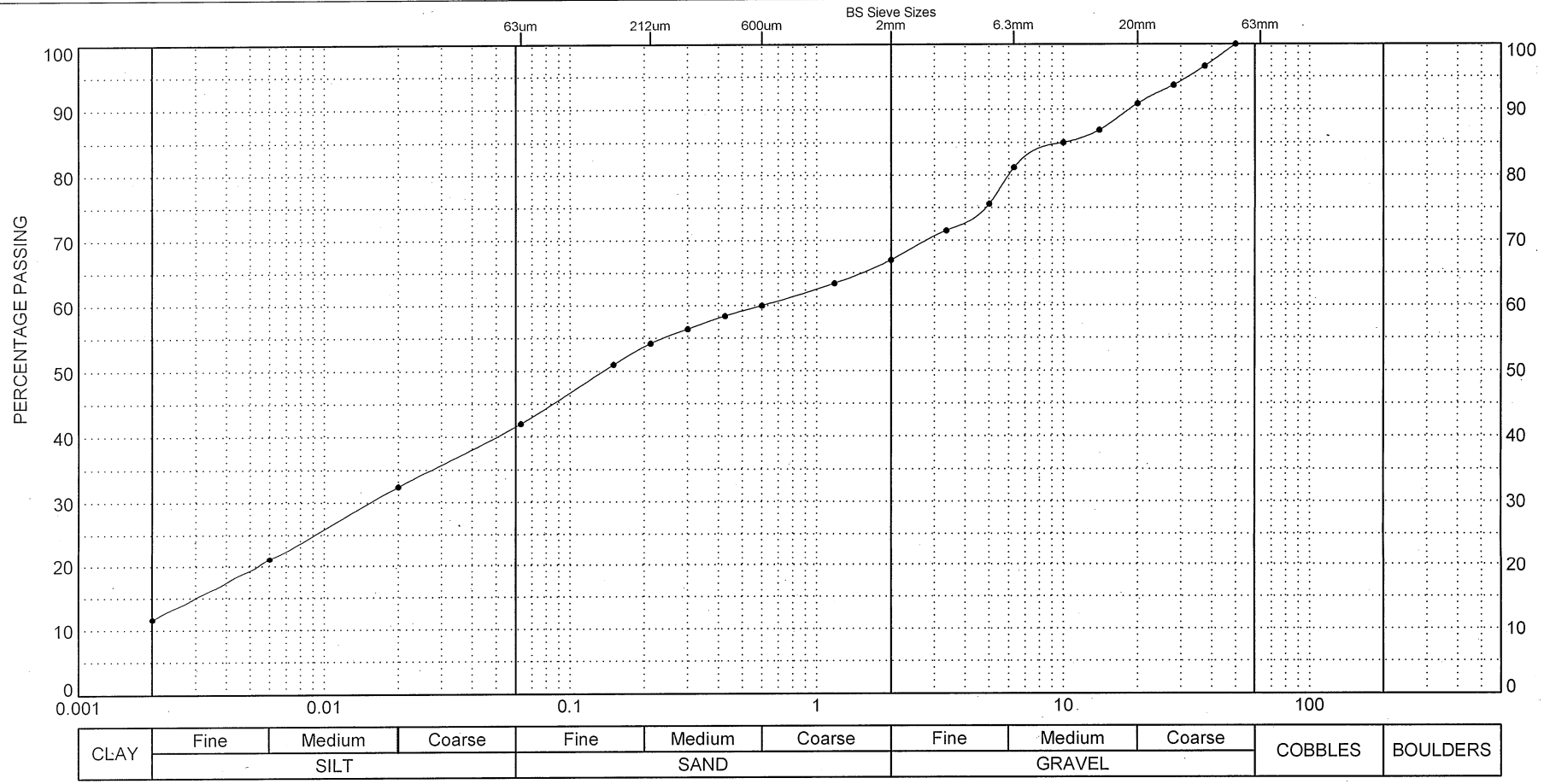
ALLIED EXPLORATION & GEOTECHNICS LIMITED

Head Office: Unit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RG - Tel: 0191 387 4700 Fax: 0191 387 4710
Regional Office: Unit 20, Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL - Tel: 01772 735 300 Fax: 01772 735 999

PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990

Exploratory Hole No :- **HCR_TP101**	Depth (m) :- **0.50**	Sample Type & No :- **LB3**	Specific Depth (m) :- **0.50**	Date Tested :- **22/06/2020**



Sieve Size (mm)	Passing (%)
50	100.0
37.5	96.6
28	93.7
20	90.9
14	86.9
10	85.0
6.3	81.2
5	75.6
3.35	71.5
2	67.0
1.18	63.4
0.6	60.0
0.425	58.4
0.3	56.4
0.212	54.2
0.15	51.0
0.063	42.0
0.02	32.4
0.006	21.0
0.002	11.7

For description of sample please refer to the Laboratory Sample Description Sheet

Date of issue :-	Certificate No :-	Signed :-	Name :-	Page 1 of 1
01/07/2020	PSD/4250/HCR_TP101/LB3/0.50	MSone	[illegible]	

Client :-	Contract Title :-	AEG Contract No :-
JPG (Leeds) Ltd	Barnsley West Roundabouts	4250

UKAS TESTING 1367

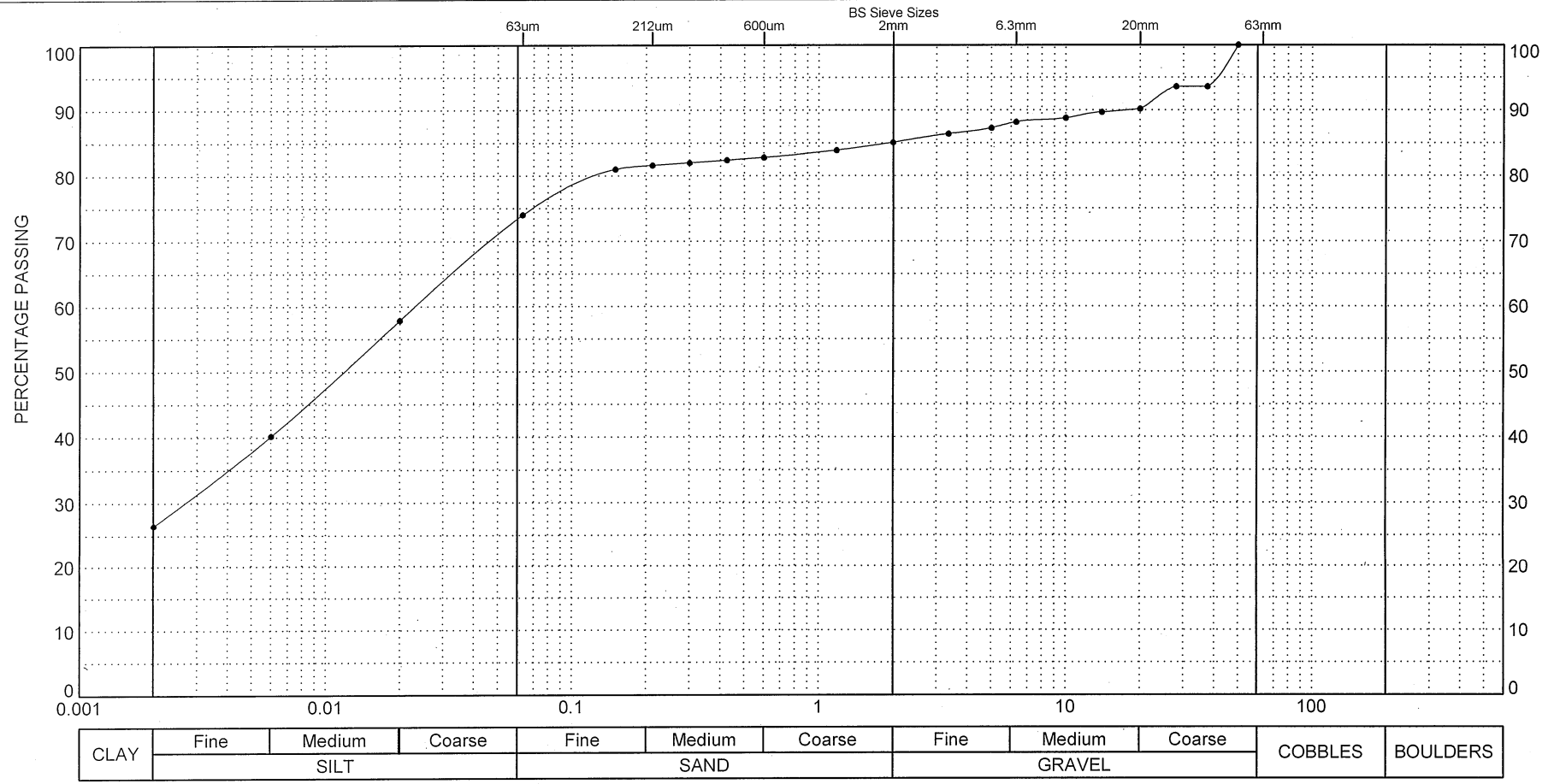
ALLIED EXPLORATION & GEOTECHNICS LIMITED

Head Office: Unit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RG - **Tel:** 0191 387 4700 **Fax:** 0191 387 4710
Regional Office: Unit 20, Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL - **Tel:** 01772 735 300 **Fax:** 01772 735 999

PARTICLE SIZE DISTRIBUTION

BS1377 : Part 2 : Clause 9.2 & 9.4 : 1990

Exploratory Hole No :- **HCR_TP105**	Depth (m) :- **3.60**	Sample Type & No :- **B8**	Specific Depth (m) :- **3.60**	Date Tested :- **22/06/2020**



Sieve Size (mm)	Passing (%)
50	100.0
37.5	93.6
28	93.6
20	90.2
14	89.7
10	88.8
6.3	88.2
5	87.3
3.35	86.4
2	85.1
1.18	83.9
0.6	82.8
0.425	82.4
0.3	82.0
0.212	81.6
0.15	81.0
0.063	74.0
0.02	57.9
0.006	40.2
0.002	26.5

For description of sample please refer to the Laboratory Sample Description Sheet

Date of issue :-	Certificate No :-	Signed :-	Name :-	Page 1 of 1
01/07/2020	PSD/4250/HCR_TP105/B8/3.60	MSeno	[illegible]	

Client :-	Contract Title :-	AEG Contract No :-
JPG (Leeds) Ltd	Barnsley West Roundabouts	4250

UKAS TESTING 1367

DETS

Certificate of Analysis

Certificate Number 20-11344

03-Jul-20

Client Allied Exploration & Geotechnics Limited
Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RG

Our Reference 20-11344

Client Reference 4250

Order No LA 2359

Contract Title Barnsley West Roundabouts

Description 12 Soil samples.

