Roxhill Developments Limited

M1 Junction 15 West – Roade Bypass

Factual Investigation Report

313583–01 (00)

NOVEMBER 2017

RSK GENERAL NOTES

Project No.: 313583-01 (00)

Title: Preliminary ground investigation factual report: M1 Junction 15 West – Roade Bypass

Client: Roxhill Developments Ltd (Roxhill), Lumonics House, Valley Drive, Swift Valley, Rugby, Warwickshire, CV21 1TQ

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Status: Final

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1 INTRODUCTION

1.1 Introduction

RSK Environment Limited (RSK) has been commissioned by Roxhill Developments Limited to carry out a Geotechnical and Geoenvironmental Assessment of the site for the proposed alignment of the bypass around the village of Roade, Northamptonshire.

The proposed highway stretches over approximately 2.5km, various land owners and land uses which predominately comprises of agricultural fields intersected from north to south by an active railway line (4 line track) in deep cutting, Blisworth Road, a shallow drainage ditch, a rough track and finally a east west trending dismantled railway line close to the most south westerly extent .

This report is specific to the investigation undertaken on the proposed highway scheme only.

The Factual Ground Investigation Report is presented herein. This report is subject to the RSK service constraints given in Appendix A.

1.2 Terms of reference

This report comprises a preliminary ground investigation report in general accordance with the requirements of:

- BS5930:1999+A2:2010 'Code of practice for site investigations':
- Environment Agency CLR 11 2004a 'Model Procedures for the Management of Land Contamination' (Contaminated Land Risk Assessment):
- Highways Agency HD22/08, 'Managing Geotechnical Risk' (Ground Investigation): and
- BS EN 1997-2:2007. Eurocode 7 — Geotechnical design — Part 2: Ground investigation and testing.

1.3 Proposed development

It is understood that the overall site is being considered for a relief bypass around the western edge of the village of Roade.

The proposed road is shown upon Roxhill Developments Ltd and BWB Masterplan ref: NGW-BWB-GEN-XX-SK-D-SK01, dated April 2016. Proposals are understood to comprise of a single 7.30m wide carriageway plus 1m hardstrips and footway/cycleway provision along the route. The proposed road will start south of the village of Roade and will extend in a northwards direction around the village before branching east and crossing the railway line and reconnecting with the A508 (Northampton Road) north of the village of Roade.

1.4 Objective

The purpose of the investigation works undertaken were to confirm the underlying ground conditions present beneath the bypass alignment. The bypass alignment has previously been subject to a Preliminary Sources Study Report 313418-02 (00), dated December 2016. In addition, the information collated will be used to assist in the master planning design and to support the Environmental Statement being developed for the proposed scheme.

The main objectives of the investigation are to:

- Confirm the stratigraphy of the soil across the site;
- Confirm the groundwater and soil gas regime;
- Confirm the contamination status of the the site using a programme of in-situ screening and laboratory analysis; and
- To provide sufficient geotechnical information characterising the strata encountered beneath the alignment.

In line with Eurocode 7, BS5930, BS10175 and CLR 11 further phases of targeted investigation may be required to provide specific data and information for detailed design of individual elements of the scheme, as the design evolves.

1.5 Scope

The project has been carried out to an agreed brief as set out in RSK's proposal ref. M1 Junction 15 West: Roade Bypass, dated June 2017 in order to provide information to enable to site to be redeveloped as a new road, and a new bridge constructed across the existing railway cutting and line.

The project has been carried out to an agreed brief as set out in RSKs proposal (ref. 313583-00 (01) Specification, dated 15th June 2017.

The ground investigation fieldwork carried out at the site was undertaken in accordance with a specification developed by RSK in view of the Client's proposed development proposals.

The scope of works for the assessment include:

Inclusive within the Factual Report;

- an intrusive investigation, with associated laboratory analysis and programme of subsequent monitoring events.

Inclusive within the Interpretive Report;

- development of a refined conceptual site model followed by generic quantitative risk assessment (GQRA) to assess complete pollutant linkages that may require the implementation of migration measures to facilitate development;
- interpretation of ground conditions and ground model for the site;
- classification of the strata encountered and identification of soil properties;

- an interpretative report to assess both geotechnical and geoenvironmental risks and identify implications that will affect the detailed design of the project; and
- an assessment of the potential waste classification implications of soil arisings.

1.6 Limitations

The comments given in this report and the opinions expressed are based on the ground conditions encountered during the site work and on the results of tests made in the field and in the laboratory. However, there may be conditions pertaining to the site that have not been disclosed by the investigation and therefore could not be taken into account. In particular, it should be noted that there may be areas of made ground not detected due to the limited nature of the investigation or the thickness and quality of made ground across the site may be variable. In addition, groundwater levels and ground gas concentrations and flows may vary from those reported due to seasonal, or other, effects.

2 SITE DETAILS

2.1 Site location

The proposed Roade bypass, referred to hereafter as “the site” is located west of the village of Roade, Northampton and is designed to bypass Roade in an attempt to relieve the village of high traffic congestion. The site currently comprises of a series of agricultural fields, a dismantled railway line alignment, Blisworth Road and an existing 4 track live railway line within deep cutting. The proposed development stretches approximately 2.3 km to the west of Roade, starting south of Roade (off the A508) and extends north for approximately 1.5 km before turning eastwards for approximately 1km for the remainder of the route and reconnecting with the A508, north of Roade.

A location plan for the site is presented as Figure 1.

2.2 Local topography, geography and geomorphology

The site sits within a formerly glaciated area. The land is gently undulating with a general rise from the southern extent to the north eastern corner.

The site sits within a formerly glaciated area. The land is gently undulating with a general fall to the south of the site. At its highest, the site elevation is approximately 122m AOD located where the proposed bypass branches off from the A508 Northampton Road, north of the town of Roade. The proposed bypass crosses over a railway line north-west of the town of Roade, which is located within a deep cutting. The route dips to less than 115m AOD just after it crosses Blisworth Road and the drainage ditch, before rising back to 120m AOD at its most westerly extent. At the time of the walkover the drainage ditch did not contain any water. The route the drops again towards the A508 Stratford Road, rejoining at an elevation of approximately 100m AOD, although the topography is undulating at this end of the site.

The proposed bypass is to meet a modified section of the A508 Stratford Road, at the point at which it crosses an historic, now dismantled, overgrown railway line.

The geological sequence of the majority of the site is understood to comprise Oadby Member Glacial Till (Superficial) overlying solid deposits anticipated to be the Blisworth Limestone Formation, which is principally limestone’s with thin bands of fossiliferrous mudstone and marls, underlain by the succession of marine and non-marine mudstones, sandstones and limestones of the Blisworth Clay, Rutland Formation, Stamford Member, Northampton Sand Formation with the Whitby Mudstones at depth. Locally other deposits including Cornbrash limestone’s might be encountered at depth at the northern extent.

The geological sequence of the area is understood to be one of fossiliferrous mudstone and siltstone, laminated and bituminous in part, with thin siltstone or silty mudstone beds and rare fine-grained calcareous sandstone beds deposited within sea conditions and eroded by periods of glaciations and later deposition of Oadby Member and Glaciofluvial Deposits.

2.3 Site description

A site walkover was undertaken on the 22nd July 2016 and 24th August 2016. The proposed alignment of the proposed bypass predominately comprises fields, intersected by, from north to south, a 4 track live railway in deep cutting, Blisworth Road, a drainage ditch, a rough track/road and finally a dismantled former railway line.

From its northern extent, the proposed route leaves the A508 Northampton Road heading roughly west and crosses a ditch and hedge before crossing an arable field. Beyond the field the route crosses an existing 4 track live railway line (Roade Cutting SSSI) located within a steep, densely vegetated cutting. Immediately beyond the railway is an additional arable field with hedgerow boundaries. The first field is accessible from the A508 Northampton Road. This field can be accessed via a bridge over the railway line from the first field.

The route then turns south-west and passes through two livestock (sheep/cattle) fields bounded by hedgerows, between which is Blisworth Road. The field to the north of Blisworth Road is accessible via an adjacent field, while the field to the south is not accessible from the Road, and appears to be accessible via Hyde Farm.

From there the route heads south and crosses a drainage ditch between the southern livestock field and into a final livestock field, bounded again by hedgerows and semi mature trees and a shallow ditch, accessible via Hyde Farm. The route then turns south-east and crosses two arable fields separated by a farm track which provides access to the fields, and originates at Dovecote Farm off of Blisworth Road.

The route then terminates at the A508 Stratford Road, at the site of a dismantled railway. The dismantled railway is heavily overgrown by dense shrubs, brambles and semi-mature and mature trees. The end of the former railway immediately adjacent to the A508 is fully overgrown. An area of low growth and grassed verge is present adjacent to the A508, while the point at which the proposed bypass and the modified A508 will meet is accessed via the arable field to its north, mentioned above. The dismantled railway can also be accessed via a gated entrance of an adjacent field, further south along the A508.

2.4 Published geology and expected ground conditions

Table 1 provides further details of the anticipated geological succession.

Table 1: Anticipated ground conditions at the site

Geological unit	Description	Thickness (m)
Surfacing and Buried Structures: (source: Envirocheck History Maps, Site Observation, Service records, Site clearance)	Hard standing was identified along roads that cross the route, however the vast majority of the site is open fields anticipated to be underlain by topsoil's from surface to nominal thicknesses. A known gas main was identified on the services drawing records as crossing a small portion of the northern most point where the proposed route joins the A508.	No thickness recorded
Made Ground / Topsoil: (source: BGS Maps, Available Borehole Logs, Envirocheck Geology & History Maps, memoirs)	The entire site is anticipated to be underlain by a cultivated plough layer or topsoil and turf resulting in a subsoil or growing medium. Given its extensive use for arable crops and livestock grazing, it is anticipated that this layer could extend between 0.2m and 0.6m depth and is anticipated to be derived from the underlying Glacial Till, and would be anticipated to be sandy gravelly clay in nature.	No thickness recorded
	There is the potential for made ground to be present below and adjacent to any roads or railways that cross the route of the proposed bypass. The thickness of highway constructions are anticipated to be no greater than 0.45m in depth and likely to comprise bound macadam surfacing over granular sub base and perhaps granular hardcore capping.	
Superficial geology		
Oadby Member (Glacial Till/ Diamicton Till) (source: BGS Maps, Available Borehole Logs, Envirocheck Geology & History Maps, memoirs)	The majority of the site appears to be underlain by a mantle of Oadby Member (Diamicton Till/Glacial Till) which is anticipated to be primarily over consolidated sandy gravelly clay. It may also contain sandy gravel strings, lenses and pockets which may contain perched or confined groundwater. Limited deposits of Glaciofluvial Deposits are anticipated to be present at the southern end of the route.	No thickness recorded
Solid geology		

Blisworth Limestone Member/ Rutland Formation	The entirety of the site is indicarted to be underlain by the Blisworth Limestone Formation, likely to be weathered beneath superficial deposits to firm to stiff grey and brown clays tending to off-white or yellowish limestone with thin marl and mudstone bands. Calcareous shell and fossil fragments are common throughout these deposits. Beneath which the Blisworth Clay Formation is likely to be encountered. In the extreme south of the site, the Rutland Formation is present, and is likely to be weathered to grey clays and silts. Below this strata, it is likely that the Stamford Member which is anticipated to comprise sandstone and interbedded siltstone will be present overlying the Northampton Sand Formation, all above the Whitby Mudstone Formation.	>1,350m
Mining (source: Coal Authority web viewer, BGS Maps, Available Borehole Logs, Envirocheck records, Geology & History Maps)	None identified	N/A
Faults (source: BGS Maps, Available Borehole Logs, Envirocheck Geology Maps, memoirs)	None identified	N/A
Opencast Quarrying (source: Coal Authority web viewer, BGS Maps, Envirocheck History Maps)	Some sand and gravel quarries noted within 200m of the site, although none expected on site.	N/A
Mineral Protection (source: Local Authority Plan)	None identified	N/A
Soil Chemistry (source: Envirocheck / BGS)	Available soil chemistry data suggests that the natural soils anticipated to be present at shallow depths across the site are unlikely to contain any significantly elevated concentrations of contaminants that would be considered to represent a risk to Human Health for a commercial development.	N/A
Source: British Geological Survey: http://mapapps.bgs.ac.uk/geologyofbritain/home.html (accessed on 11th October 2017).		

3 GROUND INVESTIGATION

3.1 Introduction

Intrusive investigation fieldworks were undertaken between 5th September and 20th September 2017, and were followed by a series of four, weekly ground gas and groundwater monitoring and sampling events.

3.2 Investigation strategy

The techniques adopted for the intrusive investigation were selected on the basis of the investigation objectives and the anticipated geological conditions.

The investigation and sampling strategy was primarily focused on the characterisation of the ground conditions in order to:

- Define the necessary geotechnical parameters and evaluate the likely engineering behaviours of the material to inform the master planning design of the proposed bypass;
- Identify the chemical status of the site and confirm the absence of potential risks to human health and the environment.
- Provide baseline data to confirm the status of the site.

3.3 Investigation layout

The layout of the investigation was generally designed to provide a non targeted coverage of the ground conditions pertaining to the site along its entire route with some targeted investigation at points of critical infrastructure such as the railway over bridge and drainage elements. However it should be recognised that the works were constrained by the topography, services and utilities and land ownership. Specific areas of the site were not accessed during this pre-planning phase investigation as access agreements were not in place and these are highlighted on Figure 2. Therefore planned trial pits 6, 8, 9, 10, 11, 19, 21, 24 and 25 were not excavated.

Prior to commencement of the works, the exploratory holes were set out and coordinates and level of each position were recorded using a Leica Viva GPS accurate to +/-5mm in horizontal positioning and +/-10mm in elevation. The coordinates and level data are given on the exploratory hole records presented for each exploratory position, in their respective appendices.

The as-built exploratory hole location plan is presented as Figure 2 with the proposed development plan overlain.

3.4 Health and safety

Services data was obtained and overlaid upon plans to aid in the design and safe positioning of exploratory holes.

RSK prepared a Health and Safety Plan (HASP) and Risk Assessments & Method Statements (RAMS) which were submitted to the client's principal designer, health and safety advisor for consideration and comment. These documents were fully developed before works commenced at the site. Prior to commencing RSK's attendance on site, a pre-start meeting was held between RSK, the Client, and the current land owners; in order to identify the potential constraints and agree appropriate exploratory positions and access routes; and obtain all necessary permissions. Where permissions were not forthcoming, lands were not accessed and works not undertaken.

Potential health and safety, ecological and archaeological constraints were identified prior to commencement of intrusive investigation works, and a suite of control measures adopted in order to mitigate any potential constraints and risks. The specialist third party consultants dealing with these individual issues were contacted in advance of the works and constraints and suitable methodology for conducting these works to mitigate any risks were agreed and undertaken in full coordination with these specialist consultants. The constraints identified and the control measures adopted are summarised in Table 2 below.

Table 2: Identified constraints and control measures adopted on site

Constraint	Details	Control measures
Underground utility apparatus	A buried gas main is known to cross the northern most field of the proposed route.	RSK met with landowners and stakeholders to confirm suitable access routes and viable exploratory hole locations prior to finalising the ground investigation specification and commencing works. Utility information was obtained and overlaid upon plans to aid in the safe positioning of exploratory holes. RSK SafeGround team used a number of non intrusive techniques and equipment to check all exploratory positions and the surrounding areas were free of buried services and utilities, as follows: • CAT & Genny (Radiodetection RD8000), • Ground Penetrating Radar (GPR) - GSSI SIR-3000 console with the GSSI 400MHz antenna (standard frequency, used in high risk clearances) Following issue of a permit to dig from the RSK Safeground team, hand excavated service avoidance inspection pits were excavated to depths of 1.20mbgl prior to commencing all boreholes. Additionally, all boreholes were again scanned with a CAT and Genny at the bottom of the hand excavated inspection pit. Boring was only commenced if no evidence of services was uncovered.
Overhead cables	Overhead cables are known to cross the central portion of the proposed route near Hyde Farm.	Should crossing under overhead cables be required, the preferred route would be to track around the cables, however if that is not possible, RSK engineers acted as banksman and the machine was tracked under the cables by the pole, whilst the cable was at its highest point.
Geology	SSSI	In the vicinity of the proposed bridge over the railway line, the area has been designated as the Roade Cutting SSSI. No works were undertaken on the SSSI only adjacent to it and not impacting upon it.
Ecological	Stewardship land	RSK ensured that no positions were located within the vicinity of the Stewardship land and that no personnel.

3.5 Investigation techniques

3.5.1 Rotary core boring

A series of five continual window sample and rotary cored follow on boreholes were drilled as it was considered that this is the most appropriate method of investigating the anticipated ground conditions to depth. Initially these holes were sunk using windowless sampling techniques through shallow superficial deposits; and then were continued through the solid deposits using primarily pwf and 150mm diameter rotary coring techniques utilising air/mist flush. Two boreholes were drilled to 30m, two were drilled to 20m and one was drilled to 15m.

This enabled superficial and solid strata samples and core to be obtained and logged to confirm the strata depths and allow the strata to be accurately described. These techniques were also used to facilitate in-situ strength testing of shallow and deep deposits, and to obtain in-situ representative disturbed and undisturbed samples for laboratory testing and to facilitate the installation of monitoring instrumentation within the superficial and solid deposits to allow long term groundwater and gas monitoring.

The rotary cored borehole logs are presented in Appendix F.

3.5.2 Windowless sampler borehole

A series of twelve windowless sampler boreholes were sunk to depths ranging from 2.5m to 5.45m along the length of the proposed bypass as it was considered that this is the most appropriate method of investigating the shallow ground conditions to depths of around 5m depth whilst facilitating insitu testing and the installation for monitoring of shallow ground gas and groundwater conditions.

This enabled superficial samples to be obtained and logged to confirm strata depths and to allow the strata to be accurately logged. This technique was also used to facilitate in-situ strength testing of the shallow deposits and to obtain in-situ representative disturbed samples for laboratory testing and to facilitate the installation of monitoring instrumentation within the superficial deposits to allow long term ground gas and groundwater monitoring.

The window sample borehole logs are presented in Appendix E.

3.5.3 Trial pitting

A series of eighteen trial pit holes were excavated to depths ranging from 0.50m to 4.50m bgl across the proposed route as it was considered that this is the most appropriate method of investigating the shallow ground conditions, examining mass nature of the strata, stability and likely water ingress as well as enabling large bulk disturbed samples to be obtained sufficient to allow laboratory soil classification and earthworks testing.

This enabled superficial samples to be obtained and logged to confirm the strata depths and to allow the strata to be accurately logged. This technique was also used to facilitate

in-situ strength testing of cohesive strata and to obtain in-situ representative disturbed samples for laboratory testing.

The trial pit logs are presented in Appendix D.

3.5.4 Dynamic Cone Penetrometer

A series of thirteen dynamic cone penetrometer (DCP) were sunk to depths of 1m at the position of all trial pits. This was considered to be the most appropriate method of determining the change in California Bearing Ratio property with depth along the proposed route. The DCP test results are presented in Appendix H.

3.6 Investigation scope of works

The investigation undertaken at the site comprised the following:

- Setting out and service Clearance (RSK SafeGround);
- Sinking of 5 combined windowless and rotary follow on cored boreholes to depths between 15.00m and 30.00m bgl;
- Sinking of 12 window sample boreholes to depths between 3.00m and 5.45m;
- Excavation of 18 trial pits to depths between 0.50m and 4.50m;
- Sinking of 13 DCP tests to a depth of 1m;
- Installation of 17no combined groundwater/gas monitoring wells to varying depths within superficial deposits and bedrock including provision of lockable vandal proof covers;
- Four return visits to monitor groundwater levels & ground gas concentrations;
- One visit (first visit) to purge the groundwater from all boreholes;
- One visit (second visit) to undertake water sampling from boreholes;
- Surveying in of as built exploratory hole positions using GPS surveying equipment;
- Associated sampling and in-situ testing including SPTs;
- Soil and rock sample geotechnical laboratory testing; and
- Soil and groundwater sample chemical laboratory testing.

3.7 In-situ testing

In-situ Standard Penetration Tests (SPTs) were undertaken at regular intervals within the window sampler and rotary cored boreholes. SPTs were undertaken at metre intervals within windowless sample boreholes, and within superficial deposits of rotary boreholes. Upon reaching solid geology, SPTs were undertaken at 3.00m intervals where strata were conducive to testing. The results are presented in full on the borehole logs presented within Appendix E and F.

Additionally, hand vane tests were undertaken in cohesive material where practical and the results are presented on the exploratory hole logs within Appendix D.

Thirteen Dynamic Cone Penetrometer (DCPs) tests were undertaken at positions adjacent to selected trial pits in an attempt to obtain the strength profile of the top 1m of

underlying ground. This will enable a calculation of CBR to facilitate road design. The results are presented in full in Appendix H.

In-situ soakaway testing was undertaken with three trial pits (TP22, 23, 26) where possible storm water attenuation ponds maybe required. The locations of these trial pits are denoted upon the as built exploratory hole location plan presented as Figure 2. Soakaway tests were undertaken in unsupported shallow trial pits (2.45m to 3.00m bgl), and were attempted in general accordance with the recommendation of BRE 365.

The two tests undertaken within TP22 and TP26 did not soakaway sufficiently to allow calculation of infiltration rates. TP23 was extrapolated to obtain the infiltration rate. The strata in which these tests were undertaken were predominantly cohesive and not considered to be conducive to soakaways and the testing has confirmed this. The in-situ soakaway test results are presented in Appendix G and the results are summarised below within Table 3.

Table 3: Summary of soakaway test results

Location	Test Zone (depth m bgl)	Calculated infiltration Rate (m/s)	Strata
TP22	1.00 – 2.45	N/A	Oadby Member- slightly gravelly silty CLAY / Possible Made Ground
TP23	1.70 – 3.00	2.13×10^{-6}	Oadby Member- slightly gravelly sandy CLAY / Possible Made Ground
TP26	1.75 – 3.00	N/A	Oadby Member- slightly gravelly silty, sandy CLAY

3.8 Sampling and laboratory analysis

A programme of laboratory testing, scheduled by RSK as detailed below, was carried out on selected samples obtained from the materials encountered beneath the site.

Details of the soil samples obtained during the intrusive investigation are recorded on the exploratory hole records presented in Appendix D, E and F.

Details of groundwater samples are included in monitoring reports in Appendix J and L.

3.8.1 Geotechnical testing

A programme of laboratory testing was scheduled by RSK to be carried out on selected suitable samples, in order to provide characteristic geotechnical strata properties. The programme of geotechnical testing undertaken is presented within Table 4 below and the results available at the time of issue are included within Appendix K.

Table 4: Summary of geotechnical testing programme

Analysis undertaken	No.	Rationale
Classification testing		
Particle Size Distribution (PSD) Sieve	7	Particle size analysis has been undertaken on representative samples of the superficial deposits in order to determine the mass percentage of individual particle size ranges within the sample, and thus enable the required engineering parameters to be determined for the stratum.
Classification tests (Atterberg Limits) and	5	Classification testing undertaken on representative samples, to enable outline engineering parameters to be determined for the proposed foundation strata. Moisture content testing has been scheduled in order to determine the natural water content of the underlying geology. Consistency limits have been scheduled in order to characterise the behaviour of the clay soils.
Natural Moisture Content	31	
Dry density / moisture content relationship (4.5kg compaction)	2	Laboratory analysis undertaken to determine the relationship between moisture content and dry density of a soil when compacted using a 4.5kg rammer, and examine the optimum moisture content and maximum dry density of each strata.
Concrete		
pH, water soluble sulphate, acid soluble sulphate, total sulphur	7	Chemical testing undertaken on soil samples in order to determine levels of sulphates and thus evaluate the possible impacts on buried concrete structures.
Strength testing		
Unconfined compressive strength	2	Unconfined compressive strength testing has been undertaken on selected core samples in order to provide information relating to the strength of the underlying bedrock.
Point load index	10	Point load index testing has been undertaken on selected samples of the sandstone and mudstone in order to provide details of the strength index of the rock for preliminary design purposes.

3.8.2 Environmental testing

Environmental laboratory testing was undertaken in order to characterise the shallow soils beneath the site, and to assess contaminant concentrations within near surface soils encountered with regard to human health and the environment.

The programme of chemical testing undertaken on the soil samples is presented in Table 5. Samples obtained for laboratory analysis were collected in a variety of containers appropriate to the anticipated testing suite required. Samples were stored in accordance with the RSK quality procedures to maintain sample integrity and preservation and to minimise the chance of cross contamination. The results for environmental testing of soil and groundwater is presented in Appendix I and Appendix J, respectively.

Table 5: Summary of chemical testing programme

Analysis undertaken	No.	Rationale
Asbestos screen	20	Suite of geoenvironmental laboratory testing undertaken on representative samples of the shallow soil profile encountered in order to enable a quantitative assessment of risks to human health and the environment.
pH	20	
Total Petroleum Hydrocarbons Criteria Working Group (TPHCWG), BTEX, and MBTE	20	
Total Organic Carbon (TOC)	20	
Metals (arsenic, cadmium, total chromium, hexavalent chromium, lead, selenium, water soluble boron, mercury, copper, nickel, and zinc)	20	
Phenols	20	
Polycyclic Aromatic Hydrocarbons (PAH)	20	
Pesticides (Pest C combined suite) and triaxine herbicides	4	

3.9 Instrumentation and monitoring

Intrusive investigation works were undertaken 5th to 25th September 2017, and were followed by a series of four, weekly ground gas and groundwater monitoring events. The findings of the monitoring undertaken is presented within Appendix L.

An infrared gas meter was used to measure gas flow, concentrations of carbon dioxide (CO_2), methane (CH_4) and oxygen (O_2) in percentage by volume, while hydrogen sulphide (H_2S) and carbon monoxide (CO) were recorded in parts per million.

Table 6: Summary of monitoring well response zones

Well	Response zone (m bgl)	Response zone stratum	Monitoring events	Date
BH01	10.00 – 20.00	BWL	4	28.09.17 – 23.10.17
BH02	20.00 – 30.00	PRF	4	28.09.17 – 23.10.17
BH03	8.00 – 15.00	BWL/RF	4	28.09.17 – 23.10.17

Well	Response zone (m bgl)	Response zone stratum	Monitoring events	Date
BH04	7.00 – 11.00	RF	4	28.09.17 – 23.10.17
BH05	8.00 – 12.00	RF	4	28.09.17 – 23.10.17
WS01	1.00 – 2.50	GT	4	28.09.17 – 23.10.17
WS02	3.00 – 5.00	GT	4	28.09.17 – 23.10.17
WS03	1.00 – 3.00	GT	4	28.09.17 – 23.10.17
WS04	1.00 – 2.00	GT/WRF	4	28.09.17 – 23.10.17
WS05	2.00 – 4.00	WRF	4	28.09.17 – 23.10.17
WS06	2.00 – 4.00	WRF	4	28.09.17 – 23.10.17
WS07	1.00 – 2.50	WRF	4	28.09.17 – 23.10.17
WS08	1.00 – 3.00	WRF	4	28.09.17 – 23.10.17
WS09	1.00 – 3.00	WRF	4	28.09.17 – 23.10.17
WS10	2.00 – 4.00	GT	4	28.09.17 – 23.10.17
WS11	3.00 – 5.00	GT	4	28.09.17 – 23.10.17
WS12	3.00 – 5.00	GT	4	28.09.17 – 23.10.17
GT = Glacial Till, WRF = Weathered Rutland Formation, PRF = Possible Rutland Formation, RF = Rutland Formation and BWL = Blisworth Limestone Formation				

3.10 Groundwater developing, sampling and analysis

Depth to groundwater level was determined at each of the installed monitoring wells, during the monitoring programme.

Where sufficient depths of groundwater were recorded the wells were subsequently purged by 3 well volumes and where they recharged sufficiently they were sampled.

All water samples were collected in containers appropriate to the anticipated testing suite required. The containers were filled to capacity and placed in a cool box to minimise volatilisation. Samples were transported directly to the testing laboratory under chain of custody documentation.

Details of water monitoring and sampling can be found in the instrumentation monitoring records included in Appendix L. Details of the number of tests undertaken are shown below in Table 7.

Table 7: Summary of groundwater analysis programme

Analysis undertaken	No	Rationale
Dissolved metals (Std Suite)	6	Groundwater analysis used in conjunction with the results of
Speciated Polycyclic Aromatic Hydrocarbons (PAH)		

Analysis undertaken	No	Rationale
Total Petroleum Hydrocarbons Criteria Working Group (TPHCWG), BTEX, and MBTE		the soil analysis and soil Leachate analysis in order to form a Qualitative Tier 2 assessment of potential risks to the identified controlled water receptors.
Dissolved Organic Carbon (DOC)		
Calcium		
Hardness		
pH		
Electrical conductivity		
Total alkalinity		
Chloride		
Volatile Organic Compounds/ Semi-Volatile Organic Compounds	4	

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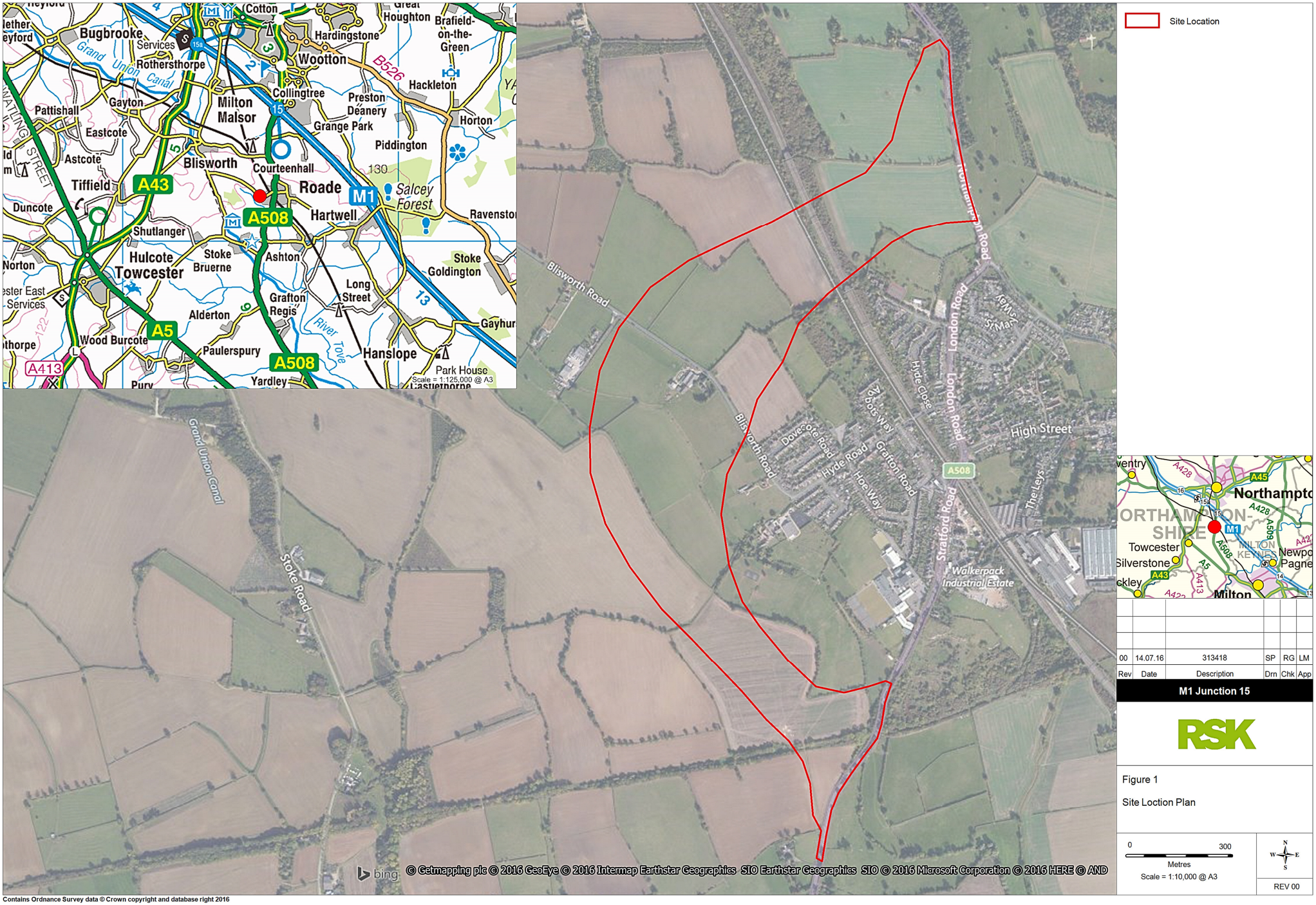
FIGURES



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Rev	Date	Description	Drn	Chk	App
00	14.07.16	313418	SP	RG	LM

M1 Junction 15

RSK

Figure 1

Site Loction Plan

0 300

Metres

Scale = 1:10,000 @ A3

N W E S

REV 00

File Name : \\cv-nas1\AsbestosGeoscience Data\Cov Ground and Environment\Jobs\313000 ONWARDS\313400 - 313499\313418 - Northampton Junction 15\ 0 Drawings\GIS

Site boundary (Feb 2017)

Borehole (BH)

Dynamic Cone Penetrometer (DCP)

Trial Pit (TP) with Soakaway (S)

Window Sample (WS)

No access

Trial pits 6, 8, 9, 10, 11, 19, 21, 24 and 25 were not excavated as access permissions were not in place at the time of works

Rev	Date	Description	Drn	Chk	App
00	10.11.17	313583	SP	RG	LM

M1 Junction 15 West - Roade Bypass

RSK

Figure 2

As Built Exploratory Hole Location Plan

Map 1 of 3

0 100

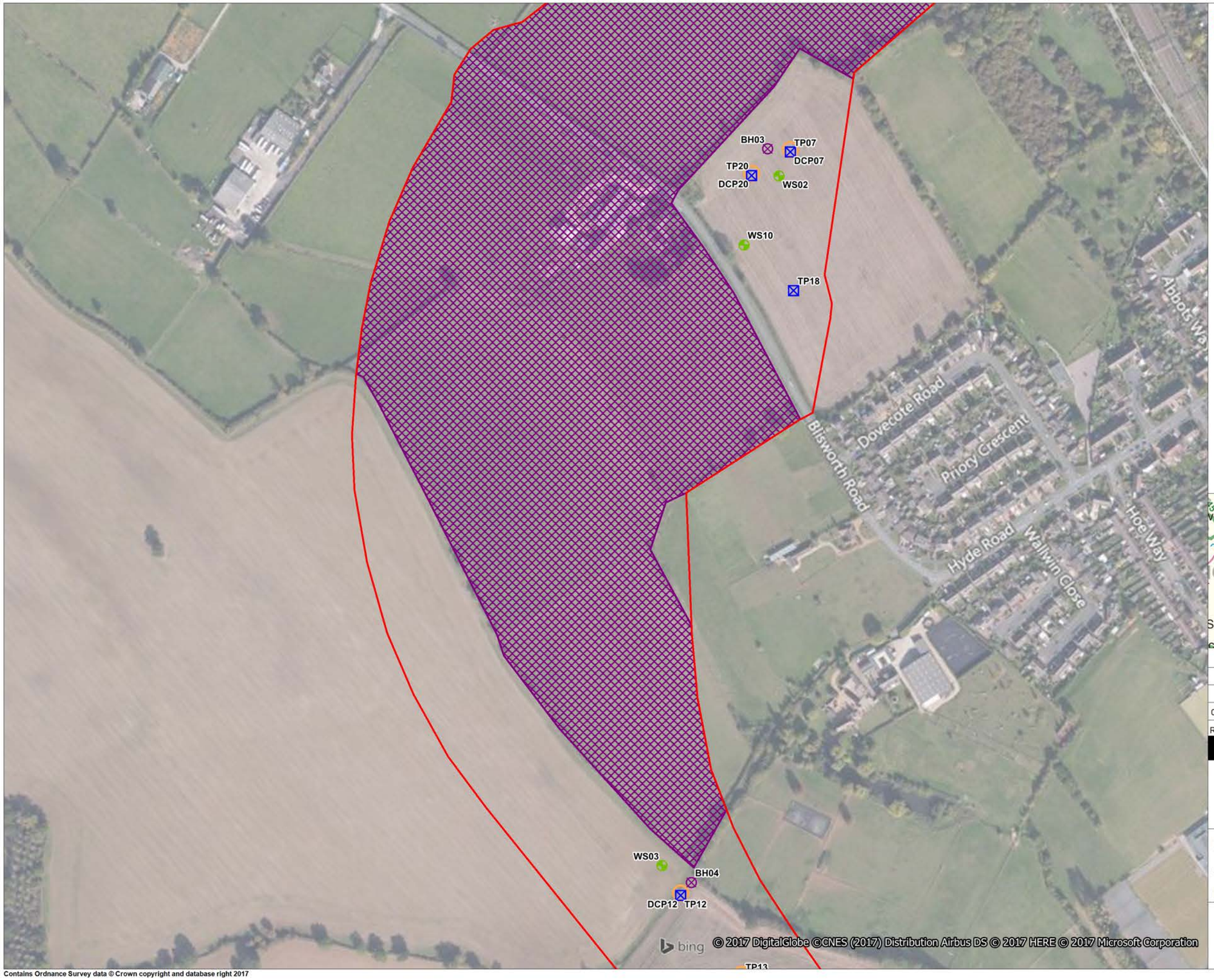
metres

Scale = 1:3,500 @ A3

N W E S

REV 00

File Name : U:\Geo\313583 - Roade Bypass\GIS



Site boundary (Feb 2017)

Borehole (BH)

Dynamic Cone Penetrometer (DCP)

Trial Pit (TP) with Soakaway (S)

Window Sample (WS)

No access

Trial pits 6, 8, 9, 10, 11, 19, 21, 24 and 25 were not excavated as access permissions were not in place at the time of works

Rev	Date	Description	Drn	Chk	App
00	10.11.17	313583	SP	RG	LM

M1 Junction 15 West - Roade Bypass

RSK

Figure 2

As Built Exploratory Hole Location Plan

Map 2 of 3

0 100

metres

Scale = 1:3,500 @ A3

N W E S

REV 00

File Name : U:\Geo\313583 - Roade Bypass\GIS

Site boundary (Feb 2017)

Borehole (BH)

Dynamic Cone Penetrometer (DCP)

Trial Pit (TP) with Soakaway (S)

Window Sample (WS)

No access

Trial pits 6, 8, 9, 10, 11, 19, 21, 24 and 25 were not excavated as access permissions were not in place at the time of works

Rev	Date	Description	Drn	Chk	App
00	10.11.17	313583	SP	RG	LM

M1 Junction 15 West - Roade Bypass

RSK

Figure 2

As Built Exploratory Hole Location Plan

Map 3 of 3

0 100

metres

Scale = 1:3,500 @ A3

N W E S

REV 00

File Name : U:\Geo\313583 - Roade Bypass\GIS

APPENDIX A
SERVICE CONSTRAINTS

1. This report and the site investigation carried out in connection with the report (together the "Services") were compiled and carried out by RSK Environment Limited (RSK) for Roxhill Developments Limited in accordance with the terms of a contract between RSK and the "client", dated July 2014. The Services were performed by RSK with the skill and care ordinarily exercised by a reasonable environmental consultant at the time the Services were performed. Further, and in particular, the Services were performed by RSK taking into account the limits of the scope of works required by the client, the time scale involved and the resources, including financial and manpower resources, agreed between RSK and the client.

2. Other than that expressly contained in paragraph 1 above, RSK provides no other representation or warranty whether express or implied, in relation to the Services.

3. Unless otherwise agreed the Services were performed by RSK exclusively for the purposes of the client. RSK is not aware of any interest of or reliance by any party other than the client in or on the Services. Unless expressly provided in writing, RSK does not authorise, consent or condone any party other than the client relying upon the Services. Should this report or any part of this report, or otherwise details of the Services or any part of the Services be made known to any such party, and such party relies thereon that party does so wholly at its own and sole risk and RSK disclaims any liability to such parties. **Any such party would be** well advised to seek independent advice from a competent environmental consultant and/or lawyer.

4. It is RSK's understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was a significant factor in determining the scope and level of the Services. Should the purpose for which the report is used, or the proposed use of the site change, this report may no longer be valid and any further use of or reliance upon the report in those circumstances by the client without RSK 's review and advice shall be at the client's sole and own risk. Should RSK be requested to review the report after the date hereof, RSK shall be entitled to additional payment at the then existing rates or such other terms as agreed between RSK and the client.

5. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of RSK. In the absence of such written advice of RSK, reliance on the report in the future shall be at the client's own and sole risk. Should RSK be requested to review the report in the future, RSK shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between RSK and the client.

6. The observations and conclusions described in this report are based solely upon the Services which were provided pursuant to the agreement between the client and RSK. RSK has not performed any observations, investigations, studies or testing not specifically set out or required by the contract between the client and RSK. RSK is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the Services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this report, RSK did not seek to evaluate the presence on or off the site of asbestos, electromagnetic fields, lead paint, heavy metals, radon gas or other radioactive or hazardous materials.

7. The Services are based upon RSK's observations of existing physical conditions at the Site gained from a walk-over survey of the site together with RSK's interpretation of information including documentation, obtained from third parties and from the client on the history and usage of the site. The Services are also based on information and/or analysis provided by independent testing and information services or laboratories upon which RSK was reasonably entitled to rely. The Services clearly are limited by the accuracy of the information, including documentation, reviewed by RSK and the observations possible at the time of the walk-over survey. Further RSK was not authorised and did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the Services. RSK is not liable for any inaccurate information or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to RSK and including the doing of any independent investigation of the information provided to RSK save as otherwise provided in the terms of the contract between the client and RSK.

8. The phase II or intrusive environmental site investigation aspects of the Services is a limited sampling of the site at pre-determined borehole and soil vapour locations based on the operational configuration of the site. The conclusions given in this report are based on information gathered at the specific test locations and can only be extrapolated to an undefined limited area around those locations. The extent of the limited area depends on the soil and groundwater conditions, together with the position of any current structures and underground facilities and natural and other activities on site. In addition chemical analysis was carried out for a limited number of parameters [as stipulated in the contract between the client and RSK] [based on an understanding of the available operational and historical information,] and it should not be inferred that other chemical species are not present.

9. Any site drawing(s) provided in this report is (are) not meant to be an accurate base plan, but is (are) used to present the general relative locations of features on, and surrounding, the site.

APPENDIX B
EXPLORATORY HOLE RECORDS

Schedule of exploratory holes – **M1 Junction 15 West, Northampton Roade Bypass – Preliminary Stage Ground Investigation**

Proposed Structure	Hole reference	Type/Method	Minimum depth (m)	Instruments	Remarks
Comacchio Combined Window Sample and Rotary Cored Boreholes					
Current/Past: Farmland Purpose/Proposed: New Bypass & Bridge over WCML	**BH 1 - 2**	Comacchio 205 (window sample with rotary follow on)	**30m**	**Slotted in solid deposits to monitor any deep water tables and allow water sampling for water quality analysis (assumed to be slotted between 15 - 25 bgl)**	**Comacchio 205 Holes** Boreholes will be commenced using percussive window sampling techniques with 1m long discrete samples taken. SPT/SPT-C will be required to be taken at 1m intervals in superficial deposits. Soil samples will be obtained for geotechnical and geochemical laboratory testing. Where rock head is breached or progress has slowed by nature of rock or stiffness of cohesive strata (mudstones/sandstones/limestones) then the instruction of the Investigation Supervisor should be sought. The Investigation Supervisor may request that the drilling be switched to rotary boring techniques. Rotary boring shall be undertaken using 1.5m long barrel and shall be undertaken using a suitable flush media to minimise disturbance to the sample and maximise the quality of recovery. It is envisaged that air /mist, foam or polymer flush will be required depending upon the geological strata being cored. Rock must be carefully. The investigation supervision may request SPT/SPT-c tests or UT70 samples to be taken intermittently between core runs depending upon the strata type, depth and location. Rotary Core shall be split, photographed, logged and sub sampled on site as soon as possible following completion of each borehole to confirm the strata thickness and depths. Window samples and core holes shall be cased as necessary to facilitate progress and minimise disturbance and cross contaminations of samples by strata from above. **Water** Groundwater seepages, perched water and water strikes should be carefully recorded and rigs stood to monitor any rise over a minimum of 20minutes. **Instrumentation.** At this time it is envisaged that 50mm diameter HDPE slotted standpipes (including well screen) will be installed in the holes to allow monitoring of groundwater tables and soil gas. Details of the precise response zone to be directed by the Investigation Supervisor;
Current/Past: Farmland Purpose/Proposed: New Bypass and associated civil engineering features, underpasses and over bridges and earthworks	**BH 3 - 5**	Comacchio 205 (window sample with rotary follow on)	**15-20m**	**Slotted in solid deposits to monitor any deep water tables and allow water sampling for water quality analysis (assumed to be slotted between 5 - 10m bgl)**	

Proposed Structure	Hole reference	Type/Method	Minimum depth (m)	Instruments	Remarks
Window Sample Boreholes					
Current/Past: Farmland Purpose/Proposed: New Bypass and associated civil engineering features, underpasses and over bridges and earthworks.	**WS1 -12**		**5 – 6m**		Boreholes will be commenced using percussive window sampling techniques with 1m long discrete samples taken. SPT/SPT-C will be required to be taken at 1m intervals in superficial deposits. Window samples and core holes shall be cased as necessary to facilitate progress and minimise disturbance and cross contaminations of samples by strata from above. Soil samples will be obtained for geotechnical and geochemical laboratory testing. **Water** Groundwater seepages, perched water and water strikes should be carefully recorded and rigs stood to monitor any rise over a minimum of 20minutes. **Instrumentation.** At this time it is envisaged that 50mm diameter HDPE slotted standpipes (including well screen) will be installed in the holes to allow monitoring of groundwater tables and soil gas. Details of the precise response zone to be directed by the Investigation Supervisor;+
Trial Pits					
Current/Past: Farmland Purpose/Proposed: New Bypass and associated civil engineering features, underpasses and over bridges and earthworks	**TP 1-21**	**Machine Excavated Trial hole**	**4.5m**	Not Applicable	**Mechanically excavated, using a wheeled excavator with a capability to dig to 4.5m depth or refusal depending upon findings and rock head;** Locations designed to provide non-targeted investigation and assessment of the shallow soils to inform earthworks classification and specification and confirm shallow ground model; Samples are required for chemical laboratory analysis; Excavate to refusal or 4.5m bgl. Backfill with arisings upon completion and compact, tracking in. Engineer to define local shallow groundwater regime and confirm stability. Engineer to note dig ability of materials and delays and durations. **Large bulk samples to be obtained at approximately 1m depth centres for strata classification and to allow earthworks classification, compaction and stabilisation testing.**
	TP 22-26	**Machine Excavated Trial hole For Soakaways**	**3m**		**As above depth aimed at specific pond depths to provide data on possible soakway / permeabilities of exisiting strata to confirm if ponds need to be lined or will drain.**

APPENDIX C
SITE PHOTOGRAPHS

APPENDIX C
EXPLORATORY HOLE PHOTOGRAPHS

Photo no. **1**	**Date:** 11/09/2017
Exploratory hole number: Trial pit 1	
Description: Trial Pit 1 excavated to a maximum depth of 3.80m.	