Date Received 26-Jun-20

Date Started 26-Jun-20

Date Completed 03-Jul-20

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

UKAS TESTING
2139

Summary of Chemical Analysis

Soil Samples

Our Ref 20-11344
Client Ref 4250
Contract Title Barnsley West Roundabouts

				Lab No	1689682	1689683	1689684	1689685	1689686	1689687	1689688	1689689	1689690	1689691	1689692	1689693
					BGR_TP1	BGR_TP1	BGR_TP1	BGR_TP1	BGR_TP1	BGR_TP1	HCR_TP1	HCR_TP1	HCR_TP1	HCR_TP1	HCR_TP1	HCR_TP1
				Sample ID	01	01	02	03	04	05	01	02	03	03	04	05
				Depth	0.10	1.00	2.00	1.00	2.00	1.50	2.00	1.00	0.20	3.00	3.50	2.50
				Other ID	1	4	4	5	5	5	4	5	2	5	7	5
				Sample Type	J	J	J	J	J	J	J	J	J	J	J	J
				Sampling Date	10/06/2020	10/06/2020	10/06/2020	10/06/2020	10/06/2020	10/06/2020	09/06/2020	09/06/2020	09/06/2020	09/06/2020	09/06/2020	09/06/2020
				Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**													
Inorganics																
pH	DETSC 2008#		pH		6.7	7.2	7.8	7.7	7.2	7.3	11.1	7.6	7.1	7.1	5.6	7.3
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l		16	22	54	56	16	24	190	140	160	160	89	130

Key: # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Information in Support of the Analytical Results

Our Ref 20-11344
Client Ref 4250
Contract Barnsley West Roundabouts

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1689682	BGR_TP101 0.10 SOIL	10/06/20	PT 1L	pH + Conductivity (7 days)	
1689683	BGR_TP101 1.00 SOIL	10/06/20	PT 1L	pH + Conductivity (7 days)	
1689684	BGR_TP102 2.00 SOIL	10/06/20	PT 1L	pH + Conductivity (7 days)	
1689685	BGR_TP103 1.00 SOIL	10/06/20	PT 1L	pH + Conductivity (7 days)	
1689686	BGR_TP104 2.00 SOIL	10/06/20	PT 1L	pH + Conductivity (7 days)	
1689687	BGR_TP105 1.50 SOIL	10/06/20	PT 1L	pH + Conductivity (7 days)	
1689688	HCR_TP101 2.00 SOIL	09/06/20	PT 1L	pH + Conductivity (7 days)	
1689689	HCR_TP102 1.00 SOIL	09/06/20	PT 1L	pH + Conductivity (7 days)	
1689690	HCR_TP103 0.20 SOIL	09/06/20	PT 1L	pH + Conductivity (7 days)	
1689691	HCR_TP103 3.00 SOIL	09/06/20	PT 1L	pH + Conductivity (7 days)	
1689692	HCR_TP104 3.50 SOIL	09/06/20	PT 1L	pH + Conductivity (7 days)	
1689693	HCR_TP105 2.50 SOIL	09/06/20	PT 1L	pH + Conductivity (7 days)	

Key: P-Plastic T-Tub

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

Soil Analysis Notes

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

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

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

Disposal

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

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

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MOISTURE CONTENT/DRY DENSITY RELATIONSHIP

BS 1377 : Part 4 : 1990 (Test deviated from standard due to excessive coarse material)

Specimen Identification

Exploratory Hole No :- **BGR_TP101** Depth (m) :- **1.50** Sample Type & No :- **LB6**

Test Method 2.5kg Compaction Separate Samples

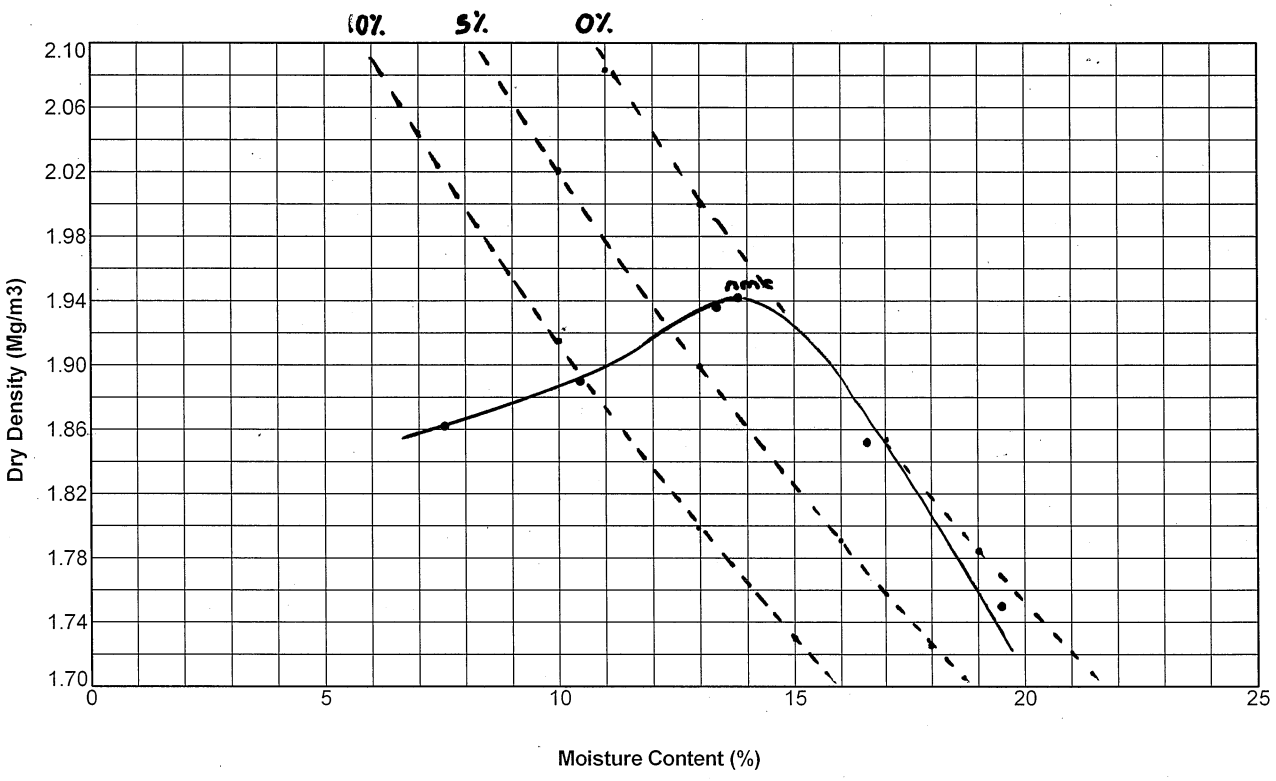
Test Results

Optimum Moisture Content (%) = **13.8** Particle Density (Assumed) = **2.70**

Maximum Dry Density (Mg/m3) = **1.94** Retained on 20mm Sieve (%) = **24.8**

Date Tested = **29/06/2020** Retained on 37.5mm Sieve (%) = **12.5**

Remarks :



For description of sample please refer to the Laboratory Sample Description Sheet

Contract Title :-	Client :-
Barnsley West Roundabouts	JPG (Leeds) Ltd

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Date of issue :- 01/07/2020	Certificate No :- COMP/4250/1	AEG Contract No. :- 4250	UKAS TESTING 1367

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MOISTURE CONTENT/DRY DENSITY RELATIONSHIP

BS 1377 : Part 4 : 1990 (Test deviated from standard due to excessive coarse material)

Specimen Identification

Exploratory Hole No :- **BGR_TP101** Depth (m) :- **1.50** Sample Type & No :- **LB6**

Test Method 4.5kg Compaction Separate Samples

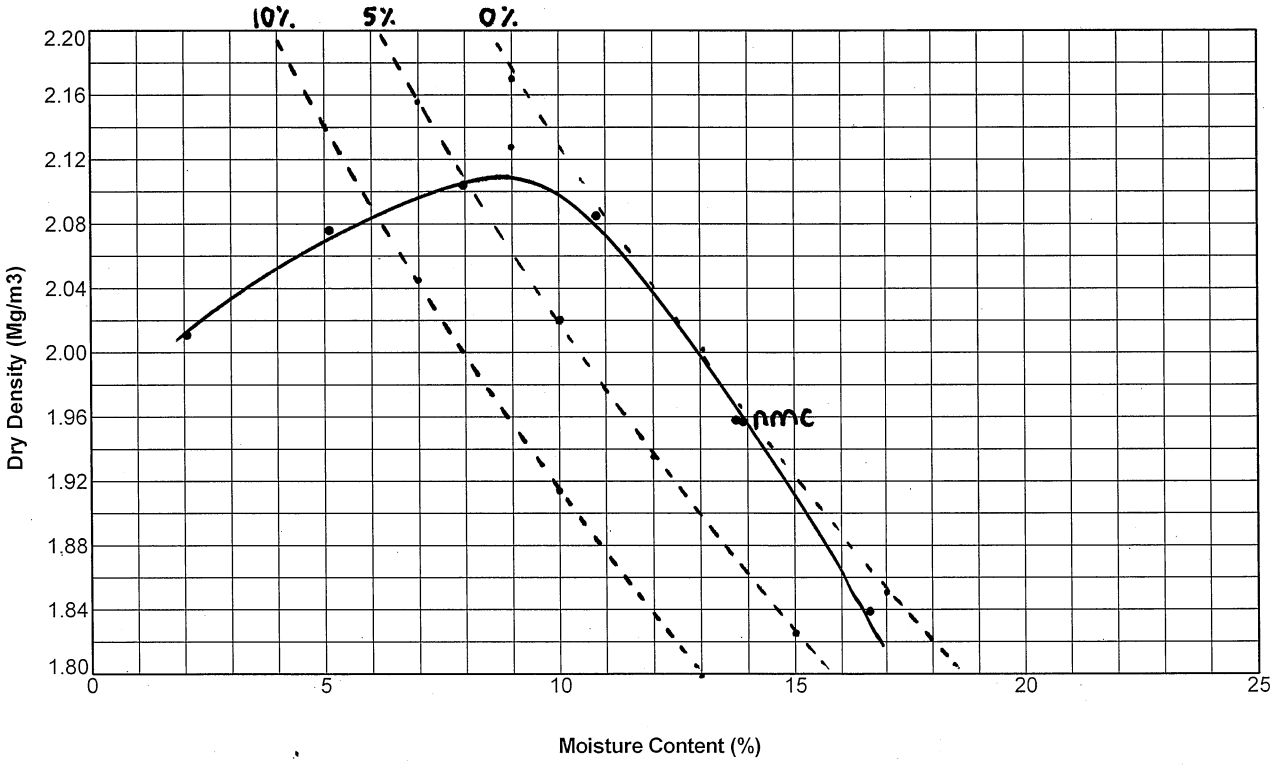
Test Results

Optimum Moisture Content (%) = **9.0** Particle Density (Assumed) = **2.70**

Maximum Dry Density (Mg/m3) = **2.11** Retained on 20mm Sieve (%) = **24.8**

Date Tested = **29/06/2020** Retained on 37.5mm Sieve (%) = **12.5**

Remarks :



For description of sample please refer to the Laboratory Sample Description Sheet

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Barnsley West Roundabouts	JPG (Leeds) Ltd

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Date of issue :- 01/07/2020	Certificate No :- COMP/4250/1	AEG Contract No. :- **4250**	UKAS TESTING 1367

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MOISTURE CONTENT/DRY DENSITY RELATIONSHIP

BS 1377 : Part 4 : 1990 (Test deviated from standard due to excessive coarse material)

Specimen Identification

Exploratory Hole No :- **BGR_TP103** Depth (m) :- **1.50** Sample Type & No :- **LB6**

Test Method 2.5kg Compaction Separate Samples

Test Results

Optimum Moisture Content (%) = **16.0**

Particle Density (Assumed) = **2.80**

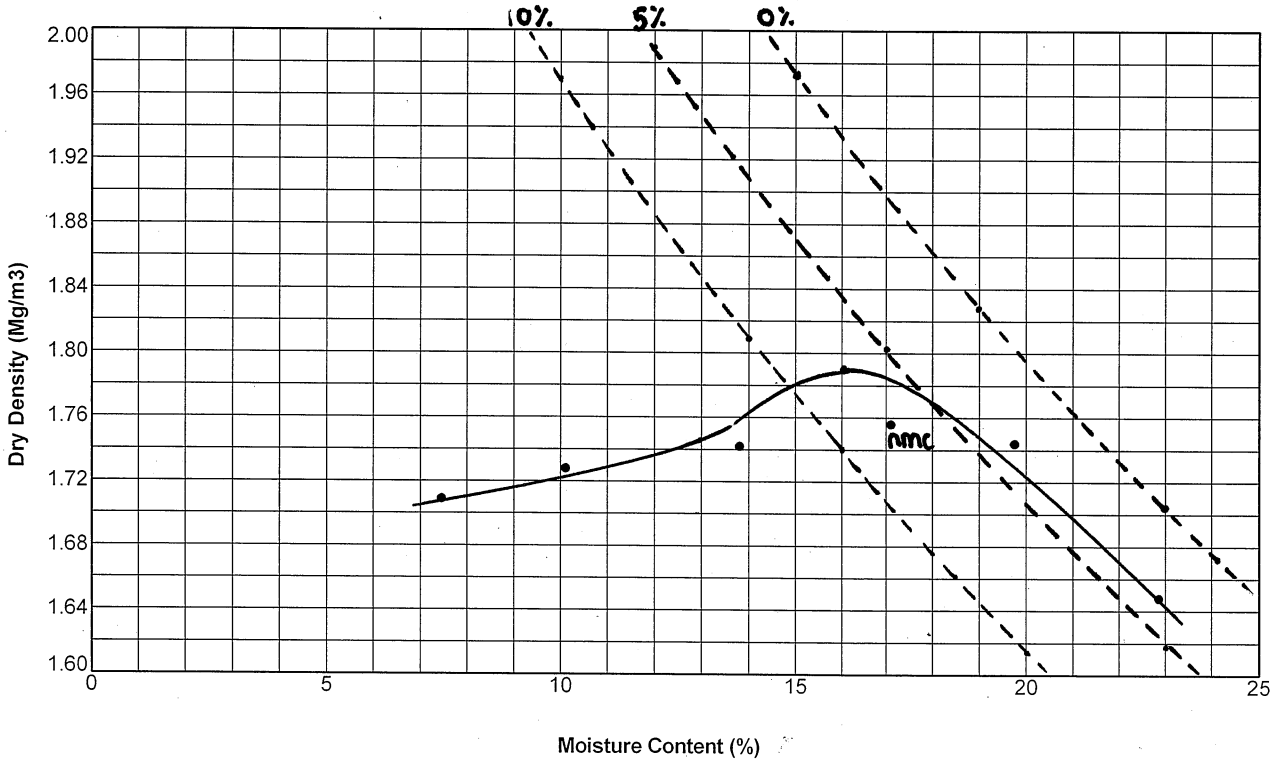
Maximum Dry Density (Mg/m3) = **1.79**

Retained on 20mm Sieve (%) = **9.8**

Date Tested = **24/06/2020**

Retained on 37.5mm Sieve (%) = **9.2**

Remarks :



For description of sample please refer to the Laboratory Sample Description Sheet

Contract Title :-	Client :-
Barnsley West Roundabouts	JPG (Leeds) Ltd

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Date of issue :- 06/07/2020	Certificate No :- COMP/4250/1	AEG Contract No. :- 4250	UKAS TESTING 1367

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MOISTURE CONTENT/DRY DENSITY RELATIONSHIP

BS 1377 : Part 4 : 1990 (Test deviated from standard due to excessive coarse material)

Specimen Identification

Exploratory Hole No :- **BGR_TP103** Depth (m) :- **1.50** Sample Type & No :- **LB6**

Test Method 4.5kg Compaction Separate Samples

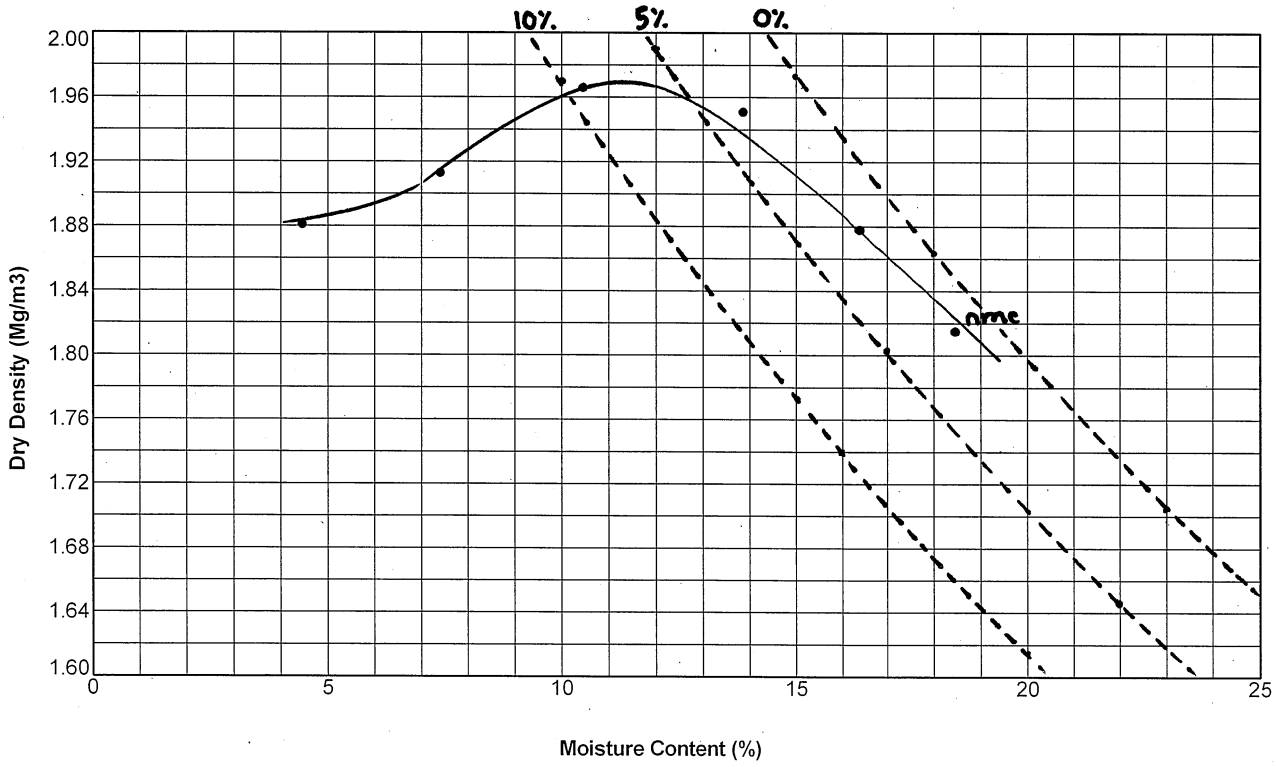
Test Results

Optimum Moisture Content (%) = **11.5** Particle Density (Assumed) = **2.80**

Maximum Dry Density (Mg/m3) = **1.97** Retained on 20mm Sieve (%) = **9.8**

Date Tested = **24/06/2020** Retained on 37.5mm Sieve (%) = **9.2**

Remarks :



For description of sample please refer to the Laboratory Sample Description Sheet

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Barnsley West Roundabouts	JPG (Leeds) Ltd

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MOISTURE CONTENT/DRY DENSITY RELATIONSHIP

BS 1377 : Part 4 : 1990

Specimen Identification

Exploratory Hole No :- **BGR_TP105** Depth (m) :- **2.00** Sample Type & No :- **LB6**

Test Method 2.5kg Compaction Single Sample

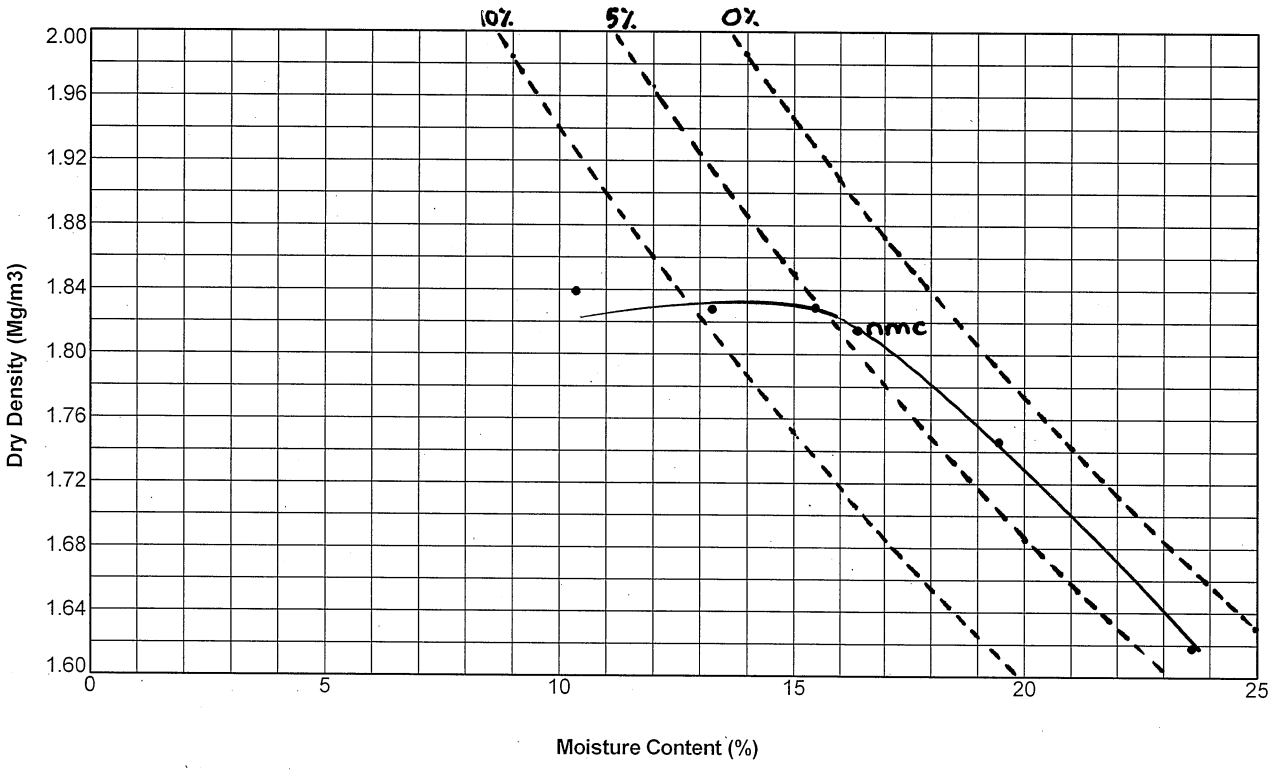
Test Results

Optimum Moisture Content (%) = **15.5** Particle Density (Assumed) = **2.75**

Maximum Dry Density (Mg/m3) = **1.83** Retained on 20mm Sieve (%) = **0.0**

Date Tested = **25/06/2020** Retained on 37.5mm Sieve (%) = **0.0**

Remarks :



For description of sample please refer to the Laboratory Sample Description Sheet

Contract Title :-	Client :-
Barnsley West Roundabouts	JPG (Leeds) Ltd

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Date of issue :- 06/07/2020	Certificate No :- COMP/4250/1	AEG Contract No. :- 4250	UKAS TESTING 1367

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MOISTURE CONTENT/DRY DENSITY RELATIONSHIP

BS 1377 : Part 4 : 1990

Specimen Identification

Exploratory Hole No :- **BGR_TP105** Depth (m) :- **2.00** Sample Type & No :- **LB6**

Test Method 4.5kg Compaction Single Sample

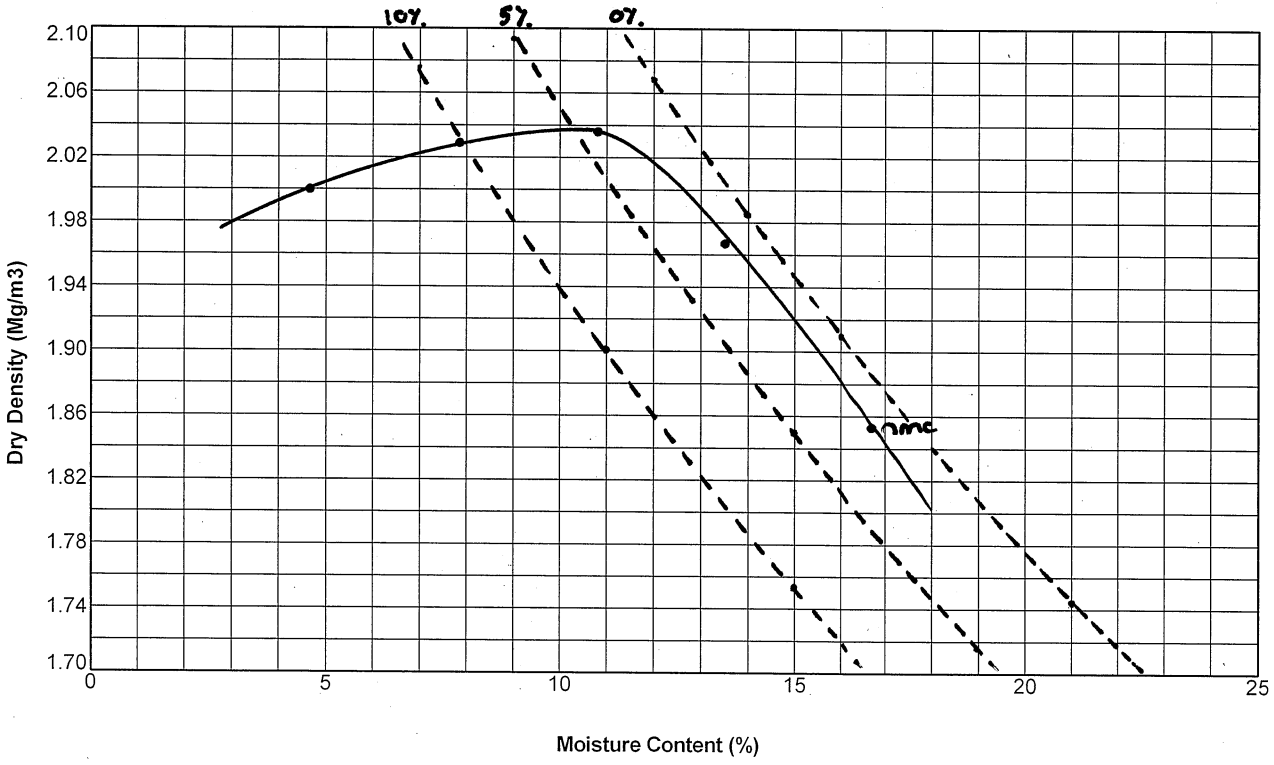
Test Results

Optimum Moisture Content (%) = **10.8** Particle Density (Assumed) = **2.75**

Maximum Dry Density (Mg/m3) = **2.04** Retained on 20mm Sieve (%) = **0.0**

Date Tested = **25/06/2020** Retained on 37.5mm Sieve (%) = **0.0**

Remarks :