Photo No. **2**	**Date:** 11/09/2017
Exploratory hole number: Trial pit 1	
Description: Trial pit 1 stockpiled material	

Photo No.	Date:	
3	11/09/2017	
Exploratory hole number: Trial pit 2		
Description:		

Photo No.	Date:	
4	11/09/2017	
Exploratory hole number: Trial pit 2		
Description: Trial pit 2 stockpiled material		

Photo no. 5	Date: 11/09/2017	
Exploratory hole number: Trial pit 3		
Description: Trial pit 3 excavated to a maximum depth of 4.00m.		

Photo No. 6	Date: 11/09/2017	
Exploratory hole number: Trial pit 3		
Description: Trial pit 3 stockpiled material		

Photo No.	Date:
7	11/09/2017

Exploratory hole number:

Trial pit 4

Description:

Trial pit 4 excavated to a maximum depth of 3.80m.

Photo No.	Date:
8	11/09/2017

Exploratory hole number:

Trial pit 4

Description:

Trial pit 3 stockpiled material

Photo no. 9	Date: 11/09/2017	
Exploratory hole number: Trial pit 5		
Description: Trial pit 4 excavated to a maximum depth of 3.20m.		

Photo No. 10	Date: 11/09/2017	
Exploratory hole number: Trial pit 5		
Description: Trial pit 5 stockpiled material		

Photo No.	Date:
11	08/09/2017

Exploratory hole number:

Trial pit 7

Description:

Trial pit 7 excavated to a maximum depth of 3.80m.

Photo No.	Date:
12	08/09/2017

Exploratory hole number:

Trial pit 7

Description:

Trial pit 7 stockpiled material

Photo no. **13**	**Date:** 08/09/2017
Exploratory hole number: Trial pit 12	
Description: Trial pit 7 excavated to a maximum depth of 3.60m.	

Photo No. **14**	**Date:** 08/09/2017
Exploratory hole number: Trial pit 12	
Description: Trial pit 12 stockpiled material.	

Photo No.	Date:
15	08/09/2017

Exploratory hole number:

Trial pit 13

Description:

Trial pit 7 excavated to a maximum depth of 3.60m.

Photo No.	Date:
16	08/09/2017

Exploratory hole number:

Trial pit 13

Description:

Trial pit 13 stockpiled material

Photo no. **17**	**Date:** 07/09/2017	
Exploratory hole number: Trial pit 14		
Description: Trial pit 14 excavated to a maximum depth of 3.60m.		

Photo No. **18**	**Date:** 07/09/2017	
Exploratory hole number: Trial pit 14		
Description: Trial pit 14 stockpiled material		

Photo No.	Date:
19	07/09/2017

Exploratory hole number:

Trial pit 15

Description:

Trial pit 15 excavated to a maximum depth of 2.50m.

Photo No.	Date:
20	07/09/2012

Exploratory hole number:

Trial pit 15

Description:

Trial pit 15 stockpiled material

Photo no. 21	Date: 07/09/2017	
Exploratory hole number: Trial pit 16		
Description: Trial pit 15 excavated to a maximum depth of 1.80m.		

Photo No. 22	Date: 07/09/2017	
Exploratory hole number: Trial pit 16		
Description: Trial pit 16 stockpiled material		

Photo No.	Date:
23	07/09/2017

Exploratory hole number:

Trial pit 16A

Description:

Trial pit 16 excavated to a maximum depth of 0.50m.

Photo No.	Date:
24	07/09/2017

Exploratory hole number:

Trial pit 17

Description:

Trial pit 17 excavated to a maximum depth of 4.50m.

Photo no. 25	Date: 07/09/2017	
Exploratory hole number: Trial pit 17		
Description: Trial pit 17 stockpiled material.		

Photo No. 26	Date: 08/09/2017	
Exploratory hole number: Trial pit 18		
Description: Trial pit 18 excavated to a maximum depth of 3.60m.		

Photo No.	Date:
27	08/09/2017
Exploratory hole number: Trial pit 18	
Description: Trial pit 18 stockpiled material.	

Photo No.	Date:
28	08/09/2017
Exploratory hole number: Trial pit 20	
Description: Trial pit 20 excavated to a maximum depth of 3.80m.	

Photo no.	Date:
29	08/09/2017

Exploratory hole number:

Trial pit 20

Description:

Trial pit 20 stockpiled material.

Photo No.	Date:
30	13/09/2017

Exploratory hole number:

Trial pit 23

Description:

Trial pit 23 excavated to a maximum depth of 3.00m and soakaway test undertaken.

Photo No.	Date:
31	13/09/2017
Exploratory hole number: Trial pit 23	
Description: Trial pit 23 stockpiled material.	

Photo No.	Date:
32	13/09/2017
Exploratory hole number: Trial pit 26	
Description: Trial pit 26 excavated to a maximum depth of 3.00m	

Photo no. 33	Date: 13/09/2017	
Exploratory hole number: Trial pit 26		
Description: Trial pit 26 stockpiled material		

Photo No. 34	Date: 06/09/2017	
Exploratory hole number: Window Sample 01		
Description: Window sample 01 drilled to 2.50m.		

Photo No.	Date:
35	06/09/2017

Exploratory hole number:

Window Sample 02

Description:

Window sample 02 drilled to 5.45m.

Photo No.	Date:
36	06/09/2017

Exploratory hole number:

Window Sample 03

Description:

Window sample 03 drilled to 3.00m.

Photo no.	Date:	
37	05/09/2017	
Exploratory hole number: Window Sample 04		
Description: Window sample 04 drilled to 4.90m.		

Photo No.	Date:	
38	05/09/2017	
Exploratory hole number: Window Sample 05		
Description: Window sample 05 drilled to 4.45m.		

Photo No.	Date:
39	05/09/2017

Exploratory hole number:

Window Sample 06

Description:

Window sample 06 drilled to 5.45m.

Photo No.	Date:
40	05/09/2017

Exploratory hole number:

Window Sample 07

Description:

Window sample 07 drilled to 4.45m.

Photo no.	Date:
41	05/09/2017

Exploratory hole number:

Window Sample 08

Description:

Window sample 08 drilled to 5.45m.

Photo No.	Date:
42	05/09/2017

Exploratory hole number:

Window Sample 09

Description:

Window sample 09 drilled to 3.00m.

Photo No.	Date:
43	06/09/2017

Exploratory hole number:

Window Sample 10

Description:

Window sample 10 drilled to 4.45m

Photo No.	Date:
44	06/09/2017

Exploratory hole number:

Window Sample 11

Description:

Window sample 11 drilled to 4.80m.

Photo no. 45	Date: 06/09/2017	
Exploratory hole number: Window Sample 12		
Description: Window sample 12 drilled to 5.00m.		

Photo No. 46	Date: 19/09/2017	
Exploratory hole number: Borehole 01		
Description: Borehole 01 dynamic sampling run from 1.00m to 9.00m		

Photo No.	Date:
47	21/09/2017

Exploratory hole number:

Borehole 01

Description:

Borehole 01, box 1 of 7, 9.00m to 12.00m

Photo No.	Date:
48	21/09/2017

Exploratory hole number:

Borehole 01

Description:

Borehole 01, box 2 of 7, 12.00m to 15.00m

Photo no. 49	Date: 21/09/2017	
Exploratory hole number: Borehole 01		
Description: Borehole 01, box 3 of 7, 15.00m to 18.00m.		

Photo No. 50	Date: 21/09/2017	
Exploratory hole number: Borehole 01		
Description: Borehole 01, box 4 of 7, 18.00m to 21.00m.		

Photo No.	Date:
51	21/09/2017

Exploratory hole number:

Borehole 01

Description:

Borehole 01, box 5 of 7, 21.00m to 24.00m.

Photo No.	Date:
52	21/09/2017

Exploratory hole number:

Borehole 01

Description:

Borehole 01, box 6 of 7, 24.00m to 27.00m

Photo no. 53	Date: 21/09/2017	
Exploratory hole number: Borehole 01		
Description: Borehole 01, box 7 of 7, 27.00m to 30.00m		

Photo No. 54	Date: 15/09/2017	
Exploratory hole number: Borehole 02		
Description: Borehole 02 dynamic sampling run from 1.00m to 8.50m.		

Photo No.	Date:
55	15/09/2017

Exploratory hole number:

Borehole 02

Description:

Borehole 02, Box 1 of 8, 8.50m to 11.50m.

Photo No.	Date:
56	15/09/2017

Exploratory hole number:

Borehole 02

Description:

Borehole 02, Box 2 of 8, 11.50m to 14.50m.

Photo no.	Date:
57	18/09/2017

Exploratory hole number:

Borehole 02

Description:

Borehole 02, Box 2 of 8, 14.50m to 17.50m.

Photo No.	Date:
58	18/09/2017

Exploratory hole number:

Borehole 02

Description:

Borehole 02, Box 4 of 8, 17.50m to 20.00m.

Photo No.	Date:
59	18/09/2017

Exploratory hole number:

Borehole 02

Description:

Borehole 02, Box 5 of 8, 20.00m to 22.50m.

Photo No.	Date:
60	18/09/2017

Exploratory hole number:

Borehole 02

Description:

Borehole 02, Box 6 of 8, 22.50m to 24.00m.

Photo no. 61	Date: 19/09/2017	
Exploratory hole number: Borehole 02		
Description: Borehole 02, Box 7 of 8, 24.00m to 27.00m.		

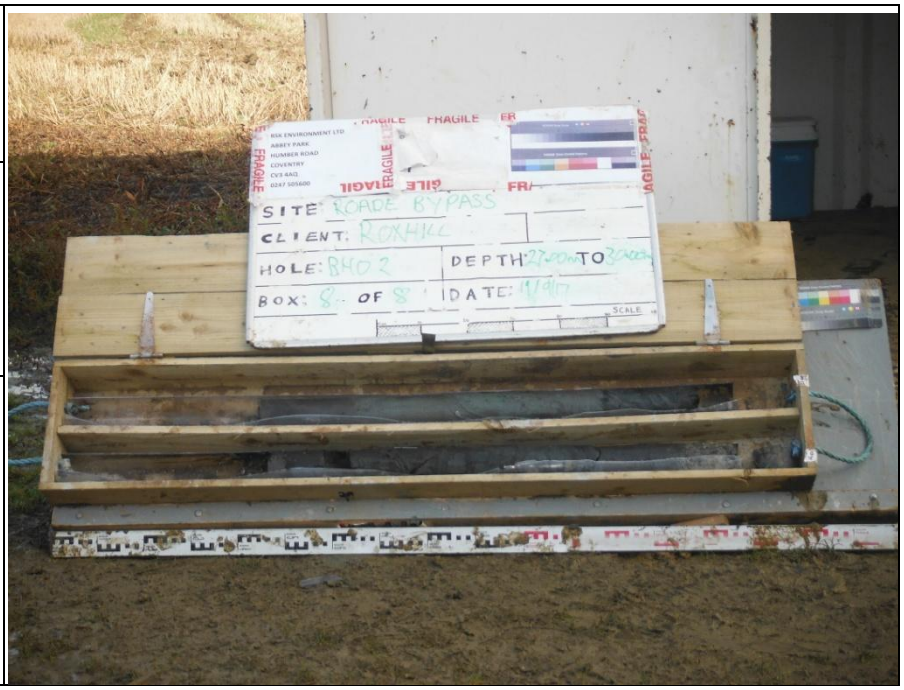
Photo No. 62	Date: 19/09/2017	
Exploratory hole number: Borehole 02		
Description: Borehole 02, Box 8 of 8, 27.00m to 30.00m.		

Photo No.	Date:
63	14/09/20147

Exploratory hole number:

Borehole 03

Description:

Borehole 03, Box 1 of 4, 4.50m to 7.50m.

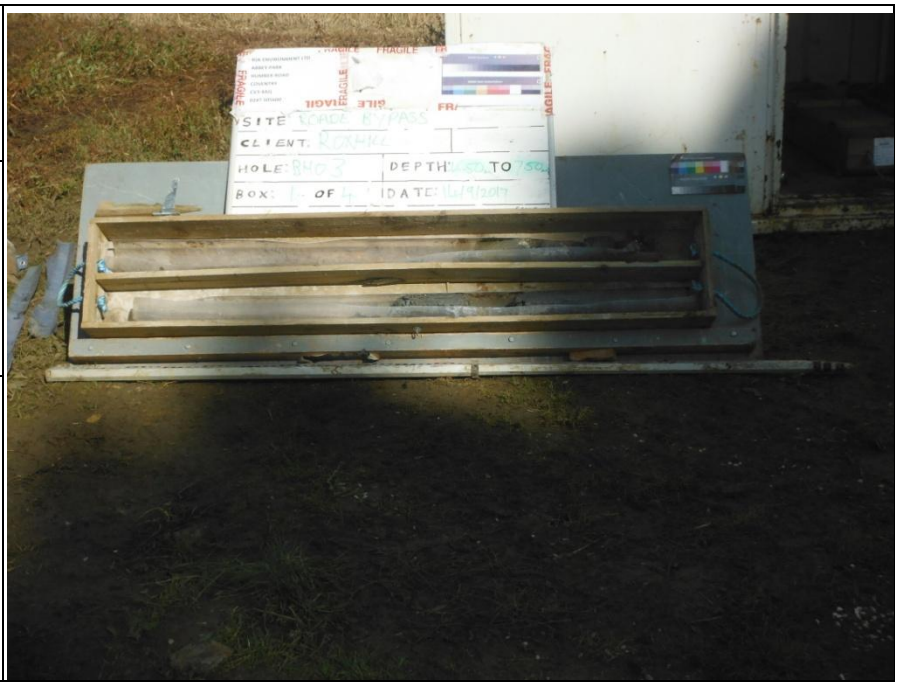


Photo No.	Date:
64	14/09/2017

Exploratory hole number:

Borehole 03

Description:

Borehole 03, Box 2 of 4, 7.50m to 10.50m.

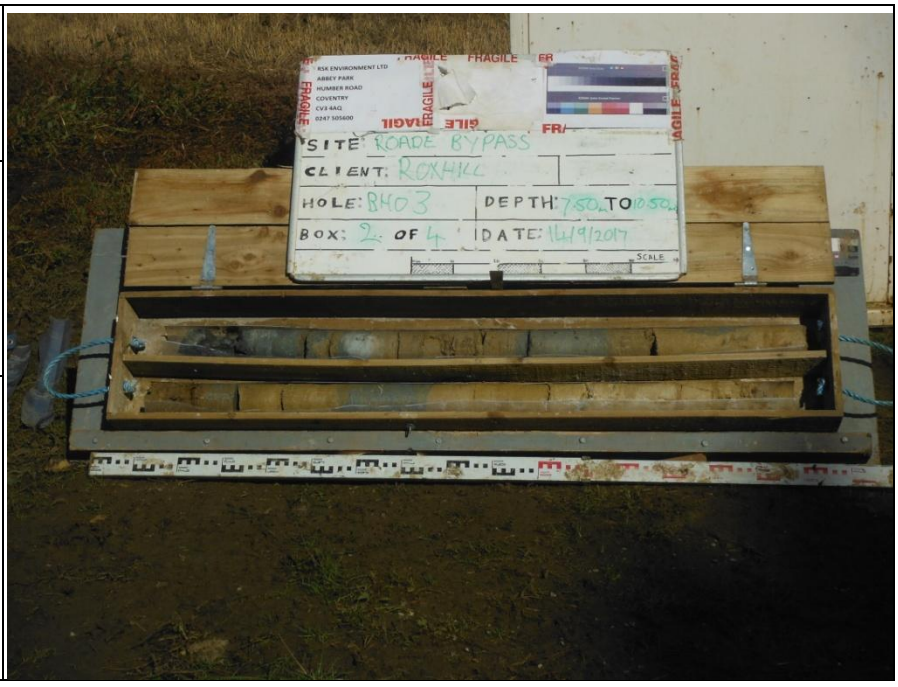


Photo no.	Date:	
65	14/09/2017	
Exploratory hole number: Borehole 03		
Description: Borehole 03, Box 3 of 4, 10.50m to 13.50m.		

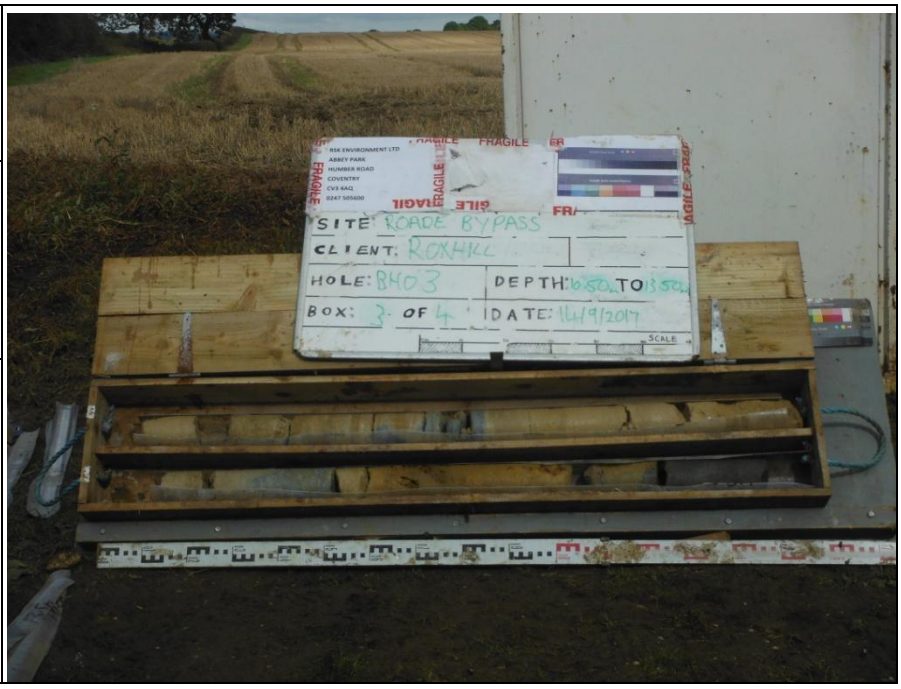


Photo No.	Date:	
66	14/09/2017	
Exploratory hole number: Borehole 03		
Description: Borehole 03, Box 4 of 4, 13.50m to 15.00m.		

Photo No.	Date:
67	12/09/2017

Exploratory hole number:

Borehole 04

Description:

Borehole 04, Box 1 of 7, 4.00m to 6.50m.

Photo no.	Date:
68	12/09/2017

Exploratory hole number:

Borehole 04

Description:

Borehole 04, Box 2 of 7, 6.50m to 9.50m.

Photo No.	Date:
69	12/09/2017

Exploratory hole number:

Borehole 04

Description:

Borehole 04, Box 3 of 7, 9.50m to 11.00m

Photo No.	Date:
70	12/09/2017

Exploratory hole number:

Borehole 04

Description:

Borehole 04, Box 4 of 7, 11.00m to 14.00m.

Photo No.	Date:
71	12/09/2017

Exploratory hole number:

Borehole 04

Description:

Borehole 04, Box 5 of 7, 14.00m to 15.50m.

Photo no.	Date:
72	12/09/2017

Exploratory hole number:

Borehole 04

Description:

Borehole 04, Box 6 of 7, 18.50m to 20.00m.

Photo No.	Date:
73	12/09/2017

Exploratory hole number:

Borehole 04

Description:

Borehole 04, Box 7 of 7, 18.50m to 20.00m.

Photo No.	Date:
74	12/09/2017

Exploratory hole number:

Borehole 05

Description:

Borehole 05, 1.20m to 4.00m.

Photo No.	Date:
75	12/09/2017

Exploratory hole number:

Borehole 04

Description:

Borehole 04, Box 5 of 7, 14.00m to 15.50m.

Photo no.	Date:
76	12/09/2017

Exploratory hole number:

Borehole 04

Description:

Borehole 04, Box 6 of 7, 18.50m to 20.00m.

Photo No.	Date:
77	12/09/2017

Exploratory hole number:

Borehole 04

Description:

Borehole 04, Box 7 of 7, 18.50m to 20.00m.

Photo No.	Date:
78	12/09/2017

Exploratory hole number:

Borehole 05

Description:

Borehole 05, 1.20m to 4.00m.

Photo No. 79	Date: 12/09/2017	
Exploratory hole number: Borehole 05		
Description: Borehole 05, Box 1 of 5, 4.00m to 7.00m.		

Photo no. 80	Date: 12/09/2017	
Exploratory hole number: Borehole 05		
Description: Borehole 05, Box 2 of 5, 7.00m to 10.00m.		

Photo No.	Date:
81	12/09/2017
Exploratory hole number: Borehole 05	
Description: Borehole 05, Box 3 of 5, 11.50m to 14.00m	

Photo No.	Date:
82	12/09/2017
Exploratory hole number: Borehole 05	
Description: Borehole 05, Box 4 of 5, 14.00m to 17.00m.	

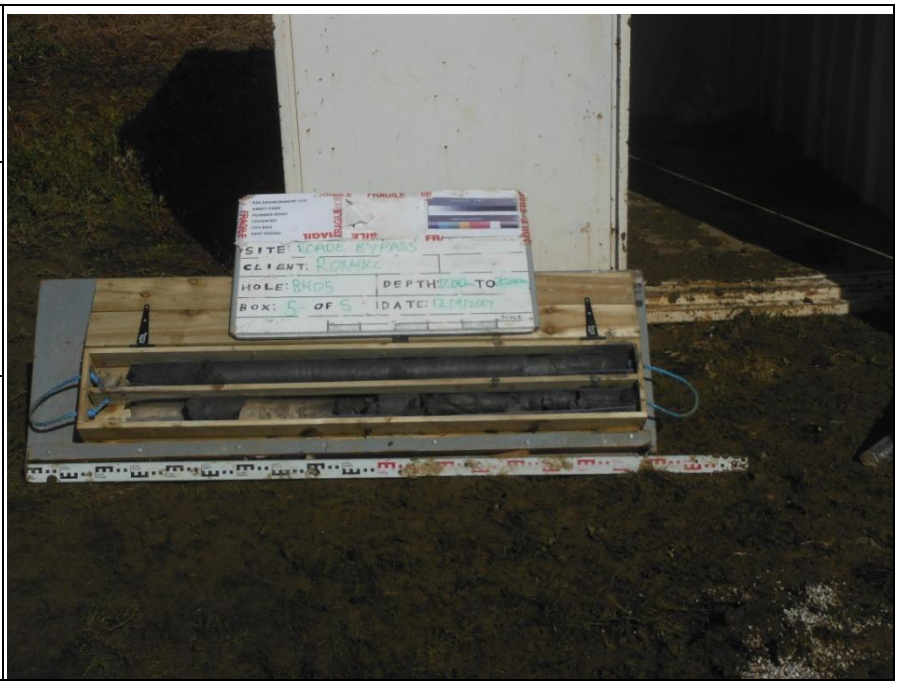
Photo No.	Date:
83	12/09/2017

Exploratory hole number:

Borehole 05

Description:

Borehole 05, Box 5 of 5, 17.00m to 20.00m.



APPENDIX D
TRIAL PIT LOGS

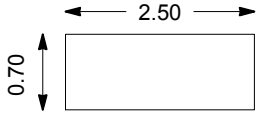
TRIAL PIT LOG

Contract:	Client:	Trial Pit:
Roade Bypass	**Roxhill**	**TP01**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**11.09.17** End: **11.09.17**	**121.28**	**E:475469.5 N:252463.3**	**1** of **1**

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
						Crop over silty slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of quartzite, flint and limestone. (TOPSOIL)		(0.30)	
0.20		ES					120.98	0.30	
0.20		PID	0.0ppm						
						Firm orangish brown light grey silty slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to rounded fine to coarse limestone, chalk, flint and quartzite. (GLACIAL TILL)			
0.50		V	c_u=64/52/68						
0.70		D							
0.70		PID	0.0ppm					(1.10)	
0.80		B							
0.80		PID	0.0ppm						
							119.88	1.40	
						Firm stiff light grey and brown silty slighty sandy CLAY with rare to occasional fine rounded limestone gravel. (GLACIAL TILL)			
1.70		D							
1.70		PID	0.0ppm						
1.80		B							
1.80		PID	0.0ppm						
						. . . at 2.60m large limestone boulders.		(2.40)	
2.80		D							
2.80		PID	0.0ppm						
						. . . at 3.00m pocket of gravelly sand.			
						. . . at 3.20m becoming dark grey.			
3.40		D							
3.40		PID	0.0ppm						
							117.48	3.80	
						Dark grey medium strong to strong LIMESTONE. (BLISWORTH LIMESTONE FORMATION) Trial pit terminated at 3.8m depth due to rockbed.			

Plan (Not to Scale)



General Remarks

1. Location scanned with GPR prior to breaking ground. No services encountered.
2. Hard digging from 2.50m bgl.
3. Trial pit remained stable during excavation.
4. Groundwater not encountered.
5. Trial pit backfilled with arisings upon completion.

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Logged By:	Checked By:
Machine dug	**JCB-3CX**	**RSalama**	DMB

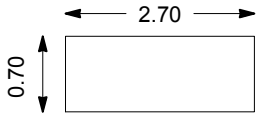
TRIAL PIT LOG

Contract:	Client:	Trial Pit:
Roade Bypass	**Roxhill**	**TP02**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**11.09.17**	**120.60**	**E:475303.7 N:252359.8**	**1** of **1**
	End: **11.09.17**			

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
0.20		ES				Crop over silty slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of quartzite, flint and limestone. (TOPSOIL)	120.30	(0.30) 0.30	
0.20		PID	0.0ppm						
0.50		D				Firm orangish brown light grey silty slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to rounded fine to coarse limestone, flint and quartzite. (GLACIAL TILL)			
0.50		PID	0.0ppm						
0.70		V	c_u=48/62/66						
1.00		B				. . . at 1.00m occasional angular limestone cobbles.		(1.30)	
1.00		PID	0.0ppm						
1.50		D					119.00	1.60	
1.50		PID	0.0ppm			Firm to stiff light grey and brown silty slighty sandy CLAY with rare to occasional fine rounded limestone gravel. (GLACIAL TILL)			
2.00		B							
2.00		PID	0.0ppm						
2.50		D						(2.00)	
2.50		PID	0.0ppm						
3.00		D				. . . at 3.00m dark grey.			
3.00		PID	0.0ppm						
3.50		D					117.00	3.60	
3.50		PID	0.0ppm						
						Strong dark grey and grey LIMESTONE. (BLISWORTH LIMESTONE FORMATION)	116.90	3.70	
						Trial pit terminated at 3.70m depth on rockbed.			

Plan (Not to Scale)



General Remarks

1. Location scanned with GPR prior to breaking ground. No services encountered.
2. Trial pit remained stable during excavation.
3. Groundwater not encountered.
4. Trial pit backfilled with arisings upon completion.

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Logged By:	Checked By:
Machine dug	**JCB-3CX**	**RSalama**	DMB

TRIAL PIT LOG

Contract:	Client:	Trial Pit:
Roade Bypass	**Roxhill**	**TP03**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**11.09.17** End: **11.09.17**	**119.66**	**E:475144.8 N:252257.5**	**1** of **1**

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
						Turf over silty slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse quartzite, flint and limestone. (POSSIBLE MADE GROUND)	119.46	0.20	
0.30		ES				Firm to stiff light grey and dark greyish brown silty slightly sandy slightly gravelly CLAY with rare limestone boulders and cobbles. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse quartzite, flint and limestone. Boulders are >250mm and are rounded. Cobbles are approximately 150mm and are subangular to subrounded. (GLACIAL TILL/POSSIBLE MADE GROUND)			
0.30		PID	0.0ppm						
0.50		B							
0.50		PID	0.0ppm						
0.60		V	c_u=98/110/102						
0.70		D							
0.70		PID	0.0ppm						
1.00		B							
1.00		PID	0.0ppm					(2.00)	
1.70		D							
1.70		PID	0.0ppm						
1.80		V	c_u=112/102/108						
							117.46	2.20	
						Firm brown, light grey and orangish brown silty slightly sandy slightly gravelly CLAY. Sand is dine to coarse. Gravel is subangular to subrounded fine to coarse limestone, quartzite and flint with occasional limestone cobbles and boulders. Cobbles are 150mm to 250mm and are subrounded to subangular. Boulders are >300mm and are rounded. (GLACIAL TILL/POSSIBLE MADE GROUND)			
2.50		V	c_u=60/72/56						
2.60		D							
2.60		PID	0.0ppm					(1.80)	
3.50		D							
3.50		PID	0.0ppm						
							115.66	4.00	
4.00		D				Trial pit terminated at 4.00m depth.			
4.00		PID	0.0ppm						

Plan (Not to Scale)

General Remarks

1. Location scanned with GPR prior to breaking ground. No services encountered.
2. Trial pit remained stable during excavation.
3. Groundwater not encountered.
4. Trial pit backfilled with arisings upon completion.

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Logged By:	Checked By:
Machine dug	**JCB-3CX**	**RSalama**	DMB

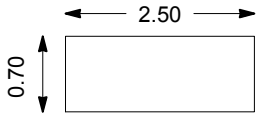
TRIAL PIT LOG

Contract:	Client:	Trial Pit:
Roade Bypass	**Roxhill**	**TP04**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**11.09.17**	**121.42**	**E:475070.3 N:252224.4**	**1** of **1**
	End: **11.09.17**			

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
0.50		ES				Firm light grey and dark greyish brown silty slightly sandy slightly gravelly CLAY with rare limestone boulders and cobbles. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse quartzite, flint and limestone. (GLACIAL TILL/POSSIBLE MADE GROUND)			
0.50		PID	0.0ppm						
0.70		D							
0.70		PID	0.0ppm						
1.00		B						(2.00)	
1.00		PID	0.0ppm						
1.70		D							
1.70		PID	0.0ppm				119.42	2.00	
2.00		B				Soft brown, light grey and orangish brown silty slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse limestone, quartzite and flint with occasional limestone cobbles and boulders. (GLACIAL TILL)			
2.00		PID	0.0ppm						
2.50		D						(1.10)	
2.50		PID	0.0ppm				118.32	3.10	
						Firm dark brown silty slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse quartzite and limestone. (GLACIAL TILL)		(0.90)	
							117.42	4.00	
						Trial pit terminated at 4.00m depth.			

Plan (Not to Scale)



General Remarks

1. Location scanned with GPR prior to breaking ground. No services encountered.
2. Trial pit remained stable during excavation.
3. Groundwater not encountered.
4. Trial pit backfilled with arisings upon completion.

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Logged By:	Checked By:
Machine dug	**JCB-3CX**	**RSalama**	DMB

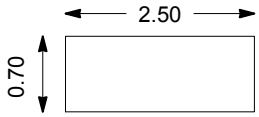
TRIAL PIT LOG

Contract:	Client:	Trial Pit:
Roade Bypass	**Roxhill**	**TP05**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**11.09.17** End: **11.09.17**	**120.61**	**E:474984.3 N:252133.6**	**1** of **1**

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
						Crop over silty slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of quartzite, flint and limestone. (TOPSOIL)		(0.30)	
0.20		ES					120.31	0.30	
0.20		PID	0.0ppm						
						Firm orangish brown light grey silty slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to rounded fine to coarse limestone, flint and quartzite. (GLACIAL TILL)			
0.50		D							
0.50		V	c_u=38/46/50						
0.50		PID	0.0ppm						
1.00		B							
1.00		PID	0.0ppm						
1.50		D						(2.90)	
1.50		PID	0.0ppm						
2.00		B							
2.00		PID	0.0ppm						
2.50		D							
2.50		PID	0.0ppm						
3.00		D							
3.00		PID	0.0ppm				117.41	3.20	
						Very strong grey LIMESTONE. (BLISWORTH LIMESTONE FORMATION) Trial pit terminated at 3.20m depth.			

Plan (Not to Scale)



General Remarks

1. Location scanned with GPR prior to breaking ground. No services encountered.
2. Trial pit remained stable during excavation.
3. Groundwater not encountered.
5. Trial pit backfilled with arisings upon completion.

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Logged By:	Checked By:
Machine dug	**JCB-3CX**	**RSalama**	DMB

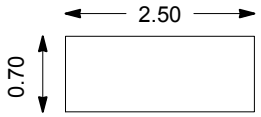
TRIAL PIT LOG

Contract:	Client:	Trial Pit:
Roade Bypass	**Roxhill**	**TP07**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	End: **08.09.17**	**119.86**	**E:474875.3 N:251916.9**	**1** of **1**

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
0.10 0.10		ES PID	 0.0ppm			Brown silty slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse quartzite and flint.	119.66	0.20	
0.50 0.50		D PID	 0.0ppm			Firm brown and light grey mottled orangish brown silty slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse limestone. (GLACIAL TILL)			
0.80		V	c_u=48/56/52						
						. . . at 1.40m large limestone boulder.			
1.50 1.50		D PID	 0.0ppm						
						. . . at 1.80m grey in colour.		(3.60)	
						. . . at 2.30m dark grey.			
2.50 2.50		D PID	 0.0ppm						
3.50 3.50		D PID	 0.0ppm				116.06	3.80	
						Trial pit terminated at 3.80m depth due to machine lifting.			

Plan (Not to Scale)



General Remarks

1. Location scanned with GPR prior to breaking ground. No services encountered.
2. Hard digging from 3.40m bgl.
3. Trial pit remained stable during excavation.
4. Groundwater not encountered.
5. Trial pit backfilled with arisings upon completion.

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Logged By:	Checked By:
Machine dug	**JCB-3CX**	**RSalama**	DMB

AGS

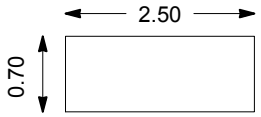
TRIAL PIT LOG

Contract:	Client:	Trial Pit:
Roade Bypass	**Roxhill**	**TP12**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**08.09.17** End: **08.09.17**	**115.32**	**E:474783.5 N:251216.1**	**1** of **1**

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
						Brown silty slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse flint, quartzite and chalk. (TOPSOIL)		(0.30)	
0.20		ES					115.02	0.30	
0.20		PID	0.0ppm						
						Firm to stiff orangish brown silty slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse quartzite, limestone and chalk. (GLACIOFLUVIAL DEPOSITS)		(0.70)	
0.90		D					114.32	1.00	
0.90		PID	0.0ppm						
1.00		B				Orangish brown slightly silty slightly clayey slightly gravelly SAND. SAnd is fine to coarse. Gravel is subangular to subrounded fine to coarse of quartzite and flint. (GLACIOFLUVIAL DEPOSITS)		(0.30)	
1.00		PID	0.0ppm				114.02	1.30	
1.10		D							
1.10		PID	0.0ppm						
						Orangish brown sandy GRAVEL. Sand is fine to coarse. Gravel is subangular to rounded fine to coarse of quartzite and flint. (GLACIOFLUVIAL DEPOSITS)			
2.00		D							
2.00		PID	0.0ppm					(2.00)	
3.00		B							
3.00		PID	0.0ppm						
						. . . at 3.20m large limestone boulders, > 300mm.	112.02	3.30	
						Trial pit terminated at 3.30m depth on assumed rockhead.			

Plan (Not to Scale)



General Remarks

1. Location scanned with GPR prior to breaking ground. No services encountered.
2. Trial pit remained stable during excavation.
3. Groundwater not encountered.
4. Trial pit backfilled with arisings upon completion.

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Logged By:	Checked By:
Machine dug	**JCB-3CX**	**RSalama**	DMB

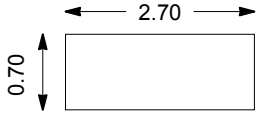
TRIAL PIT LOG

Contract:	Client:	Trial Pit:
Roade Bypass	**Roxhill**	**TP13**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**08.09.17** End: **08.09.17**	**115.93**	**E:474841.1 N:251141.4**	**1** of **1**

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
						Brown silty slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse flint and quartzite. (TOPSOIL)	115.73	0.20	
0.70		D				Firm to stiff orangish brown silty slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse quartzite, limestone and chalk. (GLACIAL TILL)			
0.70		PID	0.0ppm						
0.80		B							
0.80		PID	0.0ppm					(1.60)	
						. . . between 1.40m and 1.70m gravelly clay.			
							114.13	1.80	
1.90		B				Very soft orangish brown silty CLAY. (GLACIAL TILL)			
1.90		PID	0.0ppm					(0.70)	
							113.43	2.50	
2.80		B				Firm brown silty slightly sandy slightly gravelly CLAY with occasional limestone boulders. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse ironstone and limestone. Boulders are of 20x15x20cm limestone. (GLACIAL TILL)			
2.80		PID	0.0ppm					(0.90)	
2.90		D							
2.90		PID	0.0ppm				112.53	3.40	
3.40		D				Extremely weak light greyish brown silty LIMESTONE. (BLISWORTH LIMESTONE FORMATION)			
3.40		PID	0.0ppm					(0.60)	
							111.93	4.00	
						Trial pit terminated at 4.00m depth.			

Plan (Not to Scale)



General Remarks

1. Location scanned with GPR prior to breaking ground. No services encountered.
2. Hard digging from 3.40m bgl.
3. Trial pit remained stable during excavation.
4. Groundwater not encountered.
5. Trial pit backfilled with arisings upon completion.

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Logged By:	Checked By:
Machine dug	**JCB-3CX**	**RSalama**	DMB

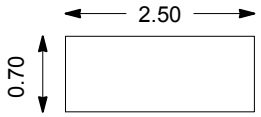
TRIAL PIT LOG

Contract:	Client:	Trial Pit:
Roade Bypass	**Roxhill**	**TP14**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**07.09.17** End: **07.09.17**	**114.78**	**E:474922.9 N:251044.6**	**1** of **1**

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
						Brown silty slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of quartzite and flint with occasional quartzite and limestone cobbles. Cobbles are 6x4x6cm.		(0.30)	
0.20		ES					114.48	0.30	
0.20		PID	0.0ppm			(TOPSOIL)			
						Frim orangish brown silty slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of quartzite with occasional limestone cobbles. (GLACIAL TILL)			
0.50		B							
0.50		PID	0.0ppm						
0.60		D							
0.60		PID	0.0ppm			. . . at 0.30m frequent limestone boulders. Boulders are 30x20x20cm.			
								(2.40)	
1.50		B							
1.50		PID	0.0ppm						
1.60		D							
1.60		PID	0.0ppm						
2.50		B							
2.50		PID	0.0ppm						
2.60		D					112.08	2.70	
2.60		PID	0.0ppm			Very stiff dark greyish brown silty slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to rounded fine to coarse of limestone and mudstone lithorelicts. (WEATHERED BLISWORTH LIMESTONE FORMATION)		(0.30)	
							111.78	3.00	
						Medium strong to strong dark greyish brown LIMESTONE recovered as cobbles and gravel. (BLISWORTH LIMESTONE FORMATION)		(0.60)	
3.50		B					111.18	3.60	
3.50		PID	0.0ppm						
3.60		D							
3.60		PID	0.0ppm			Trial pit terminated at 3.60m depth.			

Plan (Not to Scale)



General Remarks

1. Location scanned with GPR prior to breaking ground. No services encountered.
2. Trial pit remained stable during excavation.
3. Groundwater not encountered.
4. Trial pit backfilled with arisings upon completion.

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Logged By:	Checked By:
Machine dug	**JCB-3CX**	**RSalama**	DMB

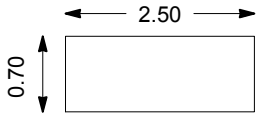
TRIAL PIT LOG

Contract:	Client:	Trial Pit:
Roade Bypass	**Roxhill**	**TP15**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	End: **07.09.17**	**110.97**	**E:475025.6 N:250920.1**	**1** of **1**

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
0.20 0.20	1	ES PID	0.0ppm			Brown silty slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of quartzite and flint with occasional quartzite, flint and limestone cobbles. Cobbles are 6x4x6cm. (TOPSOIL)	110.67	(0.30) 0.30	
0.50		V	c_u=42/50/58			Firm orangish brown silty slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of quartzite with occasional limestone cobbles. (WEATHERED BLISWORTH LIMESTONE FORMATION)			
0.70 0.70	4	D PID	0.0ppm					(0.90)	
1.00 1.00	3	B PID	0.0ppm				109.77	1.20	
1.50 1.50 1.50	5 7	D ES PID	0.0ppm			Firm to stiff yellowish brown and grey silty slighty sandy slightly gravelly CLAY with frequent limestone cobbles. (WEATHERED BLISWORTH LIMESTONE FORMATION)		(1.10)	
2.00 2.00	6	B PID	0.0ppm				108.67	2.30	
2.40 2.40 2.50		D PID B	0.0ppm			Extremely weak yellowish brown slightly clayey slightly sandy LIMESTONE. (BLISWORTH LIMESTONE FORMATION)		(1.70)	
						Trial pit terminated at 4.00m depth.	106.97	4.00	

Plan (Not to Scale)



General Remarks

1. Location scanned with GPR prior to breaking ground. No services encountered.
2. Hard digging from 1.50m bgl.
3. Trial pit remained stable during excavation.
4. Groundwater not encountered.
5. Trial pit backfilled with arisings upon completion.

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Logged By:	Checked By:
Machine dug	**JCB-3CX**	**RSalama**	DMB

AGS

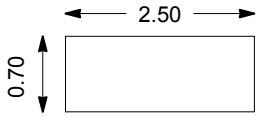
TRIAL PIT LOG

Contract:	Client:	Trial Pit:
Roade Bypass	**Roxhill**	**TP16**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**07.09.17** End: **07.09.17**	**104.51**	**E:475082.9 N:250808.0**	**1** of **1**

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
0.10		ES				Brown silty slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of quartzite, flint, chalk and limestone. (TOPSOIL)	104.21	(0.30) 0.30	
0.10		PID	0.0ppm						
0.60		B				Light brown creamy silty slightly sandy gravelly CLAY with frequent limestone cobbles. Cobbles are 7x6x6cm and are limestone. Gravel is subangular to subrounded fine to coarse of limestone. (WEATHERED BLISWORTH LIMESTONE FORMATION)	103.81	(0.40) 0.70	
0.60		PID	0.0ppm						
1.60		B				Very stiff dark grey mottled orangish brown silty slightly sandy desicated CLAY. (RUTLAND FORMATION)		(1.10)	
1.60		PID	0.0ppm						
1.70		D					102.71	1.80	
1.70		PID	0.0ppm			. . . from 1.80m becoming light bluish grey. Trial pit terminated at 1.80m depth.			

Plan (Not to Scale)



General Remarks

1. Location scanned with GPR prior to breaking ground. No services encountered.
2. Hard digging from 0.70m bgl.
3. Trial pit remained stable during excavation.
4. Groundwater not encountered.
5. Trial pit backfilled with arisings upon completion.

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Logged By:	Checked By:
Machine dug	**JCB-3CX**	**RSalama**	DMB

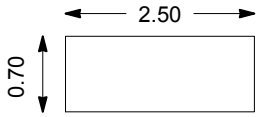
TRIAL PIT LOG

Contract:	Client:	Trial Pit:
Roade Bypass	**Roxhill**	**TP16A**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**08.09.17** End: **08.09.17**	**104.51**	**E:475082.9 N:250808.0**	**1** of **1**

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
0.20 0.20		ES PID	0.0ppm			MADE GROUND: Grass over LIMESTONE COBBLES. (MADE GROUND/RAILWAY BALLAST)	104.11	(0.40) 0.40	
0.50 0.50		ES PID	0.0ppm			Orangish brown silty slightly sandy slightly gravelly CLAY. (GLACIAL TILL) Trial pit terminated at 0.50m depth.	104.01	0.50	

Plan (Not to Scale)



General Remarks

1. Location scanned with GPR prior to breaking ground. No services encountered.
2. Trial pit remained stable during excavation.
3. Groundwater not encountered.
4. Trial pit backfilled with arisings upon completion.

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Logged By:	Checked By:
Machine dug	**JCB-3CX**	**RSalama**	DMB

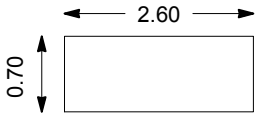
TRIAL PIT LOG

Contract:	Client:	Trial Pit:
Roade Bypass	**Roxhill**	**TP17**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**07.09.17** End: **07.09.17**	**102.16**	**E:475121.9 N:250710.3**	**1** of **1**

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
0.20		ES				Brown silty slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of quartzite, flint, chalk and limestone.	101.86	0.30	
0.20		PID	0.0ppm			(TOPSOIL)			
0.50		B				Light brown creamy silty slightly sandy gravelly CLAY with frequent limestone cobbles. Cobbles are 7x6x6cm and are limestone. Gravel is subangular to subrounded fine to coarse of limestone.		(0.70)	
0.50		PID	0.0ppm						
0.60		D							
0.60		PID	0.0ppm						
0.70		V	c_u=48/54/56			(WEATHERED BLISWORTH LIMESTONE FORMATION)	101.16	1.00	
1.30		V	c_u=98/110/86			Very stiff grey mottled orangish brown slightly sandy CLAY. Sand is fine to coarse. (WEATHERED BLISWORTH LIMESTONE FORMATION)			
1.50		B							
1.50		PID	0.0ppm						
1.60		D				. . . at 1.70m white subangular to angular fine to coarse limestone gravels.			
1.60		PID	0.0ppm						
2.50		B						(3.20)	
2.50		PID	0.0ppm						
2.60		D							
2.60		PID	0.0ppm			. . . at 2.90m becoming light grey.			
3.50		B							
3.50		PID	0.0ppm						
3.60		D				. . . at 3.70m becoming grey in colour.			
3.60		PID	0.0ppm						
4.40		D				Soft dark bluish grey mottled orangish brown silty slightly sandy CLAY with frequent subangular to angular fine to coarse mudstone lithorelicts.	97.96	4.20	
4.40		PID	0.0ppm			(RUTLAND FORMATION)	97.66	4.50	
4.50		B				Trial pit terminated at 4.50m depth.			

Plan (Not to Scale)



General Remarks

1. Location scanned with GPR prior to breaking ground. No services encountered.
2. Hard digging from 2.00m bgl.
3. Trial pit remained stable during excavation.
4. Groundwater not encountered.
5. Trial pit backfilled with arisings upon completion.