For description of sample please refer to the Laboratory Sample Description Sheet

Contract Title :-	Client :-
Barnsley West Roundabouts	JPG (Leeds) Ltd

Signed :-	Name :-		Page 1 of 1
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MOISTURE CONTENT/DRY DENSITY RELATIONSHIP

BS 1377 : Part 4 : 1990 (Test deviated from standard due to excessive coarse material)

Specimen Identification

Exploratory Hole No :- **HCR_TP103** Depth (m) :- **3.50** Sample Type & No :- **LB6**

Test Method 2.5kg Compaction Separate Samples

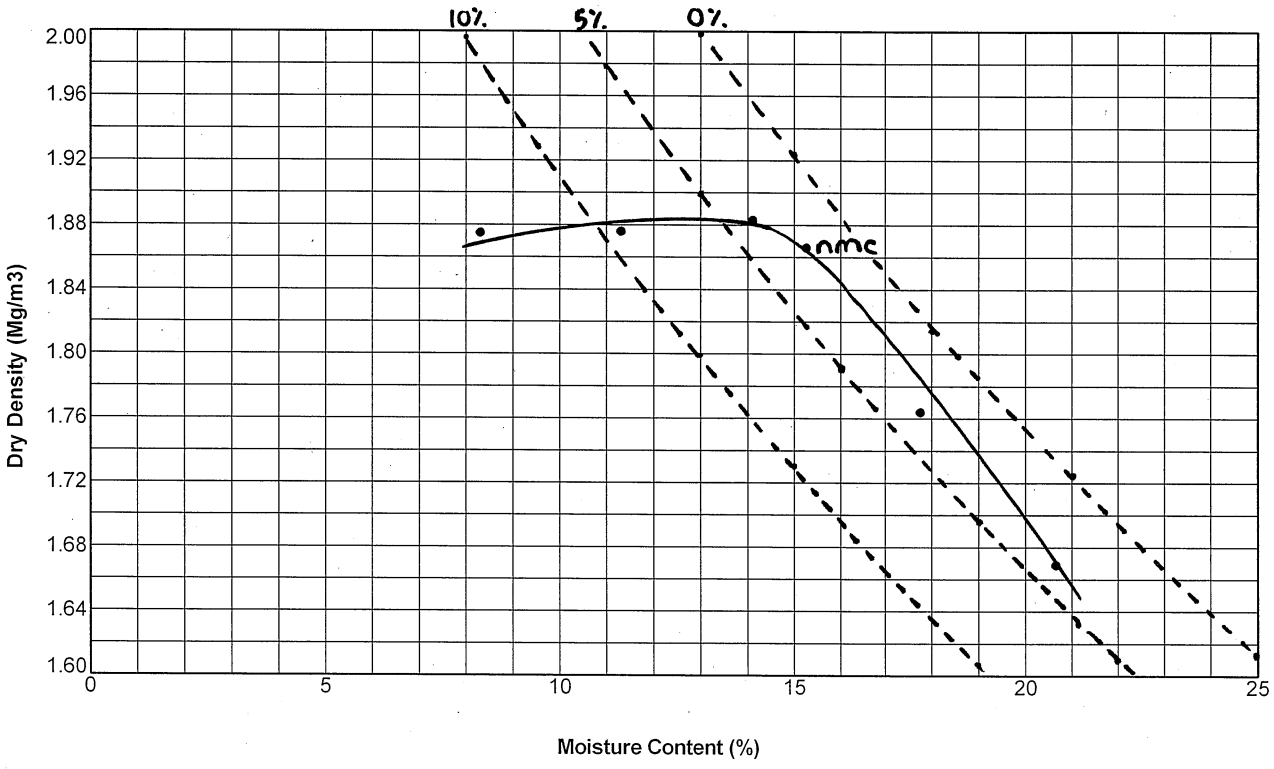
Test Results

Optimum Moisture Content (%) = **14.1** Particle Density (Assumed) = **2.70**

Maximum Dry Density (Mg/m3) = **1.88** Retained on 20mm Sieve (%) = **18.2**

Date Tested = **23/06/2020** Retained on 37.5mm Sieve (%) = **9.9**

Remarks :



For description of sample please refer to the Laboratory Sample Description Sheet

Contract Title :-	Client :-
Barnsley West Roundabouts	JPG (Leeds) Ltd

Signed :- msone	Name :- [illegible]		Page 1 of 1
Date of issue :- 06/07/2020	Certificate No :- COMP/4250/1	AEG Contract No. :- 4250	UKAS TESTING 1367

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MOISTURE CONTENT/DRY DENSITY RELATIONSHIP

BS 1377 : Part 4 : 1990 (Test deviated from standard due to excessive coarse material)

Specimen Identification

Exploratory Hole No :- **HCR_TP103** Depth (m) :- **3.50** Sample Type & No :- **LB6**

Test Method 4.5kg Compaction Separate Samples

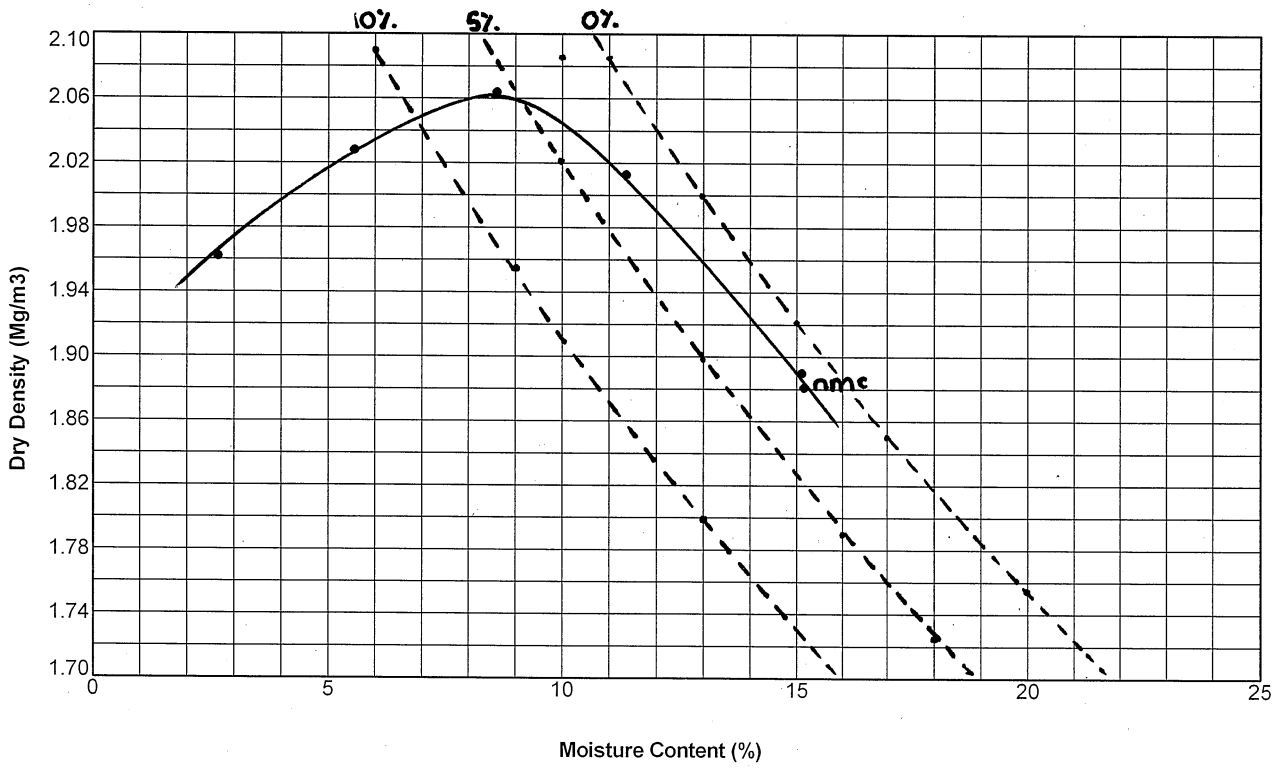
Test Results

Optimum Moisture Content (%) = **8.6** Particle Density (Assumed) = **2.70**

Maximum Dry Density (Mg/m3) = **2.06** Retained on 20mm Sieve (%) = **18.2**

Date Tested = **23/06/2020** Retained on 37.5mm Sieve (%) = **9.9**

Remarks :



For description of sample please refer to the Laboratory Sample Description Sheet

Contract Title :-	Client :-
Barnsley West Roundabouts	JPG (Leeds) Ltd

Signed :- msone	Name :- M SELWYN	Page 1 of 1	
Date of issue :- 06/07/2020	Certificate No :- COMP/4250/1	AEG Contract No. :- 4250	UKAS TESTING 1367

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MOISTURE CONTENT/DRY DENSITY RELATIONSHIP

BS 1377 : Part 4 : 1990

Specimen Identification

Exploratory Hole No :- **HCR_TP104** Depth (m) :- **3.60** Sample Type & No :- **B8**

Test Method 2.5kg Compaction Single Sample

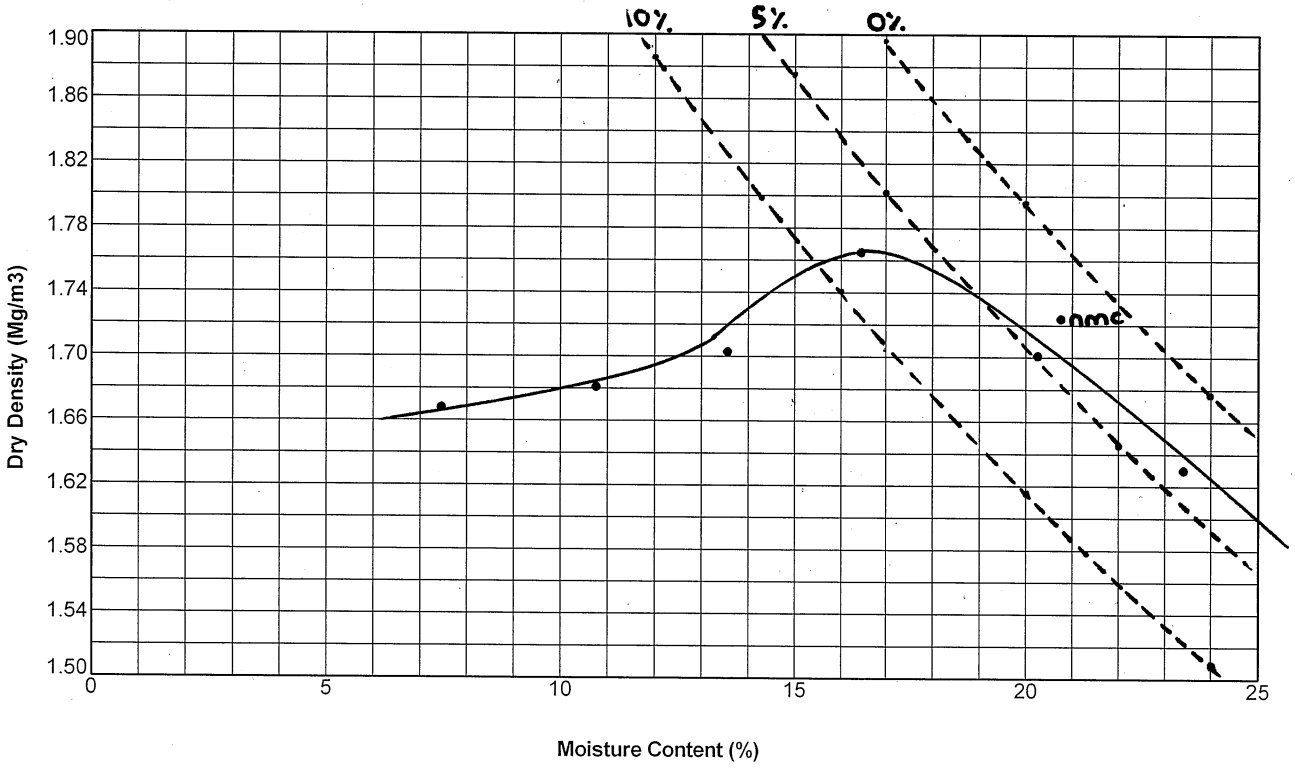
Test Results

Optimum Moisture Content (%) = **16.5** Particle Density (Assumed) = **2.80**

Maximum Dry Density (Mg/m3) = **1.77** Retained on 20mm Sieve (%) = **2.2**

Date Tested = **24/06/2020** Retained on 37.5mm Sieve (%) = **1.5**

Remarks :