All dimensions in metres | Scale: **1:35**

Method Used:	Plant Used:	Logged By:	Checked By:
Machine dug	**JCB-3CX**	**RSalama**	DMB

AGS

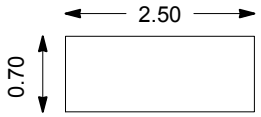
TRIAL PIT LOG

Contract:	Client:	Trial Pit:
Roade Bypass	**Roxhill**	**TP18**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**08.09.17** End: **08.09.17**	**117.37**	**E:474880.5 N:251786.9**	**1** of **1**

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
						Brown silty slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse quartzite and flint. (TOPSOIL)	117.17	0.20	
0.20		ES							
0.20		PID	0.0ppm						
						Firm brown and light grey mottled orangish brown silty slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse limestone. (GLACIAL TILL)			
0.60		V	c_u=56/68/62						
0.70		B							
0.70		PID	0.0ppm						
0.80		D						(1.80)	
0.80		PID	0.0ppm						
						. . . between 1.30m and 1.70m boulders and cobbles of limestone. Cobbles are 100mm to 250mm and are subangular to subrounded. Boulders are >300mm and are rounded to subrounded.			
1.70		D							
1.70		PID	0.0ppm						
							115.37	2.00	
2.00		V	c_u=74/68/83			Firm grey silty CLAY. (GLACIAL TILL)			
2.10		D							
2.10		PID	0.0ppm						
						. . . at 2.50m stiff.		(1.10)	
2.70		V	c_u=114/126/120						
							114.27	3.10	
3.20		D				Very stiff grey mottled orangish brown silty slightly sandy CLAY. (GLACIAL TILL)			
3.20		PID	0.0ppm			. . . at 3.30m greyish green.		(0.40)	
							113.87	3.50	
						Strong greyish green LIMESTONE. (BLISWORTH LIMESTONE FORMATION) Trial pit terminated at 3.50m depth.			

Plan (Not to Scale)



General Remarks

1. Location scanned with GPR prior to breaking ground. No services encountered.
2. Trial pit remained stable during excavation.
3. Groundwater not encountered.
4. Trial pit backfilled with arisings upon completion.

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Logged By:	Checked By:
Machine dug	**JCB-3CX**	**RSalama**	DMB

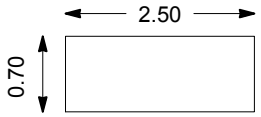
TRIAL PIT LOG

Contract:	Client:	Trial Pit:
Roade Bypass	**Roxhill**	**TP20**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**08.09.17** End: **08.09.17**	**119.11**	**E:474839.3 N:251894.4**	**1** of **1**

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
						Brown silty slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse quartzite and flint.	118.91	0.20	
0.50 0.50		D PID	0.0ppm			Firm brown and light grey mottled orangish brown silty slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse limestone. (GLACIAL TILL)			
1.50 1.50		D PID	0.0ppm						
						. . . at 2.00m becoming dark grey.		(3.60)	
2.50 2.50		D PID	0.0ppm						
3.50 3.50		D PID	0.0ppm				115.31	3.80	
						Trial pit terminated at 3.80m depth.			

Plan (Not to Scale)



General Remarks

1. Area scanned with GPr prior to breaking ground. No services detected.
2. Trial pit remained stable during excavation.
3. Groundwater not encountered.
4. Trial pit backfilled with arisings.

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Logged By:	Checked By:
Machine dug	**JCB-3CX**	**RSalama**	DMB

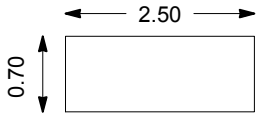
TRIAL PIT LOG

Contract:	Client:	Trial Pit:
Roade Bypass	**Roxhill**	**TP22**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**13.09.17** End: **13.09.17**	**117.11**	**E:475190.4 N:252244.0**	**1** of **1**

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
						Grass over brown silty slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded chalk, quartzite, flint and limestone. (TOPSOIL)	116.81	(0.30) 0.30	
1.00 1.00	1	B PID	0.0ppm			Firm to stiff light grey brown silty slightly sandy slightly gravelly CLAY with frequent angular limestone cobbles. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse limestone, flint and quartzite. (GLACIAL TILL/POSSIBLE MADE GROUND)		(2.70)	
2.00 2.00	2	B PID	0.0ppm						
3.00 3.00	3	B PID	0.0ppm				114.11	3.00	

Plan (Not to Scale)



General Remarks

1. Area scanned with GPR prior to breaking ground. No services detected.
2. Hard digging from 1.50m bgl.
3. Trial pit remained stable during excavation.
4. Groundwater not encountered.
5. Trial pit backfilled with arisings.
6. Trial pit used for soakaway test.

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Logged By:	Checked By:
Machine dug	**JCB-3CX**	**RSalama**	DMB

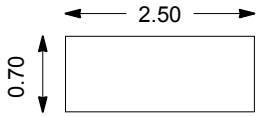
TRIAL PIT LOG

Contract:	Client:	Trial Pit:
Roade Bypass	**Roxhill**	**TP23**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**13.09.17** End: **13.09.17**	**121.20**	**E:475053.4 N:252237.1**	**1** of **1**

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
						Grass over brown silty slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse, subangular to subrounded chalk, quartzite, flint and limestone.	120.90	(0.30) 0.30	
1.00 1.00	1	B PID	0.0ppm			Firm brown light grey mottled dark grey silty slightly sandy slightly gravelly CLAY with rare limestone cobbles. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse limestone quartzite and flint. (GLACIAL TILL/POSSIBLE MADE GROUND)		(2.70)	
2.00 2.00	2	B PID	0.0ppm			. . . Brown in colour from 2.00m.			
							118.20	3.00	
3.00 3.00	3	B PID	0.0ppm						

Plan (Not to Scale)



General Remarks

1. Area scanned with GPR prior to breaking ground. No services detected.
2. Trial pit remained stable during excavation.
3. Groundwater not encountered.
4. Trial pit backfilled arisings upon completion.
5. Trial pit used for soakaway test.

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Logged By:	Checked By:
Machine dug	**JCB-3CX**	**RSalama**	DMB

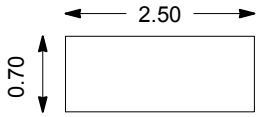
TRIAL PIT LOG

Contract:	Client:	Trial Pit:
Roade Bypass	**Roxhill**	**TP26**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**13.09.17** End: **13.09.17**	**99.88**	**E:475145.4 N:250780.4**	**1** of **1**

Samples and In-situ Tests				Water	Backfill	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
						Grass over brown silty slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse quartzite, flint and limestone.	99.58	(0.30) 0.30	
1.00 1.00	1	B PID	0.0ppm			Firm brown orange silty slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse quartzite flint and limestone. (GLACIAL TILL)			
						. . . light grey in colour from 1.50m		(2.70)	
2.00 2.00	2	B PID	0.0ppm			. . . with angular limestone cobbles from 2.50m			
						. . . Soil becoming damp from 2.80m	96.88	3.00	
3.00 3.00	2	B PID	0.0ppm						

Plan (Not to Scale)



General Remarks

1. Area scanned with GPR prior to breaking ground. No services detected.
2. Trial pit remained stable during excavation.
3. Groundwater not encountered.
4. Trial pit backfilled with arisings upon completion.
5. Trial pit used for soakaway test.

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Logged By:	Checked By:
Machine dug	**JCB-3CX**	**RSalama**	DMB

APPENDIX E
WINDOWLESS SAMPLE BOREHOLE LOGS

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Roade Bypass	**Roxhill**	**WS01**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**06.09.17** End: **06.09.17**	**120.71**	**E:475488.6 N:252412.5**	**1** of **1**

Progress	Samples / Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
	0.20	1	ES				Crop over dark brown slightly sandy slightly gravelly CLAY with frequent roots and rootlets. Gravel is angular to subrounded fine to coarse of quartzite.		(0.30)	
	0.20		PID	0.0ppm				120.41	0.30	
	0.40	2	B				(TOPSOIL) Firm orangish brown slightly sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse of chalk, quartzite and flint. (GLACIAL TILL)			
	0.90	3	D							
1.20 - 2.00 (85mm dia) 100% rec	1.20-1.65	1	SPT(c)	N=27			. . . Becoming stiff from 1.20m bgl.			
	1.20	4	D						(2.20)	
2.00 - 2.50 (75mm dia) 100% rec	2.00-2.45	2	SPT(c)	N=50			. . . becoming very stiff from 2.00m.			
	2.50-2.89	3	SPT(c)	N:50 for 285mm			Window sample hole terminated at 2.50m depth on refusal.	118.21	2.50	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Location scanned with GPR prior to breaking ground. No Services encountered.
2. Hand dug inspection pit to 1.20m bgl,
3. Groundwater not encontered.
4. Gas and groundwater monitoring well installed to 2.50m bgl.

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Premier 110**	**DSUK LTD**	**MSouthworth**	DMB

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Roade Bypass	**Roxhill**	**WS02**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**06.09.17** End: **06.09.17**	**119.35**	**E:474865.0 N:251894.1**	**1** of **2**

Progress	Samples / Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
	0.20 0.20	1	ES PID	0.0ppm			Crop over brown sandy slightly gravelly CLAY with frequent roots and rootlets. Gravel is angular to subrounded fine to coarse of chalk and quartzite. (TOPSOIL)	118.95	(0.40) 0.40	
	0.50	2	D				Firm becoming stiff orangish brown sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse of chalk and quartzite. (GLACIAL TILL)			
	0.70	4	B							
	1.00	3	D						(1.40)	
	1.20-1.65	1	SPT(c)	N=17						
	1.40	5	D					117.55	1.80	
1.20 - 2.00 (85mm dia) 100% rec										
	2.00-2.45	2	SPT(c)	N=22			Stiff greyish brown mottled orangish brown slightly sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse of chalk, quartzite and flint. (GLACIAL TILL) . . . at 1.90m cobbles of sandstone.			
2.00 - 3.00 (75mm dia) 100% rec	2.40	6	D						(1.30)	
							. . . at 2.90m becoming very stiff.			
	3.00-3.45	3	SPT(c)	N=46				116.25	3.10	
3.00 - 4.00 (65mm dia) 100% rec	3.40	7	D				Stiff dark grey silty slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse of chalk and sandstone. (GLACIAL TILL)			
	4.00-4.45	4	SPT(c)	N=40						
4.00 - 5.00 (65mm dia) 100% rec									(2.35)	
	4.40	8	D							

Drilling Progress and Water Observations

Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Location scanned with GPR prior to breaking ground. No Services encountered.
2. Hand dug inspection pit to 1.20m bgl,
3. Groundwater not encontered.
4. Gas and groundwater monitoring well installed to 5.00m bgl.

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Premier 110**	**DSUK LTD**	**MSouthworth**	DMB

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Roade Bypass	**Roxhill**	**WS02**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**06.09.17** End: **06.09.17**	**119.35**	**E:474865.0 N:251894.1**	**2** of **2**

Progress	Samples / Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
4.00 - 5.00 (65mm dia) 100% rec	5.00-5.45	5	SPT(c)	N=43			Stiff dark grey silty slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse of chalk and sandstone. (GLACIAL TILL) *(stratum copied from 3.10m from previous sheet)*	113.90	5.45	
							Window sample hole terminated at 5.45m depth.			

Drilling Progress and Water Observations					
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Premier 110**	**DSUK LTD**	**MSouthworth**	DMB

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Roade Bypass	**Roxhill**	**WS03**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**06.09.17** End: **06.09.17**	**115.32**	**E:474764.6 N:251244.6**	**1** of **1**

Progress	Samples / Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
	0.10 0.10	1	ES PID	0.0ppm			Grass over brown silty slightly clayey slightly gravelly SAND. Sand is fine to coarse. Gravel is angular to rounded fine to coarse of quartzite and flint. (TOPSOIL)	115.12	0.20	
	0.20-1.00	2	B				Orangish brown slightly silty slightly clayey slightly gravelly SAND. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of quartzite, flint and chalk. (PROBABLE GLACIOFLUVIAL DEPOSITS)		(1.00)	
	0.50	3	D					114.12	1.20	
	1.20-1.65	1	SPT	N=14			Firm orangish brown silty slightly sandy gravelly CLAY. Sand is fine to coarse . Gravel is subangular to subrounded fine to coarse of quartzite, chalk and flint. (GLACIAL TILL)			
	1.50	4	D						(1.50)	
	2.00-2.45	2	SPT	N=14						
	2.50	5	D					112.62	2.70	
							Orangish brown SAND. (GLACIAL TILL)		(0.30)	
	3.00-3.37	3	SPT	N:50 for 215mm				112.32	3.00	
							Window sample hole terminated at 3.00m depth due to refusal.			

Drilling Progress and Water Observations					
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Location scanned with GPR prior to breaking ground. No Services encountered.
2. Hand dug inspection pit to 1.20m bgl,
3. Groundwater not encontered.
4. Gas and groundwater monitoring well installed to 3.00m bgl.

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Premier 110**	**DSUK LTD**	**MSouthworth**	DMB

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Roade Bypass	**Roxhill**	**WS04**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**05.09.17** End: **05.09.17**	**104.35**	**E:475088.9 N:250819.0**	**1** of **2**

Progress	Samples / Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
	0.30	1	ES				Grass over orangish brown very sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse of quartzite. (TOPSOIL)	103.95	(0.40) 0.40	
	0.30		PID	0.0ppm						
	0.50	2	D				Light yellowish brown clayey slightly sandy slightly gravelly SILT. Sand is fine to coarse. Gravel is subangular to angular fine to coarse of siltstone lithorelicts. (GLACIAL TILL)		(1.00)	
	0.70	3	B							
	1.10	4	D							
1.20 - 2.00 (85mm dia) 100% rec	1.20-1.65	1	SPT(c)	N=20				102.95	1.40	
	1.80		D				Firm greenish grey silty CLAY. (WEATHERED RUTLAND FORMATION)			
2.00 - 3.00 (75mm dia) 95% rec	2.00-2.45	2	SPT(c)	N=34			. . . from 1.80m to 2.60m light grey.			
	2.80		D				. . . from 2.60m to 2.95m greenish grey mottled orangish brown slightly sandy.			
3.00 - 4.00 (65mm dia) 95% rec	3.00-3.45	3	SPT(c)	N=38			. . . at 3.00m light grey.		(3.88)	
	3.80		D							
4.00 - 5.00 (65mm dia) 70% rec	4.00-4.45	4	SPT(c)	N=8						

Drilling Progress and Water Observations

Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Location scanned with GPR prior to breaking ground. No Services encountered.
2. Hand dug inspection pit to 1.20m bgl,
3. Groundwater not encontered.
4. Gas and groundwater monitoring well installed to 2.00m bgl.

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Premier 110**	**DSUK LTD**	**MSouthworth**	DMB

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Roade Bypass	**Roxhill**	**WS04**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**05.09.17** End: **05.09.17**	**104.35**	**E:475088.9 N:250819.0**	**2** of **2**

Progress	Samples / Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
4.00 - 5.00 (65mm dia) 70% rec	4.80 4.90-5.28	5	D SPT(c)	N:50 for 229mm			Firm greenish grey silty CLAY. (WEATHERED RUTLAND FORMATION) *(stratum copied from 1.40m from previous* sheet)	99.07	5.28	
							Window sample hole terminated at 5.28m depth.			

Drilling Progress and Water Observations

Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Premier 110**	**DSUK LTD**	**MSouthworth**	DMB

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Roade Bypass	**Roxhill**	**WS05**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**05.09.17** End: **05.09.17**	**102.94**	**E:475094.7 N:250779.9**	**1** of **1**

Progress	Samples / Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
	0.20	1	ES				MADE GROUND: Grass over dark brown slightly silty slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse of quartzite, brick and coal. (MADE GROUND)	102.54	(0.40) 0.40	
	0.20		PID	0.0ppm						
	0.30	2	D							
	0.50	3	D							
	0.80	6	B				Firm grey occasionally mottled orangish brown silty slightly sandy slightly gravelly CLAY/ Gravel is angular to subrounded fine to coarse of quartzite, flint and chalk fragments. (GLACIAL TILL)		(0.90)	
	0.90	4	D							
	1.20-1.65	1	SPT(c)	N=37				101.64	1.30	
1.20 - 2.00 (85mm dia) 100% rec	1.20	5	D				Stiff greenish grey very clayey slightly sandy slightly gravelly SILT. Gravel is angular to subrounded fine to coarse of chalk fragments. (WEATHERED RUTLAND FORMATION)			
	1.70	7	D				. . . from 1.35m to 1.40m pocket of silt.			
	2.00-2.45	2	SPT(c)	N=21			. . . from 1.50m to 1.55m band of extremely weak siltstone.			
2.00 - 3.00 (75mm dia) 100% rec	2.00	9	D							
	2.70	8	D				. . . at 2.80m increase in siltstone gravel.		(3.15)	
	3.00-3.45	3	SPT(c)	N=31						
3.00 - 4.00 (65mm dia) 100% rec	3.70	10	D							
	4.00-4.30	4	SPT(c)	N:50 for 154mm				98.49	4.45	
							Window sample hole terminated at 4.45m depth.			

Drilling Progress and Water Observations

Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Location scanned with GPR prior to breaking ground. No Services encountered.
2. Hand dug inspection pit to 1.20m bgl,
3. Groundwater not encontered.
4. Gas and groundwater monitoring well installed to 4.00m bgl.

All dimensions in metres | Scale: **1:35**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Premier 110**	**DSUK LTD**	**MSouthworth**	DMB

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Roade Bypass	**Roxhill**	**WS06**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**05.09.17** End: **05.09.17**	**97.15**	**E:475179.7 N:250728.3**	**1** of **2**

Progress	Samples / Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
	0.10	1	ES				Grass over dark brown sandy slightly gravelly CLAY with frequent roots and rootlets. Gravel is angular to subrounded fine to coarse of quartzite. (TOPSOIL)	96.85	(0.30) 0.30	
	0.10		PID	0.0ppm						
	0.50	2	B				Firm orangish brown sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse of quartzite and flint. (GLACIAL TILL)	96.35	(0.50) 0.80	
	0.70	3	D							
	1.00	4	D				Light yellowish brown clayey slightly sandy slightly gravelly SILT. Gravel is angular to subrounded fine to coarse of siltstone. (WEATHERED RUTLAND FORMATION)	95.75	(0.60) 1.40	
	1.20-1.65	1	SPT(c)	N=18						
	1.40-1.90	7	B				Firm dark blackish brown to black silty organic rich CLAY with frequent roots and rootlets. (WEATHERED RUTLAND FORMATION)	95.25	(0.50) 1.90	
1.20 - 2.00 (85mm dia) 100% rec	1.50	10	ES							
	1.50	5	D							
	2.00-2.45	2	SPT(c)	N=10			Firm clayey slightly sandy slightly gravelly SILT. Gravel is angular to subrounded fine to coarse of siltstone. (WEATHERED RUTLAND FORMATION)	94.05	(1.20) 3.10	
	2.00	6	D							
2.00 - 3.00 (75mm dia) 64% rec										
	3.00-3.45	3	SPT(c)	N=9			Light grey very silty SAND. (WEATHERED RUTLAND FORMATION)	93.50	(0.55) 3.65	
	3.20	7	D							
3.00 - 4.00 (65mm dia) 100% rec										
	4.00-4.45	4	SPT(c)	N=10			Firm light grey occasionally mottled orangish brown silty CLAY. (WEATHERED RUTLAND FORMATION)			
	4.00	8	D							
4.00 - 5.00 (55mm dia) 100% rec										

Drilling Progress and Water Observations

Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Location scanned with GPR prior to breaking ground. No Services encountered.
2. Hand dug inspection pit to 1.20m bgl,
3. Groundwater encontered at 3.50m bgl.
4. Gas and groundwater monitoring well installed to 4.00m bgl.

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Premier 110**	**DSUK LTD**	**MSouthworth**	DMB

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Roade Bypass	**Roxhill**	**WS06**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**05.09.17** End: **05.09.17**	**97.15**	**E:475179.7 N:250728.3**	**2** of **2**

Progress	Samples / Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
4.00 - 5.00 (55mm dia) 100% rec	4.50	9	D				Firm light grey occasionally mottled orangish brown silty CLAY. (WEATHERED RUTLAND FORMATION) *(stratum copied from 3.65m from previous* sheet)		(1.80)	
	5.00-5.45	5	SPT(c)	N=32						
								91.70	5.45	
							Window sample hole terminated at 5.45m depth.			

Drilling Progress and Water Observations					
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Premier 110**	**DSUK LTD**	**MSouthworth**	DMB

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Roade Bypass	**Roxhill**	**WS07**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**05.09.17** End: **05.09.17**	**102.01**	**E:475127.9 N:250660.3**	**1** of **1**

Progress	Samples / Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
	0.20	1	ES				Grass over dark brown sand slightly gravelly CLAY with frequent roots and rootlets. Gravel is angular to subrounded fine to coarse of chalk and quartzite. (TOPSOIL)	101.71	0.30	
	0.20		PID	0.0ppm						
	0.50	2	D					101.31	(0.40) 0.70	
	1.00	3	D				Firm orangish brown very sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse of quartzite. (GLACIAL TILL)			
1.20 - 2.00 (85mm dia) 100% rec	1.20-1.65	1	SPT(c)	N=30			Stiff light yellowish brown clayey slightly sandy slightly gravelly SILT. Gravel is angular to subrounded fine to coarse of siltstone. (WEATHERED RUTLAND FORMATION)		(1.10)	
	1.20	4	D					100.21	1.80	
	1.90	5	D				Extremely weak light yellowish brown slightly laminated SILTSTONE. (WEATHERED RUTLAND FORMATION)			
2.00 - 3.00 (75mm dia) 100% rec	2.00-2.45	2	SPT(c)	N=31				99.91	2.10	
							Firm to stiff light yellowish brown clayey slightly sandy slightly gravelly SILT. Gravel is angular to subrounded fine to coarse of siltstone. (WEATHERED RUTLAND FORMATION)	99.71	2.30	
	2.90	6	D				Stiff to very stiff greenish grey silty slightly sandy CLAY. (WEATHERED RUTLAND FORMATION) . . . at 2.80m occasional iron staining. . . . at 3.10m mudstone lithorelicts.			
3.00 - 4.00 (65mm dia) 100% rec	3.00-3.45	3	SPT(c)	N=33					(2.15)	
	3.90	7	D							
	4.00-4.45	4	SPT(c)	N:50 for 295mm				97.56	4.45	
							Window sample hole terminated at 4.45m depth.			

Drilling Progress and Water Observations					
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Location scanned with GPR prior to breaking ground. No Services encountered.
2. Hand dug inspection pit to 1.20m bgl,
3. Groundwater not encontered.
4. Gas and groundwater monitoring well installed to 2.50m bgl.

All dimensions in metres | Scale: **1:35**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Premier 110**	**DSUK LTD**	**MSouthworth**	DMB

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Roade Bypass	**Roxhill**	**WS08**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**05.09.17** End: **05.09.17**	**101.76**	**E:475122.6 N:250604.3**	**1** of **2**

Progress	Samples / Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
							Grass over sandy slightly gravelly CLAY with frequent roots and rootlets. Gravel is angular to subrounded fine to coarse of quartzite. (TOPSOIL)	101.46	(0.30) 0.30	
	0.40	1	ES				Firm orangish brown sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse of flint and quartzite. (GLACIAL TILL)		(0.50)	
	0.40		PID	0.0ppm						
	0.60	2	D							
	0.70	5	B					100.96	0.80	
	0.90	3	D				Stiff to very stiff light yellowish brown clayey slightly sandy slightly gravelly SILT. Gravel is angular to subangular fine to coarse of siltstone and rare limestone. (WEATHERED RUTLAND FORMATION)			
	1.10	4	D							
1.20 - 2.00 (85mm dia) 100% rec	1.20-1.65	1	SPT(c)	N=37						
	1.80	7	D				. . . from 1.80m to 1.90m thin band of extremely weak siltstone.		(2.10)	
	2.00-2.45	2	SPT(c)	N=46						
2.00 - 3.00 (75mm dia) 100% rec	2.00	8	D					98.86	2.90	
	3.00-3.45	3	SPT(c)	N=36			Stiff to very stiff grey silty CLAY with occasional mudstone lithorelicts. (WEATHERED RUTLAND FORMATION)			
3.00 - 4.00 (65mm dia) 87% rec	3.40	9	D							
	4.00-4.45	4	SPT(c)	N=35					(2.55)	
4.00 - 5.00 (65mm dia) 81% rec	4.40	10	D							

Drilling Progress and Water Observations

Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Location scanned with GPR prior to breaking ground. No Services encountered.
2. Hand dug inspection pit to 1.20m bgl,
3. Groundwater not encontered.
4. Gas and groundwater monitoring well installed to 3.00m bgl.

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Premier 110**	**DSUK LTD**	**MSouthworth**	DMB

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Roade Bypass	**Roxhill**	**WS08**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**05.09.17** End: **05.09.17**	**101.76**	**E:475122.6 N:250604.3**	**2** of **2**

Progress	Samples / Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
4.00 - 5.00 (65mm dia) 81% rec	4.90-5.35	5	SPT(c)	N=49			Stiff to very stiff grey silty CLAY with occasional mudstone lithorelicts. (WEATHERED RUTLAND FORMATION) *(stratum copied from 2.90m from previous sheet)*	96.31	5.45	
							Window sample hole terminated at 5.45m depth.			

Drilling Progress and Water Observations					
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Premier 110**	**DSUK LTD**	**MSouthworth**	DMB

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Roade Bypass	**Roxhill**	**WS09**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**05.09.17** End: **05.09.17**	**113.77**	**E:474968.6 N:250989.9**	**1** of **1**

Progress	Samples / Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
	0.20 0.20		ES PID	0.0ppm			Grass over orangish brown very sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse of quartzite, flint and chalk. (TOPSOIL)	113.37	(0.40) 0.40	
	0.60		D				Orangish brown silty sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to angular fine to coarse of quartzite, chalk and flint. (GLACIAL TILL)			
	1.00		B							
1.20 - 2.00 (85mm dia) 100% rec	1.20-1.65	1	SPT(c)	N=40			. . . from 1.20m very stiff and mottled light grey. Gravel includes subangular to angular fine to coarse siltstone lithorelicts.		(1.60)	
	1.60		D					111.77	2.00	
2.00 - 3.00 (75mm dia) 100% rec	2.00-2.45	2	SPT(c)	N=17			Firm stiff dark grey silty slightly sandy slightly gravelly CLAY. Gravel is subangular to angular of siltstone lithorelicts. (WEATHERED RUTLAND FORMATION)		(1.00)	
	2.60		D					110.77	3.00	
	3.00-3.24	3	SPT(c)	N:50 for 154mm			Window sample hole terminated at 3.00m depth due to refusal.			

Drilling Progress and Water Observations

Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Location scanned with GPR prior to breaking ground. No Services encountered.
2. Hand dug inspection pit to 1.20m bgl,
3. Groundwater not encontered.
4. Gas and groundwater monitoring well installed to 3.00m bgl.

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Premier 110**	**DSUK LTD**	**MSouthworth**	DMB

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Roade Bypass	**Roxhill**	**WS10**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**06.09.17** End: **06.09.17**	**117.97**	**E:474832.9 N:251829.0**	**1** of **1**

Progress	Samples / Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
	0.40	1	ES				Crop over dark brown slightly gravelly sandy CLAY with frequent roots and rootlets. Gravel is angular to subrounded fine to coarse of quartzite. (TOPSOIL)	117.67	0.30	
	0.40		PID	0.0ppm						
	0.50	3	B				Firm orangish brown slightly sandy slightly gravelly silty CLAY. Gravel is angular to subrounded fine to coarse of chal, quartzite, flint and ironstone. (GLACIAL TILL)		(1.30)	
	0.60	2	D							
	1.10	6	D				. . . becoming stiff from 1.20m.			
1.20 - 2.00 (85mm dia) 100% rec	1.20-1.65	1	SPT(c)	N=30				116.37	1.60	
	1.80		D				Firm to stiff light grey mottled orangish brown silty slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of chalk and quartzite. (GLACIAL TILL)			
2.00 - 3.00 (75mm dia) 100% rec	2.00-2.45	2	SPT(c)	N=22					(1.60)	
	2.80		D							
	3.00-3.45	3	SPT(c)	N=18				114.77	3.20	
3.00 - 4.00 (65mm dia) 100% rec	3.80		D				Stiff dark grey mottled orangish brown silty CLAY. (GLACIAL TILL)		(1.25)	
	4.00-4.44	4	SPT(c)	N:50 for 290mm				113.52	4.45	
							Window sample hole terminated at 4.45m depth due to refusal.			

Drilling Progress and Water Observations					
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Location scanned with GPR prior to breaking ground. No Services encountered.
2. Hand dug inspection pit to 1.20m bgl,
3. Groundwater not encontered.
4. Gas and groundwater monitoring well installed to 4.00m bgl.

All dimensions in metres | Scale: **1:35**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Premier 110**	**DSUK LTD**	**MSouthworth**	DMB

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Roade Bypass	**Roxhill**	**WS11**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**06.09.17** End: **06.09.17**	**121.33**	**E:475066.5 N:252232.3**	**1** of **2**

Progress	Samples / Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
	0.20		ES				Grass over dark brown slightly sandy slightly gravelly CLAY with frequent roots and rootlets. Gravel is angular to subrounded fine to coarse of quartzite.		(0.30)	
	0.20		PID	0.0ppm				121.03	0.30	
							(GLACIAL TILL/POSSIBLE MADE GROUND)			
	0.60		D				Firm to stiff brown grey mottled orange silty slightly gravelly sandy CLAY. Gravel is angular to subrounded fine to coarse chalk, flint and quartzite. (GLACIAL TILL/POSSIBLE MADE GROUND) (POSSIBLE MADE GROUND)			
	1.00		B							
	1.20-1.65	1	SPT(c)	N=22			. . . becoming stiff from 1.20m.			
1.20 - 2.00 (87mm dia) 100% rec							. . . becoming light orangish brown from 1.30m		(2.30)	
	1.50		D							
	2.00-2.45	2	SPT(c)	N=23						
2.00 - 3.00 (77mm dia) 100% rec	2.50		D					118.73	2.60	
							Firm to stiff orangish brown silty slightly sandy slightly gravelly CLAY. Sand is fine to coarse subangular to subrounded fine to coarse of quartzite, flint and quartzite. (GLACIAL TILL)			
	3.00-3.45	3	SPT(c)	N=15						
3.00 - 4.00 (67mm dia) 80% rec	3.50		D						(2.64)	
	4.00-4.45	4	SPT(c)	N=26			. . . becoming stiff from 4.00m			
4.00 - 5.00 (57mm dia) 100% rec										

Drilling Progress and Water Observations

Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Location scanned with GPR prior to breaking ground. No Services encountered.
2. Hand dug inspection pit to 1.20m bgl,
3. Groundwater not encontered.
4. Gas and groundwater monitoring well installed to 5.00m bgl.

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Premier 110**	**DSUK LTD**	**MSouthworth**	DMB

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Roade Bypass	**Roxhill**	**WS11**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**06.09.17** End: **06.09.17**	**121.33**	**E:475066.5 N:252232.3**	**2** of **2**

Progress	Samples / Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
4.00 - 5.00 (57mm dia) 100% rec	4.50		D				Firm to stiff orangish brown silty slightly sandy slightly gravelly CLAY. Sand is fine to coarse subangular to subrounded fine to coarse of quartzite, flint and quartzite. (GLACIAL TILL) *(stratum copied from 2.60m from previous* sheet)	116.10	5.24	
	4.80-5.24	5	SPT(c)	N:50 for 285mm			Window sample hole terminated at 5.24m depth due to refusal.			

Drilling Progress and Water Observations					
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Premier 110**	**DSUK LTD**	**MSouthworth**	DMB

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Roade Bypass	**Roxhill**	**WS12**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**06.09.17** End: **06.09.17**	**119.74**	**E:475138.6 N:252273.3**	**1** of **2**

Progress	Samples / Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
	0.30	1	ES				Grass over dark brown slightly sandy slightly gravelly CLAY with frequent roots and rootlets. Gravel is angular to subrounded fine to coarse of quartzite. (POSSIBLE MADE GROUND)	119.34	(0.40) 0.40	
	0.30		PID	0.0ppm			Firm greyish brown mottled orangish brown slightly gravelly sandy CLAY. Gravel is angular to subrounded fine to coarse of chalk, flint and quartzite. (POSSIBLE MADE GROUND)			
	0.80	2	D							
	0.90	4	B							
	1.10	3	D						(1.50)	
	1.20-1.65	1	SPT(c)	N=9						
1.20 - 2.00 (85mm dia) 100% rec										
	1.60	5	D					117.84	1.90	
	2.00-2.45	2	SPT(c)	N=11			Firm dark grey slightly gravelly slightly sandy silty CLAY. Gravel is angular to subrounded fine to coarse of chalk. (GLACIAL TILL/POSSIBLE MADE GROUND)		(0.40)	
	2.00	6	D				(POSSIBLE MADE GROUND)	117.44	2.30	
2.00 - 3.00 (75mm dia) 100% rec							Firm orangish brown slightly gravelly slightly sandy silty CLAY. Gravel is angular to subangular fine to coarse of chalk and quartzite. (GLACIAL TILL/POSSIBLE MADE GROUND) (POSSIBLE MADE GROUND)			
	2.60	7	D							
	3.00-3.45	3	SPT(c)	N=15			. . . becoming firm to stiff from 3.00m bgl			
3.00 - 4.00 (65mm dia) 100% rec										
	3.50	8	D				. . . from 3.40m to 3.60m pockets of dark grey clay.		(3.15)	
	4.00-4.45	4	SPT(c)	N=20			. . . becoming stiff from 4.00m.			
4.00 - 5.00 (65mm dia) 100% rec										

Drilling Progress and Water Observations

Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

1. Location scanned with GPR prior to breaking ground. No Services encountered.
2. Hand dug inspection pit to 1.20m bgl,
3. Groundwater not encontered.
4. Gas and groundwater monitoring well installed to 5.00m bgl.

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Premier 110**	**DSUK LTD**	**MSouthworth**	DMB

WINDOW SAMPLE LOG

Contract:	Client:	Window Sample:
Roade Bypass	**Roxhill**	**WS12**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**06.09.17** End: **06.09.17**	**119.74**	**E:475138.6 N:252273.3**	**2** of **2**

Progress	Samples / Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Window Run	Depth	No	Type	Results						
4.00 - 5.00 (65mm dia) 100% rec	5.00-5.45	5	SPT(c)	N=31			Firm orangish brown slightly gravelly slightly sandy silty CLAY. Gravel is angular to subangular fine to coarse of chalk and quartzite. (GLACIAL TILL/POSSIBLE MADE GROUND) (POSSIBLE MADE GROUND) *(stratum copied from 2.30m from previous* sheet)	114.29	5.45	
							Window sample hole terminated at 5.45m depth.			

Drilling Progress and Water Observations					
Date	Time	Borehole Depth (m)	Casing Depth (m)	Borehole Diameter (mm)	Water Depth (m)

General Remarks

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Tracked window sampling	**Premier 110**	**DSUK LTD**	**MSouthworth**	DMB

APPENDIX F
ROTARY BOREHOLE LOGS

BOREHOLE LOG

Contract:	Client:	Borehole:
Roade Bypass	**Roxhill**	**BH01**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	End: **20.09.17**	**119.70**	**E:475141.6 N:252265.6**	**1** of **4**

Depth (m)	Samples & Testing: No	Type	Results	Mechanical Log: TCR (%)	SCR (%)	RQD (%)	If (mm)	Backfill & Instrumentation	Water	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
0.50	1	ES								Grass over firm to stiff grey brown mottled orange silty slightly sandy slighty gravelly CLAY with occasional limestone cobbles and boulders. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse quartzite, flint, chalk and limestone. (GLACIAL TILL/POSSIBLE MADE GROUND)			
0.50		PID	0.0ppm										
0.60	2	D											
0.60		PID	0.0ppm										
1.00-1.45	1	SPT	N=11										
1.60	3	D											
1.60		PID	0.0ppm										
2.00-2.45	2	SPT	N=16										
2.60	4	D										(5.30)	
2.60		PID	0.0ppm										
3.00-3.45	3	SPT	N=24							. . . stiff from 3.00m bgl.			
										. . . becoming brown orange in colour from 3.50m			
4.00-4.45	4	SPT	N=14										
5.00-5.45	5	SPT	N=18							. . . stiff from 5.00m bgl.	114.40	5.30	
5.60	5	D								Stiff dark grey light grey mottled brown silty slightly sandy gravelly CLAY with occasional cobbles of limestone. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse limestone. Cobbles are subangular 100mm to 250mm bgl. (GLACIAL TILL)			
5.60		PID	0.0ppm										
6.00-6.45	6	SPT	N=19										
6.60	6	D											
6.60		PID	0.0ppm										
7.00-7.45	7	SPT	N=24									(3.70)	
7.60	7	D											
7.60		PID	0.0ppm										
8.00-8.45	8	SPT	N=24										
8.60	8	D											
8.60		PID	0.0ppm							. . . brown orange at 8.70m bgl.	110.70	9.00	

Boring Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
19/09/17		1.00	None	300	
19/09/17		19.50	9.00	123	Dry
19/09/17		19.50	9.00	123	Dry
19/09/17		30.00	9.00	123	Dry

General Remarks

1. Location scanned with GPR prior to breaking ground. No services encountered.
2. Hand dug inspection pit tp 1.20m bgl.
3. Groundwater not encountered.
4. Gas and groundwater monitoring well installed to 20.00m bgl upon completion.

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored	**Comacchio GEO 205**	**DSUK LTD**	**RSalama**	DMB

BOREHOLE LOG

Contract:	Client:	Borehole:
Roade Bypass	**Roxhill**	**BH01**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**18.09.17** End: **20.09.17**	**119.70**	**E:475141.6 N:252265.6**	**2** of **4**

Depth (m)	Samples & Testing: No	Type	Results	Mechanical Log: TCR (%)	SCR (%)	RQD (%)	If (mm)	Backfill & Instrumentation	Water	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
9.00-10.00													
9.00-9.45	9	SPT	N=48							Medium strong dark grey silty MUDSTONE with horizontal medium spaced planar stepped clean fracture. (BLISWORTH LIMESTONE FORMATION)			
9.00-9.19	9	C		35	19	0				. . . mottled light grey from 9.60m bgl.	109.70	(1.00)	
10.00-11.50												10.00	
10.15	10	D								. . . band of firm clay from 9.60m to 9.70m bgl.			
10.15		PID	0.0ppm							Very to extremely strong light grey LIMESTONE with horizontal to vertical closely spaced planar smooth clean fractures. (BLISWORTH LIMESTONE FORMATION)			
				100	92	80				. . . mottled brown beige from 10.65m bgl.			
11.50-13.00										. . . band of soft grey clay from 11.10m to 11.15m bgl.			
11.83-12.00	11	C											
12.00-12.06	10	SPT	N:30 for 10mm							. . . band of very soft dark grey clay from 12.00, to 12.05m bgl.			
				97	79	75						(5.20)	
13.00-14.50													
13.20-13.50	12	C											
13.40	13	D											
13.40		PID	0.0ppm							. . . light grey in colour from 13.50m bgl.			
				93	78	68							
14.50-16.00													
14.80-15.00	14	C											
15.00-15.06	11	SPT	N:50 for 20mm								104.50	15.20	
				82	81	68				Medium strong to strong dark grey silty MUDSTONE with horizontal to vertical closely spaced planar smooth tight clean fractures. (BLISWORTH LIMESTONE FORMATION)	104.20	15.50	
15.60	15	D											
15.60		PID	0.0ppm										
16.00-17.50										Very to extremely strong grey LIMESTONE with horizontal close to medium space planar smooth partly open clean fractures. (BLISWORTH LIMESTONE FORMATION)		(1.95)	
16.70-16.95	16	C		91	80	79					102.25	17.45	
17.50-19.00										*Description on next sheet*			
				93	85	81							

Boring Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored	**Comacchio GEO 205**	**DSUK LTD**	**RSalama**	DMB

BOREHOLE LOG

Contract:	Client:	Borehole:
Roade Bypass	**Roxhill**	**BH01**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	End: **20.09.17**	**119.70**	**E:475141.6 N:252265.6**	**3** of **4**

Depth (m)	Samples & Testing: No	Type	Results	Mechanical Log: TCR (%)	SCR (%)	RQD (%)	If (mm)	Backfill & Instrumentation	Water	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
18.00-18.03	12	SPT	N:50 for 20mm	93	85	81				Medium strong to strong grey silty MUDSTONE with horizontal closely spaced planar smooth and rough tight to partly open fractures. (POSSIBLE RUTLAND FORMATION) *(stratum copied from 17.45m from* previous sheet) . . . light blue grey from 18.00m to 19.30m bgl. . . . dark grey from 19.30m to 19.70m bgl.			
19.00-20.00													
19.30-19.40	17	C											
19.50	18	D		55	20	20							
19.50		PID	0.0ppm										
20.00-21.00												(5.75)	
20.60-20.80	19	C		49	26	16							
21.00-22.50										. . . dark grey from 21.00m bgl.			
21.00-21.07	13	SPT	N:50 for 40mm										
22.50-24.00				59	56	56							
23.20	20	D		85	82	41					96.50	23.20	
23.20		PID	0.0ppm							Extremely strong grey LIMESTONE with horizontal close to medium spaced planar smooth partly open clean fractures. (POSSIBLE RUTLAND FORMATION)			
23.80-24.00	21	C										(1.60)	
24.00-25.50													
24.00-24.03	14	SPT	N:50 for 20mm							. . . band of medium strong to strong silty mudstone from 24.30m to 24.45m bgl.	94.90	24.80	
24.70	22	D		100	95	88							
24.70		PID	0.0ppm							Strong grey silty MUDSTONE with vertical to sub-horizontal closely to medium spaced planar smooth and rough tight to partly open fractures with shell fragments. (POSSIBLE RUTLAND FORMATION)			
25.50-27.00													
				100	97	93				. . . dark grey from 26.00m bgl.			

Boring Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored	**Comacchio GEO 205**	**DSUK LTD**	**RSalama**	DMB

BOREHOLE LOG

Contract:	Client:	Borehole:
Roade Bypass	**Roxhill**	**BH01**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**18.09.17** End: **20.09.17**	**119.70**	**E:475141.6 N:252265.6**	**4** of **4**

Depth (m)	Samples & Testing: No	Type	Results	Mechanical Log: TCR (%)	SCR (%)	RQD (%)	If (mm)	Backfill & Instrumentation	Water	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
27.00-28.50													
27.00-27.32	15	SPT	N:50 for 170mm							Strong grey silty MUDSTONE with vertical to sub-horizontal closely to medium spaced planar smooth and rough tight to partly open fractures with shell fragments. (POSSIBLE RUTLAND FORMATION) *(stratum copied from 24.80m from* previous sheet)		(5.30)	
				63	61	61							
28.15-28.50	23	C											
28.50-30.00													
				70	59	55							
30.00-30.10	16	SPT	N:50 for 85mm								89.60	30.10	
										Borehole terminated at 30.10m bgl.			

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored	**Comacchio GEO 205**	**DSUK LTD**	**RSalama**	DMB

BOREHOLE LOG

Contract:	Client:	Borehole:
Roade Bypass	**Roxhill**	**BH02**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**15.09.17** End: **18.09.17**	**121.45**	**E:475077.5 N:252210.1**	**1** of **4**

Depth (m)	Samples & Testing: No	Type	Results	Mechanical Log: TCR (%)	SCR (%)	RQD (%)	If (mm)	Backfill & Instrumentation	Water	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
0.70	1	D								Firm to stiff grey mottled brown red orange silty slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse quartzite, flint and limestone with occasional limestone cobbles and boulders. (GLACIAL TILL/POSSIBLE MADE GROUND)		(1.80)	
0.70		PID	0.0ppm										
1.00-1.45	1	SPT	N=7										
1.20	2	ES											
1.20		PID	0.0ppm										
											119.65	1.80	
1.70	3	D								Firm to stiff brown orange silty slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse quartzite, flint and limestone with frequent limestone cobbles. (GLACIAL TILL/POSSIBLE MADE GROUND)		(1.40)	
1.70		PID	0.0ppm										
2.00-2.45	2	SPT	N=16										
2.70	4	D											
2.70		PID	0.0ppm										
3.00-3.45	26	UT	100% recovery								118.25	3.20	
3.70	5	D								Firm to stiff grey mottled brown red orange silty slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular gular to subrounded fine to coarse quartzite, flint and limestone. (GLACIAL TILL/POSSIBLE MADE GROUND)		(0.70)	
3.70		PID	0.0ppm								117.55	3.90	
										. . . dark grey mottled brown from 3.70m to 4.80m bgl.		(0.90)	
4.70-5.15	3	SPT	N=16								116.65	4.80	
4.70	6	D								Firm to stiff brown orange silty slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse quartzite, flint and limestone with frequent limestone cobbles. (GLACIAL TILL/POSSIBLE MADE GROUND)		(1.90)	
4.70		PID	0.0ppm										
5.70-6.10	4	SPT	N=29										
5.70	7	D											
5.70		PID	0.0ppm										
										Firm light grey mottled brown orange silty slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse quartzite, flint and limestone with frequent limestone cobbles. (GLACIAL TILL)	114.75	6.70	
6.70-6.82	5	SPT	N:50 for 70mm										
6.70	8	D											
6.70		PID	0.0ppm										
7.00	9	D											
7.00		PID	0.0ppm										
										. . . light grey mottled brown between 4.80m to 5.10m bgl.		(1.80)	
										Stiff grey CLAY with thin bands of limestone. (WEATHERED BLISWORTH LIMESTONE FORMATION)			
											112.95	8.50	
8.50-10.00										*Description on next sheet*			
8.50-8.95	6	SPT	N=44	23	13	0							

Boring Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
14/09/17		11.50	10.00	300	11.30
15/09/17		24.00	10.00	123	21.40
18/09/17		30.00	10.00	123	21.30

General Remarks

1. Location scanned with GPR prior to breaking ground. No services encountered.
2. Hand dug inspection pit tp 1.20m bgl.
3. Groundwater encountered at 25.20m bgl and rose to 23.60m after 20 minutes.
4. Gas and groundwater monitoring well installed to 30.00m bgl upon completion.