For description of sample please refer to the Laboratory Sample Description Sheet

Contract Title :-	Client :-
Barnsley West Roundabouts	JPG (Leeds) Ltd

Signed :-	Name :-	Page 1 of 1	
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MOISTURE CONTENT/DRY DENSITY RELATIONSHIP

BS 1377 : Part 4 : 1990

Specimen Identification

Exploratory Hole No :- **HCR_TP104** Depth (m) :- **3.60** Sample Type & No :- **B8**

Test Method 4.5kg Compaction Single Sample

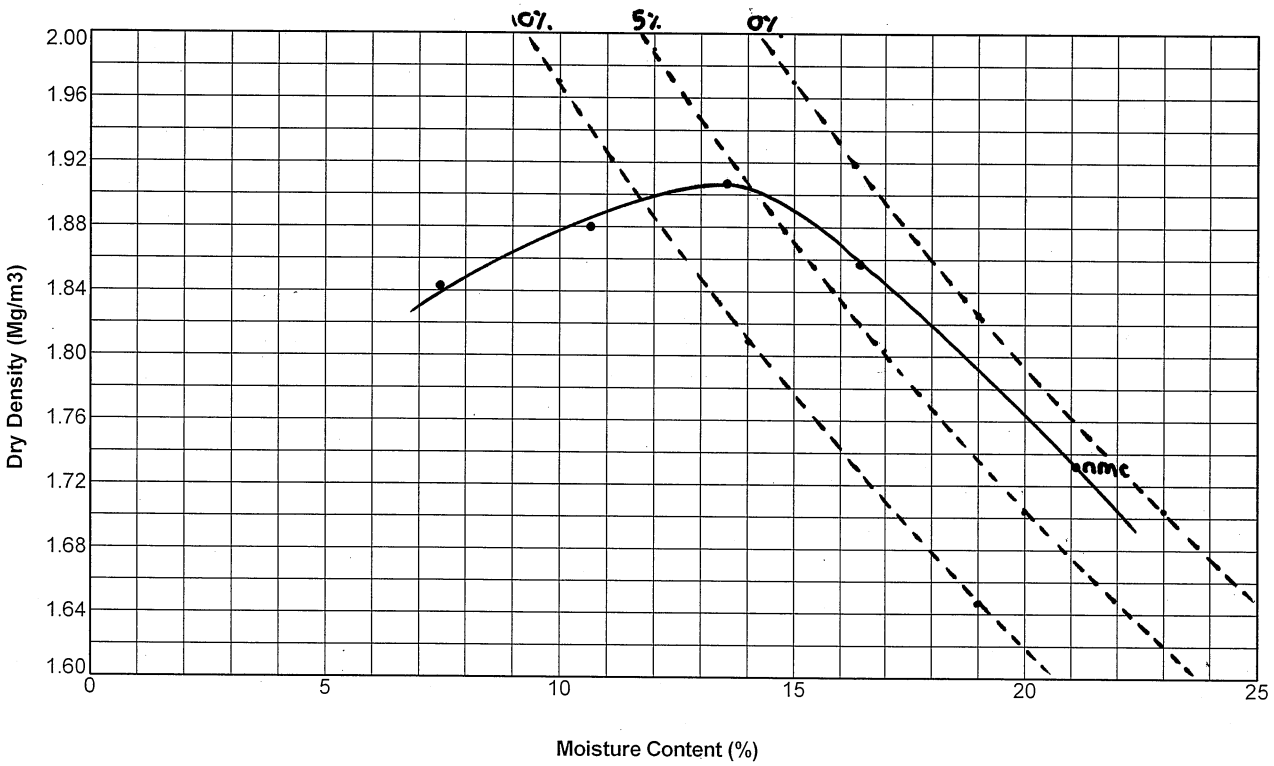
Test Results

Optimum Moisture Content (%) = **13.6** Particle Density (Assumed) = **2.80**

Maximum Dry Density (Mg/m3) = **1.91** Retained on 20mm Sieve (%) = **2.2**

Date Tested = **24/06/2020** Retained on 37.5mm Sieve (%) = **1.5**

Remarks :



For description of sample please refer to the Laboratory Sample Description Sheet

Contract Title :-	Client :-
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Signed :-	Name :-		Page 1 of 1
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MOISTURE CONTENT/DRY DENSITY RELATIONSHIP

BS 1377 : Part 4 : 1990 (Test deviated from standard due to excessive coarse material)

Specimen Identification

Exploratory Hole No :- **HCR_TP105** Depth (m) :- **3.00** Sample Type & No :- **LB6**

Test Method 2.5kg Compaction Separate Samples

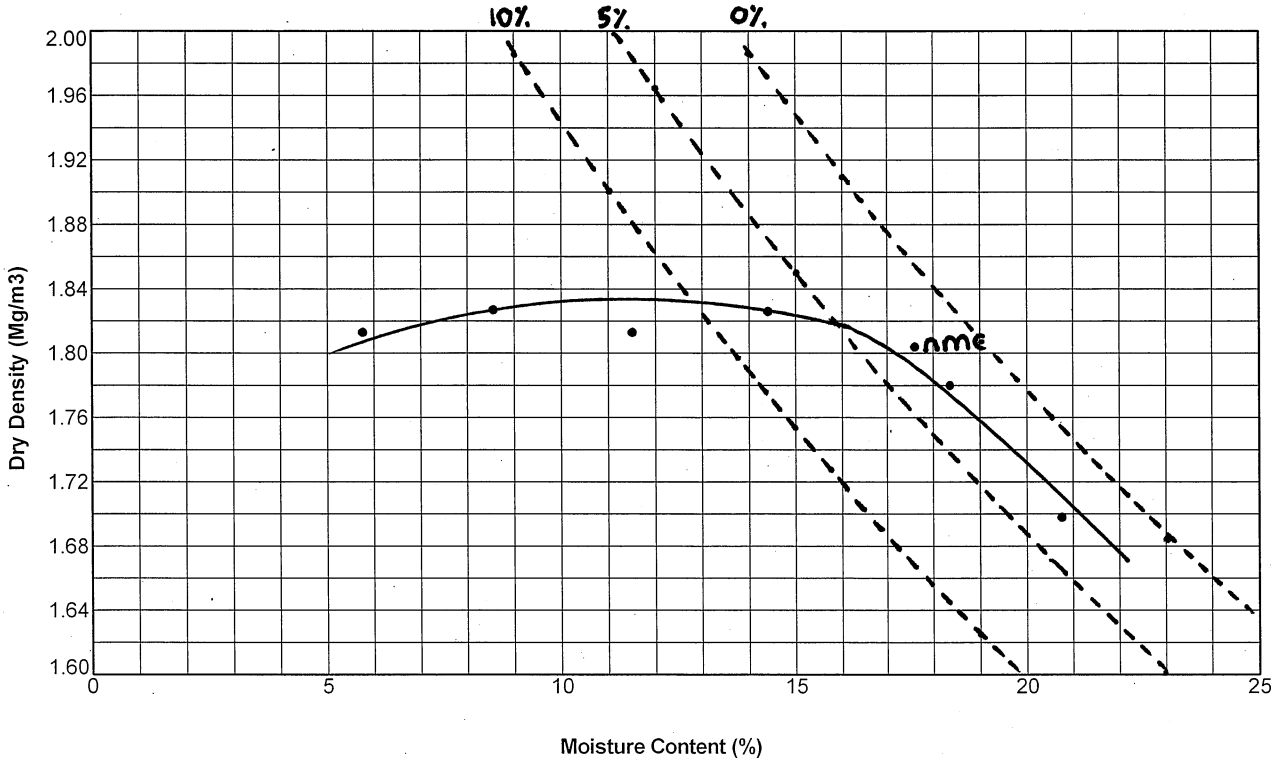
Test Results

Optimum Moisture Content (%) = **12.0** Particle Density (Assumed) = **2.75**

Maximum Dry Density (Mg/m3) = **1.83** Retained on 20mm Sieve (%) = **14.3**

Date Tested = **23/06/2020** Retained on 37.5mm Sieve (%) = **6.0**

Remarks :



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Barnsley West Roundabouts	JPG (Leeds) Ltd

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MOISTURE CONTENT/DRY DENSITY RELATIONSHIP

BS 1377 : Part 4 : 1990 (Test deviated from standard due to excessive coarse material)

Specimen Identification

Exploratory Hole No :- **HCR_TP105** Depth (m) :- **3.00** Sample Type & No :- **LB6**

Test Method 4.5kg Compaction Separate Samples

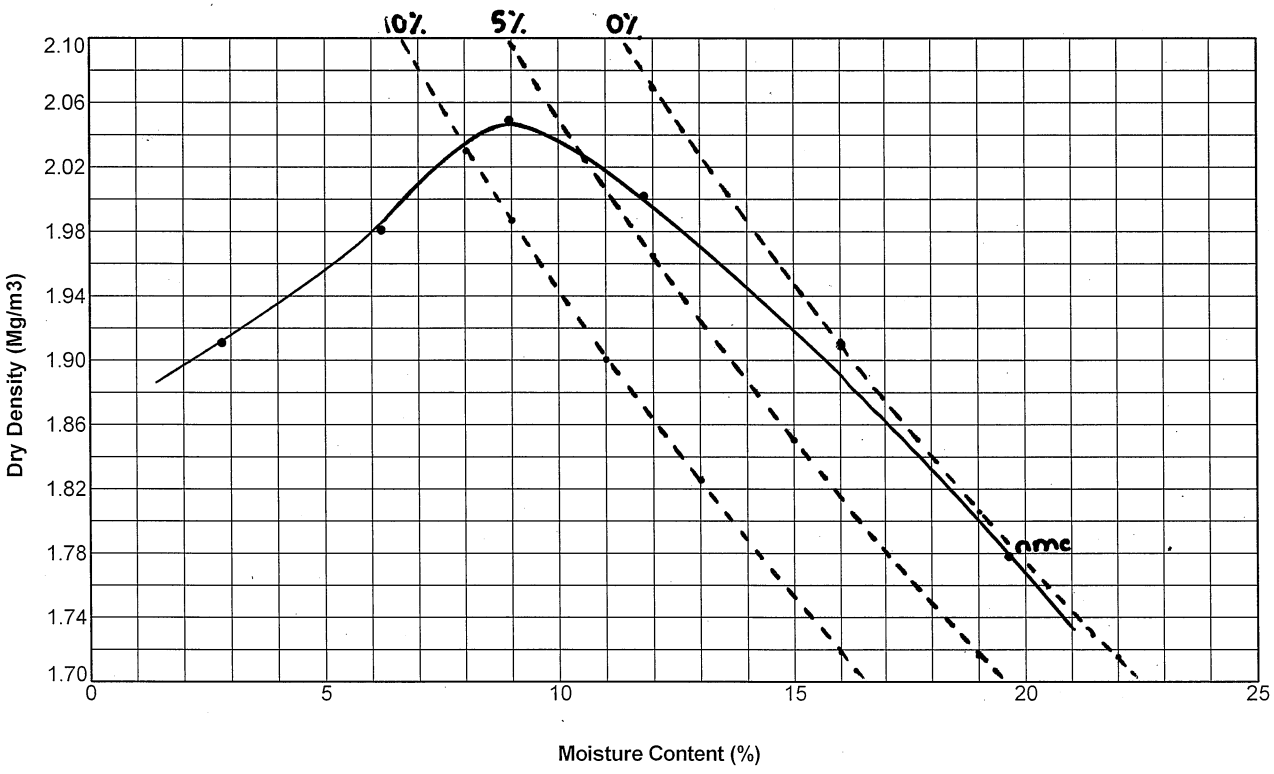
Test Results

Optimum Moisture Content (%) = **9.0** Particle Density (Assumed) = **2.75**

Maximum Dry Density (Mg/m3) = **2.05** Retained on 20mm Sieve (%) = **14.3**

Date Tested = **23/06/2020** Retained on 37.5mm Sieve (%) = **5.0**

Remarks :