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored	**Comacchio GEO 205**	**DSUK LTD**	**RSalama**	DMB

BOREHOLE LOG

Contract:	Client:	Borehole:
Roade Bypass	**Roxhill**	**BH02**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**15.09.17** End: **18.09.17**	**121.45**	**E:475077.5 N:252210.1**	**2** of **4**

Depth (m)	Samples & Testing: No	Type	Results	Mechanical Log: TCR (%)	SCR (%)	RQD (%)	If (mm)	Backfill & Instrumentation	Water	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
				23	13	0				Stiff silty CLAY with limestone cobbles. (WEATHERED BLISWORTH LIMESTONE FORMATION) *(stratum copied from 8.50m from previous sheet)*		(1.60)	
10.00-11.50											111.35	10.10	
10.00-10.45	7	SPT	N=44							Extremely weak grey silty MUDSTONE. (BLISWORTH LIMESTONE FORMATION)	111.05	10.40	
10.60	10	D								Strong to very strong silty LIMESTONE. (BLISWORTH LIMESTONE FORMATION)			
10.60		PID	0.0ppm	100	92	80						(1.10)	
11.15-11.50	11	C								. . . band of firm grey silty clay from 11.10m to 11.16m bgl.	109.95	11.50	
11.50-13.00										Soft grey silty gravelly CLAY. Gravel is subangular fine to coarse limestone with horizontal to vertical close to medium spaced planar smooth clean fractures. (BLISWORTH LIMESTONE FORMATION)	109.75	11.70	
11.50-11.58	8	SPT	N:50 for 45mm										
12.00		PID	0.0ppm										
12.27-12.54	12	C		97	79	75							
13.00-14.50										Strong to very strong grey LIMESTONE with horizontal to subhorizontal with close to medium spaced planar smooth clean fractures. (BLISWORTH LIMESTONE FORMATION)			
13.50-13.55	13	D								. . . mottled brown from 12.10m to 12.60m bgl.			
13.50		PID	0.0ppm										
13.57-13.77	14	C		93	78	68				. . . mottled brown from 13.00m to 13.60m bgl.		(4.50)	
14.50-16.00													
14.50-14.56	9	SPT	N:50 for 30mm										
15.70	15	D											
15.70		PID	0.0ppm	82	81	68				. . . band of very stiff clay from 15.60m to 15.65m bgl.			
16.00-17.50											105.25	16.20	
16.00-16.20	16	C								Weak dark grey silty MUDSTONE with closely spaced vertical partly open clean fracture. (BLISWORTH LIMESTONE FORMATION)	104.85	16.60	
				91	80	79				Very strong to Extremely strong grey silty LIMESTONE with medium space horizontal tight fractures. (BLISWORTH LIMESTONE FORMATION)			
17.50-19.00												(2.05)	
17.50-17.60	10	SPT	N:50 for 50mm	93	85	81							

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored	**Comacchio GEO 205**	**DSUK LTD**	**RSalama**	DMB

BOREHOLE LOG

Contract:	Client:	Borehole:
Roade Bypass	**Roxhill**	**BH02**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**15.09.17** End: **18.09.17**	**121.45**	**E:475077.5 N:252210.1**	**3** of **4**

Depth (m)	Samples & Testing: No	Type	Results	Mechanical Log: TCR (%)	SCR (%)	RQD (%)	If (mm)	Backfill & Instrumentation	Water	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
										. . . band of very stiff clay from 17.45m to 17.50m bgl.			
18.50-18.60	17	C		93	85	81					102.80	18.65	
										Extremely to very weak dark grey silty MUDSTONE with closely spaced horizontal - subhorizontal tight to party open clean and clay infilled fractures. (POSSIBLE RUTLAND FORMATION)			
19.00-20.00													
19.00	18	D											
19.00		PID	0.0ppm	55	20	20				. . . mottled blue from 19.00m bgl.			
20.00-21.00													
20.00-20.23	11	SPT	N:50 for 95mm	49	26	16							
21.00-22.50												(5.35)	
				59	56	56							
22.17-22.40	19	C											
22.50-24.00													
22.50-22.53	12	SPT	N:50 for 20mm							. . . band of stiff clay from 22.50, to 22.60m bgl.			
23.00	20	D											
23.00		PID	0.0ppm	85	82	41			1				
										. . . band of very stiff clay from 23.60m to 23.80m bgl.	97.45	24.00	
24.00-25.50										Extremely strong grey silty LIMESTONE with horizontal to subhorizontal close to medium spaced planar smooth clean fractures. (POSSIBLE RUTLAND FORMATION)		(1.40)	
				100	95	88			1				
25.05-25.70	21	C									96.05	25.40	
25.50-27.00										Weak to strong grey MUDSTONE with medium spaced horizontal planar smooth partly open to open clean fractures. (POSSIBLE RUTLAND FORMATION) . . . band of soft silty clay from 25.50m to 25.60m bgl.			
25.50-25.54	13	SPT	N:50 for 20mm										
25.50	22	D											
25.50		PID	0.0ppm	100	97	93							
26.77-27.00	23	C											

Boring Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored	**Comacchio GEO 205**	**DSUK LTD**	**RSalama**	DMB

BOREHOLE LOG

Contract:	Client:	Borehole:
Roade Bypass	**Roxhill**	**BH02**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**15.09.17** End: **18.09.17**	**121.45**	**E:475077.5 N:252210.1**	**4** of **4**

Depth (m)	Samples & Testing: No	Type	Results	Mechanical Log: TCR (%)	SCR (%)	RQD (%)	If (mm)	Backfill & Instrumentation	Water	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
27.00-28.50				63	61	61				Weak to strong grey MUDSTONE with medium spaced horizontal planar smooth partly open to open clean fractures. (POSSIBLE RUTLAND FORMATION) *(stratum copied from 25.40m from* previous sheet) . . . dark grey from 27.00m to 28.20m bgl.		(4.60)	
28.30	24	D											
28.30		PID	0.0ppm										
28.50-30.00													
28.50-28.75	14	SPT	N:50 for 160mm										
29.10-29.40	25	C		70	59	55				. . . mottled blue from 29.20m to 29.80m bgl.			
											91.45	30.00	
										Borehole terminated at 30.00m bgl.			

Boring Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored	**Comacchio GEO 205**	**DSUK LTD**	**RSalama**	DMB

BOREHOLE LOG

Contract:	Client:	Borehole:
Roade Bypass	**Roxhill**	**BH03**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**12.09.17** End: **13.09.17**	**119.60**	**E:474853.9 N:251919.4**	**1** of **2**

Depth (m)	Samples & Testing: No	Type	Results	Mechanical Log: TCR (%)	SCR (%)	RQD (%)	If (mm)	Backfill & Instrumentation	Water	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
										Grass over dark brown slightly gravelly sandy CLAY with frequent roots and rootlets. Gravel is angular to subrounded fine to coarse quartzite. (TOPSOIL)	119.30	0.30	
1.00-1.45	1	SPT	N=43							Firm orange brown slightly gravelly slightly sandy CLAY. Gravel is angular to subrounded fine to coarse chalk fragments, quartzite and flint. (GLACIAL TILL)		(2.70)	
1.00	1	D											
1.00		PID	0.0ppm										
1.50	2	D											
2.00	3	D									116.60	3.00	
2.00		PID	0.0ppm										
3.00-3.32	2	SPT	N:50 for 170mm							Firm dark brown grey slightly sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse quartzite, flint and chalk. (GLACIAL TILL)		(1.50)	
3.00	4	D											
3.00		PID	0.0ppm								115.10	4.50	
4.00	5	D											
4.00		PID	0.0ppm										
4.50-6.00										Firm to stiff grey silty slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded medium coarse LIMESTONE. (WEATHERED BLISWORTH LIMESTONE FORMATION)		(2.60)	
4.50-4.95	3	SPT	N=43	37	8	7							
5.90	6	D											
5.90		PID	0.0ppm								112.50	7.10	
6.00-7.50													
6.00-6.45	4	SPT	N=45	45	33	33							
7.50-9.00									1	Strong dark grey fine grained silty LIMESTONE with close to medium spaced horizontal to vertical stepped and planar, rough and smooth clean fractures. (BLISWORTH LIMESTONE FORMATION)			
7.50-7.54	5	SPT	N:50 for 30mm						1				
8.20	7	D		89	69	48				. . . with shell inclusions from 7.60m bgl.			
8.20		PID	0.0ppm							. . . beige brown from 7.90m to 8.20m bgl.			
8.35-8.60	8	C								. . . beige brown from 8.40m to 9.10m bgl.			

Boring Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
12/09/17		3.00	4.50	123	Dry
13/09/17		3.00	4.50	123	2.60
13/09/17		15.00	9.00	123	13.60

General Remarks

1. Location scanned with GPR prior to breaking ground. No services encountered.
2. Hand dug inspection pit tp 1.20m bgl.
3. Groundwater encountered at 8.00m bgl.
4. Gas and groundwater monitoring well installed to 15.00m bgl upon completion.

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored	**Comacchio GEO 205**	**DSUK LTD**	**RSalama**	DMB

BOREHOLE LOG

Contract:	Client:	Borehole:
Roade Bypass	**Roxhill**	**BH03**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**12.09.17** End: **13.09.17**	**119.60**	**E:474853.9 N:251919.4**	**2** of **2**

Depth (m)	Samples & Testing: No	Type	Results	Mechanical Log: TCR (%)	SCR (%)	RQD (%)	If (mm)	Backfill & Instrumentation	Water	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
9.00-10.50 9.00-9.03	6	SPT	N:50 for 20mm	89	56	45				Strong dark grey fine grained silty LIMESTONE with close to medium spaced horizontal to vertical stepped and planar, rough and smooth clean fractures. (BLISWORTH LIMESTONE FORMATION) *(stratum copied from 7.10m from* previous sheet) . . . stiff clay with sandstone gravels from 9.00m to 9.10m bgl. . . . beige brown from 9.20m to 9.40m bgl. . . . beige brown from 9.60m to 10.00m bgl. . . . beige brown from 11.20m to 13.00m bgl.		(6.20)	
10.50-12.00 10.50-10.71	7	SPT	N:50 for 125mm										
11.15-11.25 11.15	9	D PID	0.0ppm	91	59	52							
12.00-13.50 12.00-12.11 12.13-12.35	8 10	SPT C	N:50 for 70mm	87	67	53					106.30	13.30	
13.50-15.00 13.50-13.54 13.50	9	SPT PID	N:50 for 30mm 0.0ppm							Extremely strong dark grey silty MUDSTONE. (RUTLAND FORMATION) . . . band of stiff clay from 13.50m to 13.60m bgl.			
14.02-14.18	11	C		93	72	65						(1.75)	
14.90	12	D								. . . band of stiff clay with horizontal closely spaced planar smooth clean and clay infilled fractures from 14.600m to 14.65m bgl.	104.55	15.05	
15.00-15.05 15.00	10	SPT PID	N:50 for 36mm 0.0ppm							Borehole termianted at 15.05m bgl.			

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored	**Comacchio GEO 205**	**DSUK LTD**	**RSalama**	DMB

BOREHOLE LOG

Contract:	Client:	Borehole:
Roade Bypass	**Roxhill**	**BH04**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**11.09.17** End: **13.09.17**	**115.71**	**E:474793.0 N:251226.6**	**1** of **3**

Depth (m)	Samples & Testing: No	Type	Results	Mechanical Log: TCR (%)	SCR (%)	RQD (%)	If (mm)	Backfill & Instrumentation	Water	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
										Grass over dark brown slightly gravelly sandy CLAY with frequent roots and rootlets. Gravel is angular to subrounded fine to coarse quartzite (TOPSOIL)	115.41	0.30	
1.00-1.45 1.00 1.00	1 1	SPT D PID	N=6 0.0ppm							Firm orange brown slightly gravelly sandy CLAY. Gravel is angular to subrounded fine to coarse chalk, quartzite and flint. (GLACIAL TILL)			
2.00-2.45 2.00 2.00	2 2	SPT D PID	N=11 0.0ppm									(3.70)	
3.00-3.45 3.00 3.00	3 3	SPT D PID	N=24 0.0ppm								111.71	4.00	
4.00-5.00 4.00-4.31 4.00 4.00 4.50	4 4 5	SPT D PID D	N:50 for 160mm 0.0ppm	90	17	12				Firm orange brown slightly gravelly sandy CLAY. Gravel is angular to subrounded fine to coarse chalk, quartzite and flint. (GLACIAL TILL)	111.61	4.10	
5.00-6.50 5.00-5.41 5.00	5	SPT PID	N:50 for 255mm 0.0ppm	87	40	35				Medium strong to strong yellow orange brown fine grained LIMESTONE with an occasional clayey matrix. Fractures are Extremely widely spaced dipping 25 - 45 degrees planar occasionally stepped smooth and clean. No staining noted on fractures. (WEATHERED BLISWORTH LIMESTONE FORMATION) . . . weak from 5.50m to 5.90m bgl.		(4.20)	
6.50-8.00 6.50-6.59	6	SPT	N:50 for 60mm	85	64	53				. . . shell inclusions from 7.80m bgl.			
8.00-9.50 8.00-8.30 8.00-8.03 8.00	6 7	C SPT PID	N:50 for 20mm 0.0ppm	91	79	79					107.41	8.30	
										Medium strong to strong dark grey fine grained LIMESTONE with shell inclusions. (WEATHERED BLUE LIAS	107.01	8.70	

Boring Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
11/09/17		15.50	11.00	123	14.90
12/09/17		15.50	11.00	123	14.10
12/09/17		20.00	11.00	123	19.30

General Remarks

1. Location scanned with GPR prior to breaking ground. No services encountered.
2. Hand dug inspection pit tp 1.20m bgl.
3. Groundwater not encountered.
4. Borehole backfilled with arisings upon completion.

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored	**Comacchio GEO 205**	**DSUK LTD**	**MSouthworth**	DMB

BOREHOLE LOG

Contract:	Client:	Borehole:
Roade Bypass	**Roxhill**	**BH04**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**11.09.17** End: **13.09.17**	**115.71**	**E:474793.0 N:251226.6**	**2** of **3**

Depth (m)	Samples & Testing: No	Type	Results	Mechanical Log: TCR (%)	SCR (%)	RQD (%)	If (mm)	Backfill & Instrumentation	Water	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
				91	79	79				FORMATION) (BLISWORTH LIMESTONE FORMATION)		(0.80)	
											106.21	9.50	
9.50-11.00										Medium strong to strong yellow orange brown fine grained LIMESTONE with an occasional clayey matrix. Fractures are 35 to 45 degrees stepped smooth clean with occasional fractures infilled with clay. No staining identified upon fractures. (BLISWORTH LIMESTONE FORMATION) *(stratum copied from 8.70m from* previous sheet) . . . shell inclusions from 9.40m bgl.		(0.50)	
9.50	7	D									105.71	10.00	
9.50-9.55	8	SPT	N:50 for 30mm										
9.50		PID	0.0ppm	85	73	68							
11.00-12.50													
11.00-11.05	9	SPT	N:50 for 40mm										
				68	53	53				Stiff to very stiff dark grey silty CLAY with occasional pockets of orange brown silt. (RUTLAND FORMATION)		(3.30)	
12.00-12.35	8	C											
12.50-14.00										Strong light grey fine grained MUDSTONE. Fractures are 25 to 35 degrees planar and stepped smooth occasionally rough very wide and clean. (RUTLAND FORMATION) . . . pocket of dark grey silty clay from 10.90m to 10.95m bgl. . . . no recovery from 12.50m to 13.10m bgl.			
12.50-12.95	10	SPT	N=44								102.41	13.30	
				47	36	36				Very stiff dark blue grey silty structured CLAY with frequent mudstone lithorelicts. Fractures are 35 to 45 planar smooth occasionally rough wide to Extremely wide and clean. (RUTLAND FORMATION)			
14.00-15.50													
14.00	9	D											
14.00-14.39	11	SPT	N:50 for 241mm										
14.00		PID	0.0ppm	68	61	55						(2.70)	
15.50-17.00													
15.50-15.95	12	SPT	N=47								99.71	16.00	
16.10-16.20	10	C		93	77	77				Strong light grey fine grained MUDSTONE. Fractures are 25 to 35 planar smooth wide to Extremely wide and clean. (RUTLAND FORMATION)			
17.00-18.50												(2.10)	
17.00-17.05	13	SPT	N:50 for 40mm										
				95	72	53							

Boring Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored	**Comacchio GEO 205**	**DSUK LTD**	**MSouthworth**	DMB

BOREHOLE LOG

Contract:	Client:	Borehole:
Roade Bypass	**Roxhill**	**BH04**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**11.09.17** End: **13.09.17**	**115.71**	**E:474793.0 N:251226.6**	**3** of **3**

Depth (m)	Samples & Testing: No	Type	Results	Mechanical Log: TCR (%)	SCR (%)	RQD (%)	If (mm)	Backfill & Instrumentation	Water	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
				95	72	53				Medium strong to strong dark grey fine grained MUDSTONE. Fractures are 25 to 35 planar smooth wide to Extremely wide and open. (RUTLAND FORMATION)	97.61	18.10	
18.50-20.00													
18.50	11	D											
18.50-18.77	14	SPT	N:50 for 160mm										
18.50		PID	0.0ppm										
				100	80	80						(2.35)	
19.50-19.90	12	C								. . . becoming light grey from 19.50m bgl.			
20.00-20.10	15	SPT	N:50 for 60mm								95.26	20.45	

Boring Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored	**Comacchio GEO 205**	**DSUK LTD**	**MSouthworth**	DMB

BOREHOLE LOG

Contract:	Client:	Borehole:
Roade Bypass	**Roxhill**	**BH05**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**07.09.17** End: **08.09.17**	**101.76**	**E:475105.8 N:250762.3**	**1** of **3**

Depth (m)	Samples & Testing: No	Type	Results	Mechanical Log: TCR (%)	SCR (%)	RQD (%)	If (mm)	Backfill & Instrumentation	Water	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
										Brown silty slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse flint, quartzite and limestone. (TOPSOIL)	101.46	0.30	
1.00-1.45	1	SPT	N=30							Soft to firm light grey mottled brown orange silty slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse quartzite, flint and limestone. (GLACIAL TILL)		(2.70)	
1.00		PID	0.0ppm										
1.30	1	ES											
1.30		PID	0.0ppm										
1.70	2	D								. . . stiff from 1.20m bgl.			
2.00-2.45	2	SPT	N=22										
2.70	3	D									98.76	3.00	
2.70		PID	0.0ppm										
3.00-3.45	3	SPT	N=27							Very stiff grey mottled orange red silty slightly sandy CLAY. Sand is fine to coarse. (GLACIAL TILL)		(1.00)	
3.70	4	D									97.76	4.00	
3.70		PID	0.0ppm										
4.00-5.50										Stiff brown red silty slightly sandy CLAY. (WEATHERED BLISWORTH LIMESTONE FORMATION)	97.66	4.10	
4.00-4.36	4	SPT	N:50 for 210mm										
4.50-4.60	6	D											
4.50		PID	0.0ppm	97	63	33				Strong orange LIMESTONE with close to medium spaced horizontal to vertical planar smooth tight partly open gravel filled clean fractures. (BLISWORTH LIMESTONE FORMATION)		(2.40)	
5.20-5.50	5	C								. . . mottled light grey from 4.30m bgl.			
5.50-7.00													
5.50-5.54	6	SPT	N:50 for 30mm								95.26	6.50	
				64	59	13							
7.00-8.50										Firm grey silty CLAY with gravel sized mudstone lithorelicts. (RUTLAND FORMATION)		(1.10)	
7.00-7.45	7	SPT	N=37								94.16	7.60	
				85	76	64			1	Extremely weak dark grey black MUDSTONE. (RUTLAND FORMATION)		(0.90)	
8.50-10.00											93.26	8.50	
8.50-8.95	8	SPT	N=42	27	24	22			1	No recovery from 8.50m to 9.50m bgl.			ZCL
8.80-9.00	7	C											

Boring Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
07/09/17		14.00	11.50	N/R	Dry
07/09/17		20.00	11.50	N/R	14.30

General Remarks

1. Location scanned with GPR prior to breaking ground. No services encountered.
2. Hand dug inspection pit tp 1.20m bgl.
3. Groundwater encountered at 9.00m bgl.
4. Gas and groundwater monitoring well installed to 12.00m bgl upon completion.

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored	**Comacchio GEO 205**	**DSUK LTD**	**RSalama**	DMB

BOREHOLE LOG

Contract:	Client:	Borehole:
Roade Bypass	**Roxhill**	**BH05**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**07.09.17** End: **08.09.17**	**101.76**	**E:475105.8 N:250762.3**	**2** of **3**

Depth (m)	Samples & Testing: No	Type	Results	Mechanical Log: TCR (%)	SCR (%)	RQD (%)	If (mm)	Backfill & Instrumentation	Water	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
										No recovery from 8.50m to 9.50m bgl. *(stratum copied from 8.50m from* previous sheet)		(1.10)	ZCL
9.40-9.50 9.40	8	D PID	0.0ppm	27	24	22					92.16	9.60	
										Extremely weak dark grey black MUDSTONE. (RUTLAND FORMATION)	91.76	10.00	
10.00-10.45	9	SPT	N=28							Grey silty slightly clayey SAND. (RUTLAND FORMATION) (STAMFORD MEMBER)		(1.50)	
											90.26	11.50	
11.50-12.50 11.50-11.95	10	SPT	N=42	70	55	10				Weak grey silty MUDSTONE. (RUTLAND FORMATION)	90.21	11.55 (0.55)	
										Very stiff dark grey silty CLAY. (RUTLAND FORMATION)	89.66	12.10	
12.30-12.40	9	C								Very stiff weak grey silty MUDSTONE with horizontal to subhorizontal close to medium spaced planar and stepped smooth and rough tight to open clean and clay infilled fractures. (RUTLAND FORMATION)			
12.50-14.00 12.50-12.95	11	SPT	N=43	76	52	39							
13.70-16.50 13.70	10	D PID	0.0ppm										
14.00-15.50 14.00-14.45	12	SPT	N=42	87	67	58				. . . band of frim grey silty clay from 13.95m to 14.03m bgl.		(4.90)	
										. . . band of soft to firm grey silty clay from 15.00m to 15.20m bgl.			
15.50-17.00 15.50-15.95	13	SPT	N=46	100	87	62				. . . band of soft to firm grey silty clay from 16.10m to 16.30m bgl.			
											84.76	17.00	
17.00-18.50 17.00-17.39	14	SPT	N:50 for 235mm	100	68	54				Very stiff grey silty CLAY with gravel sized MUDSTONE lithorelicts. (RUTLAND FORMATION)	84.46	17.30	
										Description on next sheet			

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored	**Comacchio GEO 205**	**DSUK LTD**	**RSalama**	DMB

BOREHOLE LOG

Contract:	Client:	Borehole:
Roade Bypass	**Roxhill**	**BH05**

Contract Ref:	Start:	Ground Level:	National Grid Co-ordinate:	Sheet:
313583	**07.09.17** End: **08.09.17**	**101.76**	**E:475105.8 N:250762.3**	**3** of **3**

Depth (m)	Samples & Testing: No	Type	Results	Mechanical Log: TCR (%)	SCR (%)	RQD (%)	If (mm)	Backfill & Instrumentation	Water	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
18.50-20.00 18.50-18.94	15	SPT	N:50 for 285mm	100 60	68 20	54 9				Weak grey silty MUDSTONE with closely spaced, subhorizontal, planar smooth closed fractures. (RUTLAND FORMATION) *(stratum copied from 17.30m from previous sheet)*	82.76	(1.70) 19.00	
										Soft grey silty CLAY. (RUTLAND FORMATION)	82.06	(0.70) 19.70	
20.00-20.45	16	SPT	N=47							Extremely weak grey silty MUDSTONE with closely to medium spaced planar smooth partly open to open clean fractures horizontal to subhorizontal. (RUTLAND FORMATION)	81.31	(0.75) 20.45	
										Borehole terminated at 20.45m bgl.			

Boring Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored	**Comacchio GEO 205**	**DSUK LTD**	**RSalama**	DMB

APPENDIX G
INSITU SOAKAWAY RESULTS

STRUCTURAL SOILS LTD

INSITU TESTING REPORT

1774

Report No. 747620R.01(00)

Date	25-September-2017	Contract	Roade Bypass

Client RSK Environment Ltd
Address Spring Lodge
172 Chester Road
Helsby
Cheshire
WA6 0AR
For the Attention of Romani Salama

Order received	18-August-2017	Client Reference	None
Testing Started	13-September-2017	Client Order No.	P0270736
Testing Completed	13-September-2017	Instruction Type	Written

Tests marked 'Not UKAS Accredited' in this report are not included in the UKAS Accreditation Schedule for our Laboratory.

UKAS Accredited Tests

Not UKAS Accredited Tests

3no. Insitu soakaway tests carried out at locations specified by client.

The results represent the ground conditions at the specified locations and depths at the time of testing.

Please Note: Remaining samples will be retained for a period of one month from today and will then be disposed of.
Test were undertaken on samples 'as received' unless otherwise stated.
Opinions and interpretations expressed in this report are outside the scope of accreditation for this laboratory.

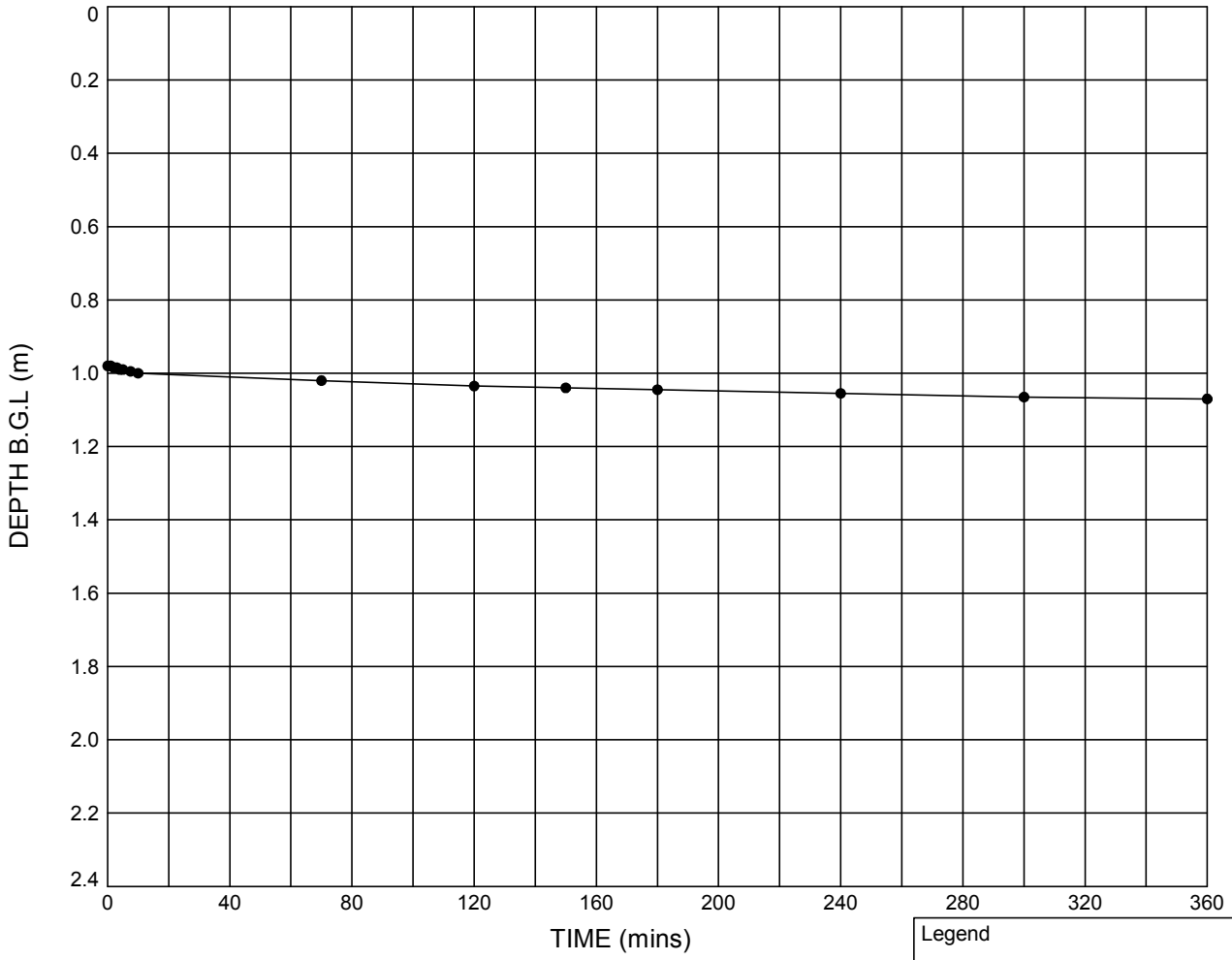
Structural Soils Ltd 1a Princess Street Bedminster Bristol BS3 4AG Tel.0117 9471000. e-mail dimitris.xirouchakis@soils.co.uk

FULL SCALE SOAKAWAY TEST

Non-standard test

Soakaway Test - Position ID : **TP22**

PLOT OF DEPTH OF WATER BELOW GROUND LEVEL AGAINST TIME



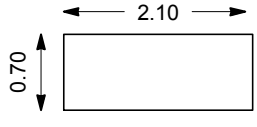
Legend

● Test 1 (13.09.17)

Pit start depth:	=	**2.45**	m
Pit final depth:	=	**2.10**	m
Effective depth, De	=	**1.12**	m
Effective storage volume, V_{p75-25}	=	**0.8232**	m^3
Surface area, a_{p50}	=	**4.6060**	m^2
Time, t_{p75-25}	=	**NA**	secs
Infiltration rate, f	=	**NA**	m/s

Notes: Test 1 - Insufficient drop in water level. Unable to calculate infiltration rate.

Plan (Not to scale)



No Bearing Taken

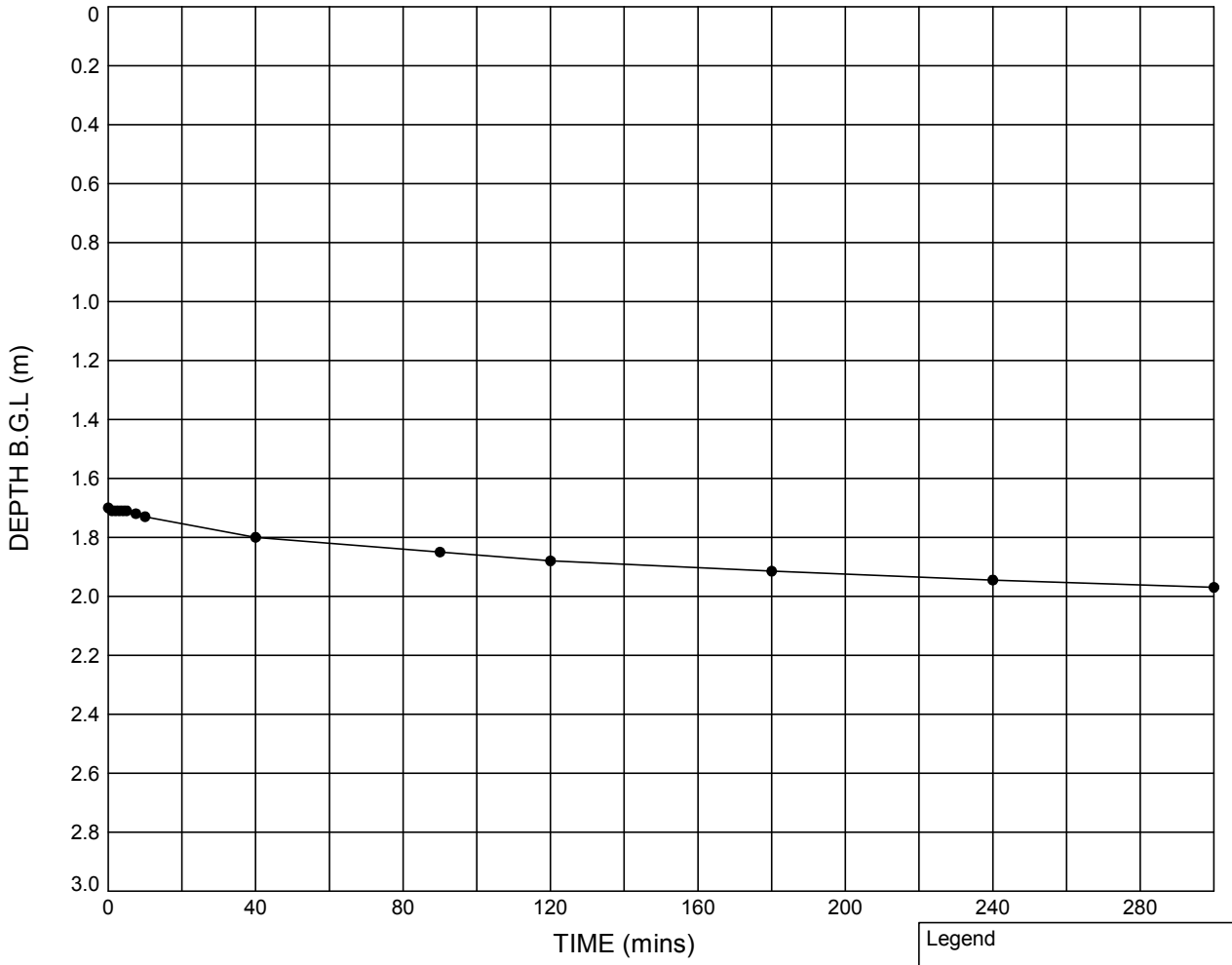
STRUCTURAL SOILS 1a Princess Street Bedminster Bristol BS3 4AG	Compiled By	Date	Checked By	Date
	MDStrowger	25/09/17	S. Phillips	25/09/17
	Contract **Roade Bypass**		Contract Ref: **747620**	

FULL SCALE SOAKAWAY TEST

Non-standard test

Soakaway Test - Position ID : **TP23**

PLOT OF DEPTH OF WATER BELOW GROUND LEVEL AGAINST TIME



Test 1

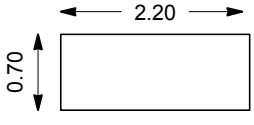
Legend

● Test 1 (13.09.17)

Pit start depth:	=	**3.00**	m
Pit final depth:	=	**2.90**	m
Effective depth, De	=	**1.20**	m
Effective storage volume, V_{p75-25}	=	**0.9240**	m^3
Surface area, a_{p50}	=	**5.0200**	m^2
Time, t_{p75-25}	=	**86400**	secs
Infiltration rate, f	=	**2.13x10^{-6}**	m/s

Please note test data was extrapolated to obtain tp75-tp25.

Plan (Not to scale)



No Bearing Taken

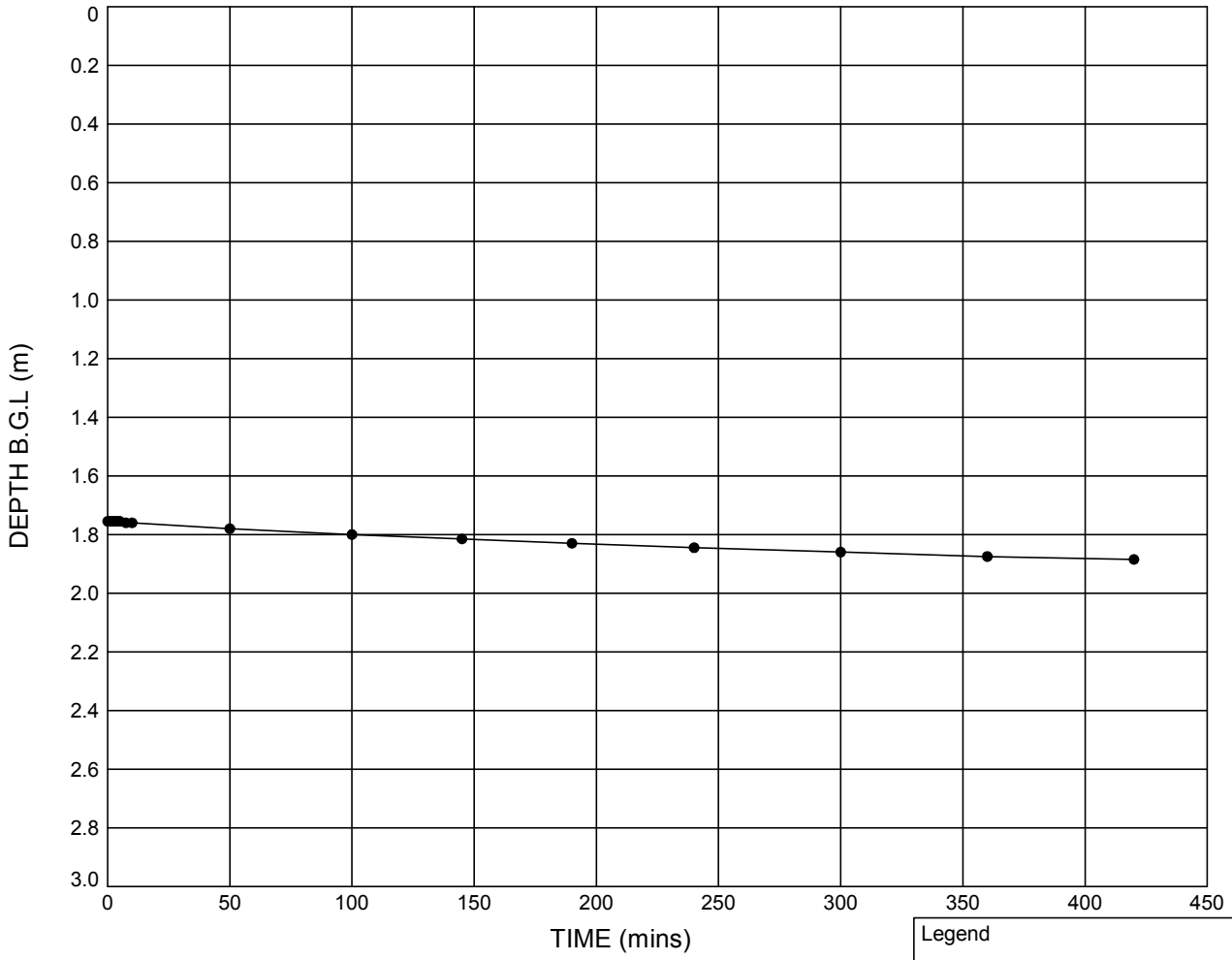
STRUCTURAL SOILS 1a Princess Street Bedminster Bristol BS3 4AG	Compiled By	Date	Checked By	Date
	MDStrowger	25/09/17	S. Phillips	25/09/17
	Contract **Roade Bypass**		Contract Ref: **747620**	

FULL SCALE SOAKAWAY TEST

Non-standard test

Soakaway Test - Position ID : **TP26**

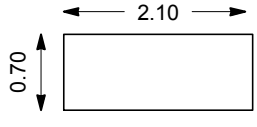
PLOT OF DEPTH OF WATER BELOW GROUND LEVEL AGAINST TIME



Legend

● Test 1 (13.09.17)

Plan (Not to scale)



No Bearing Taken

Pit start depth:	=	**2.90**	m
Pit final depth:	=	**2.89**	m
Effective depth, De	=	**1.13**	m
Effective storage volume, V_{p75-25}	=	**0.8306**	m^3
Surface area, a_{p50}	=	**4.6340**	m^2
Time, t_{p75-25}	=	**NA**	secs
Infiltration rate, f	=	**NA**	m/s

Notes: Test 1 - Insufficient drop in water level. Unable to calculate infiltration rate.

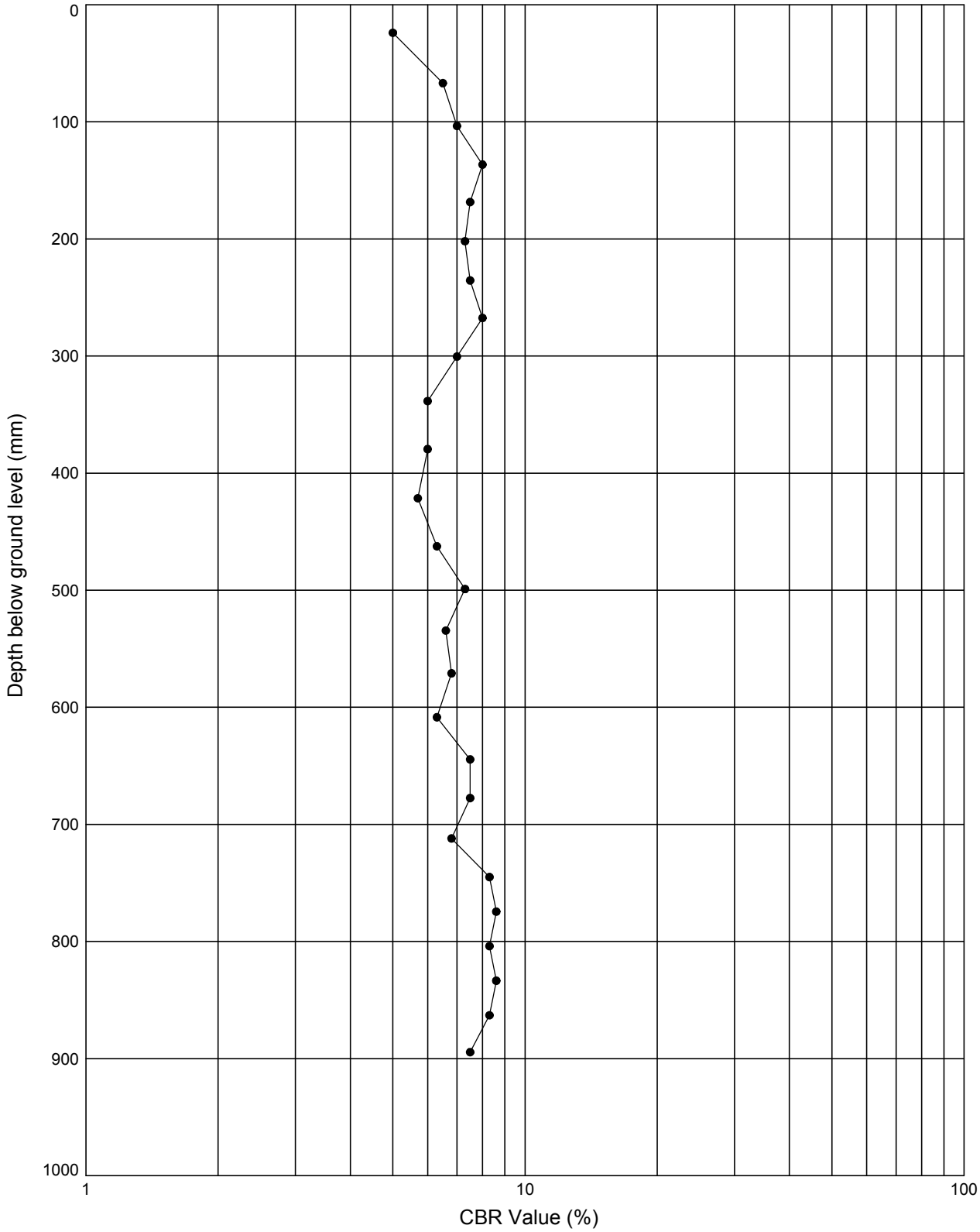
	Compiled By	Date	Checked By	Date
STRUCTURAL SOILS 1a Princess Street Bedminster Bristol BS3 4AG	MDStrawson	25/09/17	S. Phillips	25/09/17
	Contract **Roade Bypass**		Contract Ref: **747620**	

APPENDIX H
INSITU DYNAMIC CONE PENETROMETER RESULTS

DCP TEST RESULTS - DEPTH vs CBR VALUE

Position Ref : **DCP01** Test Date : **18.10.17**

Ground Level: **121.28** National Grid Co-ordinates: **E:475469.5 N:252463.3**



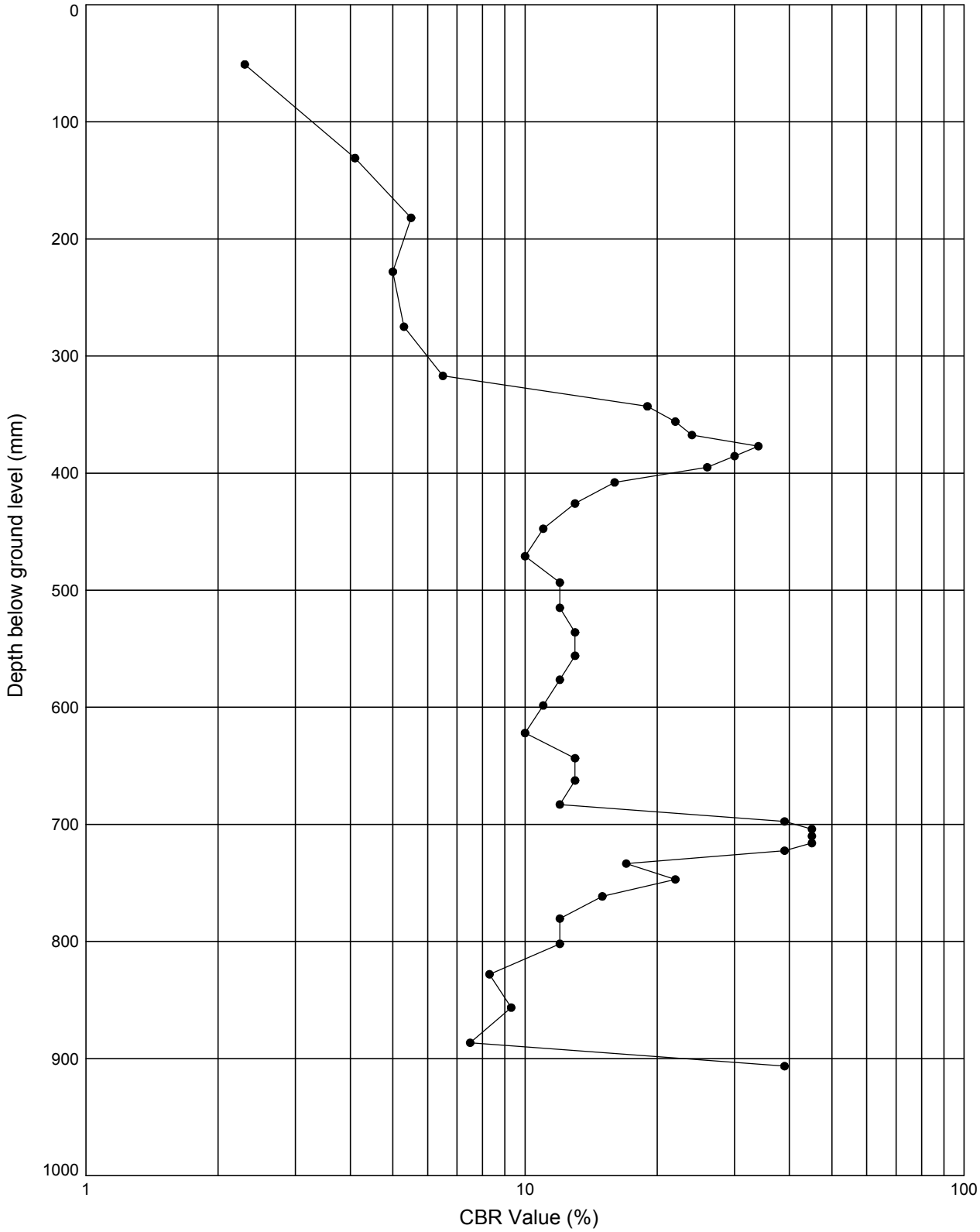
Notes: **CBR values calculated after TRRL Road Note 8 method. Values over 100% are plotted on the 100% line.**

RSK Environment Ltd Abbey Park Humber Road Coventry CV3 4AQ	Compiled By	Date	Checked By	Date
		01/11/17		
	Contract **Roade Bypass**		Contract Ref: **313583**	

DCP TEST RESULTS - DEPTH vs CBR VALUE

Position Ref : **DCP02** Test Date : **18.10.17**

Ground Level: **120.60** National Grid Co-ordinates: **E:475303.7 N:252359.8**



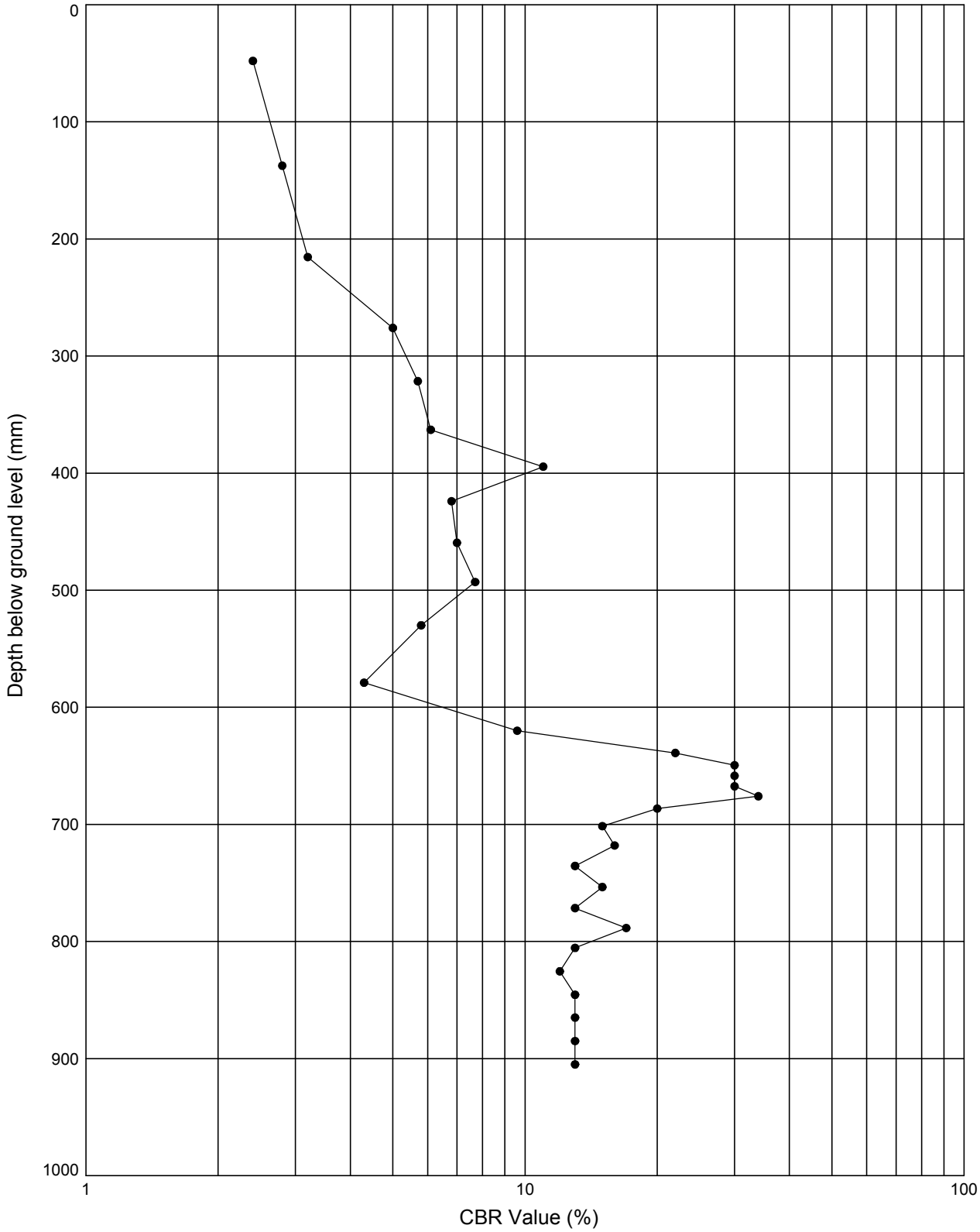
Notes: **CBR values calculated after TRRL Road Note 8 method. Values over 100% are plotted on the 100% line.**

RSK Environment Ltd Abbey Park Humber Road Coventry CV3 4AQ	Compiled By	Date	Checked By	Date
		01/11/17		
	Contract **Roade Bypass**		Contract Ref: **313583**	

DCP TEST RESULTS - DEPTH vs CBR VALUE

Position Ref : **DCP03** Test Date : **18.10.17**

Ground Level: **119.66** National Grid Co-ordinates: **E:475144.8 N:252257.5**



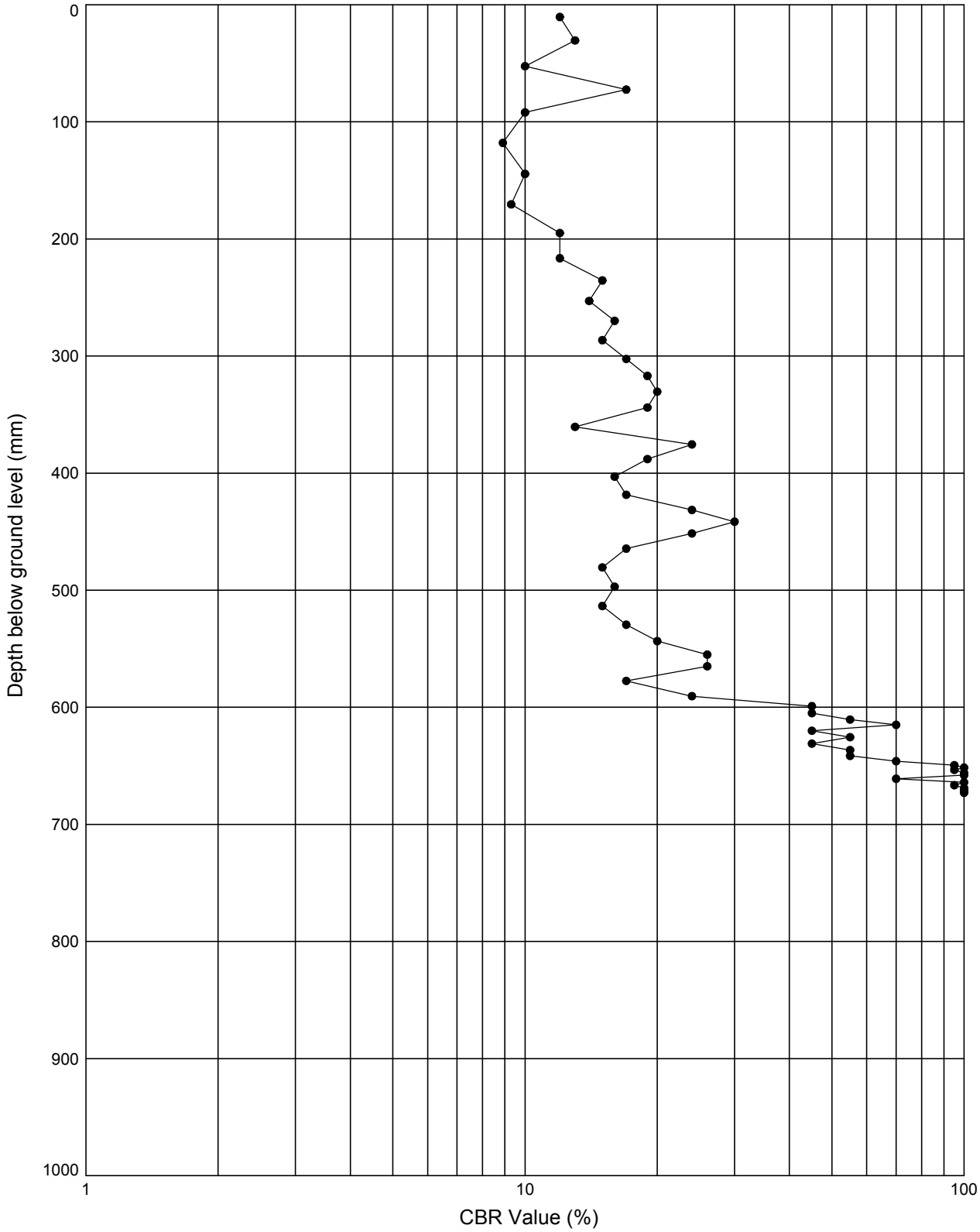
Notes: **CBR values calculated after TRRL Road Note 8 method. Values over 100% are plotted on the 100% line.**

RSK Environment Ltd Abbey Park Humber Road Coventry CV3 4AQ	Compiled By	Date	Checked By	Date
		01/11/17		
	Contract **Roade Bypass**		Contract Ref: **313583**	

DCP TEST RESULTS - DEPTH vs CBR VALUE

Position Ref : **DCP04** Test Date : **18.10.17**

Ground Level: **121.28** National Grid Co-ordinates: **E:475469.5 N:252463.3**



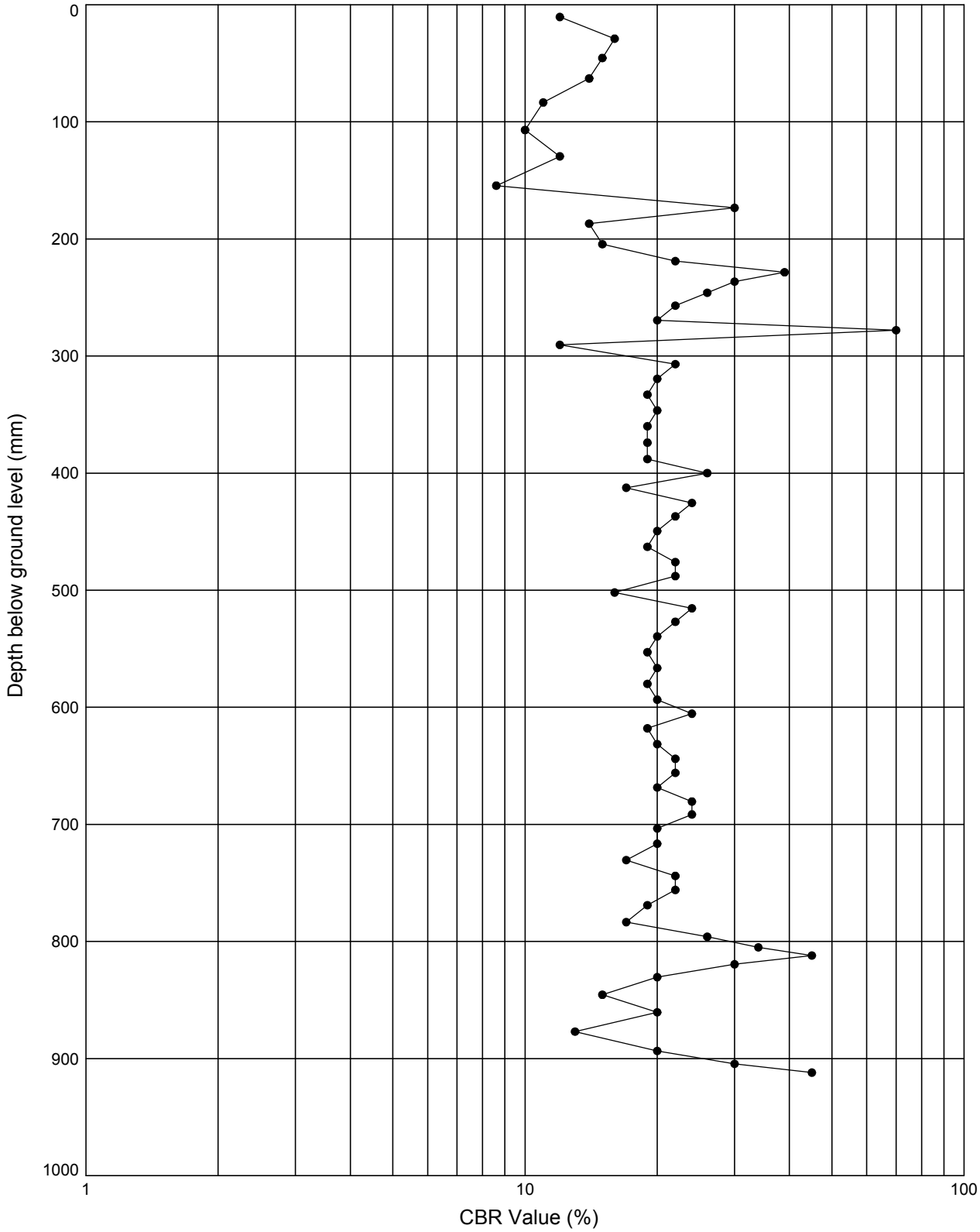
Notes: **CBR values calculated after TRRL Road Note 8 method. Values over 100% are plotted on the 100% line.**

RSK Environment Ltd Abbey Park Humber Road Coventry CV3 4AQ	Compiled By	Date	Checked By	Date
		01/11/17		
	Contract **Roade Bypass**		Contract Ref: **313583**	

DCP TEST RESULTS - DEPTH vs CBR VALUE

Position Ref : **DCP04** Test Date : **18.10.17**

Ground Level: **121.28** National Grid Co-ordinates: **E:475469.5 N:252463.3**



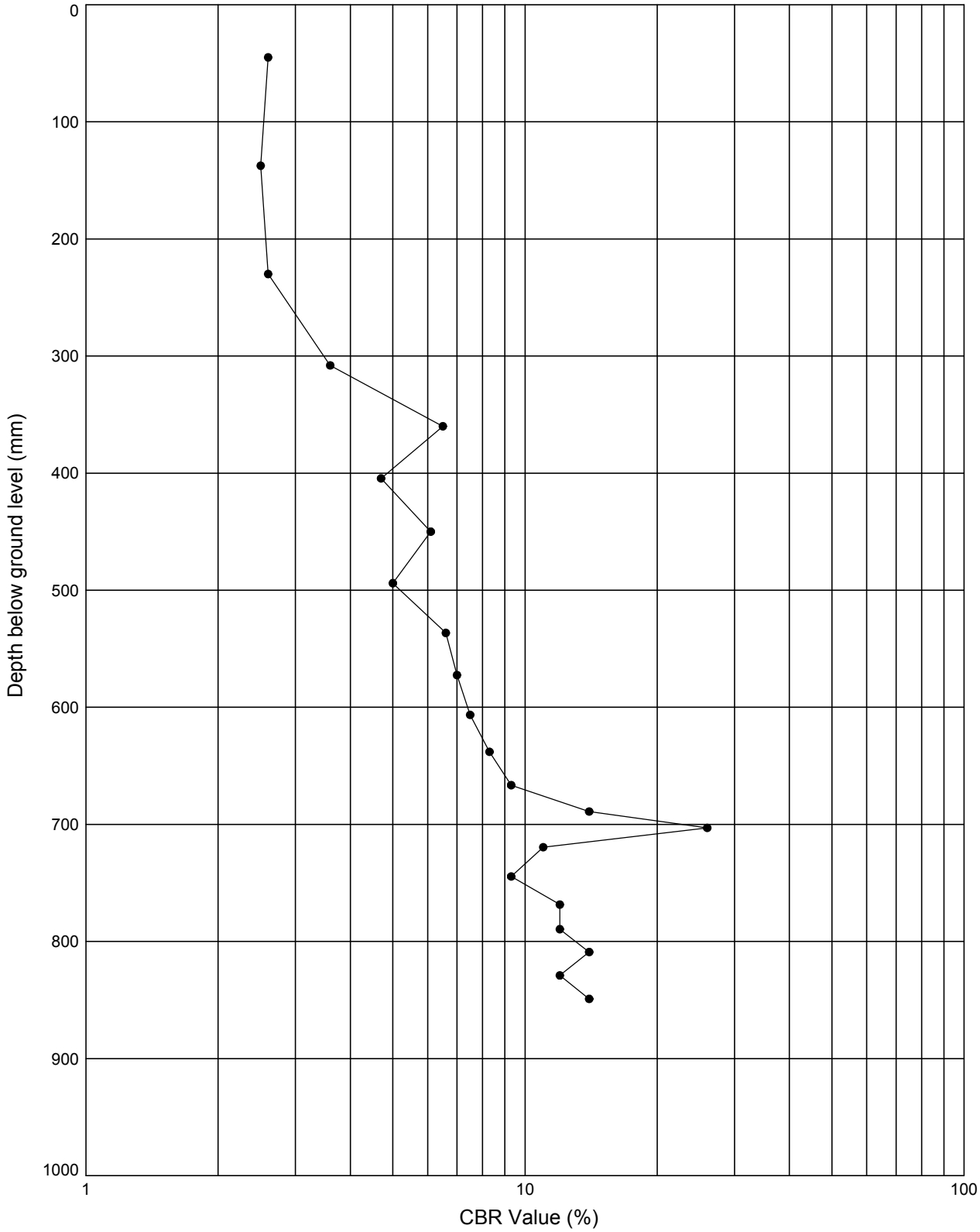
Notes: **CBR values calculated after TRRL Road Note 8 method. Values over 100% are plotted on the 100% line.**

RSK Environment Ltd Abbey Park Humber Road Coventry CV3 4AQ	Compiled By	Date	Checked By	Date
		01/11/17		
	Contract **Roade Bypass**		Contract Ref: **313583**	

DCP TEST RESULTS - DEPTH vs CBR VALUE

Position Ref : **DCP05** Test Date : **18.10.17**

Ground Level: **120.61** National Grid Co-ordinates: **E:474984.3 N:252133.6**



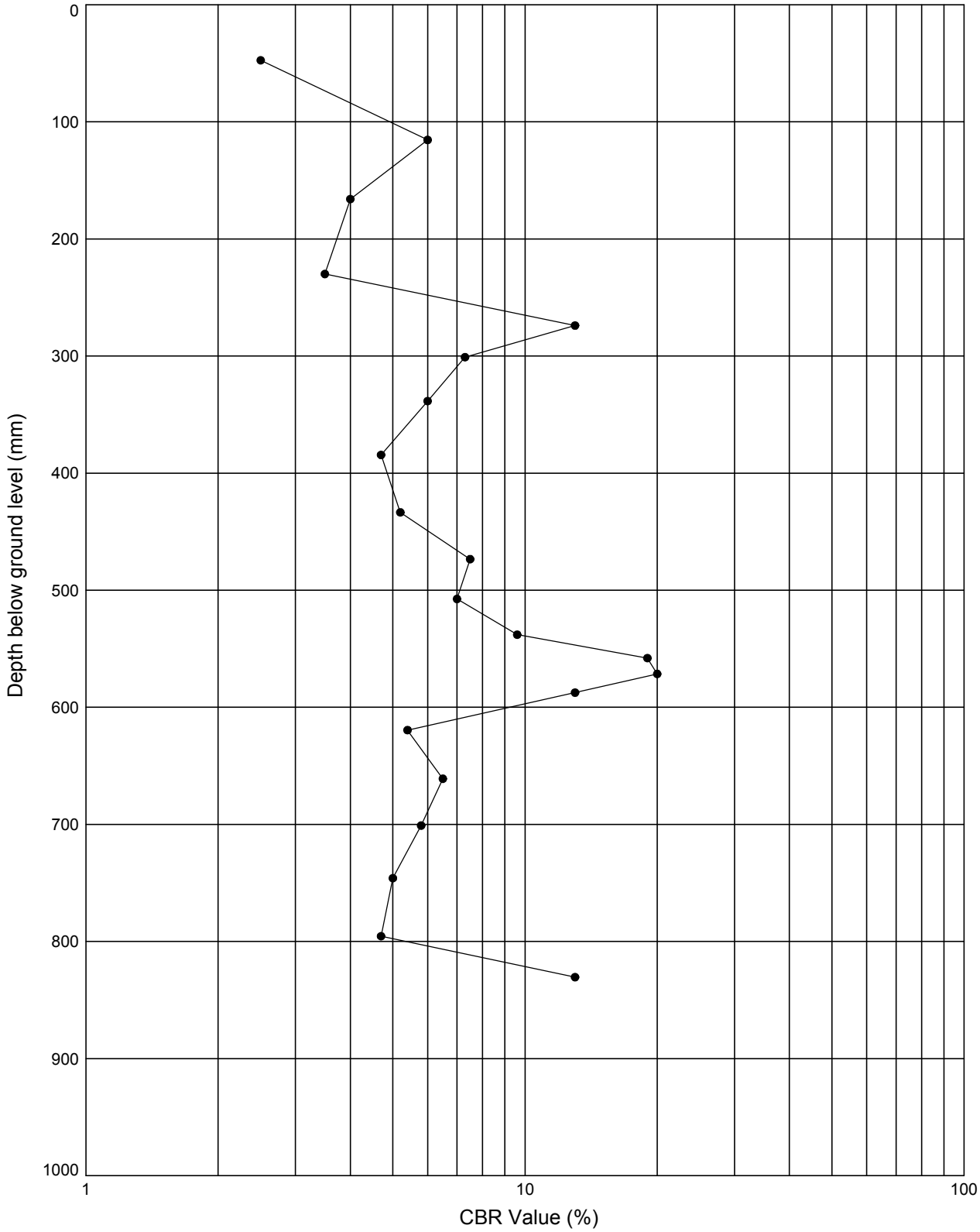
Notes: **CBR values calculated after TRRL Road Note 8 method. Values over 100% are plotted on the 100% line.**

RSK Environment Ltd Abbey Park Humber Road Coventry CV3 4AQ	Compiled By	Date	Checked By	Date
		01/11/17		
	Contract **Roade Bypass**		Contract Ref: **313583**	

DCP TEST RESULTS - DEPTH vs CBR VALUE

Position Ref : **DCP07** Test Date : **18.10.17**

Ground Level: **119.86** National Grid Co-ordinates: **E:474875.3 N:251916.9**



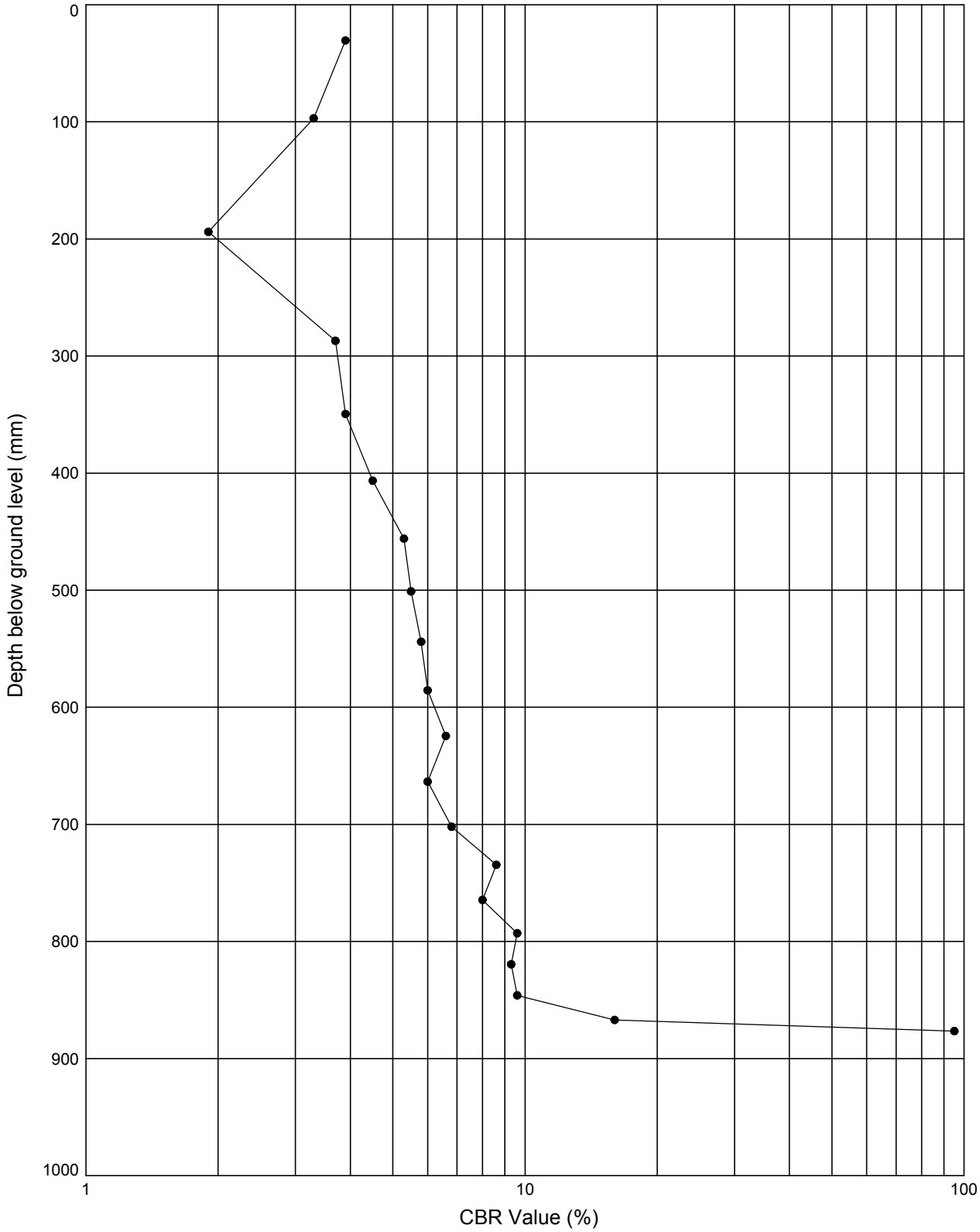
Notes: **CBR values calculated after TRRL Road Note 8 method. Values over 100% are plotted on the 100% line.**

RSK Environment Ltd Abbey Park Humber Road Coventry CV3 4AQ	Compiled By	Date	Checked By	Date
		01/11/17		
	Contract **Roade Bypass**		Contract Ref: **313583**	

DCP TEST RESULTS - DEPTH vs CBR VALUE

Position Ref : **DCP12** Test Date : **18.10.17**

Ground Level: **115.32** National Grid Co-ordinates: **E:474783.5 N:251216.1**



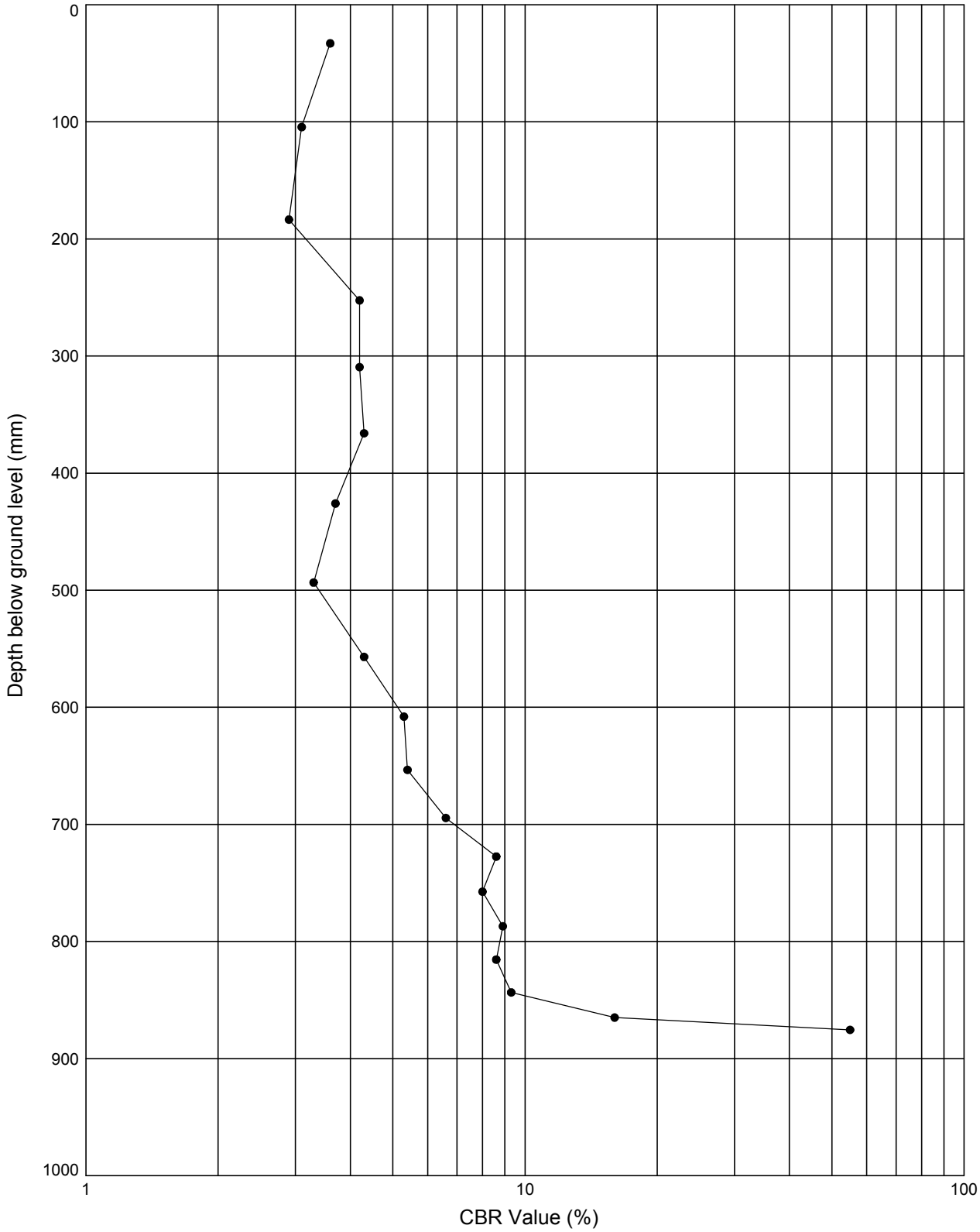
Notes: **CBR values calculated after TRRL Road Note 8 method. Values over 100% are plotted on the 100% line.**

	Compiled By	Date	Checked By	Date
RSK Environment Ltd Abbey Park Humber Road Coventry CV3 4AQ		**01/11/17**		
	Contract **Roade Bypass**		Contract Ref: **313583**	

DCP TEST RESULTS - DEPTH vs CBR VALUE

Position Ref : **DCP13** Test Date : **18.10.17**

Ground Level: **115.93** National Grid Co-ordinates: **E:474841.1 N:251141.4**



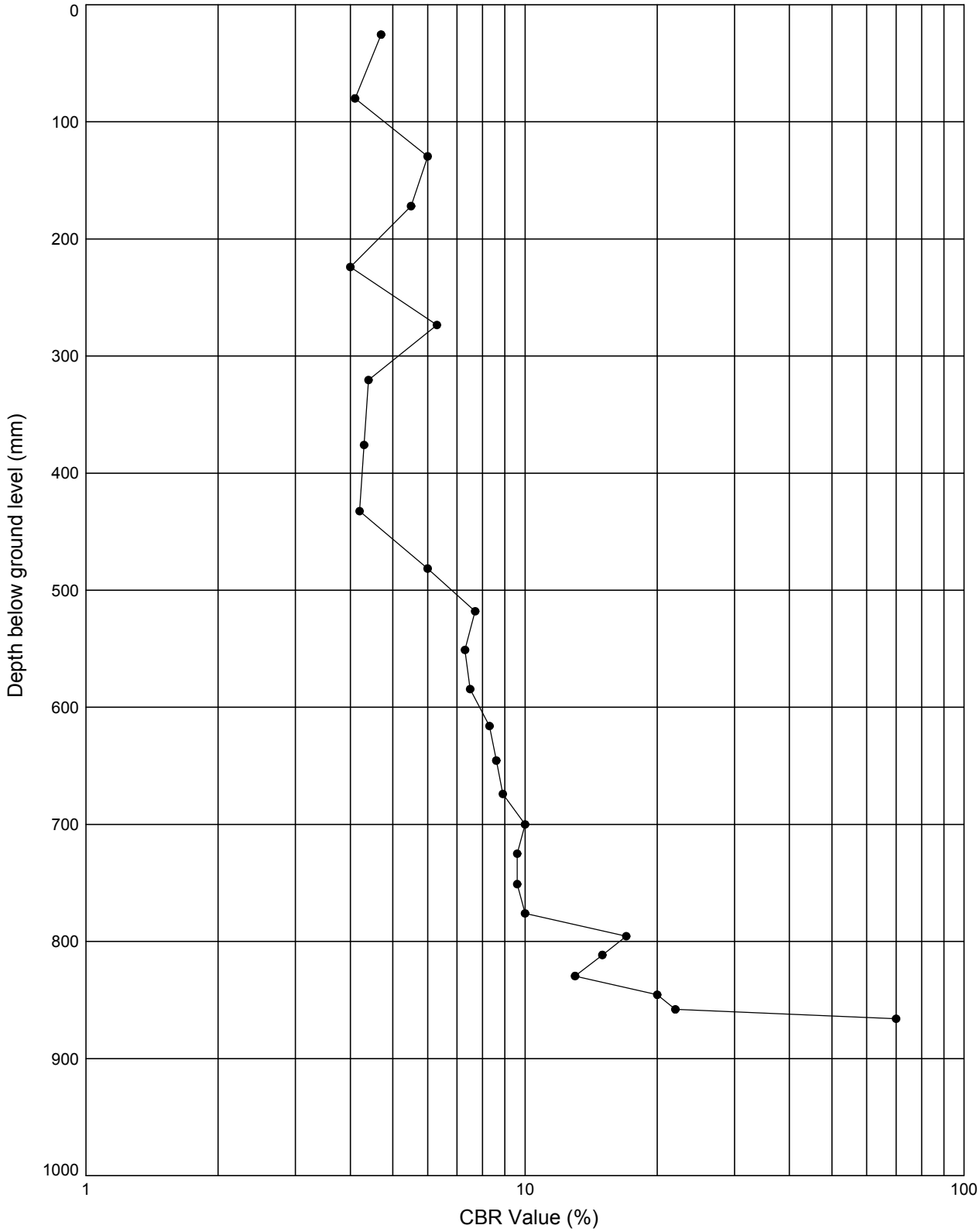
Notes: **CBR values calculated after TRRL Road Note 8 method. Values over 100% are plotted on the 100% line.**

RSK Environment Ltd Abbey Park Humber Road Coventry CV3 4AQ	Compiled By	Date	Checked By	Date
		01/11/17		
	Contract **Roade Bypass**		Contract Ref: **313583**	

DCP TEST RESULTS - DEPTH vs CBR VALUE

Position Ref : **DCP14** Test Date : **18.10.17**

Ground Level: **114.78** National Grid Co-ordinates: **E:474922.9 N:251044.6**



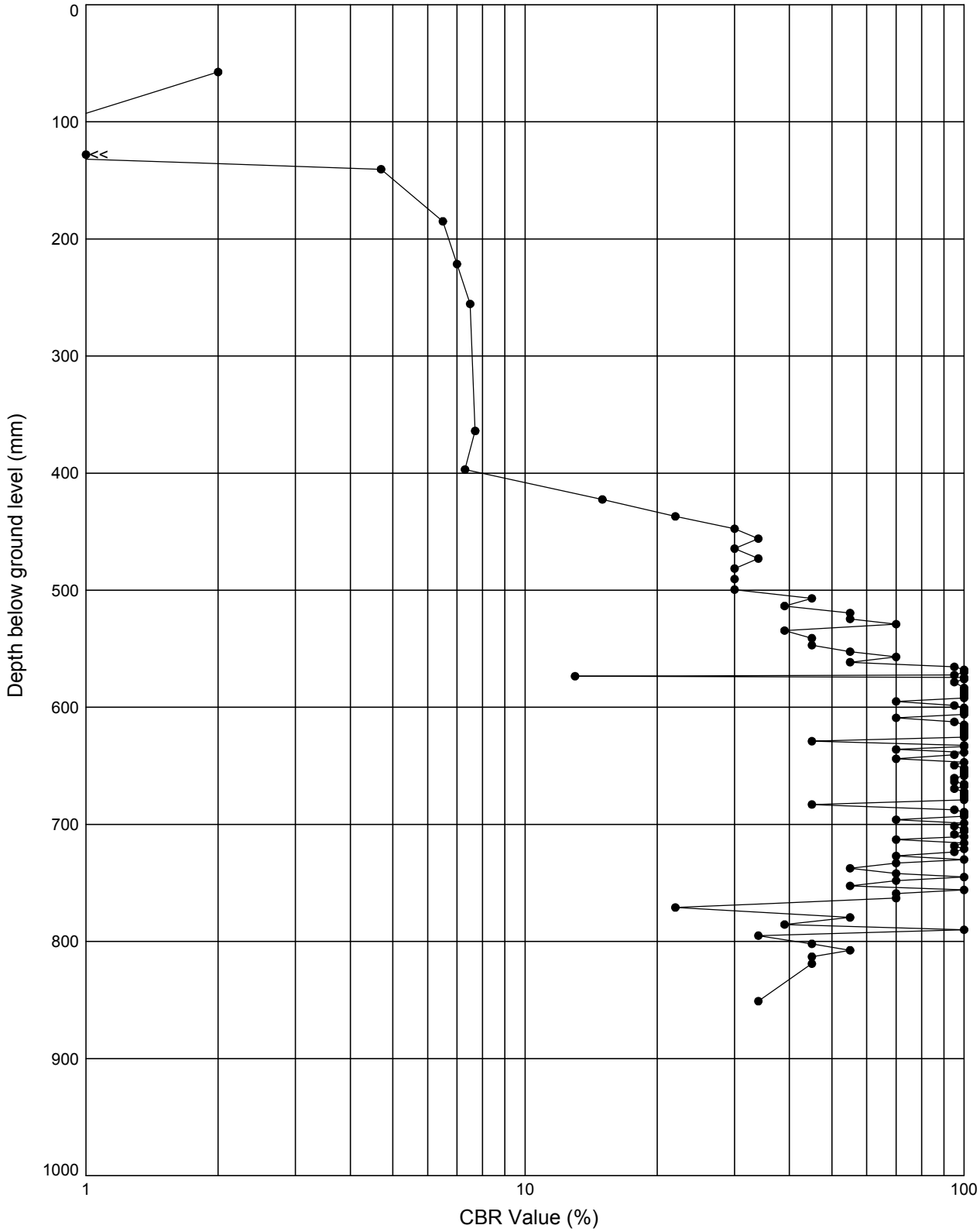
Notes: **CBR values calculated after TRRL Road Note 8 method. Values over 100% are plotted on the 100% line.**

RSK Environment Ltd Abbey Park Humber Road Coventry CV3 4AQ	Compiled By	Date	Checked By	Date
		01/11/17		
	Contract **Roade Bypass**		Contract Ref: **313583**	

DCP TEST RESULTS - DEPTH vs CBR VALUE

Position Ref : **DCP15** Test Date : **18.10.17**

Ground Level: **110.97** National Grid Co-ordinates: **E:475025.6 N:250920.1**



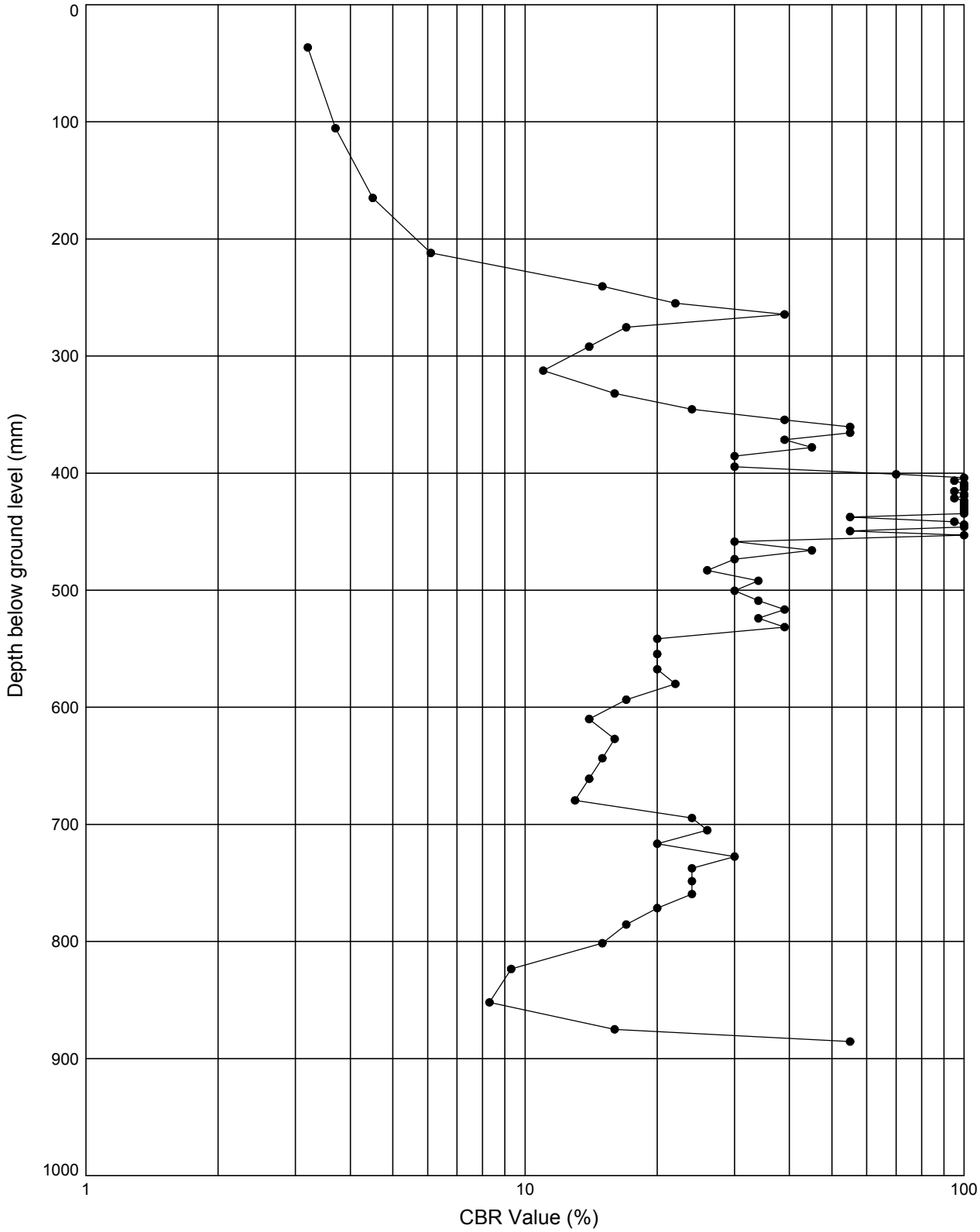
Notes: **CBR values calculated after TRRL Road Note 8 method. Values over 100% are plotted on the 100% line.**

	Compiled By	Date	Checked By	Date
RSK Environment Ltd Abbey Park Humber Road Coventry CV3 4AQ		**01/11/17**		
	Contract **Roade Bypass**		Contract Ref: **313583**	

DCP TEST RESULTS - DEPTH vs CBR VALUE

Position Ref : **DCP17** Test Date : **18.10.17**

Ground Level: **102.16** National Grid Co-ordinates: **E:475121.9 N:250710.3**



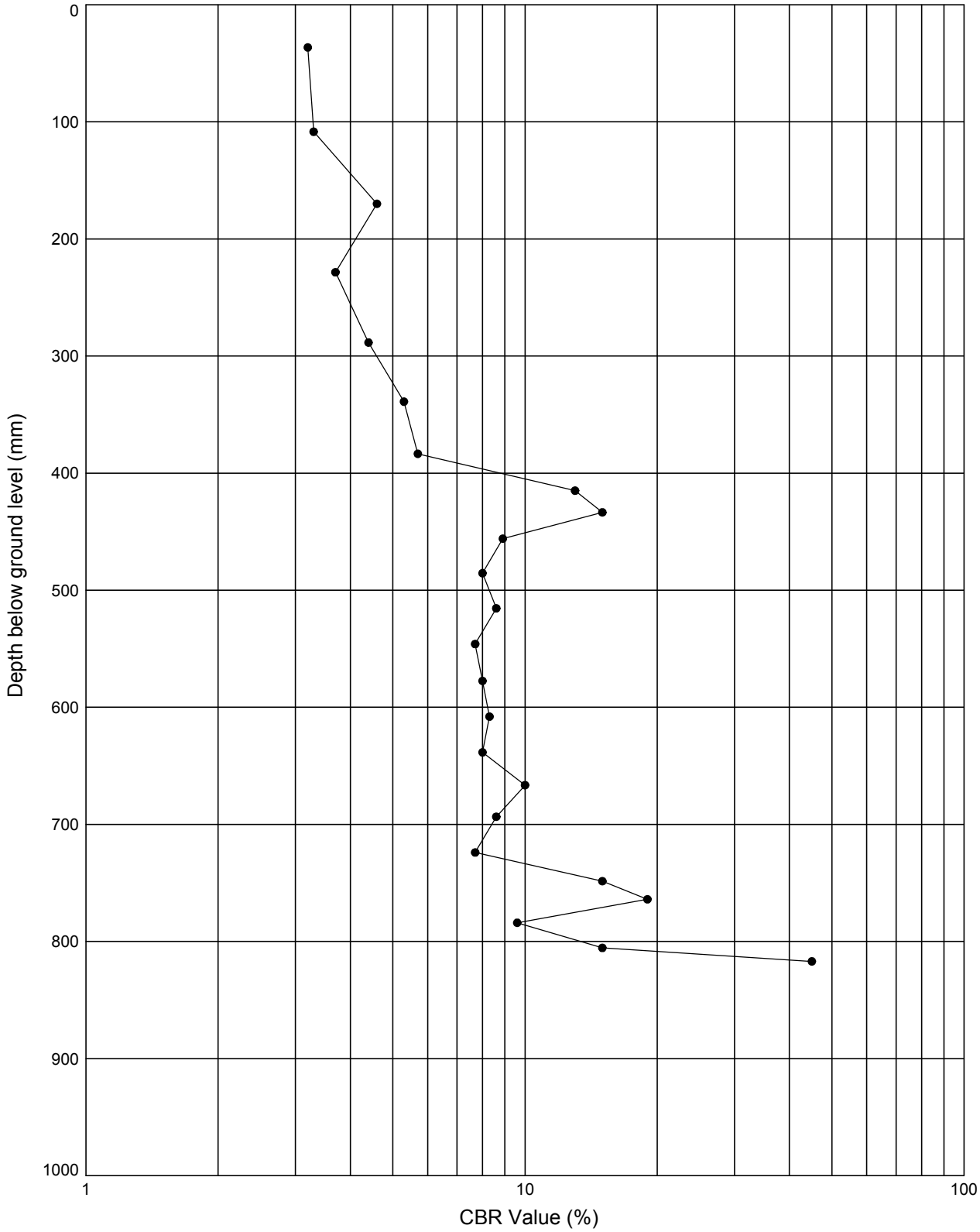
Notes: **CBR values calculated after TRRL Road Note 8 method. Values over 100% are plotted on the 100% line.**