For description of sample please refer to the Laboratory Sample Description Sheet

Contract Title :-	Client :-
Barnsley West Roundabouts	JPG (Leeds) Ltd

Signed :- MSeve	Name :-		Page 1 of 1
Date of issue :- 01/07/2020	Certificate No :- COMP/4250/1	AEG Contract No. :- 4250	UKAS TESTING 1367

ALLIED EXPLORATION & GEOTECHNICS LIMITED

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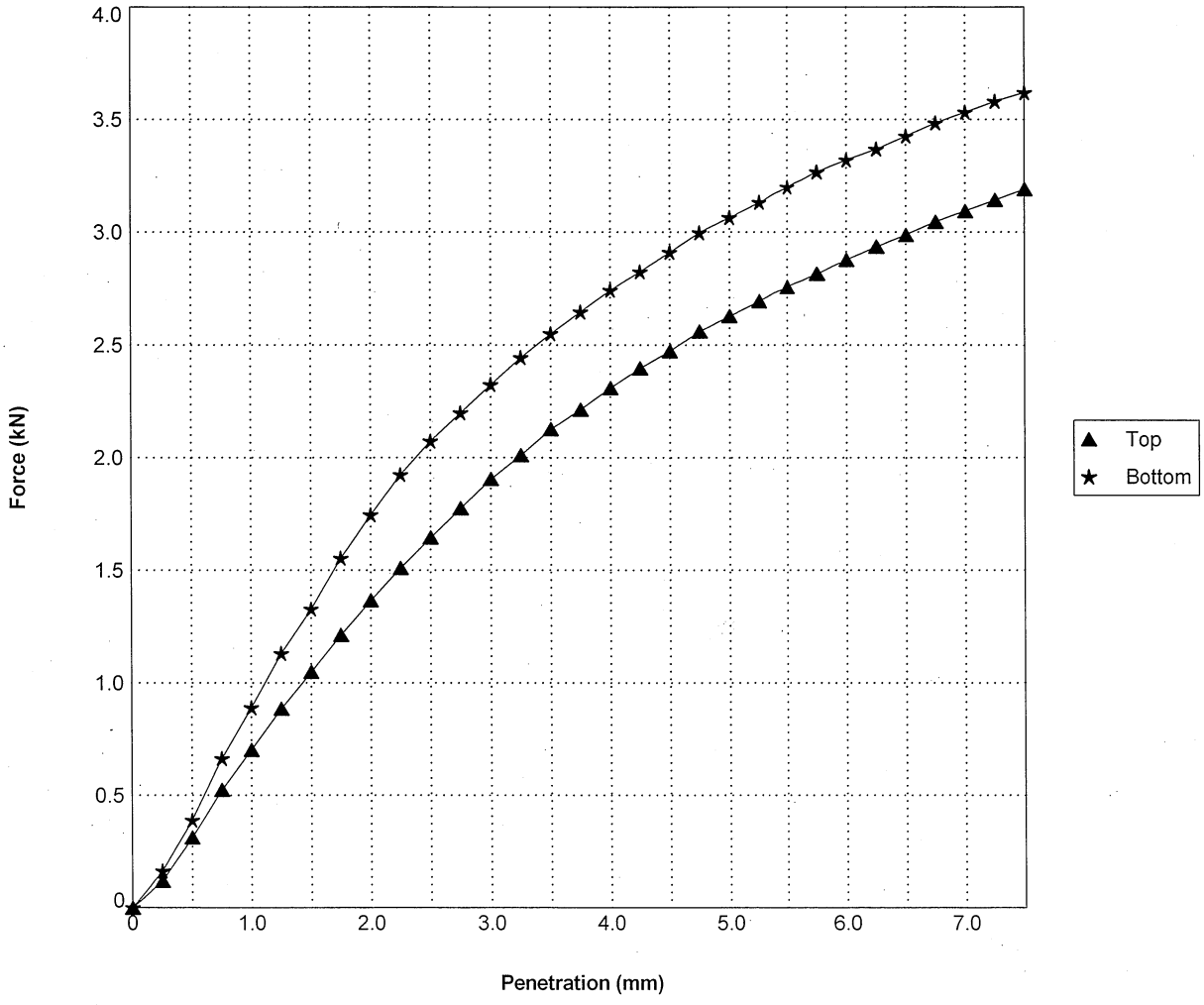
DETERMINATION OF THE CALIFORNIA BEARING RATIO

BS 1377 : Part 4 : 1990 and Part 2 : Clause 3.2 : 1990

Exploratory Hole No.- **BGR_TP104** Sample No.- **LB4** Depth (m)- **1.50**

"As Received" Moisture Content (%) :	18.9	Surcharge (Kg) :	6
Retained on 20mm (%) :	0.0	Seating Load (N) :	Top 50 / Bottom 50
Correction Needed :	No	Test Moisture Content (%) :	Top 19.0 / Bottom 18.8
Soaking Time (Days) :	N/A	Bulk Density (Mg/m^3) :	2.06
Swelling (mm) :	N/A	Dry Density (Mg/m^3) :	1.74
Date Tested :	23/06/2020	CBR Value (%) :	Top 13.1 / Bottom 15.7
Preparation Method :	2.5kg Compaction		
Remarks :			



For description of sample please refer to the Laboratory Sample Description Sheet

Contract Title :- Barnsley West Roundabouts	Client :- JPG (Leeds) Ltd

Signed :-	Name :-		Page 1 of 1
Date of issue :- 01/07/2020	Certificate No :- CBR/4250/BGR_TP104/LB4/1.50/1	AEG Contract No. :- 4250	UKAS TESTING 1367

ALLIED EXPLORATION & GEOTECHNICS LIMITED

Head Office: Unit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RG - **Tel:** 0191 387 4700 **Fax:** 0191 387 4710
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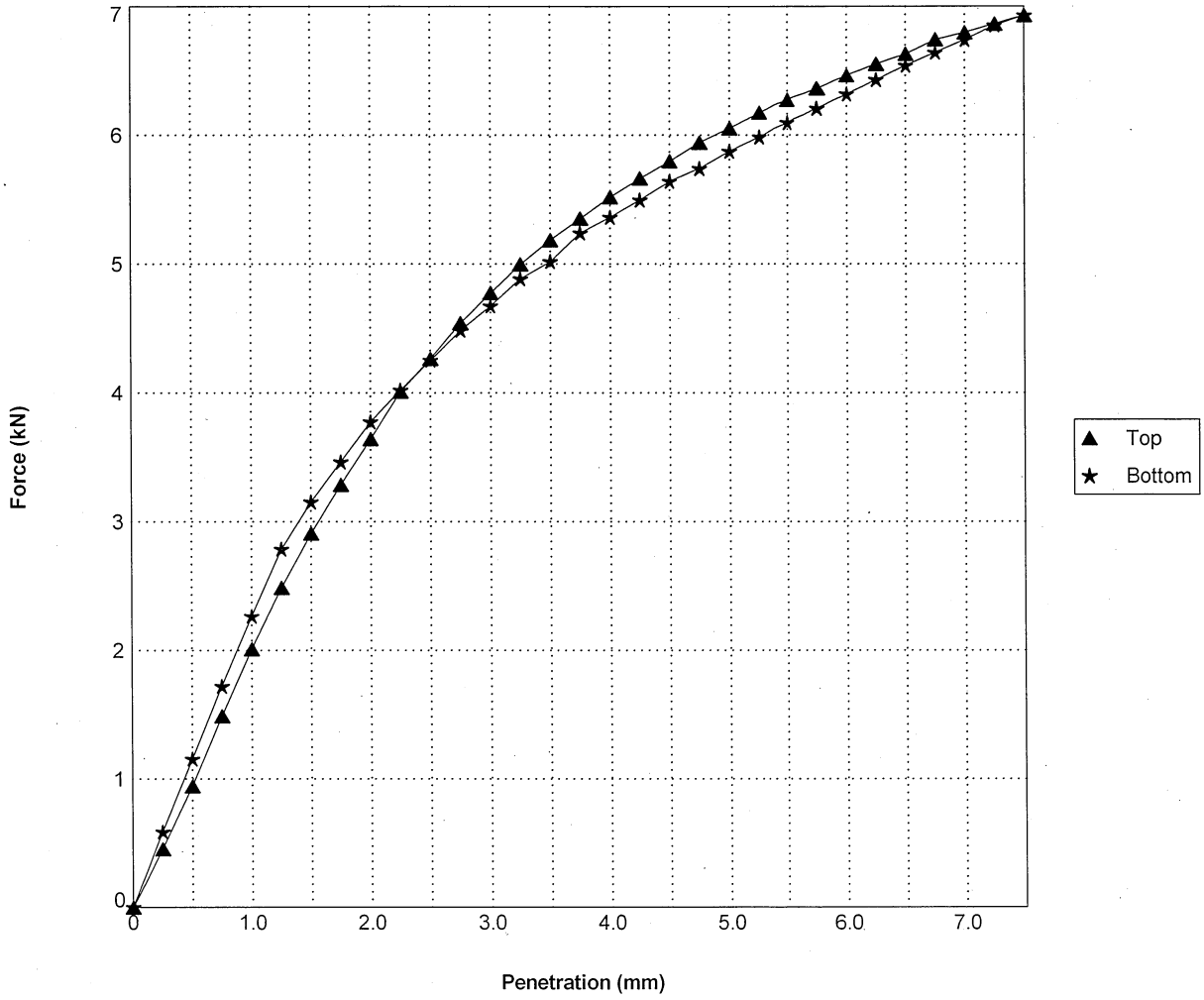
DETERMINATION OF THE CALIFORNIA BEARING RATIO

BS 1377 : Part 4 : 1990 and Part 2 : Clause 3.2 : 1990

Exploratory Hole No.- **BGR_TP105** Sample No.- **LB4** Depth (m)- **0.50**

"As Received" Moisture Content (%) :	11.1	Surcharge (Kg) :	6
Retained on 20mm (%) :	8.2	Seating Load (N) :	Top 250 / Bottom 250
Correction Needed :	No	Test Moisture Content (%) :	Top 11.7 / Bottom 10.5
Soaking Time (Days) :	N/A	Bulk Density (Mg/m^3) :	1.98
Swelling (mm) :	N/A	Dry Density (Mg/m^3) :	1.78
Date Tested :	23/06/2020	CBR Value (%) :	Top 32.3 / Bottom 32.2
Preparation Method :	2.5kg Compaction		
Remarks :			



For description of sample please refer to the Laboratory Sample Description Sheet

Contract Title :- **Barnsley West Roundabouts**	Client :- **JPG (Leeds) Ltd**

Signed :-	Name :-		Page 1 of 1
Date of issue :- 01/07/2020	Certificate No :- CBR/4250/BGR_TP105/LB4/0.50/1	AEG Contract No. :- **4250**	UKAS TESTING 1367