RSK Environment Ltd Abbey Park Humber Road Coventry CV3 4AQ	Compiled By	Date	Checked By	Date
		01/11/17		
	Contract **Roade Bypass**		Contract Ref: **313583**	

DCP TEST RESULTS - DEPTH vs CBR VALUE

Position Ref : **DCP20** Test Date : **18.10.17**

Ground Level: **119.11** National Grid Co-ordinates: **E:474839.3 N:251894.4**



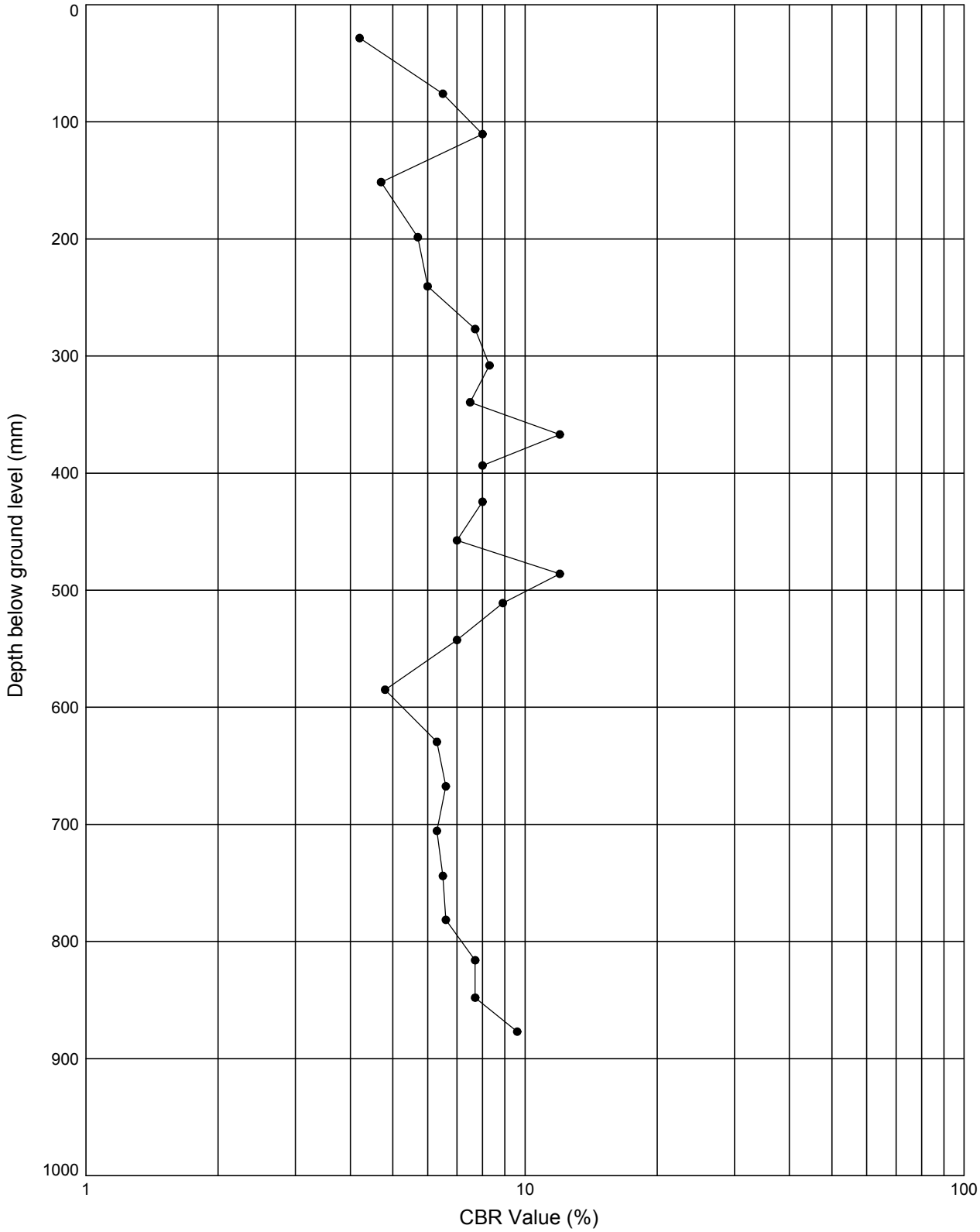
Notes: **CBR values calculated after TRRL Road Note 8 method. Values over 100% are plotted on the 100% line.**

RSK Environment Ltd Abbey Park Humber Road Coventry CV3 4AQ	Compiled By	Date	Checked By	Date
		01/11/17		
	Contract **Roade Bypass**		Contract Ref: **313583**	

DCP TEST RESULTS - DEPTH vs CBR VALUE

Position Ref : **DCP26** Test Date : **18.10.17**

Ground Level: **99.88** National Grid Co-ordinates: **E:475145.4 N:250780.4**



Notes: **CBR values calculated after TRRL Road Note 8 method. Values over 100% are plotted on the 100% line.**

	Compiled By	Date	Checked By	Date
RSK Environment Ltd Abbey Park Humber Road Coventry CV3 4AQ		**01/11/17**		
	Contract **Roade Bypass**		Contract Ref: **313583**	

APPENDIX I
CHEMICAL LABORATORY CERTIFICATES FOR SOIL ANALYSIS

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

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 17/06450
Issue Number: 1 **Date:** 06 October, 2017

Client: RSK Environment Ltd Coventry
Humber Road, Abbey Park
Coventry
UK
CV3 4AQ

Project Manager: Darren Bench
Project Name: Roade Bypass
Project Ref: 313583
Order No: N/A
Date Samples Received: 07/09/17
Date Instructions Received: 22/09/17
Date Analysis Completed: 06/10/17

Prepared by:

Danielle Brierley
Client Manager

Approved by:

Gill Walker
Laboratory Manager

Envirolab Job Number: 17/06450

Client Project Name: Roade Bypass

Client Project Ref: 313583

Lab Sample ID	17/06450/1	17/06450/2	17/06450/3	17/06450/4	17/06450/5	17/06450/6	17/06450/7	17/06450/8	Units	Method ref
Client Sample No										
Client Sample ID	TP01	TP02	TP03	TP04	TP05	TP12	TP14	TP15		
Depth to Top	0.20	0.20	0.30	0.50	0.20	0.20	0.20	0.20		
Depth To Bottom										
Date Sampled	11-Sep-17	11-Sep-17	11-Sep-17	11-Sep-17	11-Sep-17	08-Sep-17	07-Sep-17	07-Sep-17		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	6AE	6AE	6AE	6AE	6	5AE	5AE	5AE		
% Stones >10mm$_A$	<0.1	<0.1	<0.1	2.7	<0.1	1.9	1.9	3.4	% w/w	A-T-044
pH$_D^{M\#}$	7.66	7.15	8.10	8.20	6.86	7.90	7.67	7.40	pH	A-T-031s
Phenols - Total by HPLC$_A$	<0.2	<0.2	<0.2	0.4	<0.2	<0.2	<0.2	<0.2	mg/kg	A-T-050s
Total Organic Carbon$_D^{M\#}$	3.73	1.61	2.64	1.69	2.69	0.99	1.33	2.07	% w/w	A-T-032s
Arsenic$_D^{M\#}$	4	10	2	<1	4	11	7	8	mg/kg	A-T-024s
Cadmium$_D^{M\#}$	0.9	1.1	1.0	1.0	0.7	1.1	1.0	1.3	mg/kg	A-T-024s
Copper$_D^{M\#}$	33	16	24	15	12	15	14	15	mg/kg	A-T-024s
Chromium$_D^{M\#}$	36	26	39	37	34	26	26	35	mg/kg	A-T-024s
Chromium (hexavalent)$_D$	<1	<1	<1	<1	<1	<1	<1	<1	mg/kg	A-T-040s
Lead$_D^{M\#}$	30	24	20	16	21	96	21	22	mg/kg	A-T-024s
Mercury$_D$	<0.17	<0.17	0.30	<0.17	<0.17	<0.17	<0.17	<0.17	mg/kg	A-T-024s
Nickel$_D^{M\#}$	26	24	31	30	21	27	26	29	mg/kg	A-T-024s
Selenium$_D^{M\#}$	1	1	1	<1	<1	<1	<1	<1	mg/kg	A-T-024s
Zinc$_D^{M\#}$	82	68	69	53	63	73	71	87	mg/kg	A-T-024s

Envirolab Job Number: 17/06450

Client Project Name: Roade Bypass

Client Project Ref: 313583

Lab Sample ID	17/06450/1	17/06450/2	17/06450/3	17/06450/4	17/06450/5	17/06450/6	17/06450/7	17/06450/8	Units	Method ref
Client Sample No										
Client Sample ID	TP01	TP02	TP03	TP04	TP05	TP12	TP14	TP15		
Depth to Top	0.20	0.20	0.30	0.50	0.20	0.20	0.20	0.20		
Depth To Bottom										
Date Sampled	11-Sep-17	11-Sep-17	11-Sep-17	11-Sep-17	11-Sep-17	08-Sep-17	07-Sep-17	07-Sep-17		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	6AE	6AE	6AE	6AE	6	5AE	5AE	5AE		
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_A^{\#}$	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD		A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		

Envirolab Job Number: 17/06450

Client Project Name: Roade Bypass

Client Project Ref: 313583

Lab Sample ID	17/06450/1	17/06450/2	17/06450/3	17/06450/4	17/06450/5	17/06450/6	17/06450/7	17/06450/8	Units	Method ref
Client Sample No										
Client Sample ID	TP01	TP02	TP03	TP04	TP05	TP12	TP14	TP15		
Depth to Top	0.20	0.20	0.30	0.50	0.20	0.20	0.20	0.20		
Depth To Bottom										
Date Sampled	11-Sep-17	11-Sep-17	11-Sep-17	11-Sep-17	11-Sep-17	08-Sep-17	07-Sep-17	07-Sep-17		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	6AE	6AE	6AE	6AE	6	5AE	5AE	5AE		
Nitrogen Pesticides										
Ametryn$_A$	-	<50	-	-	-	<50	-	-	µg/kg	Subcon
Atraton$_A$	-	<50	-	-	-	<50	-	-	µg/kg	Subcon
Atrazine$_A$	-	<50	-	-	-	<50	-	-	µg/kg	Subcon
Prometon$_A$	-	<50	-	-	-	<50	-	-	µg/kg	Subcon
Prometryn$_A$	-	<50	-	-	-	<50	-	-	µg/kg	Subcon
Propazine$_A$	-	<50	-	-	-	<50	-	-	µg/kg	Subcon
Simazine$_A$	-	<50	-	-	-	<50	-	-	µg/kg	Subcon
Simetryn$_A$	-	<50	-	-	-	<50	-	-	µg/kg	Subcon
Terbuthylazine$_A$	-	<50	-	-	-	<50	-	-	µg/kg	Subcon
Terbutryn$_A$	-	<50	-	-	-	<50	-	-	µg/kg	Subcon

Envirolab Job Number: 17/06450

Client Project Name: Roade Bypass

Client Project Ref: 313583

Lab Sample ID	17/06450/1	17/06450/2	17/06450/3	17/06450/4	17/06450/5	17/06450/6	17/06450/7	17/06450/8	Units	Method ref
Client Sample No										
Client Sample ID	TP01	TP02	TP03	TP04	TP05	TP12	TP14	TP15		
Depth to Top	0.20	0.20	0.30	0.50	0.20	0.20	0.20	0.20		
Depth To Bottom										
Date Sampled	11-Sep-17	11-Sep-17	11-Sep-17	11-Sep-17	11-Sep-17	08-Sep-17	07-Sep-17	07-Sep-17		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	6AE	6AE	6AE	6AE	6	5AE	5AE	5AE		
Pest-c										
Mevinphos$_A$	-	<50	-	-	-	<50	-	-	µg/kg	Subcon
Dichlorvos$_A$	-	<50	-	-	-	<50	-	-	µg/kg	Subcon
alpha-Hexachlorocyclohexane (HCH)$_A$	-	<50	-	-	-	<50	-	-	µg/kg	Subcon
Diazinon$_A$	-	<50	-	-	-	<50	-	-	µg/kg	Subcon
gamma-Hexachlorocyclohexane (HCH / Lindane)$_A$	-	<50	-	-	-	<50	-	-	µg/kg	Subcon
Heptachlor$_A$	-	<50	-	-	-	<50	-	-	µg/kg	Subcon
Aldrin$_A$	-	<50	-	-	-	<50	-	-	µg/kg	Subcon
beta-Hexachlorocyclohexane (HCH)$_A$	-	<50	-	-	-	<50	-	-	µg/kg	Subcon
Methyl Parathion$_A$	-	<50	-	-	-	<50	-	-	µg/kg	Subcon
Malathion$_A$	-	<50	-	-	-	<50	-	-	µg/kg	Subcon
Fenitrothion$_A$	-	<50	-	-	-	<50	-	-	µg/kg	Subcon
Heptachlor Epoxide$_A$	-	<50	-	-	-	<50	-	-	µg/kg	Subcon
Parathion (Ethyl Parathion)$_A$	-	<50	-	-	-	<50	-	-	µg/kg	Subcon
p,p-DDE$_A$	-	<50	-	-	-	<50	-	-	µg/kg	Subcon
p,p-DDT$_A$	-	<50	-	-	-	<50	-	-	µg/kg	Subcon
p,p-Methoxychlor$_A$	-	<50	-	-	-	<50	-	-	µg/kg	Subcon
p,p-TDE (DDD)$_A$	-	<50	-	-	-	<50	-	-	µg/kg	Subcon
o,p-DDE$_A$	-	<50	-	-	-	<50	-	-	µg/kg	Subcon
o,p-DDT$_A$	-	<50	-	-	-	<50	-	-	µg/kg	Subcon
o,p-Methoxychlor$_A$	-	<50	-	-	-	<50	-	-	µg/kg	Subcon
o,p-TDE (DDD)$_A$	-	<50	-	-	-	<50	-	-	µg/kg	Subcon
Endosulphan I$_A$	-	<50	-	-	-	<50	-	-	µg/kg	Subcon
Endosulphan II$_A$	-	<50	-	-	-	<50	-	-	µg/kg	Subcon
Endosulphan Sulphate$_A$	-	<50	-	-	-	<50	-	-	µg/kg	Subcon
Endrin$_A$	-	<50	-	-	-	<50	-	-	µg/kg	Subcon
Ethion$_A$	-	<50	-	-	-	<50	-	-	µg/kg	Subcon
Dieldrin$_A$	-	<50	-	-	-	<50	-	-	µg/kg	Subcon
Azinphos-methyl$_A$	-	<50	-	-	-	<50	-	-	µg/kg	Subcon

Envirolab Job Number: 17/06450

Client Project Name: Roade Bypass

Client Project Ref: 313583

Lab Sample ID	17/06450/1	17/06450/2	17/06450/3	17/06450/4	17/06450/5	17/06450/6	17/06450/7	17/06450/8	Units	Method ref
Client Sample No										
Client Sample ID	TP01	TP02	TP03	TP04	TP05	TP12	TP14	TP15		
Depth to Top	0.20	0.20	0.30	0.50	0.20	0.20	0.20	0.20		
Depth To Bottom										
Date Sampled	11-Sep-17	11-Sep-17	11-Sep-17	11-Sep-17	11-Sep-17	08-Sep-17	07-Sep-17	07-Sep-17		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	6AE	6AE	6AE	6AE	6	5AE	5AE	5AE		
PAH 16										
Acenaphthene$_A^{M\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-019s
Anthracene$_A^{M\#}$	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	0.06	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	A-T-019s
Chrysene$_A^{M\#}$	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	mg/kg	A-T-019s
Fluorene$_A^{M\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	0.04	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	A-T-019s
Pyrene$_A^{M\#}$	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	A-T-019s
PAH (total 16)$_A^{M\#}$	0.10	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08	mg/kg	A-T-019s

Envirolab Job Number: 17/06450

Client Project Name: Roade Bypass

Client Project Ref: 313583

Lab Sample ID	17/06450/1	17/06450/2	17/06450/3	17/06450/4	17/06450/5	17/06450/6	17/06450/7	17/06450/8	Units	Method ref
Client Sample No										
Client Sample ID	TP01	TP02	TP03	TP04	TP05	TP12	TP14	TP15		
Depth to Top	0.20	0.20	0.30	0.50	0.20	0.20	0.20	0.20		
Depth To Bottom										
Date Sampled	11-Sep-17	11-Sep-17	11-Sep-17	11-Sep-17	11-Sep-17	08-Sep-17	07-Sep-17	07-Sep-17		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	6AE	6AE	6AE	6AE	6	5AE	5AE	5AE		
TPH CWG										
Ali >C5-C6$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
Ali >C6-C8$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
Ali >C8-C10$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
Ali >C10-C12$_A^{\#}$	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Ali >C12-C16$_A^{\#}$	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Ali >C16-C21$_A^{\#}$	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Ali >C21-C35$_A^{\#}$	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Total Aliphatics$_A$	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Aro >C5-C7$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
Aro >C7-C8$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
Aro >C8-C9$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
Aro >C9-C10$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
Aro >C10-C12$_A^{\#}$	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Aro >C12-C16$_A^{\#}$	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Aro >C16-C21$_A^{\#}$	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Aro >C21-C35$_A^{\#}$	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Total Aromatics$_A$	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
TPH (Ali & Aro)$_A$	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
BTEX - Benzene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
BTEX - Toluene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
BTEX - o Xylene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
MTBE$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s

Envirolab Job Number: 17/06450

Client Project Name: Roade Bypass

Client Project Ref: 313583

Lab Sample ID	17/06450/9	17/06450/10	17/06450/11	17/06450/12	17/06450/13	17/06450/15	17/06450/16	17/06450/17	Units	Method ref
Client Sample No										
Client Sample ID	TP15	TP16	TP16A	TP16A	TP17	WS02	WS04	WS05		
Depth to Top	1.50	0.10	0.20	0.50	0.20	0.20	0.30	0.20		
Depth To Bottom										
Date Sampled	07-Sep-17	07-Sep-17	08-Sep-17	08-Sep-17	07-Sep-17	06-Sep-17	30-Aug-17	30-Aug-17		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	5A	4AE	4AE	5AE	5AE	5AE	5A	5AE		
% Stones >10mm$_A$	<0.1	2.7	25.7	<0.1	<0.1	<0.1	<0.1	4.8	% w/w	A-T-044
pH$_D$ M#	8.47	8.17	8.78	8.17	7.91	7.66	8.11	7.55	pH	A-T-031s
Phenols - Total by HPLC$_A$	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	mg/kg	A-T-050s
Total Organic Carbon$_D$ M#	<0.03	1.43	<0.03	0.58	2.19	1.19	1.93	2.56	% w/w	A-T-032s
Arsenic$_D$ M#	<1	3	1	3	3	7	3	<1	mg/kg	A-T-024s
Cadmium$_D$ M#	<0.5	0.8	<0.5	0.7	0.7	1.3	0.8	0.8	mg/kg	A-T-024s
Copper$_D$ M#	5	12	2	10	13	13	14	20	mg/kg	A-T-024s
Chromium$_D$ M#	11	18	4	20	20	33	18	25	mg/kg	A-T-024s
Chromium (hexavalent)$_D$	<1	<1	<1	<1	<1	<1	<1	<1	mg/kg	A-T-040s
Lead$_D$ M#	4	18	2	13	16	19	16	16	mg/kg	A-T-024s
Mercury$_D$	<0.17	<0.17	0.31	<0.17	0.29	<0.17	0.20	<0.17	mg/kg	A-T-024s
Nickel$_D$ M#	11	17	3	17	16	33	16	21	mg/kg	A-T-024s
Selenium$_D$ M#	<1	<1	<1	<1	<1	1	<1	<1	mg/kg	A-T-024s
Zinc$_D$ M#	16	54	5	45	50	72	52	58	mg/kg	A-T-024s

Envirolab Job Number: 17/06450

Client Project Name: Roade Bypass

Client Project Ref: 313583

Lab Sample ID	17/06450/9	17/06450/10	17/06450/11	17/06450/12	17/06450/13	17/06450/15	17/06450/16	17/06450/17	Units	Method ref
Client Sample No										
Client Sample ID	TP15	TP16	TP16A	TP16A	TP17	WS02	WS04	WS05		
Depth to Top	1.50	0.10	0.20	0.50	0.20	0.20	0.30	0.20		
Depth To Bottom										
Date Sampled	07-Sep-17	07-Sep-17	08-Sep-17	08-Sep-17	07-Sep-17	06-Sep-17	30-Aug-17	30-Aug-17		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	5A	4AE	4AE	5AE	5AE	5AE	5A	5AE		
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_A$ #	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD		A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		

Envirolab Job Number: 17/06450

Client Project Name: Roade Bypass

Client Project Ref: 313583

Lab Sample ID	17/06450/9	17/06450/10	17/06450/11	17/06450/12	17/06450/13	17/06450/15	17/06450/16	17/06450/17	Units	Method ref
Client Sample No										
Client Sample ID	TP15	TP16	TP16A	TP16A	TP17	WS02	WS04	WS05		
Depth to Top	1.50	0.10	0.20	0.50	0.20	0.20	0.30	0.20		
Depth To Bottom										
Date Sampled	07-Sep-17	07-Sep-17	08-Sep-17	08-Sep-17	07-Sep-17	06-Sep-17	30-Aug-17	30-Aug-17		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	5A	4AE	4AE	5AE	5AE	5AE	5A	5AE		
Nitrogen Pesticides										
Ametryn$_A$	-	-	<50	-	<50	-	-	-	µg/kg	Subcon
Atraton$_A$	-	-	<50	-	<50	-	-	-	µg/kg	Subcon
Atrazine$_A$	-	-	<50	-	<50	-	-	-	µg/kg	Subcon
Prometon$_A$	-	-	<50	-	<50	-	-	-	µg/kg	Subcon
Prometryn$_A$	-	-	<50	-	<50	-	-	-	µg/kg	Subcon
Propazine$_A$	-	-	<50	-	<50	-	-	-	µg/kg	Subcon
Simazine$_A$	-	-	<50	-	<50	-	-	-	µg/kg	Subcon
Simetryn$_A$	-	-	<50	-	<50	-	-	-	µg/kg	Subcon
Terbuthylazine$_A$	-	-	<50	-	<50	-	-	-	µg/kg	Subcon
Terbutryn$_A$	-	-	<50	-	<50	-	-	-	µg/kg	Subcon

Envirolab Job Number: 17/06450

Client Project Name: Roade Bypass

Client Project Ref: 313583

Lab Sample ID	17/06450/9	17/06450/10	17/06450/11	17/06450/12	17/06450/13	17/06450/15	17/06450/16	17/06450/17	Units	Method ref
Client Sample No										
Client Sample ID	TP15	TP16	TP16A	TP16A	TP17	WS02	WS04	WS05		
Depth to Top	1.50	0.10	0.20	0.50	0.20	0.20	0.30	0.20		
Depth To Bottom										
Date Sampled	07-Sep-17	07-Sep-17	08-Sep-17	08-Sep-17	07-Sep-17	06-Sep-17	30-Aug-17	30-Aug-17		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	5A	4AE	4AE	5AE	5AE	5AE	5A	5AE		
Pest-c										
Mevinphos$_A$	-	-	<50	-	<50	-	-	-	µg/kg	Subcon
Dichlorvos$_A$	-	-	<50	-	<50	-	-	-	µg/kg	Subcon
alpha-Hexachlorocyclohexane (HCH)$_A$	-	-	<50	-	<50	-	-	-	µg/kg	Subcon
Diazinon$_A$	-	-	<50	-	<50	-	-	-	µg/kg	Subcon
gamma-Hexachlorocyclohexane (HCH / Lindane)$_A$	-	-	<50	-	<50	-	-	-	µg/kg	Subcon
Heptachlor$_A$	-	-	<50	-	<50	-	-	-	µg/kg	Subcon
Aldrin$_A$	-	-	<50	-	<50	-	-	-	µg/kg	Subcon
beta-Hexachlorocyclohexane (HCH)$_A$	-	-	<50	-	<50	-	-	-	µg/kg	Subcon
Methyl Parathion$_A$	-	-	<50	-	<50	-	-	-	µg/kg	Subcon
Malathion$_A$	-	-	<50	-	<50	-	-	-	µg/kg	Subcon
Fenitrothion$_A$	-	-	<50	-	<50	-	-	-	µg/kg	Subcon
Heptachlor Epoxide$_A$	-	-	<50	-	<50	-	-	-	µg/kg	Subcon
Parathion (Ethyl Parathion)$_A$	-	-	<50	-	<50	-	-	-	µg/kg	Subcon
p,p-DDE$_A$	-	-	<50	-	<50	-	-	-	µg/kg	Subcon
p,p-DDT$_A$	-	-	<50	-	<50	-	-	-	µg/kg	Subcon
p,p-Methoxychlor$_A$	-	-	<50	-	<50	-	-	-	µg/kg	Subcon
p,p-TDE (DDD)$_A$	-	-	<50	-	<50	-	-	-	µg/kg	Subcon
o,p-DDE$_A$	-	-	<50	-	<50	-	-	-	µg/kg	Subcon
o,p-DDT$_A$	-	-	<50	-	<50	-	-	-	µg/kg	Subcon
o,p-Methoxychlor$_A$	-	-	<50	-	<50	-	-	-	µg/kg	Subcon
o,p-TDE (DDD)$_A$	-	-	<50	-	<50	-	-	-	µg/kg	Subcon
Endosulphan I$_A$	-	-	<50	-	<50	-	-	-	µg/kg	Subcon
Endosulphan II$_A$	-	-	<50	-	<50	-	-	-	µg/kg	Subcon
Endosulphan Sulphate$_A$	-	-	<50	-	<50	-	-	-	µg/kg	Subcon
Endrin$_A$	-	-	<50	-	<50	-	-	-	µg/kg	Subcon
Ethion$_A$	-	-	<50	-	<50	-	-	-	µg/kg	Subcon
Dieldrin$_A$	-	-	<50	-	<50	-	-	-	µg/kg	Subcon
Azinphos-methyl$_A$	-	-	<50	-	<50	-	-	-	µg/kg	Subcon

Envirolab Job Number: 17/06450

Client Project Name: Roade Bypass

Client Project Ref: 313583

Lab Sample ID	17/06450/9	17/06450/10	17/06450/11	17/06450/12	17/06450/13	17/06450/15	17/06450/16	17/06450/17	Units	Method ref
Client Sample No										
Client Sample ID	TP15	TP16	TP16A	TP16A	TP17	WS02	WS04	WS05		
Depth to Top	1.50	0.10	0.20	0.50	0.20	0.20	0.30	0.20		
Depth To Bottom										
Date Sampled	07-Sep-17	07-Sep-17	08-Sep-17	08-Sep-17	07-Sep-17	06-Sep-17	30-Aug-17	30-Aug-17		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	5A	4AE	4AE	5AE	5AE	5AE	5A	5AE		
PAH 16										
Acenaphthene$_A^{M\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-019s
Anthracene$_A^{M\#}$	<0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	<0.04	<0.04	0.16	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	<0.04	<0.04	0.28	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	<0.05	<0.05	0.32	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	<0.05	<0.05	0.29	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07	<0.07	0.12	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	A-T-019s
Chrysene$_A^{M\#}$	<0.06	<0.06	0.19	<0.06	<0.06	<0.06	<0.06	<0.06	mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	<0.04	0.05	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	<0.08	<0.08	0.17	<0.08	<0.08	<0.08	<0.08	<0.08	mg/kg	A-T-019s
Fluorene$_A^{M\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	<0.03	<0.03	0.25	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	<0.03	<0.03	0.04	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	A-T-019s
Pyrene$_A^{M\#}$	<0.07	<0.07	0.18	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	A-T-019s
PAH (total 16)$_A^{M\#}$	<0.08	<0.08	2.07	<0.08	<0.08	<0.08	<0.08	<0.08	mg/kg	A-T-019s

Envirolab Job Number: 17/06450

Client Project Name: Roade Bypass

Client Project Ref: 313583

Lab Sample ID	17/06450/9	17/06450/10	17/06450/11	17/06450/12	17/06450/13	17/06450/15	17/06450/16	17/06450/17	Units	Method ref
Client Sample No										
Client Sample ID	TP15	TP16	TP16A	TP16A	TP17	WS02	WS04	WS05		
Depth to Top	1.50	0.10	0.20	0.50	0.20	0.20	0.30	0.20		
Depth To Bottom										
Date Sampled	07-Sep-17	07-Sep-17	08-Sep-17	08-Sep-17	07-Sep-17	06-Sep-17	30-Aug-17	30-Aug-17		
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Sample Matrix Code	5A	4AE	4AE	5AE	5AE	5AE	5A	5AE		
TPH CWG										
Ali >C5-C6$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
Ali >C6-C8$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
Ali >C8-C10$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
Ali >C10-C12$_A^{\#}$	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Ali >C12-C16$_A^{\#}$	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Ali >C16-C21$_A^{\#}$	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Ali >C21-C35$_A^{\#}$	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Total Aliphatics$_A$	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Aro >C5-C7$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
Aro >C7-C8$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
Aro >C8-C9$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
Aro >C9-C10$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
Aro >C10-C12$_A^{\#}$	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Aro >C12-C16$_A^{\#}$	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Aro >C16-C21$_A^{\#}$	<0.1	<0.1	0.3	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Aro >C21-C35$_A^{\#}$	<0.1	<0.1	0.4	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
Total Aromatics$_A$	<0.1	<0.1	0.8	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
TPH (Ali & Aro)$_A$	<0.1	<0.1	0.8	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	A-T-023s
BTEX - Benzene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
BTEX - Toluene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
BTEX - o Xylene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s
MTBE$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/kg	A-T-022s

Envirolab Job Number: 17/06450

Client Project Name: Roade Bypass

Client Project Ref: 313583

Lab Sample ID	17/06450/18	17/06450/19	17/06450/21	17/06450/23					Units	Method ref
Client Sample No										
Client Sample ID	WS06	WS06	WS08	WS10						
Depth to Top	0.10	1.50	0.40	0.40						
Depth To Bottom										
Date Sampled	05-Sep-17	05-Sep-17	05-Sep-17	06-Sep-17						
Sample Type	Soil	Soil	Soil	Soil						
Sample Matrix Code	5AE	3E	5AE	5A						
% Stones >10mm$_A$	10.7	<0.1	<0.1	<0.1					% w/w	A-T-044
pH$_D^{M\#}$	7.66	7.75	8.02	7.97					pH	A-T-031s
Phenols - Total by HPLC$_A$	0.2	<0.2	<0.2	<0.2					mg/kg	A-T-050s
Total Organic Carbon$_D^{M\#}$	1.29	2.03	0.65	0.44					% w/w	A-T-032s
Arsenic$_D^{M\#}$	4	<1	6	6					mg/kg	A-T-024s
Cadmium$_D^{M\#}$	0.8	<0.5	1.1	0.9					mg/kg	A-T-024s
Copper$_D^{M\#}$	13	21	13	16					mg/kg	A-T-024s
Chromium$_D^{M\#}$	22	29	22	28					mg/kg	A-T-024s
Chromium (hexavalent)$_D$	<1	<1	<1	<1					mg/kg	A-T-040s
Lead$_D^{M\#}$	17	16	14	13					mg/kg	A-T-024s
Mercury$_D$	<0.17	<0.17	<0.17	<0.17					mg/kg	A-T-024s
Nickel$_D^{M\#}$	19	3	23	30					mg/kg	A-T-024s
Selenium$_D^{M\#}$	<1	<1	<1	<1					mg/kg	A-T-024s
Zinc$_D^{M\#}$	55	9	65	50					mg/kg	A-T-024s

Envirolab Job Number: 17/06450

Client Project Name: Roade Bypass

Client Project Ref: 313583

Lab Sample ID	17/06450/18	17/06450/19	17/06450/21	17/06450/23					Units	Method ref
Client Sample No										
Client Sample ID	WS06	WS06	WS08	WS10						
Depth to Top	0.10	1.50	0.40	0.40						
Depth To Bottom										
Date Sampled	05-Sep-17	05-Sep-17	05-Sep-17	06-Sep-17						
Sample Type	Soil	Soil	Soil	Soil						
Sample Matrix Code	5AE	3E	5AE	5A						
Asbestos in Soil (inc. matrix)										
Asbestos in soil$_A^{\#}$	NAD	NAD	NAD	NAD						A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A	N/A	N/A						

Envirolab Job Number: 17/06450

Client Project Name: Roade Bypass

Client Project Ref: 313583

Lab Sample ID	17/06450/18	17/06450/19	17/06450/21	17/06450/23					Units	Method ref
Client Sample No										
Client Sample ID	WS06	WS06	WS08	WS10						
Depth to Top	0.10	1.50	0.40	0.40						
Depth To Bottom										
Date Sampled	05-Sep-17	05-Sep-17	05-Sep-17	06-Sep-17						
Sample Type	Soil	Soil	Soil	Soil						
Sample Matrix Code	5AE	3E	5AE	5A						
PAH 16										
Acenaphthene$_A^{M\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-019s
Acenaphthylene$_A^{M\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-019s
Anthracene$_A^{M\#}$	<0.02	<0.02	<0.02	<0.02					mg/kg	A-T-019s
Benzo(a)anthracene$_A^{M\#}$	0.06	<0.04	<0.04	<0.04					mg/kg	A-T-019s
Benzo(a)pyrene$_A^{M\#}$	0.07	<0.04	<0.04	<0.04					mg/kg	A-T-019s
Benzo(b)fluoranthene$_A^{M\#}$	0.07	<0.05	<0.05	<0.05					mg/kg	A-T-019s
Benzo(ghi)perylene$_A^{M\#}$	<0.05	0.08	<0.05	<0.05					mg/kg	A-T-019s
Benzo(k)fluoranthene$_A^{M\#}$	<0.07	<0.07	<0.07	<0.07					mg/kg	A-T-019s
Chrysene$_A^{M\#}$	<0.06	<0.06	<0.06	<0.06					mg/kg	A-T-019s
Dibenzo(ah)anthracene$_A^{M\#}$	<0.04	<0.04	<0.04	<0.04					mg/kg	A-T-019s
Fluoranthene$_A^{M\#}$	0.09	<0.08	<0.08	<0.08					mg/kg	A-T-019s
Fluorene$_A^{M\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-019s
Indeno(123-cd)pyrene$_A^{M\#}$	0.05	0.06	<0.03	<0.03					mg/kg	A-T-019s
Naphthalene$_A^{M\#}$	<0.03	<0.03	<0.03	<0.03					mg/kg	A-T-019s
Phenanthrene$_A^{M\#}$	0.04	<0.03	<0.03	<0.03					mg/kg	A-T-019s
Pyrene$_A^{M\#}$	<0.07	<0.07	<0.07	<0.07					mg/kg	A-T-019s
PAH (total 16)$_A^{M\#}$	0.41	0.13	<0.08	<0.08					mg/kg	A-T-019s

Envirolab Job Number: 17/06450

Client Project Name: Roade Bypass

Client Project Ref: 313583

Lab Sample ID	17/06450/18	17/06450/19	17/06450/21	17/06450/23					Units	Method ref
Client Sample No										
Client Sample ID	WS06	WS06	WS08	WS10						
Depth to Top	0.10	1.50	0.40	0.40						
Depth To Bottom										
Date Sampled	05-Sep-17	05-Sep-17	05-Sep-17	06-Sep-17						
Sample Type	Soil	Soil	Soil	Soil						
Sample Matrix Code	5AE	3E	5AE	5A						
TPH CWG										
Ali >C5-C6$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Ali >C6-C8$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Ali >C8-C10$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Ali >C10-C12$_A^{\#}$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Ali >C12-C16$_A^{\#}$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Ali >C16-C21$_A^{\#}$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Ali >C21-C35$_A^{\#}$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Total Aliphatics$_A$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Aro >C5-C7$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Aro >C7-C8$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Aro >C8-C9$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Aro >C9-C10$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
Aro >C10-C12$_A^{\#}$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Aro >C12-C16$_A^{\#}$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Aro >C16-C21$_A^{\#}$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Aro >C21-C35$_A^{\#}$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
Total Aromatics$_A$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
TPH (Ali & Aro)$_A$	<0.1	<0.1	<0.1	<0.1					mg/kg	A-T-023s
BTEX - Benzene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
BTEX - Toluene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
BTEX - Ethyl Benzene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
BTEX - m & p Xylene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
BTEX - o Xylene$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s
MTBE$_A^{\#}$	<0.01	<0.01	<0.01	<0.01					mg/kg	A-T-022s

REPORT NOTES

General:
This report shall not be reproduced, except in full, without written approval from Envirolab.
All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside the scope of our accreditation.
If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

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

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

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

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

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

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

Please contact us if you need any further information.

APPENDIX J
CHEMICAL LABORATORY CERTIFICATES FOR GROUNDWATER ANALYSIS

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

FINAL ANALYTICAL TEST REPORT

Envirolab Job Number: 17/06888
Issue Number: 1 **Date:** 23 October, 2017

Client: RSK Environment Ltd Coventry
Humber Road, Abbey Park
Coventry
UK
CV3 4AQ

Project Manager: Darren Bench/Michael Lawson
Project Name: Roade Bypass
Project Ref: 313583
Order No: N/A
Date Samples Received: 09/10/17
Date Instructions Received: 11/10/17
Date Analysis Completed: 22/10/17

Prepared by:

Melanie Marshall
Laboratory Coordinator

Approved by:

Iain Haslock
Analytical Consultant

UKAS TESTING
1247

Envirolab Job Number: 17/06888

Client Project Name: Roade Bypass

Client Project Ref: 313583

Lab Sample ID	17/06888/1	17/06888/2	17/06888/3	17/06888/4	17/06888/5	17/06888/6			Units	Method ref
Client Sample No										
Client Sample ID	BH01	BH02	BH04	BH05	WS02	WS10				
Depth to Top	17.17	20.15	9.92	7.00	2.80	3.25				
Depth To Bottom										
Date Sampled	05-Oct-17	05-Oct-17	05-Oct-17	05-Oct-17	05-Oct-17	05-Oct-17				
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW				
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A				
pH (w)$_A^{\#}$	6.76	6.89	6.94	7.01	6.86	7.16			pH	A-T-031w
Electrical conductivity @ 20degC (w)$_A^{\#}$	1347	839	787	1090	1785	2560			µs/cm	A-T-037w
Alkalinity (total) (w) Colorimetry$_A^{\#}$	307	296	281	340	291	301			mg/l Ca CO3	A-T-038w
Hardness Total$_A^{\#}$	758	434	452	502	1110	1840			mg/l Ca CO3	A-T-049w
Ammoniacal nitrogen (w)$_A^{\#}$	0.56	0.49	0.09	0.32	0.05	0.07			mg/l	A-T-033w
Nitrate (w)$_A^{\#}$	<0.10	0.12	2.90	<0.10	2.46	0.15			mg/l	A-T-026w
Sulphate (w)$_A^{\#}$	471	158	198	259	788	1520			mg/l	A-T-026w
DOC (w)$_A^{\#}$	3.7	3.8	4.4	2.9	2.7	2.4			mg/l	A-T-032w
Arsenic (dissolved)$_A^{\#}$	<1	<1	<1	1	<1	<1			µg/l	A-T-025w
Boron (dissolved)$_A^{\#}$	1400	2220	277	329	67	109			µg/l	A-T-025w
Cadmium (dissolved)$_A^{\#}$	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2			µg/l	A-T-025w
Calcium (dissolved)$_A^{\#}$	240	134	164	166	379	564			mg/l	A-T-049w
Copper (dissolved)$_A^{\#}$	<1	1	1	<1	1	2			µg/l	A-T-025w
Chromium (dissolved)$_A^{\#}$	1	3	10	<1	7	8			µg/l	A-T-025w
Chromium (hexavalent) (w)$_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.05			mg/l	A-T-040w
Iron (dissolved)$_A^{\#}$	137	18	19	<10	<10	29			µg/l	A-T-025w
Ferrous iron FeII (w)$_A$	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			mg/l	Test kit
Ferric iron FeIII (w)	0.1	<0.1	<0.1	<0.1	<0.1	<0.1			mg/l	Calc
Lead (dissolved)$_A^{\#}$	<1	<1	<1	<1	<1	<1			µg/l	A-T-025w
Magnesium (dissolved)$_A^{\#}$	39	24	11	21	40	104			mg/l	A-T-049w
Mercury (dissolved)$_A^{\#}$	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			µg/l	A-T-025w
Nickel (dissolved)$_A^{\#}$	8	3	8	2	29	24			µg/l	A-T-025w
Selenium (dissolved)$_A^{\#}$	1	2	5	<1	24	3			µg/l	A-T-025w
Zinc (dissolved)$_A^{\#}$	31	21	27	<1	40	139			µg/l	A-T-025w

Envirolab Job Number: 17/06888

Client Project Name: Roade Bypass

Client Project Ref: 313583

Lab Sample ID	17/06888/1	17/06888/2	17/06888/3	17/06888/4	17/06888/5	17/06888/6			Units	Method ref
Client Sample No										
Client Sample ID	BH01	BH02	BH04	BH05	WS02	WS10				
Depth to Top	17.17	20.15	9.92	7.00	2.80	3.25				
Depth To Bottom										
Date Sampled	05-Oct-17	05-Oct-17	05-Oct-17	05-Oct-17	05-Oct-17	05-Oct-17				
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW				
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A				
PAH 16MS (w)										
Acenaphthene $(w)_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			µg/l	A-T-019w
Acenaphthylene $(w)_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			µg/l	A-T-019w
Anthracene $(w)_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			µg/l	A-T-019w
Benzo(a)anthracene $(w)_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	0.03			µg/l	A-T-019w
Benzo(a)pyrene $(w)_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	0.05			µg/l	A-T-019w
Benzo(b)fluoranthene $(w)_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	0.04			µg/l	A-T-019w
Benzo(ghi)perylene $(w)_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	0.02			µg/l	A-T-019w
Benzo(k)fluoranthene $(w)_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	0.02			µg/l	A-T-019w
Chrysene $(w)_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	0.03			µg/l	A-T-019w
Dibenzo(ah)anthracene $(w)_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			µg/l	A-T-019w
Fluoranthene $(w)_A^{\#}$	<0.01	<0.01	0.02	<0.01	<0.01	0.05			µg/l	A-T-019w
Fluorene $(w)_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			µg/l	A-T-019w
Indeno(123-cd)pyrene $(w)_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	0.03			µg/l	A-T-019w
Naphthalene $(w)_A^{\#}$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			µg/l	A-T-019w
Phenanthrene $(w)_A^{\#}$	<0.01	<0.01	0.02	<0.01	<0.01	0.02			µg/l	A-T-019w
Pyrene $(w)_A^{\#}$	<0.01	<0.01	0.02	<0.01	<0.01	0.04			µg/l	A-T-019w
PAH (total 16) $(w)_A^{\#}$	<0.01	<0.01	0.06	<0.01	<0.01	0.33			µg/l	A-T-019w
Phenols (speciated HPLC) (w)										
Phenol $(w)_A$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/l	A-T-050w
Cresols $(w)_A$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/l	A-T-050w
Xylenols $(w)_A$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/l	A-T-050w
Resorcinol $(w)_A$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/l	A-T-050w
Phenols - Total by HPLC $(w)_A$	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01			mg/l	A-T-050w

Envirolab Job Number: 17/06888

Client Project Name: Roade Bypass

Client Project Ref: 313583

Lab Sample ID	17/06888/1	17/06888/2	17/06888/3	17/06888/4	17/06888/5	17/06888/6			Units	Method ref
Client Sample No										
Client Sample ID	BH01	BH02	BH04	BH05	WS02	WS10				
Depth to Top	17.17	20.15	9.92	7.00	2.80	3.25				
Depth To Bottom										
Date Sampled	05-Oct-17	05-Oct-17	05-Oct-17	05-Oct-17	05-Oct-17	05-Oct-17				
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW				
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A				
SVOC (excluding PAH-16) (w)										
2,4,5-Trichlorophenol$_A$	<2	<2	<1	<1	-	-			µg/l	A-T-052w
2,4,6-Trichlorophenol$_A$	<2	<2	<1	<1	-	-			µg/l	A-T-052w
2,4-Dichlorophenol$_A$	<2	<2	<1	<1	-	-			µg/l	A-T-052w
2,4-Dimethylphenol$_A$	<2	<2	<1	<1	-	-			µg/l	A-T-052w
2,4-Dinitrotoluene$_A$	<2	<2	<1	<1	-	-			µg/l	A-T-052w
2,6-Dinitrotoluene$_A$	<2	<2	<1	<1	-	-			µg/l	A-T-052w
2-Chloronaphthalene$_A$	<2	<2	<1	<1	-	-			µg/l	A-T-052w
2-Chlorophenol$_A$	<2	<2	<1	<1	-	-			µg/l	A-T-052w
2-Methylnaphthalene$_A$	<2	<2	<1	<1	-	-			µg/l	A-T-052w
2-Methylphenol$_A$	<2	<2	<1	<1	-	-			µg/l	A-T-052w
2-Nitrophenol$_A$	<2	<2	<1	<1	-	-			µg/l	A-T-052w
4-Bromophenyl phenyl ether$_A$	<2	<2	<1	<1	-	-			µg/l	A-T-052w
4-Chloro-3-methylphenol$_A$	<2	<2	<1	<1	-	-			µg/l	A-T-052w
Bis(2-chloroisopropyl)ether$_A$	<2	<2	<1	<1	-	-			µg/l	A-T-052w
4-Methylphenol$_A$	<2	<2	<1	<1	-	-			µg/l	A-T-052w
4-Nitrophenol$_A$	<2	<2	<1	<1	-	-			µg/l	A-T-052w
Bis(2-chloroethyl)ether$_A$	<2	<2	<1	<1	-	-			µg/l	A-T-052w
Bis(2-chloroethoxy)methane$_A$	<2	<2	<1	<1	-	-			µg/l	A-T-052w
Bis(2-ethylhexyl)phthalate$_A$	<20	<20	<10	<10	-	-			µg/l	A-T-052w
Butylbenzyl phthalate$_A$	<2	<2	<1	<1	-	-			µg/l	A-T-052w
Carbazole$_A$	<2	<2	<1	<1	-	-			µg/l	A-T-052w
Dibenzofuran$_A$	<2	<2	<1	<1	-	-			µg/l	A-T-052w
n-Dibutylphthalate$_A$	<2	<2	<1	<1	-	-			µg/l	A-T-052w
n-Dioctylphthalate$_A$	<20	<20	<10	<10	-	-			µg/l	A-T-052w
n-Nitroso-n-dipropylamine$_A$	<2	<2	<1	<1	-	-			µg/l	A-T-052w
Diethyl phthalate$_A$	<2	<2	<1	<1	-	-			µg/l	A-T-052w
Dimethyl phthalate$_A$	<2	<2	<1	<1	-	-			µg/l	A-T-052w
Hexachlorobenzene$_A$	<2	<2	<1	<1	-	-			µg/l	A-T-052w
Pentachlorophenol$_A$	<2	<2	<1	<1	-	-			µg/l	A-T-052w
Phenol$_A$	<2	<2	<1	<1	-	-			µg/l	A-T-052w
Hexachloroethane$_A$	<2	<2	<1	<1	-	-			µg/l	A-T-052w
Nitrobenzene$_A$	<2	<2	<1	<1	-	-			µg/l	A-T-052w