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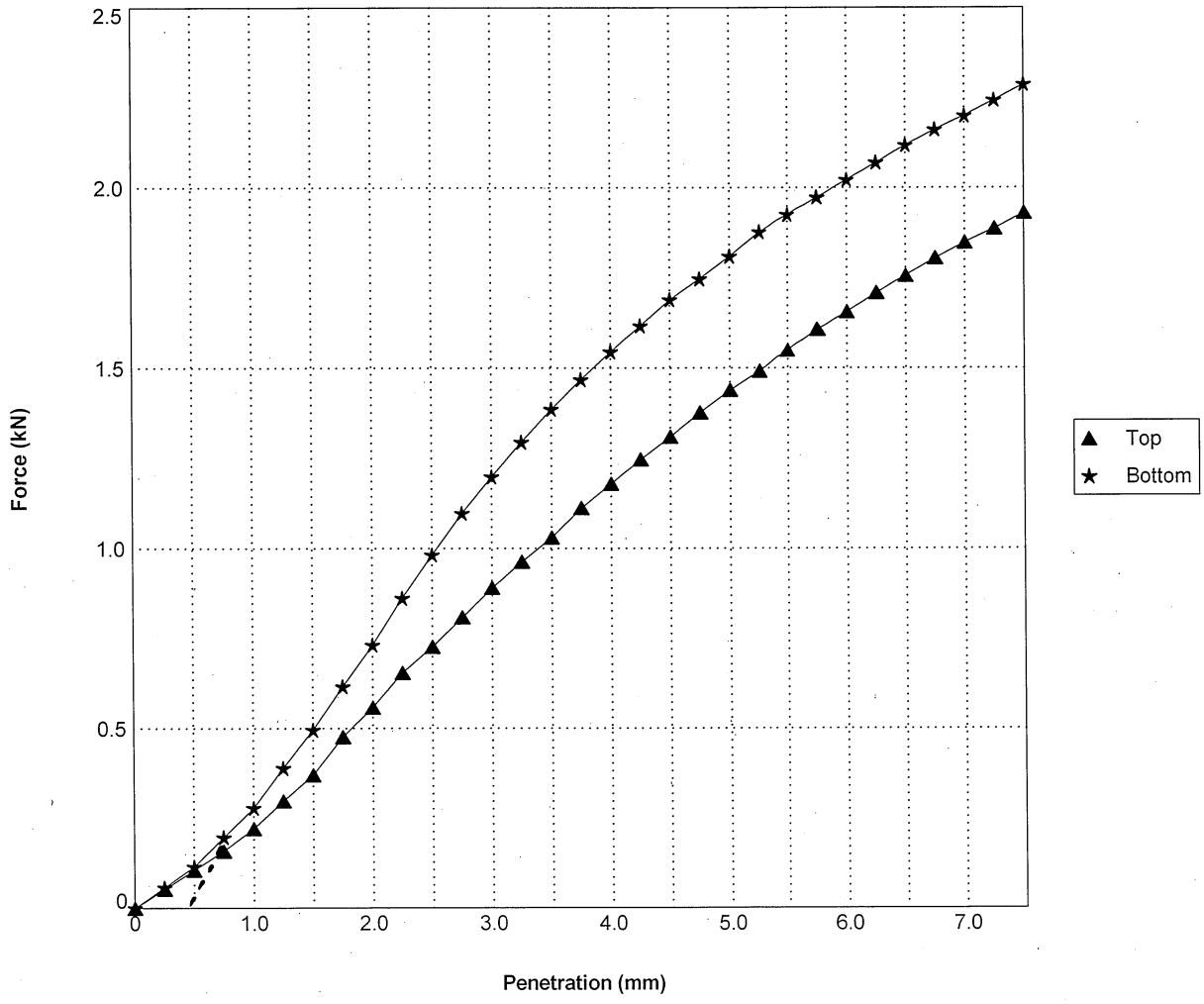
DETERMINATION OF THE CALIFORNIA BEARING RATIO

BS 1377 : Part 4 : 1990 and Part 2 : Clause 3.2 : 1990

Exploratory Hole No.- **BGR_TP105** Sample No.- **LB6** Depth (m)- **2.00**

"As Received" Moisture Content (%) :	17.2	Surcharge (Kg) :	6
Retained on 20mm (%) :	0.0	Seating Load (N) :	Top 50 / Bottom 50
Correction Needed :	Yes	Test Moisture Content (%) :	Top 16.6 / Bottom 17.7
Soaking Time (Days) :	N/A	Bulk Density (Mg/m^3) :	2.12
Swelling (mm) :	N/A	Dry Density (Mg/m^3) :	1.81
Date Tested :	23/06/2020	CBR Value (%) :	Top 7.2 / Bottom 9.4
Preparation Method :	2.5kg Compaction		
Remarks :			



For description of sample please refer to the Laboratory Sample Description Sheet

Contract Title :- Barnsley West Roundabouts	Client :- JPG (Leeds) Ltd

Signed :-	Name :-	Page 1 of 1	UKAS TESTING 1367
Date of issue :- 01/07/2020	Certificate No :- CBR/4250/BGR_TP105/LB6/2.00/1	AEG Contract No. :- **4250**	

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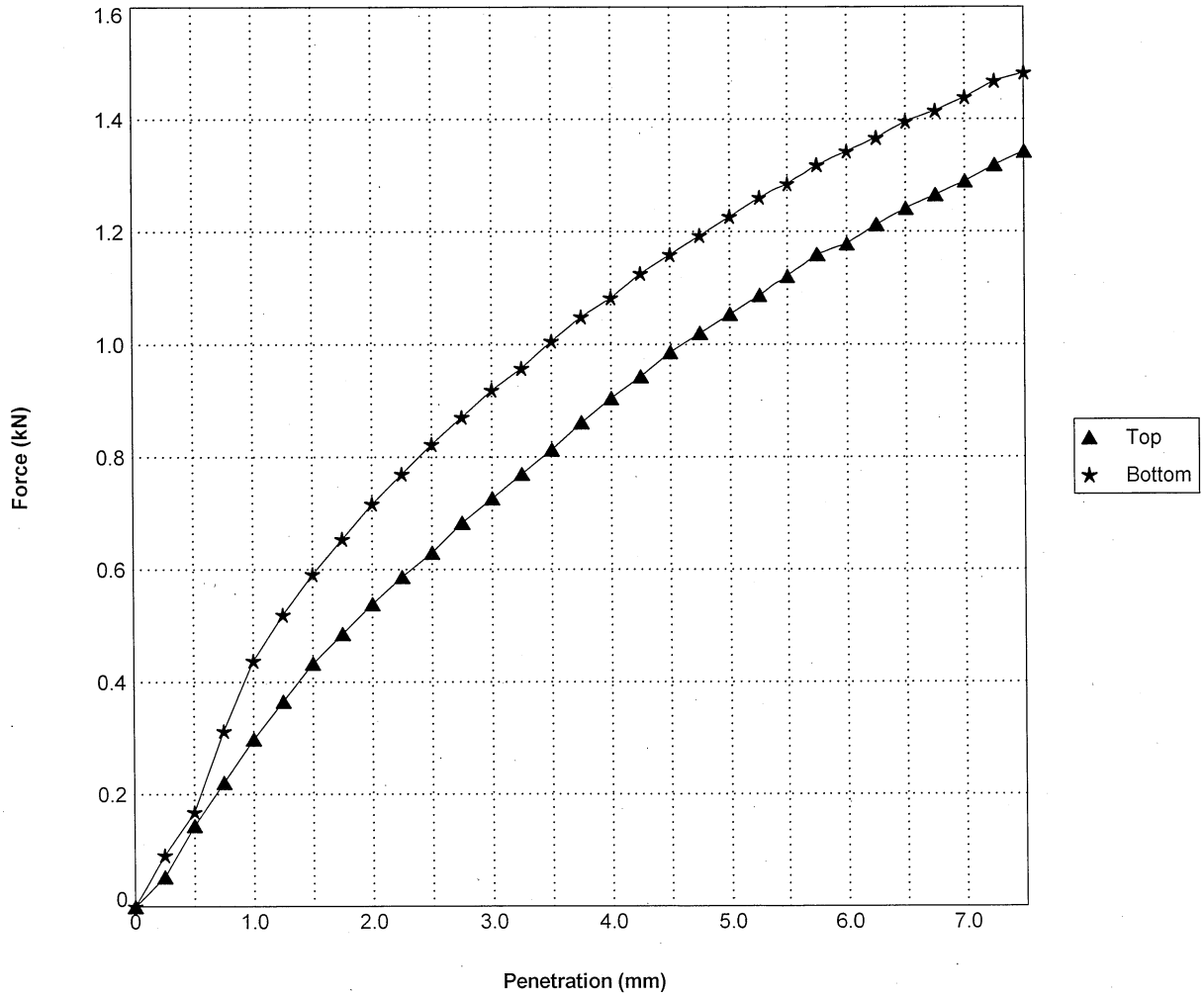
DETERMINATION OF THE CALIFORNIA BEARING RATIO

2

Exploratory Hole No.- **HCR_TP102** Sample No.- **LB6** Depth (m)- **1.50**

"As Received" Moisture Content (%) :	14.4	Surcharge (Kg) :	6
Retained on 20mm (%) :	18.2	Seating Load (N) :	Top 50 / Bottom 50
Correction Needed :	No	Test Moisture Content (%) :	Top 14.7 / Bottom 14.0
Soaking Time (Days) :	N/A	Bulk Density (Mg/m^3) :	2.19
Swelling (mm) :	N/A	Dry Density (Mg/m^3) :	1.91
Date Tested :	23/06/2020	CBR Value (%) :	Top 5.3 / Bottom 6.2
Preparation Method :	2.5kg Compaction		
Remarks :			



For description of sample please refer to the Laboratory Sample Description Sheet

Contract Title :- **Barnsley West Roundabouts**	Client :- **JPG (Leeds) Ltd**

Signed :-	Name :-		Page 1 of 1
Date of issue :- 01/07/2020	Certificate No :- CBR/4250/HCR_TP102/LB6/1.50/1	AEG Contract No. :- **4250**	

UKAS TESTING 1367

ALLIED EXPLORATION & GEOTECHNICS LIMITED

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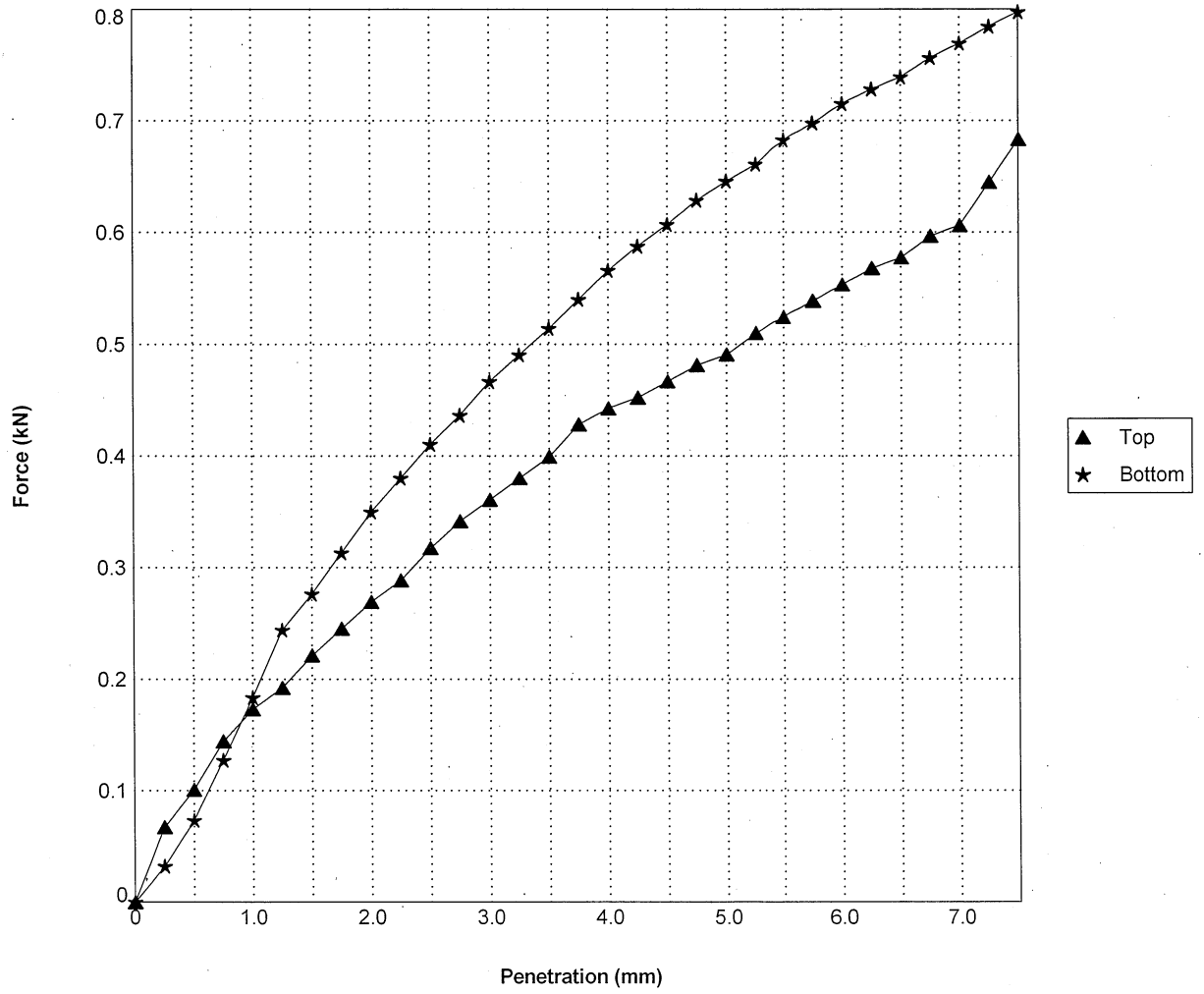
DETERMINATION OF THE CALIFORNIA BEARING RATIO