Envirolab Job Number: 17/06888

Client Project Name: Roade Bypass

Client Project Ref: 313583

Lab Sample ID	17/06888/1	17/06888/2	17/06888/3	17/06888/4	17/06888/5	17/06888/6			Units	Method ref
Client Sample No										
Client Sample ID	BH01	BH02	BH04	BH05	WS02	WS10				
Depth to Top	17.17	20.15	9.92	7.00	2.80	3.25				
Depth To Bottom										
Date Sampled	05-Oct-17	05-Oct-17	05-Oct-17	05-Oct-17	05-Oct-17	05-Oct-17				
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW				
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A				
Isophorone$_A$	<2	<2	<1	<1	-	-			µg/l	A-T-052w
Hexachlorocyclopentadiene$_A$	<2	<2	<1	<1	-	-			µg/l	A-T-052w
Perylene$_A$	<2	<2	<1	<1	-	-			µg/l	A-T-052w

Envirolab Job Number: 17/06888

Client Project Name: Roade Bypass

Client Project Ref: 313583

Lab Sample ID	17/06888/1	17/06888/2	17/06888/3	17/06888/4	17/06888/5	17/06888/6			Units	Method ref
Client Sample No										
Client Sample ID	BH01	BH02	BH04	BH05	WS02	WS10				
Depth to Top	17.17	20.15	9.92	7.00	2.80	3.25				
Depth To Bottom										
Date Sampled	05-Oct-17	05-Oct-17	05-Oct-17	05-Oct-17	05-Oct-17	05-Oct-17				
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW				
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A				
VOC (w)										
Dichlorodifluoromethane$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
Chloromethane$_A$	<10	<10	<10	<10	-	-			µg/l	A-T-006w
Vinyl Chloride$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
Bromomethane$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
Chloroethane$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
Trichlorofluoromethane$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
trans 1,2-Dichloroethene$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
Dichloromethane$_A$	<5	<5	<5	<5	-	-			µg/l	A-T-006w
Carbon Disulphide$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
1,1-Dichloroethene$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
1,1-Dichloroethane$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
cis 1,2-Dichloroethene$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
Bromochloromethane$_A^{\#}$	<5	<5	<5	<5	-	-			µg/l	A-T-006w
Chloroform$_A$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
2,2-Dichloropropane$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
1,2-Dichloroethane$_A^{\#}$	<2	<2	<2	<2	-	-			µg/l	A-T-006w
1,1,1-Trichloroethane$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
1,1-Dichloropropene$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
Benzene$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
Carbon Tetrachloride$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
Dibromomethane$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
1,2-Dichloropropane$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
Bromodichloromethane$_A^{\#}$	<10	<10	<10	<10	-	-			µg/l	A-T-006w
Trichloroethene$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
cis 1,3-Dichloropropene$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
trans 1,3-Dichloropropene$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
1,1,2-Trichloroethane$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
Toluene$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
1,3-Dichloropropane$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
Dibromochloromethane$_A^{\#}$	<3	<3	<3	<3	-	-			µg/l	A-T-006w
1,2-Dibromoethane$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
Tetrachloroethene$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w

Envirolab Job Number: 17/06888

Client Project Name: Roade Bypass

Client Project Ref: 313583

Lab Sample ID	17/06888/1	17/06888/2	17/06888/3	17/06888/4	17/06888/5	17/06888/6			Units	Method ref
Client Sample No										
Client Sample ID	BH01	BH02	BH04	BH05	WS02	WS10				
Depth to Top	17.17	20.15	9.92	7.00	2.80	3.25				
Depth To Bottom										
Date Sampled	05-Oct-17	05-Oct-17	05-Oct-17	05-Oct-17	05-Oct-17	05-Oct-17				
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW				
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A				
1,1,1,2-Tetrachloroethane$_A$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
Chlorobenzene$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
Ethylbenzene$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
m & p Xylene$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
Bromoform$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
Styrene$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
1,1,2,2-Tetrachloroethane$_A$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
o-Xylene$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
1,2,3-Trichloropropane$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
Isopropylbenzene$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
Bromobenzene$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
2-Chlorotoluene$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
n-propylbenzene$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
4-Chlorotoluene$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
1,2,4-Trimethylbenzene$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
4-Isopropyltoluene$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
1,3,5-Trimethylbenzene$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
1,2-Dichlorobenzene$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
1,4-Dichlorobenzene$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
sec-Butylbenzene$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
tert-Butylbenzene$_A^{\#}$	<2	<2	<2	<2	-	-			µg/l	A-T-006w
1,3-Dichlorobenzene$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
n-butylbenzene$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w
1,2-Dibromo-3-chloropropane$_A^{\#}$	<2	<2	<2	<2	-	-			µg/l	A-T-006w
1,2,4-Trichlorobenzene$_A^{\#}$	<3	<3	<3	<3	-	-			µg/l	A-T-006w
1,2,3-Trichlorobenzene$_A^{\#}$	<3	<3	<3	<3	-	-			µg/l	A-T-006w
Hexachlorobutadiene$_A^{\#}$	<1	<1	<1	<1	-	-			µg/l	A-T-006w

Envirolab Job Number: 17/06888

Client Project Name: Roade Bypass

Client Project Ref: 313583

Lab Sample ID	17/06888/1	17/06888/2	17/06888/3	17/06888/4	17/06888/5	17/06888/6			Units	Method ref
Client Sample No										
Client Sample ID	BH01	BH02	BH04	BH05	WS02	WS10				
Depth to Top	17.17	20.15	9.92	7.00	2.80	3.25				
Depth To Bottom										
Date Sampled	05-Oct-17	05-Oct-17	05-Oct-17	05-Oct-17	05-Oct-17	05-Oct-17				
Sample Type	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW	Water - EW				
Sample Matrix Code	N/A	N/A	N/A	N/A	N/A	N/A				
TPH CWG										
Ali >C5-C6 $(w)_A^{\#}$	<1	<1	<1	<1	<1	<1			µg/l	A-T-022w
Ali >C6-C8 $(w)_A^{\#}$	<1	<1	<1	<1	<1	<1			µg/l	A-T-022w
Ali >C8-C10 $(w)_A^{\#}$	<1	<1	<1	<1	<1	<1			µg/l	A-T-022w
Ali >C10-C12 $(w)_A^{\#}$	<5	<5	<5	<5	<5	<5			µg/l	A-T-023w
Ali >C12-C16 $(w)_A^{\#}$	<5	<5	<5	<5	<5	<5			µg/l	A-T-023w
Ali >C16-C21 $(w)_A^{\#}$	<5	<5	<5	<5	<5	<5			µg/l	A-T-023w
Ali >C21-C35 $(w)_A^{\#}$	<5	<5	<5	<5	<5	<5			µg/l	A-T-023w
Total Aliphatics $(w)_A$	<5	<5	<5	<5	<5	<5			µg/l	A-T-022+23w
Aro >C5-C7 $(w)_A^{\#}$	<1	<1	<1	<1	<1	<1			µg/l	A-T-022w
Aro >C7-C8 $(w)_A^{\#}$	<1	<1	<1	<1	<1	<1			µg/l	A-T-022w
Aro >C8-C9 $(w)_A^{\#}$	<1	<1	<1	<1	<1	<1			µg/l	A-T-022w
Aro >C9-C10 $(w)_A^{\#}$	<1	<1	<1	<1	<1	<1			µg/l	A-T-022w
Aro >C10-C12 $(w)_A^{\#}$	<5	<5	<5	<5	<5	<5			µg/l	A-T-023w
Aro >C12-C16 $(w)_A^{\#}$	<5	<5	<5	<5	<5	<5			µg/l	A-T-023w
Aro >C16-C21 $(w)_A^{\#}$	<5	<5	<5	<5	<5	<5			µg/l	A-T-023w
Aro >C21-C35 $(w)_A^{\#}$	<5	<5	<5	<5	<5	<5			µg/l	A-T-023w
Total Aromatics $(w)_A$	<5	<5	<5	<5	<5	<5			µg/l	A-T-022+23w
TPH (Ali & Aro) $(w)_A$	<5	<5	<5	<5	<5	<5			µg/l	A-T-022+23w
BTEX - Benzene $(w)_A^{\#}$	<1	<1	<1	<1	<1	<1			µg/l	A-T-022w
BTEX - Toluene $(w)_A^{\#}$	<1	<1	<1	<1	<1	<1			µg/l	A-T-022w
BTEX - Ethyl Benzene $(w)_A^{\#}$	<1	<1	<1	<1	<1	<1			µg/l	A-T-022w
BTEX - m & p Xylene $(w)_A^{\#}$	<1	<1	<1	<1	<1	<1			µg/l	A-T-022w
BTEX - o Xylene $(w)_A^{\#}$	<1	<1	<1	<1	<1	<1			µg/l	A-T-022w
MTBE $(w)_A^{\#}$	<1	<1	<1	<1	<1	<1			µg/l	A-T-022w

REPORT NOTES

General:
This report shall not be reproduced, except in full, without written approval from Envirolab.
All samples contained within this report, and any received with the same delivery, will be disposed of one month after the date of this report.
Analytical results reflect the quality of the sample at the time of analysis only.
Opinions and interpretations expressed are outside the scope of our accreditation.
If results are in italic font they are associated with an AQC failure and there is insufficient sample to repeat the analysis. These are not accredited and are unreliable.
A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

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

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

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

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

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

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

Please contact us if you need any further information.

APPENDIX K
GEOTECHNICAL LABORATORY CERTIFICATES

TESTING VERIFICATION CERTIFICATE

1774

The test results included in this report are certified as:-

ISSUE STATUS: **FINAL**

In accordance with the Structural Soils Ltd Laboratory Quality Management System, results sheets and summaries of results issued by the laboratory are checked by an approved signatory. The integrity of the test data and results are ensured by control of the computer system employed by the laboratory as part of the Software Verification Program as detailed in the Laboratory Quality Manual.

This testing verification certificate covers all testing compiled on or before the following datetime: **02/11/2017 15:24:39**.

Testing reported after this date is not covered by this Verification Certificate.

Approved Signatory
Mark Athorne (Laboratory Manager)

(Head Office)
Bristol Laboratory
Unit 1A, Princess Street
Bedminster
Bristol
BS3 4AG

Castleford Laboratory
The Potteries, Pottery Street
Castleford
West Yorkshire
WF10 1NJ

Hemel Laboratory
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

Tonbridge Laboratory
Anerley Court, Half Moon Lane
Hildenborough
Tonbridge
TN11 9HU

STRUCTURAL SOILS LTD	Contract: **M1 Junction 15 Roade Bypass**	Job No: **782814**

STRUCTURAL SOILS LTD

TEST REPORT

Report No. 782814 R1 1774

Date 02-November-2017 Contract M1 Junction 15 Roade Bypass

Client RSK Environment Ltd
Address Spring Lodge
172 Chester Road
Helsby
Cheshire WA6 0AR

For the Attention of Michael Lawson

Samples submitted by client	29/09/2017	Client Reference	313583
Testing Started	02/10/2017	Client Order No.	
Testing Completed	02/11/2017	Instruction Type	Written

Ukas Accredited Tests Underatken

Moisture Content (oven drying method) BS1377:Part 2:1990,clause 3.2 (superseded)**
Liquid Limit (one point method) BS1377:Part 2:1990,clause 4.4
Plastic Limit BS1377:Part 2:1990,clause 5.3
Plasticity Index Derivation BS1377:Part 2:1990,clause 5.4
Particle Size Distribution wet sieve method BS1377:Part 2:1990,clause 9.2
Dry density/moisture content relationship 4.5kg rammer method BS1377:Part 4:1990 clause 3.5/3.6

Non Ukas Accredited Tests Undertaken

Particle Size Distribution sedimentation hydrometer method BS1377:Part 2: 1990,clause 9.5

Tests Undertaken at our Bristol Laboratory

Summary of Water Content Tests ISRM 2007
Point Load ISRM 2007
Unconfined Compressive Strength (in house method based on ISRM 2007)
Permeability (triaxial cell method) BS1377:Part 6:1990,clause 6
Sulphate content (acid extract) BS1377:Part 3:1990,clause 5.2
Sulphate content (water extract) BS1377:Part 3:1990,clause 5.3
pH Value BS1377:Part 3:1990,clause 9.5

* This clause of BS1377 is no longer the most up to date method due to the publication of ISO17892

Please Note: Remaining samples will be retained for a period of one month from today and will then be disposed of.
Test were undertaken on samples 'as received' unless otherwise stated.
Opinions and interpretations expressed in this report are outside the scope of accreditation for this laboratory.

Structural Soils Ltd, The Potteries, Pottery Street, Castleford, WF10 1NJ Tel.01977 552255. E-mail mark.athorne@soils.co.uk

SUMMARY OF SOIL CLASSIFICATION TESTS

In accordance with clauses 3.2,4.3,4.4,5.3,5.4,7.2,8.2,8.3 of BS1377:Part 2:1990

Exploratory Position ID	Sample Ref	Sample Type	Depth (m)	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	% <425um	Description of Sample
TP12	1	B	1.00	10					Light brown very sandy slightly gravelly CLAY
TP14	1	B	0.50	23					Brown slightly sandy slightly gravelly CLAY
TP16	1	B	0.60	11	44	19	25	67	Brown slightly sandy slightly gravelly CLAY
TP17	1	B	0.50	17	33	18	15	66	Light brown slightly sandy gravelly CLAY
TP20	1	D	0.50	14	42	16	26	72	Brown slightly sandy slightly gravelly CLAY
WS01	1	B	0.90	16	53	20	33	89	Dark brown slightly sandy slightly gravelly CLAY
WS03	1	B	0.20	16					Light brown sandy slightly gravelly CLAY
WS05	1	B	0.80	27	65	30	35	91	Grey sandy gravelly CLAY

STRUCTURAL SOILS LTD

Contract:

M1 Junction 15 Roade Bypass

Contract Ref:

782814

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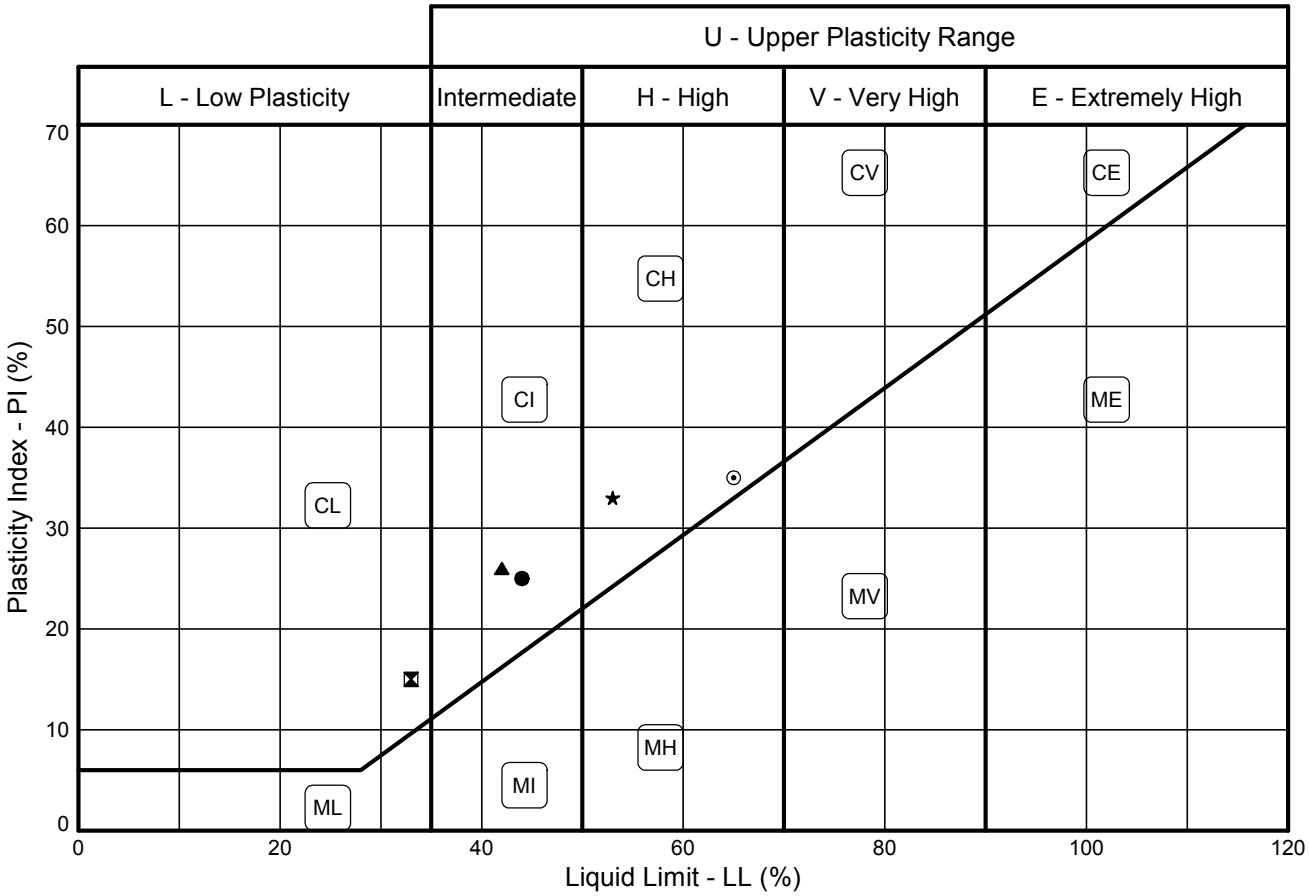
PLASTICITY CHART - PI Vs LL

In accordance with BS5930:2015
Testing in accordance with BS1377-2:1990



Sample Identification				BS Test Method #	Preparation Method +	MC	LL	PL	PI	<425um	Lab location	
	Exploratory Position ID	Sample	Depth (m)			%	%	%	%	%		
●	TP16	1B	0.60	3.2/4.4/5.3/5.4	4.2.4	11	44	19	25	67	C	
⊠	TP17	1B	0.50	3.2/4.4/5.3/5.4	4.2.4	17	33	18	15	66	C	
▲	TP20	1D	0.50	3.2/4.4/5.3/5.4	4.2.4	14	42	16	26	72	C	
★	WS01	1B	0.90	3.2/4.4/5.3/5.4	4.2.4	16	53	20	33	89	C	
⊙	WS05	1B	0.80	3.2/4.4/5.3/5.4	4.2.4	27	65	30	35	91	C	

Tested in accordance with the following clauses of BS1377-2:1990.

3.2 - Moisture Content
4.3 - Cone Penetrometer Method
4.4 - One Point Cone Penetrometer Method
4.6 - One Point Casagrande Method
5.3 - Plastic Limit Method
5.4 - Plasticity Index

+ Tested in accordance with the following clauses of BS1377-2:1990.

4.2.3 - Natural State
4.2.4 - Wet Sieved

Key: * = Non-standard test, NP = Non plastic.

Lab location: B = Bristol (BS3 4AG), C = Castleford (WF10 1NJ), H = Hemel Hempstead (HP3 9RT), T = Tonbridge (TN11 9HU)

STRUCTURAL SOILS
The Potteries
Pottery Street
Castleford
W. Yorkshire WF10 1NJ

Compiled By		Date
M. Fisher	MAUREEN FISHER	02/11/17

Contract	Contract Ref:
M1 Junction 15 Roade Bypass	782814

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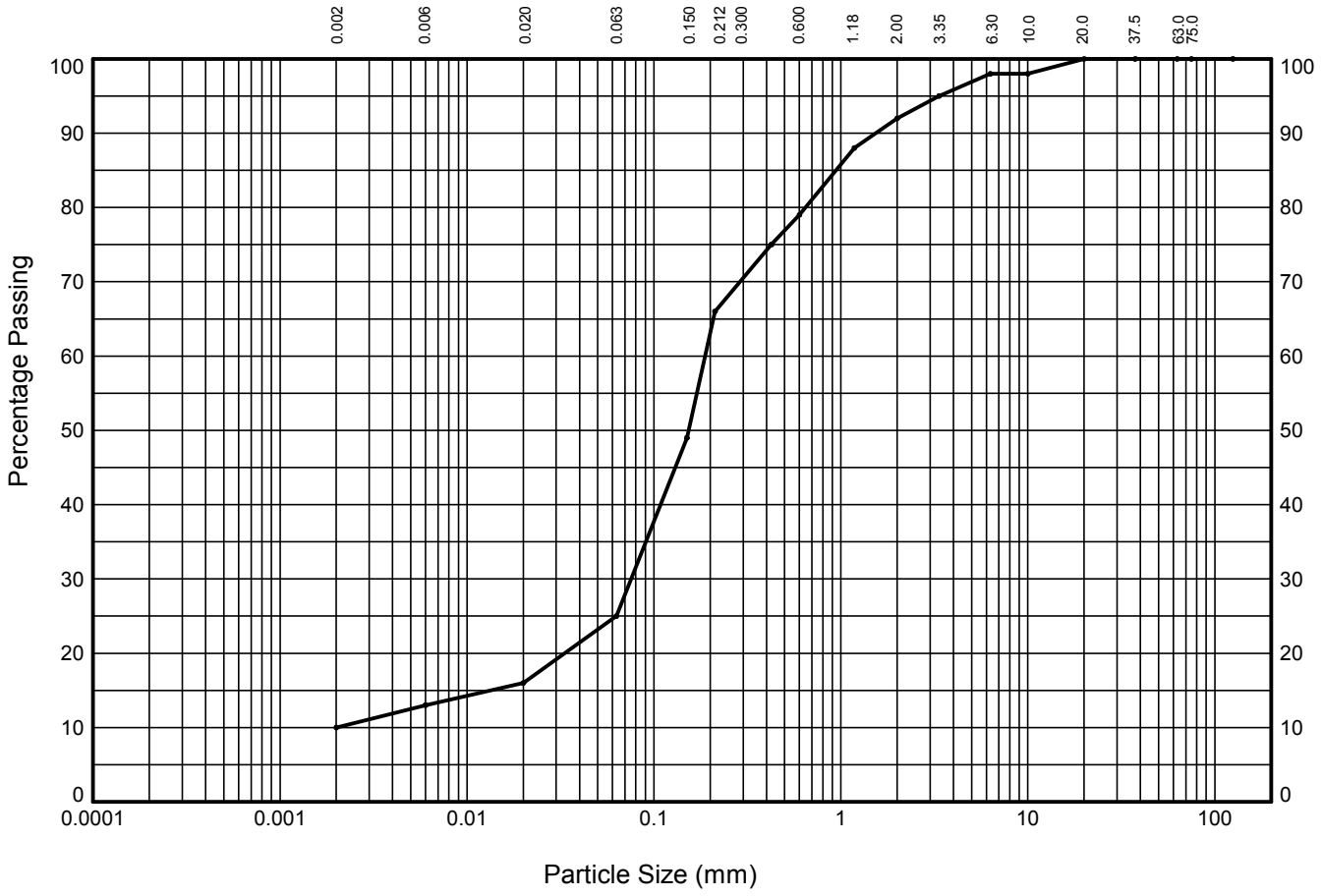
PARTICLE SIZE DISTRIBUTION TEST

In accordance with clauses 9.2, 9.5 of BS1377:Part 2:1990

Trial Pit: **TP12** Sample Ref: **1** Sample Type: **B** Depth (m): **1.00**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	SILT			SAND			GRAVEL			

Test Sieve (mm)	Percent Passing (%)
125.0	**100**
75.0	**100**
63.0	**100**
37.5	**100**
20.0	**100**
10.0	**98**
6.30	**98**
3.35	**95**
2.00	**92**
1.18	**88**
0.600	**79**
0.425	**75**
0.212	**66**
0.150	**49**
0.063	**25**

Particle Diameter (mm)	Percent Passing (%)
0.02	**16**
0.006	**13**
0.002	**10**

Sedimentation sample was not pre-treated

Soil Fraction	Sieve Percentage (%)
GRAVEL	**8**
SAND	**67**
SILT	**15**
CLAY	**10**

Soil Description:

Light brown very sandy slightly gravelly CLAY

STRUCTURAL SOILS
The Potteries
Pottery Street
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W. Yorkshire WF10 1NJ

Compiled By		Date
C Cole	**CATHERINE COLE**	**02/11/17**

Contract	Contract Ref:
M1 Junction 15 Roade Bypass	**782814**

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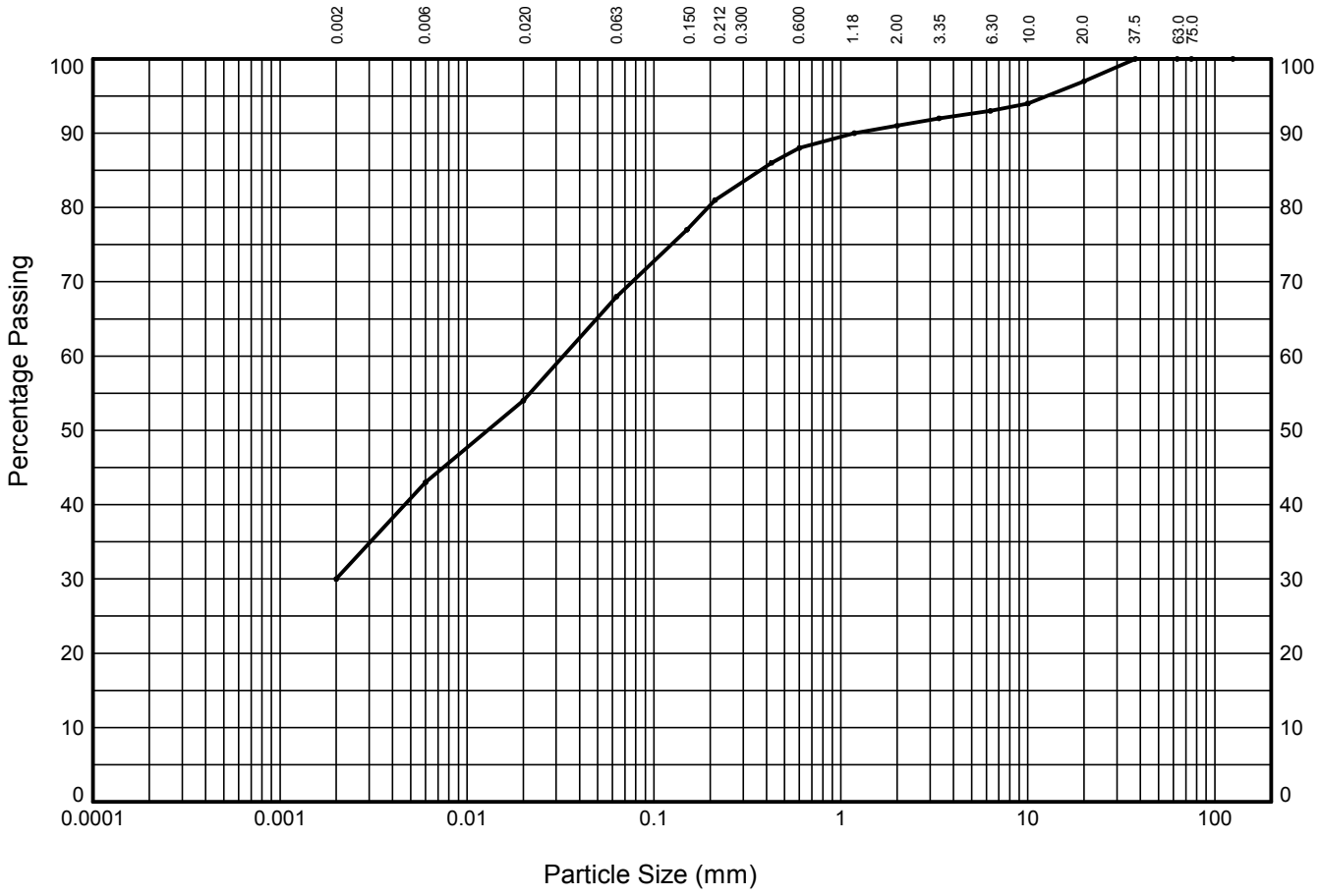
PARTICLE SIZE DISTRIBUTION TEST

In accordance with clauses 9.2, 9.5 of BS1377:Part 2:1990

Trial Pit: **TP14** Sample Ref: **1** Sample Type: **B** Depth (m): **0.50**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	SILT			SAND			GRAVEL			

Test Sieve (mm)	Percent Passing (%)
125.0	**100**
75.0	**100**
63.0	**100**
37.5	**100**
20.0	**97**
10.0	**94**
6.30	**93**
3.35	**92**
2.00	**91**
1.18	**90**
0.600	**88**
0.425	**86**
0.212	**81**
0.150	**77**
0.063	**68**

Particle Diameter (mm)	Percent Passing (%)
0.02	**54**
0.006	**43**
0.002	**30**

Sedimentation sample was not pre-treated

Soil Fraction	Sieve Percentage (%)
GRAVEL	**9**
SAND	**23**
SILT	**38**
CLAY	**30**

Soil Description:

Brown slightly sandy slightly gravelly CLAY

STRUCTURAL SOILS
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Compiled By		Date
C Cole	**CATHERINE COLE**	**02/11/17**

Contract	Contract Ref:
M1 Junction 15 Roade Bypass	**782814**

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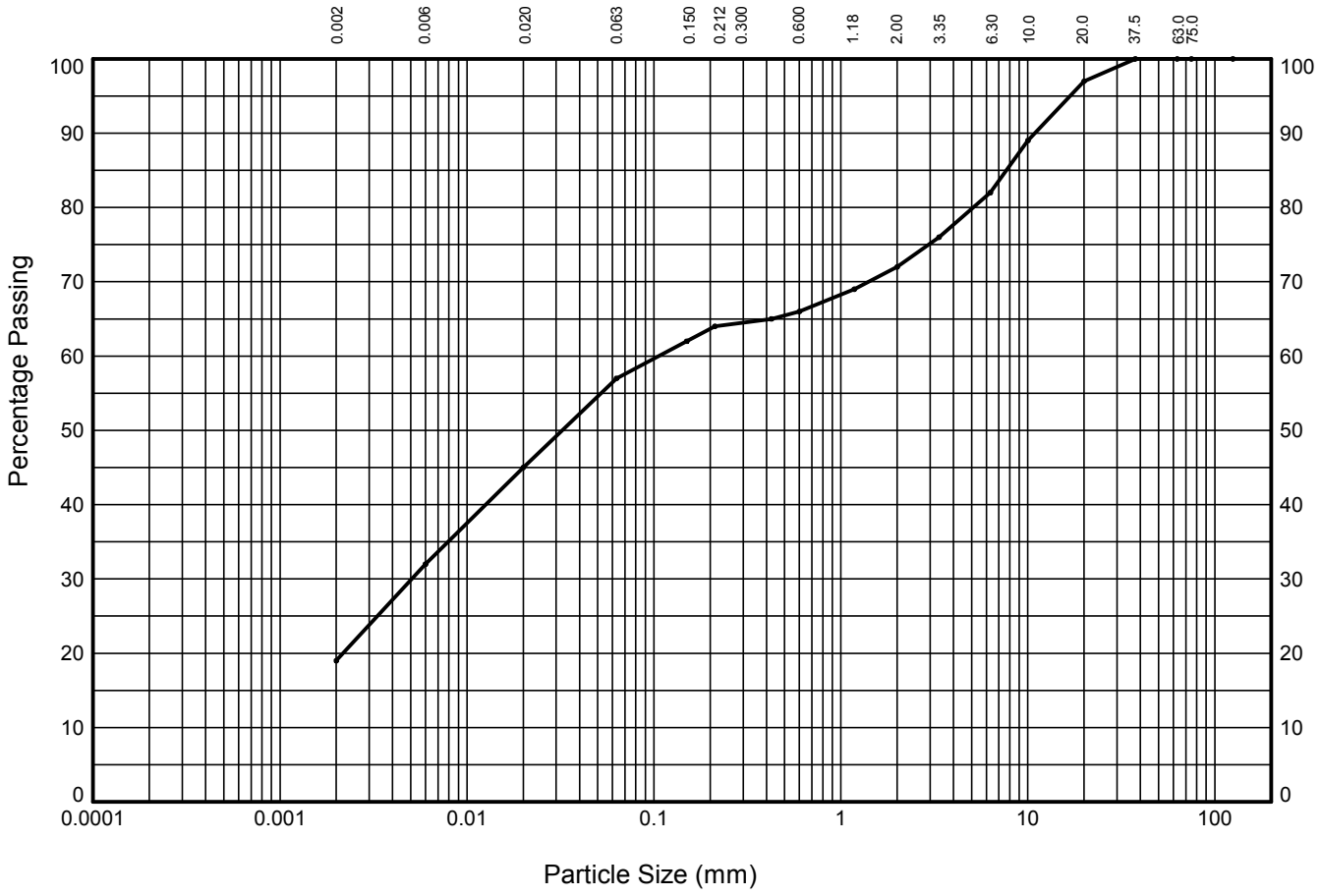
PARTICLE SIZE DISTRIBUTION TEST

In accordance with clauses 9.2, 9.5 of BS1377:Part 2:1990

Trial Pit: **TP16** Sample Ref: **1** Sample Type: **B** Depth (m): **0.60**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	SILT			SAND			GRAVEL			

Test Sieve (mm)	Percent Passing (%)
125.0	**100**
75.0	**100**
63.0	**100**
37.5	**100**
20.0	**97**
10.0	**89**
6.30	**82**
3.35	**76**
2.00	**72**
1.18	**69**
0.600	**66**
0.425	**65**
0.212	**64**
0.150	**62**
0.063	**57**

Particle Diameter (mm)	Percent Passing (%)
0.02	**45**
0.006	**32**
0.002	**19**

Sedimentation sample was not pre-treated

Soil Fraction	Sieve Percentage (%)
GRAVEL	**28**
SAND	**15**
SILT	**38**
CLAY	**19**

Soil Description:

Brown slightly sandy slightly gravelly CLAY

STRUCTURAL SOILS
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Pottery Street
Castleford
W. Yorkshire WF10 1NJ

Compiled By		Date
C Cole	**CATHERINE COLE**	**02/11/17**

Contract	Contract Ref:
M1 Junction 15 Roade Bypass	**782814**

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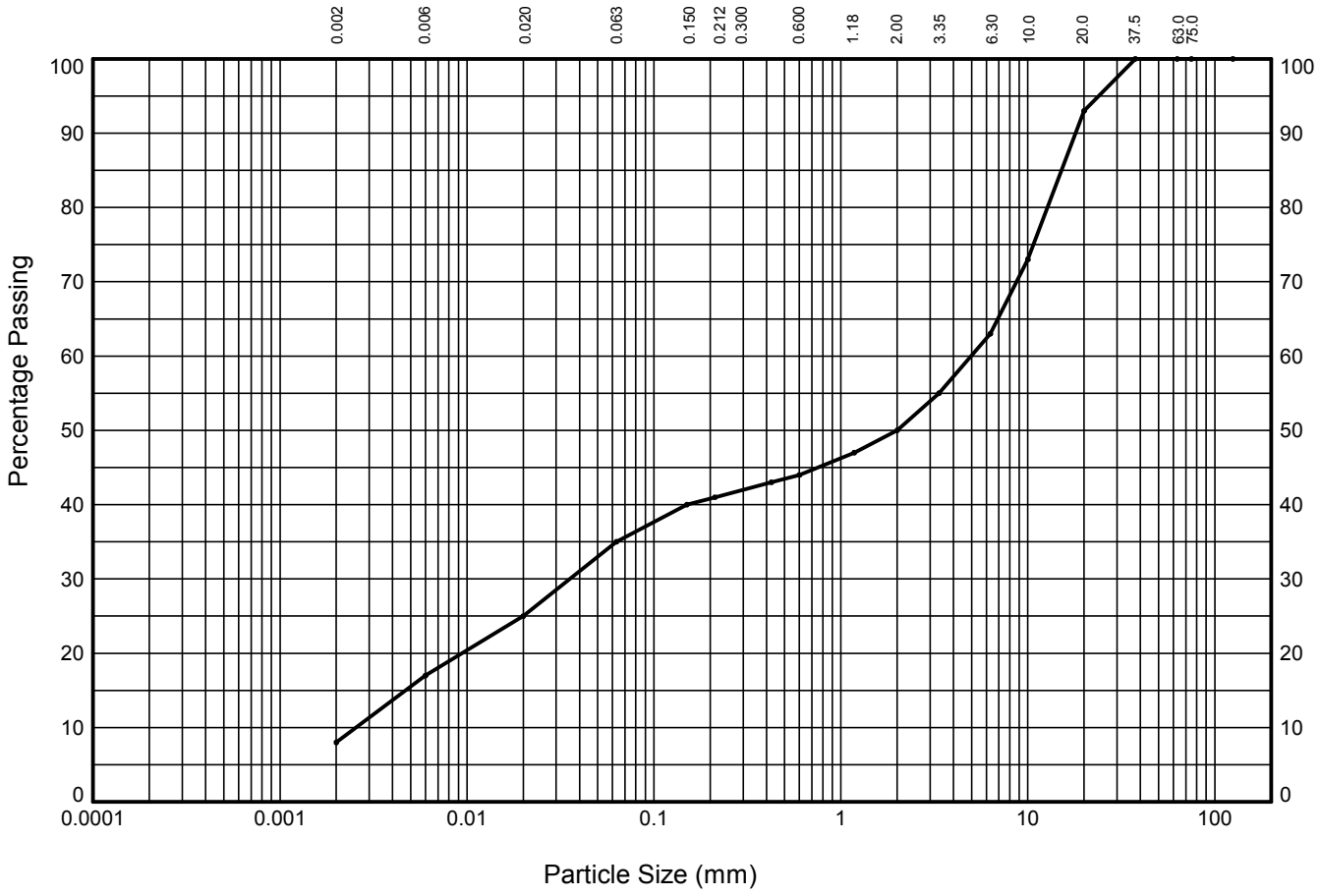
PARTICLE SIZE DISTRIBUTION TEST

In accordance with clauses 9.2, 9.5 of BS1377:Part 2:1990

Trial Pit: **TP17** Sample Ref: **1** Sample Type: **B** Depth (m): **0.50**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	SILT			SAND			GRAVEL			

Test Sieve (mm)	Percent Passing (%)
125.0	**100**
75.0	**100**
63.0	**100**
37.5	**100**
20.0	**93**
10.0	**73**
6.30	**63**
3.35	**55**
2.00	**50**
1.18	**47**
0.600	**44**
0.425	**43**
0.212	**41**
0.150	**40**
0.063	**35**

Particle Diameter (mm)	Percent Passing (%)
0.02	**25**
0.006	**17**
0.002	**8**

Sedimentation sample was not pre-treated

Soil Fraction	Sieve Percentage (%)
GRAVEL	**50**
SAND	**15**
SILT	**27**
CLAY	**8**

Soil Description:

Light brown slightly sandy gravelly CLAY

STRUCTURAL SOILS
The Potteries
Pottery Street
Castleford
W. Yorkshire WF10 1NJ

Compiled By		Date
M. Fisher	**MAUREEN FISHER**	**02/11/17**

Contract	Contract Ref:
M1 Junction 15 Roade Bypass	**782814**

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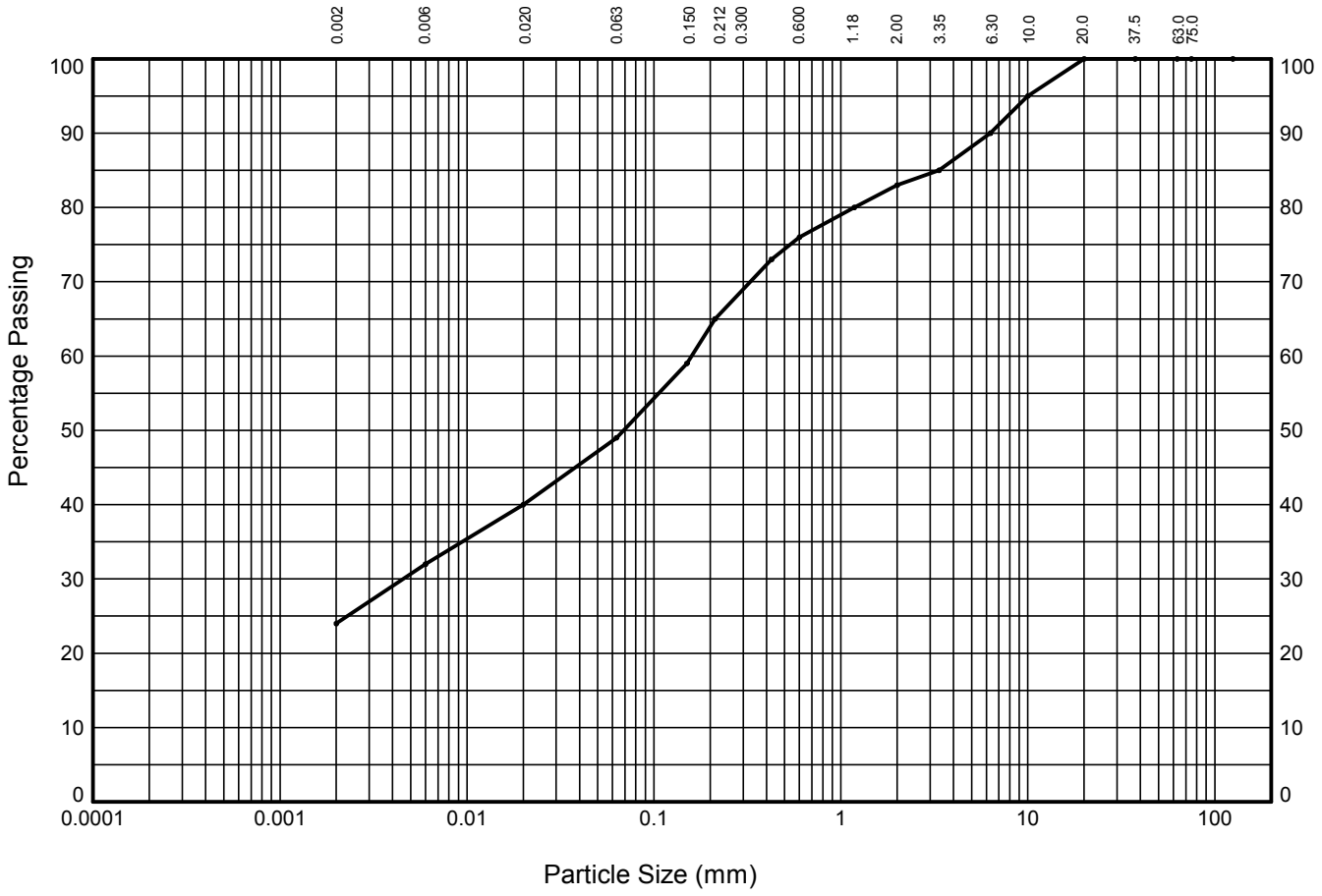
PARTICLE SIZE DISTRIBUTION TEST

In accordance with clauses 9.2, 9.5 of BS1377:Part 2:1990

Trial Pit: **TP20** Sample Ref: **1** Sample Type: **D** Depth (m): **0.50**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	SILT			SAND			GRAVEL			

Test Sieve (mm)	Percent Passing (%)
125.0	**100**
75.0	**100**
63.0	**100**
37.5	**100**
20.0	**100**
10.0	**95**
6.30	**90**
3.35	**85**
2.00	**83**
1.18	**80**
0.600	**76**
0.425	**73**
0.212	**65**
0.150	**59**
0.063	**49**

Particle Diameter (mm)	Percent Passing (%)
0.02	**40**
0.006	**32**
0.002	**24**

Sedimentation sample was not pre-treated

Soil Fraction	Sieve Percentage (%)
GRAVEL	**17**
SAND	**34**
SILT	**25**
CLAY	**24**

Soil Description:

Brown slightly sandy slightly gravelly CLAY

STRUCTURAL SOILS
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Pottery Street
Castleford
W. Yorkshire WF10 1NJ

Compiled By		Date
M. Fisher	**MAUREEN FISHER**	**02/11/17**

Contract	Contract Ref:
M1 Junction 15 Roade Bypass	**782814**

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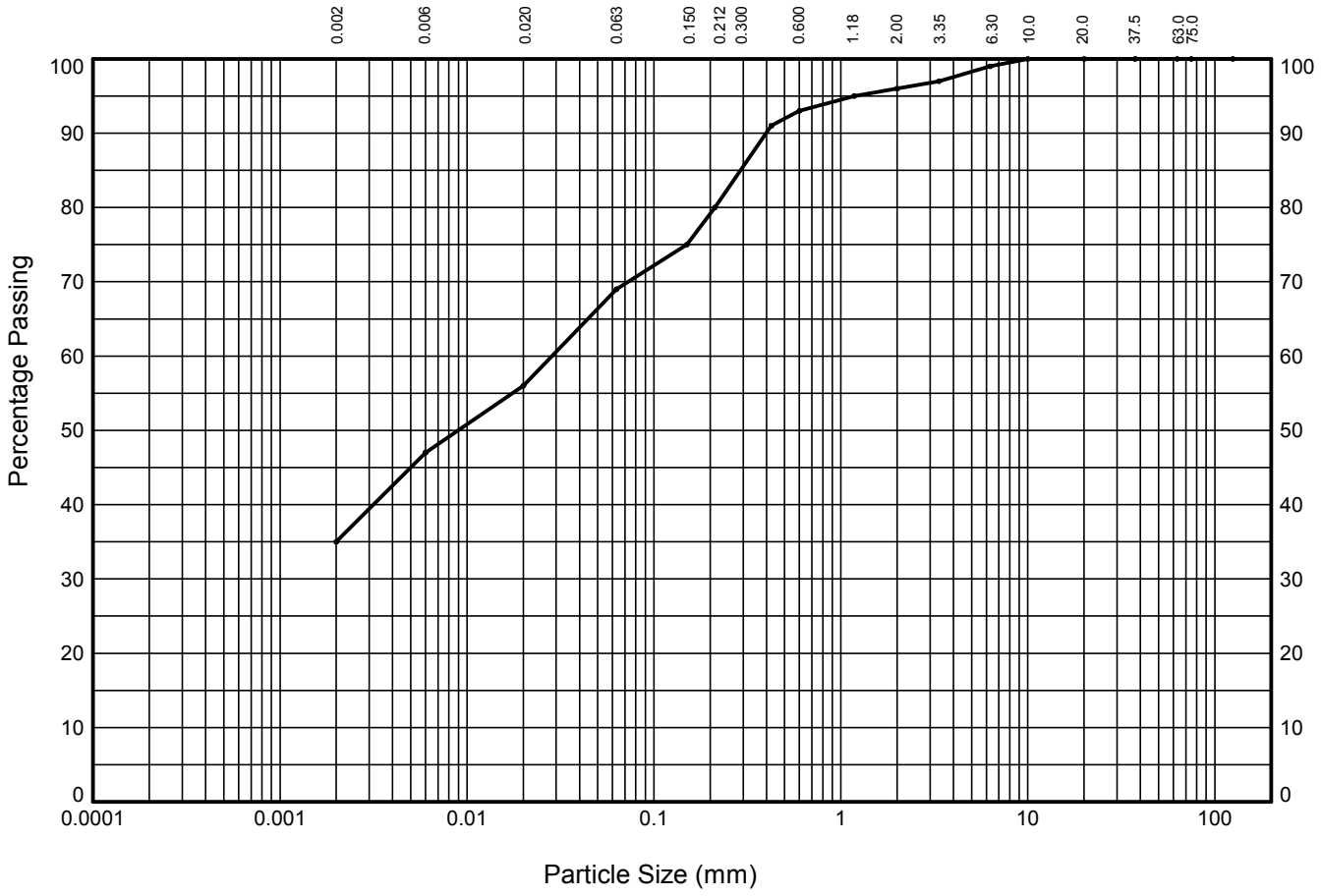
PARTICLE SIZE DISTRIBUTION TEST