BS 1377 : Part 4 : 1990 and Part 2 : Clause 3.2 : 1990

Exploratory Hole No.- **HCR_TP104** Sample No.- **LB6** Depth (m)- **1.00**

"As Received" Moisture Content (%) :	17.9	Surcharge (Kg) :	6
Retained on 20mm (%) :	8.6	Seating Load (N) :	Top 50 / Bottom 10
Correction Needed :	No	Test Moisture Content (%) :	Top 18.4 / Bottom 17.4
Soaking Time (Days) :	N/A	Bulk Density (Mg/m^3) :	2.11
Swelling (mm) :	N/A	Dry Density (Mg/m^3) :	1.79
Date Tested :	23/06/2020	CBR Value (%) :	Top 2.4 / Bottom 3.2
Preparation Method :	2.5kg Compaction		
Remarks :			



For description of sample please refer to the Laboratory Sample Description Sheet

Contract Title :- **Barnsley West Roundabouts**	Client :- **JPG (Leeds) Ltd**

Signed :- MSon	Name :-		Page 1 of 1
Date of issue :- 01/07/2020	Certificate No :- CBR/4250/HCR_TP104/LB6/1.00/1	AEG Contract No. :- **4250**	UKAS TESTING 1367

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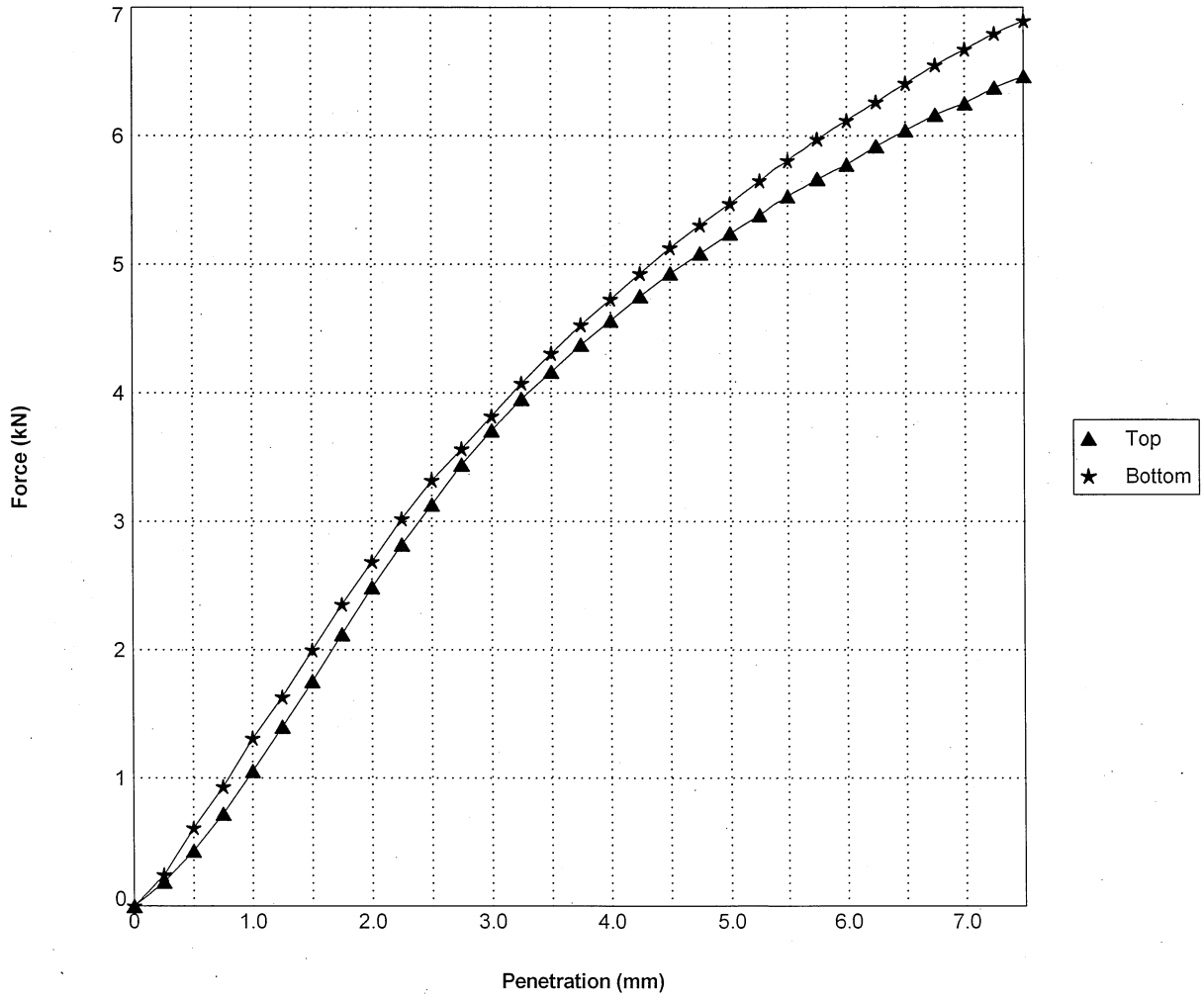
DETERMINATION OF THE CALIFORNIA BEARING RATIO

BS 1377 : Part 4 : 1990 and Part 2 : Clause 3.2 : 1990

Exploratory Hole No.- **HCR_TP105** Sample No.- **LB4** Depth (m)- **0.40**

"As Received" Moisture Content (%) :	13.7	Surcharge (Kg) :	6
Retained on 20mm (%) :	7.2	Seating Load (N) :	Top 50 / Bottom 50
Correction Needed :	No	Test Moisture Content (%) :	Top 14.6 / Bottom 12.8
Soaking Time (Days) :	N/A	Bulk Density (Mg/m^3) :	2.00
Swelling (mm) :	N/A	Dry Density (Mg/m^3) :	1.76
Date Tested :	23/06/2020	CBR Value (%) :	Top 26.2 / Bottom 27.4
Preparation Method :	2.5kg Compaction		
Remarks :			



For description of sample please refer to the Laboratory Sample Description Sheet

Contract Title :-	Client :-
Barnsley West Roundabouts	JPG (Leeds) Ltd

Signed :-	Name :-	Page 1 of 1	
Date of issue :- 01/07/2020	Certificate No :- CBR/4250/HCR_TP105/LB4/0.40/1	AEG Contract No. :- **4250**	UKAS TESTING 1367

Appendix E Gas and Groundwater Monitoring Results

GAS AND GROUNDWATER MONITORING RESULTS

Site: Barugh Green Road Roundabout - Barnsley West
Job No: 4848 **Client:** Strata Sterling Barnsley West Limited
Visit No: 1 **Date:** 03/08/2020

JPG CIVIL & STRUCTURAL ENGINEERING

Monitoring Location	Gas Concentration									Gas Emission Rate		GWL	Base of Standpipe
	Peak			Steady			Highest	Highest	Lowest	Litre/Hour			
BH	CH_4		CO_2	CH_4		CO_2	H_2S	CO	O_2				
	% lel	%v/v	%	% lel	%v/v	%	ppm	ppm	%	Peak	Steady	(m) bgl	
BGR_BH101	0.0	0.0	6.9	0.0	0.0	6.9	1	0	9.9	0.1	0.1	2.68	4.00
BGR_BH102	0.0	0.0	8.0	0.0	0.0	0.1	1	1	16.2	0.1	0.1	2.15	6.85
BGR_BH103	0.0	0.0	0.6	0.0	0.0	0.5	1	1	19.9	0.1	0.1	2.48	5.50

Ambient Concentration (% volume): CH_4 0.0 %v/v; O_2 20.3 %v/v; CO_2 0.1 %v/v

Barometric Pressure: Start 999; End 999
Barometric Pressure Trend: Steady
Weather: Partially sunny/dry

Monitoring Equipment: GA5000
Serial Number of Equipment: G505491
Date of Last Calibration: 09.Jun.2020
Operator: JAM

Key	Remarks
NR - Not Recorded NA - Not Applicable	
	Checked: **Approved:**

GAS AND GROUNDWATER MONITORING RESULTS

Site: Barugh Green Road Roundabout - Barnsley West
Job No: 4848 **Client:** Strata Sterling Barnsley West Limited
Visit No: 2 **Date:** 13/08/2020

JPG CIVIL & STRUCTURAL ENGINEERING

Monitoring Location	Gas Concentration									Gas Emission Rate		GWL	Base of Standpipe
	Peak			Steady			Highest	Highest	Lowest	Litre/Hour			
BH	CH_4		CO_2	CH_4		CO_2	H_2S	CO	O_2				
	% lel	%v/v	%	% lel	%v/v	%	ppm	ppm	%	Peak	Steady	(m) bgl	
BGR_BH101	0.0	0.0	6.9	0.0	0.0	6.9	1	1	13.4	0.0	0.0	2.80	4.00
BGR_BH102	0.0	0.0	0.5	0.0	0.0	0.5	1	1	18.5	0.0	0.0	2.28	6.85
BGR_BH103	0.0	0.0	2.3	0.0	0.0	2.3	1	0	19.0	0.0	0.0	1.55	5.50

Ambient Concentration (% volume): CH_4 0.0 %v/v; O_2 21.0 %v/v; CO_2 0.1 %v/v

Barometric Pressure: Start 999; End 999
Barometric Pressure Trend: Steady
Weather: Overcast

Monitoring Equipment: GA5000
Serial Number of Equipment: G505491
Date of Last Calibration: 09.Jun.2020
Operator: BKW

Key	Remarks
NR - Not Recorded NA - Not Applicable	

Checked: **Approved:**

GAS AND GROUNDWATER MONITORING RESULTS

Site: Barugh Green Road Roundabout - Barnsley West
Job No: 4848 **Client:** Strata Sterling Barnsley West Limited
Visit No: 3 **Date:** 28/08/2020

JPG CIVIL & STRUCTURAL ENGINEERING

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_2S	CO	O_2	Litre/Hour			
	% lel	%v/v	%	% lel	%v/v	%	ppm	ppm	%	Peak	Steady	(m) bgl	
BGR_BH101	0.0	0.0	8.1	0.0	0.0	7.9	0	0	5.7	0.0	0.0	1.54	4.00
BGR_BH102	0.0	0.0	1.1	0.0	0.0	1.1	1	0	17.4	0.0	0.0	1.45	6.85
BGR_BH103	0.0	0.0	3.4	0.0	0.0	3.2	0	0	17.2	5.0	1.4	1.20	5.50

Ambient Concentration (% volume): CH_4 0.1 %v/v; CO_2 0.1 %v/v; O_2 21.1 %v/v

Barometric Pressure: Start 993; End 994
Barometric Pressure Trend: Rising
Weather: Overcast

Monitoring Equipment: GA5000
Serial Number of Equipment: G505491
Date of Last Calibration: 09.Jun.2020
Operator: BKW

Key	Remarks
NR - Not Recorded NA - Not Applicable	

Checked: **Approved:**

SUMMARY OF GROUND GAS MONITORING

BH NO.	Peak CH4 (% v/v) MIN	Peak CH4 (% v/v) MAX	Steady CH4 (% v/v) MIN	Steady CH4 (% v/v) MAX	Peak CO2 (% v/v) MIN	Peak CO2 (% v/v) MAX	Steady CO2 (% v/v) MIN	Steady CO2 (% v/v) MAX	H_2S ppm MAX	CO ppm MAX	O2 (% v/v) MIN	O2 (% v/v) MAX	max limiting bh flow rate for CH4*	max limiting bh flow rate for CO2**	Peak Flow (l/hr) MAX	Steady Flow (l/hr) MAX	SWL (m bgl) MIN	SWL (m bgl) MAX
BGR_BH101	0.0	0.0	0.0	0.0	6.9	8.1	6.9	7.9	1	1	5.7	13.4	0	0.1106	0.1	0.1	1.54	2.80
BGR_BH102	0.0	0.0	0.0	0.0	0.5	8.0	0.1	1.1	1	1	16.2	18.5	0	0.0154	0.1	0.1	1.45	2.28
BGR_BH103	0.0	0.0	0.0	0.0	0.6	3.4	0.5	3.2	1	1	17.2	19.9	0	0.0448	5.0	1.4	1.20	2.48

* Based of peak CH4 and peak flows.
** Based on steady CO2 and steady flows.

	VISIT 1	VISIT 2	VISIT 3
MB Start	999	999	993
MB Finish	999	999	994
Pressure Change	Steady	Steady	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 in to 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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