In accordance with clauses 9.2, 9.5 of BS1377:Part 2:1990

Window Sample: **WS01** Sample Ref: **1** Sample Type: **B** Depth (m): **0.90**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	SILT			SAND			GRAVEL			

Test Sieve (mm)	Percent Passing (%)
125.0	**100**
75.0	**100**
63.0	**100**
37.5	**100**
20.0	**100**
10.0	**100**
6.30	**99**
3.35	**97**
2.00	**96**
1.18	**95**
0.600	**93**
0.425	**91**
0.212	**80**
0.150	**75**
0.063	**69**

Particle Diameter (mm)	Percent Passing (%)
0.02	**56**
0.006	**47**
0.002	**35**

Sedimentation sample was not pre-treated

Soil Fraction	Sieve Percentage (%)
GRAVEL	**4**
SAND	**27**
SILT	**34**
CLAY	**35**

Soil Description:

Dark brown slightly sandy slightly gravelly CLAY

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Contract	Contract Ref:
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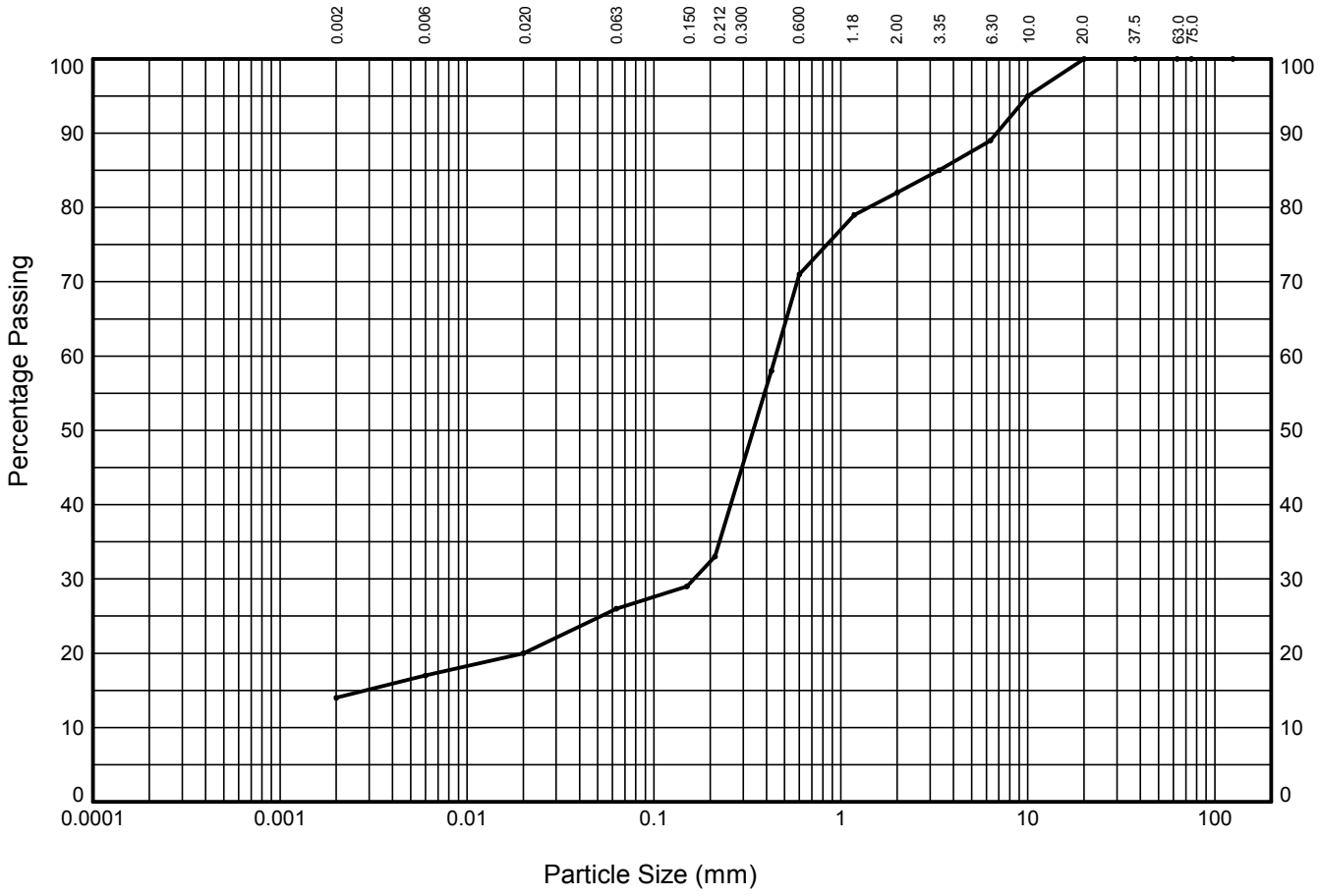
PARTICLE SIZE DISTRIBUTION TEST

In accordance with clauses 9.2, 9.5 of BS1377:Part 2:1990

Window Sample: **WS03** Sample Ref: **1** Sample Type: **B** Depth (m): **0.20**



CLAY	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	COBBLES
	SILT			SAND			GRAVEL			

Test Sieve (mm)	Percent Passing (%)
125.0	**100**
75.0	**100**
63.0	**100**
37.5	**100**
20.0	**100**
10.0	**95**
6.30	**89**
3.35	**85**
2.00	**82**
1.18	**79**
0.600	**71**
0.425	**58**
0.212	**33**
0.150	**29**
0.063	**26**

Particle Diameter (mm)	Percent Passing (%)
0.02	**20**
0.006	**17**
0.002	**14**

Sedimentation sample was not pre-treated

Soil Fraction	Sieve Percentage (%)
GRAVEL	**18**
SAND	**56**
SILT	**12**
CLAY	**14**

Soil Description:

Light brown sandy slightly gravelly CLAY

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Compiled By		Date
C Cole	**CATHERINE COLE**	**02/11/17**

Contract	Contract Ref:
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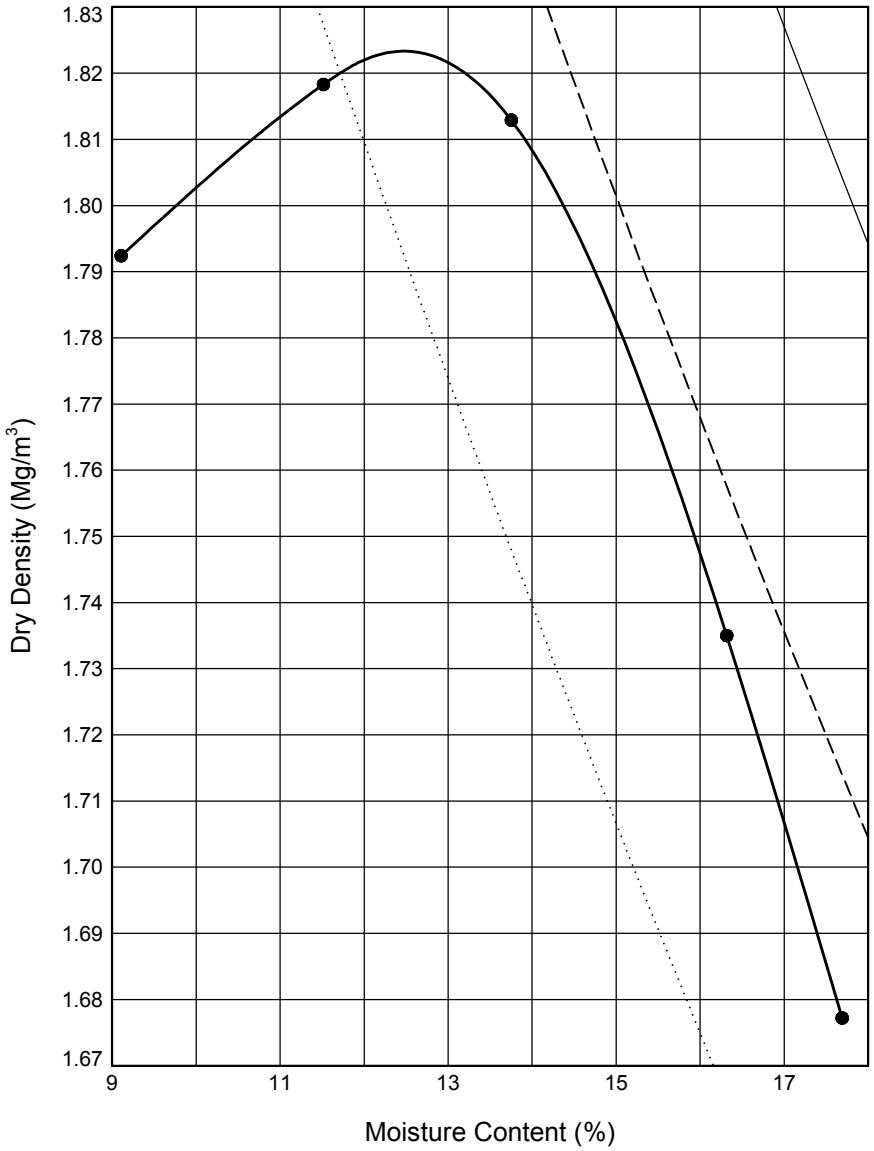
DRY DENSITY / MOISTURE CONTENT RELATIONSHIP TEST

In accordance with clauses 3.3,3.4,3.5,3.6,3.7 of BS1377:Part 4:1990

Trial Pit: **TP12** Sample Ref: **1** Sample Type: **B** Depth (m): **1.00**



Initial Sample Conditions		Test Details	Test Results
Initial Moisture Content (%) : **16**		Compaction Type : **Heavy**	Maximum Dry Density (Mg/m^3) : **1.82**
% Retained on 37.5mm BS Sieve : **0**		Mass of Rammer (kg): **4.5**	Optimum Moisture Content (%) : **13**
% Retained on 20.0mm BS Sieve : **0**		Type of Mould : **Proctor**	Method Used: **Clause 3.5**
Particle Density - assumed (Mg/m^3) : **2.65**			Remarks:
Size of Soil Pieces : **<20mm**		Separate samples were used.	

Sample Description	Key to Air Voids Lines		
Light brown very sandy slightly gravelly CLAY	——— 0%	– – – – 5%	····· 10%

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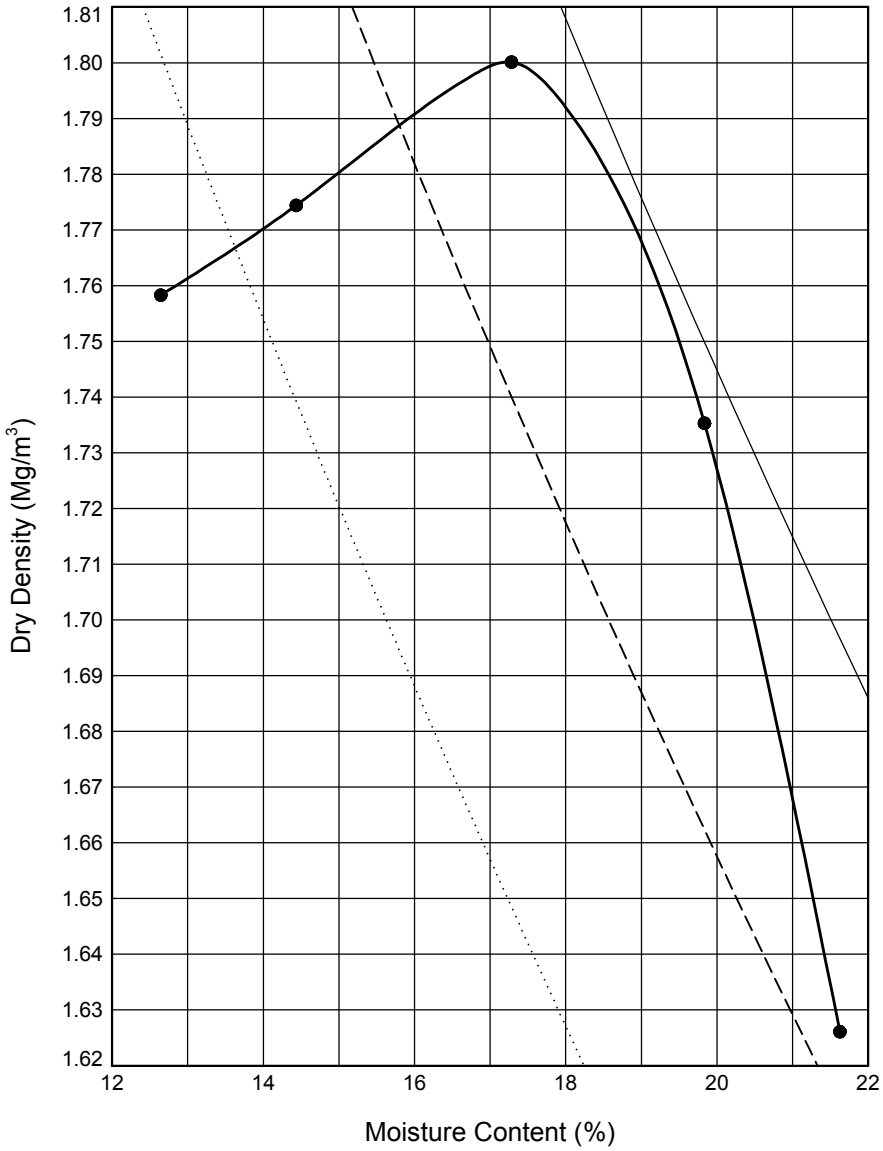
Contract Ref: **782814**

DRY DENSITY / MOISTURE CONTENT RELATIONSHIP TEST

In accordance with clauses 3.3,3.4,3.5,3.6,3.7 of BS1377:Part 4:1990

Trial Pit: **TP14** Sample Ref: **1** Sample Type: **B** Depth (m): **0.50**



Initial Sample Conditions			Test Details		Test Results		
Initial Moisture Content (%)	:	**13**	Compaction Type	: **Heavy**	Maximum Dry Density (Mg/m^3)	:	**1.80**
% Retained on 37.5mm BS Sieve	:	**0**	Mass of Rammer (kg):	**4.5**	Optimum Moisture Content (%)	:	**17**
% Retained on 20.0mm BS Sieve	:	**2**	Type of Mould	: **Proctor**	Method Used: **Clause 3.5**		
Particle Density - assumed (Mg/m^3)	:	**2.68**			Remarks:		
Size of Soil Pieces	:	**<20mm**	Separate samples were used.				

Sample Description	Key to Air Voids Lines		
Brown slightly sandy slightly gravelly CLAY	——— 0%	– – – – 5%	····· 10%

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Contract	Contract Ref:
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SUMMARY OF WATER CONTENT TESTS

RT08 Water Content of Rock (in accordance with ISRM 2007)

Exploratory Position ID	Sample Ref	Depth (m)	Sample Type	Water Content (%)	Lab	
BH02	**2**	**11.15**	**C**	**4.7**	**B**	

Lab location: B = Bristol (BS3 4AG), C = Castleford (WF10 1NJ), H = Hemel Hempstead (HP3 9RT), T = Tonbridge (TN11 9HU)

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Contract:	Contract Ref:
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DETERMINATION OF POINT LOAD STRENGTH

RT03 Point Load Testing (in accordance with ISRM 2007)

Exploratory Position ID	Depth (m)	Type of Test	Width or Length (W or L) (mm)	Platen Separation (D) (mm)	Failure Load (P) (kN)	Equivalent Diameter (D_e) (mm)	Point Load (I_s) (MN/m^2)	Size Factor (F)	Point Load Index ($I_{s(50)}$) (MN/m^2)	Water Content (%)	Rock Type	Lab location
BH01	9.00	D	50	90	0.260	90	0.03	1.30	0.04 (✓)	27	MUDSTONE	**B**
BH01	9.00	A	90	55	0.200	79	0.03	1.23	0.04 (✓)	27	MUDSTONE	**B**

Results

$I_s(50)$ Mean Axial tests = **0.04** MN/m^2
$I_s(50)$ Mean Diametral tests = **0.04** MN/m^2
$I_a(50)$ Strength Anisotropy Index = **1.07** (calculated from highest and lowest diametral and axial $I_s(50)$ ratio)
Note:Size Correction Factor (F) calculated using $F = (D_e/50)^{0.45}$ (where D_e is equivalent core diameter).

Key

Type of Test column:, A = Axial, D = Diametral, I = Irregular, B = Block, L = Parallel, P = Perpendicular, [NS] denotes Non-standard Test.
Point Load Index column: (✓) = included in mean calculations, (✗) = excluded from mean calculations
Lab location: B = Bristol (BS3 4AG), C = Castleford (WF10 1NJ), H = Hemel Hempstead (HP3 9RT), T = Tonbridge (TN11 9HU)

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DETERMINATION OF POINT LOAD STRENGTH

RT03 Point Load Testing (in accordance with ISRM 2007)

Exploratory Position ID	Depth (m)	Type of Test	Width or Length (W or L) (mm)	Platen Separation (D) (mm)	Failure Load (P) (kN)	Equivalent Diameter (D_e) (mm)	Point Load (I_s) (MN/m^2)	Size Factor (F)	Point Load Index ($I_{s(50)}$) (MN/m^2)	Water Content (%)	Rock Type	Lab location
BH01	11.83	D	80	87	2.095	87	0.28	1.28	0.36 (✓)	9.5	LIMESTONE	**B**
BH01	11.83	A	87	88	1.345	99	0.14	1.36	0.19 (✓)	9.5	LIMESTONE	**B**

Results

$I_s(50)$ Mean Axial tests = **0.19** MN/m^2
$I_s(50)$ Mean Diametral tests = **0.36** MN/m^2
$I_a(50)$ Strength Anisotropy Index = **1.9** (calculated from highest and lowest diametral and axial $I_s(50)$ ratio)
Note:Size Correction Factor (F) calculated using $F = (D_e/50)^{0.45}$ (where D_e is equivalent core diameter).

Key

Type of Test column:, A = Axial, D = Diametral, I = Irregular, B = Block, L = Parallel, P = Perpendicular, [NS] denotes Non-standard Test.
Point Load Index column: (✓) = included in mean calculations, (✗) = excluded from mean calculations
Lab location: B = Bristol (BS3 4AG), C = Castleford (WF10 1NJ), H = Hemel Hempstead (HP3 9RT), T = Tonbridge (TN11 9HU)

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DETERMINATION OF POINT LOAD STRENGTH

RT03 Point Load Testing (in accordance with ISRM 2007)

Exploratory Position ID	Depth (m)	Type of Test	Width or Length (W or L) (mm)	Platen Separation (D) (mm)	Failure Load (P) (kN)	Equivalent Diameter (D_e) (mm)	Point Load (I_s) (MN/m^2)	Size Factor (F)	Point Load Index ($I_{s(50)}$) (MN/m^2)	Water Content (%)	Rock Type	Lab location
BH01	14.80	D	105	88	5.130	88	0.66	1.29	0.85 (✓)	4.7	LIMESTONE	**B**
BH01	14.80	A	88	50	10.710	75	1.91	1.20	2.29 (✓)	4.7	LIMESTONE	**B**

Results

$I_s(50)$ Mean Axial tests = **2.29** MN/m^2
$I_s(50)$ Mean Diametral tests = **0.85** MN/m^2
$I_a(50)$ Strength Anisotropy Index = **2.68** (calculated from highest and lowest diametral and axial $I_s(50)$ ratio)
Note:Size Correction Factor (F) calculated using $F = (D_e/50)^{0.45}$ (where D_e is equivalent core diameter).

Key

Type of Test column:, A = Axial, D = Diametral, I = Irregular, B = Block, L = Parallel, P = Perpendicular, [NS] denotes Non-standard Test.
Point Load Index column: (✓) = included in mean calculations, (χ) = excluded from mean calculations
Lab location: B = Bristol (BS3 4AG), C = Castleford (WF10 1NJ), H = Hemel Hempstead (HP3 9RT), T = Tonbridge (TN11 9HU)

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DETERMINATION OF POINT LOAD STRENGTH

RT03 Point Load Testing (in accordance with ISRM 2007)

Exploratory Position ID	Depth (m)	Type of Test	Width or Length (W or L) (mm)	Platen Separation (D) (mm)	Failure Load (P) (kN)	Equivalent Diameter (D_e) (mm)	Point Load (I_s) (MN/m^2)	Size Factor (F)	Point Load Index ($I_{s(50)}$) (MN/m^2)	Water Content (%)	Rock Type	Lab location
BH01	16.70	D	65	88	1.315	88	0.17	1.29	0.22 (✓)	7.3	LIMESTONE	**B**
BH01	16.70	A	88	68	0.980	87	0.13	1.28	0.17 (✓)	7.3	LIMESTONE	**B**

Results

$I_s(50)$ Mean Axial tests = **0.17** MN/m^2
$I_s(50)$ Mean Diametral tests = **0.22** MN/m^2
$I_a(50)$ Strength Anisotropy Index = **1.33** (calculated from highest and lowest diametral and axial $I_s(50)$ ratio)
Note:Size Correction Factor (F) calculated using $F = (D_e/50)^{0.45}$ (where D_e is equivalent core diameter).

Key

Type of Test column:, A = Axial, D = Diametral, I = Irregular, B = Block, L = Parallel, P = Perpendicular, [NS] denotes Non-standard Test.
Point Load Index column: (✓) = included in mean calculations, (χ) = excluded from mean calculations
Lab location: B = Bristol (BS3 4AG), C = Castleford (WF10 1NJ), H = Hemel Hempstead (HP3 9RT), T = Tonbridge (TN11 9HU)

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DETERMINATION OF POINT LOAD STRENGTH

RT03 Point Load Testing (in accordance with ISRM 2007)

Exploratory Position ID	Depth (m)	Type of Test	Width or Length (W or L) (mm)	Platen Separation (D) (mm)	Failure Load (P) (kN)	Equivalent Diameter (D_e) (mm)	Point Load (I_s) (MN/m^2)	Size Factor (F)	Point Load Index ($I_{s(50)}$) (MN/m^2)	Water Content (%)	Rock Type	Lab location
BH01	23.80	D	95	87	15.510	87	2.05	1.28	2.63 (✓)	1.7	LIMESTONE	**B**
BH01	23.80	A	87	84	24.815	96	2.67	1.34	3.58 (✓)	1.7	LIMESTONE	**B**

Results

$I_s(50)$ Mean Axial tests = **3.58** MN/m^2
$I_s(50)$ Mean Diametral tests = **2.63** MN/m^2
$I_a(50)$ Strength Anisotropy Index = **1.36** (calculated from highest and lowest diametral and axial $I_s(50)$ ratio)
Note:Size Correction Factor (F) calculated using $F = (D_e/50)^{0.45}$ (where D_e is equivalent core diameter).

Key

Type of Test column:, A = Axial, D = Diametral, I = Irregular, B = Block, L = Parallel, P = Perpendicular, [NS] denotes Non-standard Test.
Point Load Index column: (✓) = included in mean calculations, (χ) = excluded from mean calculations
Lab location: B = Bristol (BS3 4AG), C = Castleford (WF10 1NJ), H = Hemel Hempstead (HP3 9RT), T = Tonbridge (TN11 9HU)

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DETERMINATION OF POINT LOAD STRENGTH

RT03 Point Load Testing (in accordance with ISRM 2007)

Exploratory Position ID	Depth (m)	Type of Test	Width or Length (W or L) (mm)	Platen Separation (D) (mm)	Failure Load (P) (kN)	Equivalent Diameter (D_e) (mm)	Point Load (I_s) (MN/m^2)	Size Factor (F)	Point Load Index ($I_{s(50)}$) (MN/m^2)	Water Content (%)	Rock Type	Lab location
BH02	16.00	D	100	87	22.560	87	2.98	1.28	3.82 (✓)	2.0	LIMESTONE	**B**
BH02	16.00	A	87	105	25.935	108	2.23	1.41	3.15 (✓)	2.0	LIMESTONE	**B**

Results

$I_s(50)$ Mean Axial tests = **3.15** MN/m^2
$I_s(50)$ Mean Diametral tests = **3.82** MN/m^2
$I_a(50)$ Strength Anisotropy Index = **1.21** (calculated from highest and lowest diametral and axial $I_s(50)$ ratio)
Note:Size Correction Factor (F) calculated using $F = (D_e/50)^{0.45}$ (where D_e is equivalent core diameter).

Key

Type of Test column:, A = Axial, D = Diametral, I = Irregular, B = Block, L = Parallel, P = Perpendicular, [NS] denotes Non-standard Test.
Point Load Index column: (✓) = included in mean calculations, (χ) = excluded from mean calculations
Lab location: B = Bristol (BS3 4AG), C = Castleford (WF10 1NJ), H = Hemel Hempstead (HP3 9RT), T = Tonbridge (TN11 9HU)

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DETERMINATION OF POINT LOAD STRENGTH

RT03 Point Load Testing (in accordance with ISRM 2007)

Exploratory Position ID	Depth (m)	Type of Test	Width or Length (W or L) (mm)	Platen Separation (D) (mm)	Failure Load (P) (kN)	Equivalent Diameter (D_e) (mm)	Point Load (I_s) (MN/m^2)	Size Factor (F)	Point Load Index ($I_{s(50)}$) (MN/m^2)	Water Content (%)	Rock Type	Lab location
BH02	18.30	D	78	87	1.330	87	0.18	1.28	0.23 (✓)	6.6	LIMESTONE	**B**
BH02	18.30	A	87	74	1.990	91	0.24	1.31	0.32 (✓)	6.6	LIMESTONE	**B**

Results

$I_s(50)$ Mean Axial tests = **0.32** MN/m^2
$I_s(50)$ Mean Diametral tests = **0.23** MN/m^2
$I_a(50)$ Strength Anisotropy Index = **1.41** (calculated from highest and lowest diametral and axial $I_s(50)$ ratio)
Note:Size Correction Factor (F) calculated using $F = (D_e/50)^{0.45}$ (where D_e is equivalent core diameter).

Key

Type of Test column:, A = Axial, D = Diametral, I = Irregular, B = Block, L = Parallel, P = Perpendicular, [NS] denotes Non-standard Test.
Point Load Index column: (✓) = included in mean calculations, (χ) = excluded from mean calculations
Lab location: B = Bristol (BS3 4AG), C = Castleford (WF10 1NJ), H = Hemel Hempstead (HP3 9RT), T = Tonbridge (TN11 9HU)

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DETERMINATION OF POINT LOAD STRENGTH

RT03 Point Load Testing (in accordance with ISRM 2007)

Exploratory Position ID	Depth (m)	Type of Test	Width or Length (W or L) (mm)	Platen Separation (D) (mm)	Failure Load (P) (kN)	Equivalent Diameter (D_e) (mm)	Point Load (I_s) (MN/m^2)	Size Factor (F)	Point Load Index ($I_{s(50)}$) (MN/m^2)	Water Content (%)	Rock Type	Lab location
BH02	22.17	D	100	87	0.635	87	0.08	1.28	0.11 (✓)	13	LIMESTONE	**B**
BH02	22.17	A	87	44	0.705	70	0.14	1.16	0.17 (✓)	13	LIMESTONE	**B**

Results

$I_s(50)$ Mean Axial tests = **0.17** MN/m^2
$I_s(50)$ Mean Diametral tests = **0.11** MN/m^2
$I_a(50)$ Strength Anisotropy Index = **1.56** (calculated from highest and lowest diametral and axial $I_s(50)$ ratio)
Note:Size Correction Factor (F) calculated using $F = (D_e/50)^{0.45}$ (where D_e is equivalent core diameter).

Key

Type of Test column:, A = Axial, D = Diametral, I = Irregular, B = Block, L = Parallel, P = Perpendicular, [NS] denotes Non-standard Test.
Point Load Index column: (✓) = included in mean calculations, (χ) = excluded from mean calculations
Lab location: B = Bristol (BS3 4AG), C = Castleford (WF10 1NJ), H = Hemel Hempstead (HP3 9RT), T = Tonbridge (TN11 9HU)

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Contract Ref: **782814**

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DETERMINATION OF POINT LOAD STRENGTH

RT03 Point Load Testing (in accordance with ISRM 2007)

Exploratory Position ID	Depth (m)	Type of Test	Width or Length (W or L) (mm)	Platen Separation (D) (mm)	Failure Load (P) (kN)	Equivalent Diameter (D_e) (mm)	Point Load (I_s) (MN/m^2)	Size Factor (F)	Point Load Index ($I_{s(50)}$) (MN/m^2)	Water Content (%)	Rock Type	Lab location
BH02	25.05	D	85	87	1.470	87	0.19	1.28	0.25 (✓)	10	LIMESTONE	**B**
BH02	25.05	A	87	64	1.160	84	0.16	1.26	0.21 (✓)	10	LIMESTONE	**B**

Results

$I_s(50)$ Mean Axial tests = **0.21** MN/m^2
$I_s(50)$ Mean Diametral tests = **0.25** MN/m^2
$I_a(50)$ Strength Anisotropy Index = **1.2** (calculated from highest and lowest diametral and axial $I_s(50)$ ratio)
Note:Size Correction Factor (F) calculated using $F = (D_e/50)^{0.45}$ (where D_e is equivalent core diameter).

Key

Type of Test column:, A = Axial, D = Diametral, I = Irregular, B = Block, L = Parallel, P = Perpendicular, [NS] denotes Non-standard Test.
Point Load Index column: (✓) = included in mean calculations, (χ) = excluded from mean calculations
Lab location: B = Bristol (BS3 4AG), C = Castleford (WF10 1NJ), H = Hemel Hempstead (HP3 9RT), T = Tonbridge (TN11 9HU)

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Contract Ref: **782814**

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DETERMINATION OF POINT LOAD STRENGTH

RT03 Point Load Testing (in accordance with ISRM 2007)

Exploratory Position ID	Depth (m)	Type of Test	Width or Length (W or L) (mm)	Platen Separation (D) (mm)	Failure Load (P) (kN)	Equivalent Diameter (D_e) (mm)	Point Load (I_s) (MN/m^2)	Size Factor (F)	Point Load Index ($I_{s(50)}$) (MN/m^2)	Water Content (%)	Rock Type	Lab location
BH02	29.10	D	95	88	1.075	88	0.14	1.29	0.18 (✓)	8.3	MUDSTONE	**B**
BH02	29.10	A	88	77	0.585	93	0.07	1.32	0.09 (✓)	8.3	MUDSTONE	**B**

Results

$I_s(50)$ Mean Axial tests = **0.09** MN/m^2
$I_s(50)$ Mean Diametral tests = **0.18** MN/m^2
$I_a(50)$ Strength Anisotropy Index = **2** (calculated from highest and lowest diametral and axial $I_s(50)$ ratio)
Note:Size Correction Factor (F) calculated using $F = (D_e/50)^{0.45}$ (where D_e is equivalent core diameter).

Key

Type of Test column:, A = Axial, D = Diametral, I = Irregular, B = Block, L = Parallel, P = Perpendicular, [NS] denotes Non-standard Test.
Point Load Index column: (✓) = included in mean calculations, (χ) = excluded from mean calculations
Lab location: B = Bristol (BS3 4AG), C = Castleford (WF10 1NJ), H = Hemel Hempstead (HP3 9RT), T = Tonbridge (TN11 9HU)

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Contract: **Roade Bypass 313583**			

UNCONFINED COMPRESSIVE STRENGTH

RT05 UCS of Rock-Sample Preparation (In-house method based on ASTM D4543-08 and Eurocode 7 Part 2 W.1.1)
RT06 UCS of Rock (In-house method based on ISRM 2007, ASTM D4543-08 and Eurocode 7 Part 2 W.1.1)

Borehole: **BH01** Sample Ref: **4** Sample Type: **C** Depth (m): **14.80**

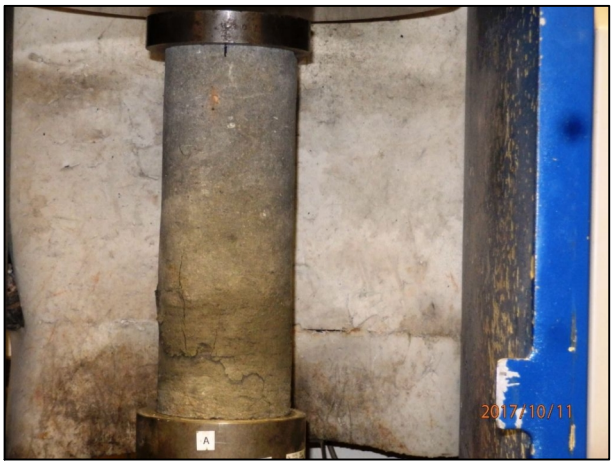
Bulk Density (Mg/m^3): **2.48** Dry Density (Mg/m^3): **2.37** Moisture Content (%): **4.7**
Length (mm): **234.73** Diameter (mm): **86.25** Length/Diameter Ratio: **2.72**
Test Duration (mins:secs): **3:42** Stress Rate (kN/min): **12** Load at Failure (kN): **35.0**
UCS (MPa): **6.0** Failure Type: **Axial cleavage**

Note: **Axis of loading parallel to core axis**
Description: **Grey LIMESTONE**
Specimen Preparation: **Specimen was not recored.**
Sample tolerance checks: Straightness: **FAIL**. Flatness: **PASS**. Perpendicularity: **PASS**.

Front view (pre-test)

Rear view (pre-test)

Front view (post-test)



Rear view (post-test)

Samples delivered from site to storage facility. Samples are stored in a frost free environment, at temperatures >4°C
Compression machine: Impact CT340 2000kN Auto Compression Machine Serial No. CT340-22. SSL No. 011076

STRUCTURAL SOILS
1a Princess Street
Bedminster
Bristol
BS3 4AG

Compiled By		Date
	EMY HOWARD	01/11/17
Contract: **Roade Bypass 313583**	Job No: **782814**	

UNCONFINED COMPRESSIVE STRENGTH

RT05 UCS of Rock-Sample Preparation (In-house method based on ASTM D4543-08 and Eurocode 7 Part 2 W.1.1)
RT06 UCS of Rock (In-house method based on ISRM 2007, ASTM D4543-08 and Eurocode 7 Part 2 W.1.1)

Borehole: **BH02** Sample Ref: **3** Sample Type: **C** Depth (m): **12.27**

Bulk Density (Mg/m^3): **2.49** Dry Density (Mg/m^3): **2.37** Moisture Content (%): **5.0**
Length (mm): **222.08** Diameter (mm): **86.06** Length/Diameter Ratio: **2.58**
Test Duration (mins:secs): **6:58** Stress Rate (kN/min): **12** Load at Failure (kN): **160.6**
UCS (MPa): **27.6** Failure Type: **Axial cleavage**

Note: **Axis of loading parallel to core axis**
Description: **Grey LIMESTONE**
Specimen Preparation: **Specimen was not recored.**
Sample tolerance checks: Straightness: **FAIL**. Flatness: **PASS**. Perpendicularity: **PASS**.

Front view (pre-test)

Rear view (pre-test)

Front view (post-test)

Rear view (post-test)

Samples delivered from site to storage facility. Samples are stored in a frost free environment, at temperatures >4°C
Compression machine: Impact CT340 2000kN Auto Compression Machine Serial No. CT340-22. SSL No. 011076

STRUCTURAL SOILS
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Compiled By		Date
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Contract	Job No
Roade Bypass 313583	782814

SUMMARY OF CHEMICAL ANALYSES

Exploratory Position ID	Sample Ref	Sample Type	Depth (m)	Acid Soluble Sulphate (% SO_4)	Aqueous Extract Sulphate (mg/l SO_4)	pH	Total Sulphur (%)	Description
BH01	1	C	9.00	0.06	290	9.04	0.70	Dark brownish grey MUDSTONE
BH01	4	C	14.80	0.41	652	6.63	1.44	Grey LIMESTONE
BH02	3	C	12.27	0.19	239	7.44	0.13	Grey LIMESTONE
BH02	7	C	18.30	0.20	158	8.29	0.70	Grey LIMESTONE
BH03	1	C	14.02	0.42	530	7.85	1.39	Grey MUDSTONE
BH04	1	C	12.00	0.23	260	8.25	0.54	Grey MUDSTONE
BH05	1	C	12.30	0.03	119	8.35	0.40	Grey MUDSTONE

NOTES:- Chemical tests were undertaken by Envirolab

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AGS

APPENDIX L
GAS AND GROUNDWATER MONITORING RESULTS

IN-SITU WATER MONITORING RESULTS

	Weather	Ground Conditions	Wind Conditions	Air Temperature (°C)	Equipment Used & Remarks
Round 2	Cloudy	Damp	Medium	12	GA5000 + Dipmeter

Exploratory Position ID	Pipe Ref	Pipe Diameter	Monitoring Round / Test Number	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring	Water Depth (mbgl)	pH	Redox (mV)	Conduc-tivity (uS/cm)	Temp-erature (°C)	Dissolved Oxygen (mg/l)	Remarks
BH01	1	50	2 / 1	20.00	19.50	10.00 to 20.00	05/10/2017 10:01	17.17	9.00	318	4379	11.2	4.2	General Remarks: Samples taken.
BH02	1	50	2 / 1	30.00	29.02	20.00 to 30.00	05/10/2017 09:20	20.15	7.84	306	1650	11.2	3.7	General Remarks: Samples taken, cloudy grey and no odour.
BH04	1	50	2 / 1	11.00	10.87	7.00 to 11.00	06/10/2017	9.92	---	---	---	---	---	General Remarks: Samples taken but well ran dry before readings could be taken.
BH05	1	50	2 / 1	12.00	9.78	8.00 to 12.00	05/10/2017 13:40	6.92	7.84	274	2338	12.0	4.1	General Remarks: Samples taken, very cloudy grey and no odour.
WS02	1	50	2 / 1	5.00	5.00	3.00 to 5.00	05/10/2017 10:50	2.77	---	---	---	---	---	General Remarks: Samples taken, started off clear but became cloudier and no odour. Unable to take readings due to slow recharge.
WS10	1	50	2 / 1	4.00	4.04	2.00 to 4.00	05/10/2017 15:30	3.22	---	---	---	---	---	General Remarks: Samples taken, clear and no odour. Unable to take readings due to well running dry.

Key: NDA denotes 'no data available'.

RSK Environment Ltd
Abbey Park
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CV3 4AQ

Compiled By	Date	Checked By	Date	Contract Ref:
	02/11/17			313583

Contract: **Roade Bypass**

IN-SITU GAS MONITORING RESULTS

[Pressures]	Previous	During	Start	End	Equipment Used & Remarks
Round 1	-	Fluctuating	1004	1003	Weather: Cloudy + Ground: Wet + Wind: Light + Air Temp: 15DegC
Round 2	-	Fluctuating	1001	1003	GA5000 + Dipmeter + Weather: Cloudy + Ground: Damp + Wind: Medium + Air Temp: 12DegC
Round 3	-	Rising	1007	1009	Weather: Clear + Ground: Dry + Wind: Light + Air Temp: 15DegC
Round 4	-	Fluctuating	1002	993	

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
BH01	1	50	1	20.00	---	10.00 to 20.00	28/09/2017 09:05:00	1001	1001	$-0.1_{(I)}$	-	-	-	-	-	-	-
BH01	1	50	1		---	10.00 to 20.00	30 secs	-	-	$-0.1_{(SS)}$	-	-	-	-	-	-	-
BH01	1	50	1 (2)	20.00	---	10.00 to 20.00	28/09/2017 09:06:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0
BH01	1	50	1 (2)		---	10.00 to 20.00	15 secs	-	-	-	-	0.1	0.0	21.0	0.0	1	0
BH01	1	50	1 (2)		---	10.00 to 20.00	30 secs	-	-	-	-	0.1	0.0	21.0	0.0	1	0
BH01	1	50	1 (2)		---	10.00 to 20.00	60 secs	-	-	-	-	0.1	0.0	21.0	0.0	1	0
BH01	1	50	1 (2)		---	10.00 to 20.00	90 secs	-	-	-	-	0.1	0.0	20.9	0.0	1	0
BH01	1	50	1 (2)		---	10.00 to 20.00	120 secs	-	-	-	-	0.1	0.0	21.0	0.0	1	0
BH01	1	50	1 (2)		---	10.00 to 20.00	180 secs	-	-	-	-	0.1	0.0	21.0	0.0	1	0
BH01	1	50	1 (2)		---	10.00 to 20.00	240 secs	-	-	-	-	0.1	0.0	21.0	0.0	1	0
BH01	1	50	1 (2)		---	10.00 to 20.00	300 secs	-	-	-	-	0.1	0.0	20.9	0.0	1	0
BH01	1	50	1 (3)	20.00	19.62	10.00 to 20.00	28/09/2017 09:12:00	-	-	-	16.53	-	-	-	-	-	-
BH01	1	50	2	20.00	---	10.00 to 20.00	05/10/2017 09:52:00	1001	999	$0.0_{(I)}$	-	-	-	-	-	-	-
BH01	1	50	2		---	10.00 to 20.00	30 secs	-	-	$0.0_{(SS)}$	-	-	-	-	-	-	-
BH01	1	50	2 (2)	20.00	---	10.00 to 20.00	05/10/2017 09:53:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0
BH01	1	50	2 (2)		---	10.00 to 20.00	15 secs	-	-	-	-	0.1	0.0	20.9	0.0	0	0
BH01	1	50	2 (2)		---	10.00 to 20.00	30 secs	-	-	-	-	0.1	0.0	20.9	0.0	0	0
BH01	1	50	2 (2)		---	10.00 to 20.00	60 secs	-	-	-	-	0.1	0.0	20.9	0.0	0	0

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

RSK Environment Ltd
Abbey Park
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Coventry
CV3 4AQ

Compiled By	Date	Checked By	Date	Contract Ref:
MDStrange	26/10/17			313583

Contract: **Roade Bypass**

IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
BH01	1	50	2 (2)		---	10.00 to 20.00	90 secs	-	-	-	-	0.1	0.0	20.9	0.0	0	0
BH01	1	50	2 (2)		---	10.00 to 20.00	120 secs	-	-	-	-	0.1	0.0	20.9	0.0	0	0
BH01	1	50	2 (2)		---	10.00 to 20.00	180 secs	-	-	-	-	0.1	0.0	21.0	0.0	0	0
BH01	1	50	2 (2)		---	10.00 to 20.00	240 secs	-	-	-	-	0.1	0.0	21.0	0.0	0	0
BH01	1	50	2 (2)		---	10.00 to 20.00	300 secs	-	-	-	-	0.1	0.0	21.0	0.0	0	0
BH01	1	50	2 (3)	20.00	19.50	10.00 to 20.00	05/10/2017 09:59:00	-	-	-	17.17	-	-	-	-	-	-
BH01	1	50	3	20.00	---	10.00 to 20.00	13/10/2017 09:55:00	-	-	$0.0_{(I)}$	-	-	-	-	-	-	-
BH01	1	50	3		---	10.00 to 20.00	30 secs	-	-	$0.0_{(SS)}$	-	-	-	-	-	-	-
BH01	1	50	3 (2)	20.00	---	10.00 to 20.00	13/10/2017 09:56:00	-	-	-	-	0.1	0.0	20.9	-	0	0
BH01	1	50	3 (2)		---	10.00 to 20.00	60 secs	-	-	-	-	0.1	0.0	20.9	-	0	0
BH01	1	50	3 (2)		---	10.00 to 20.00	90 secs	-	-	-	-	0.1	0.0	20.9	-	0	0
BH01	1	50	3 (2)		---	10.00 to 20.00	120 secs	-	-	-	-	0.1	0.0	20.9	-	0	0
BH01	1	50	3 (2)		---	10.00 to 20.00	150 secs	-	-	-	-	0.1	0.0	20.9	-	0	0
BH01	1	50	3 (2)		---	10.00 to 20.00	240 secs	-	-	-	-	0.1	0.0	20.9	-	0	0
BH01	1	50	3 (2)		---	10.00 to 20.00	255 secs	-	-	-	-	0.1	0.0	20.9	-	0	0
BH01	1	50	3 (2)		---	10.00 to 20.00	270 secs	-	-	-	-	0.1	0.0	20.9	-	0	0
BH01	1	50	3 (3)	20.00	19.50	10.00 to 20.00	13/10/2017 10:00:45	-	-	-	17.37	-	-	-	-	-	-
BH01	1	50	4	20.00	---	10.00 to 20.00	19/10/2017 10:21:00	-	-	$0.2_{(I)}$	-	-	-	-	-	-	-

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Compiled By	Date	Checked By	Date	Contract Ref:
MDStrange	26/10/17			313583

Contract: **Roade Bypass**

IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
BH01	1	50	4		---	10.00 to 20.00	15 secs	-	-	$0.1_{(SS)}$	-	-	-	-	-	-	-
BH01	1	50	4 (2)	20.00	---	10.00 to 20.00	19/10/2017 10:21:30	-	-	-	-	0.1	0.0	20.9	-	0	0
BH01	1	50	4 (2)		---	10.00 to 20.00	30 secs	-	-	-	-	0.2	0.0	20.7	-	0	0
BH01	1	50	4 (2)		---	10.00 to 20.00	90 secs	-	-	-	-	0.1	0.0	20.7	-	0	0
BH01	1	50	4 (2)		---	10.00 to 20.00	120 secs	-	-	-	-	0.1	0.0	20.8	-	0	0
BH01	1	50	4 (2)		---	10.00 to 20.00	150 secs	-	-	-	-	0.1	0.0	20.8	-	0	0
BH01	1	50	4 (2)		---	10.00 to 20.00	180 secs	-	-	-	-	0.1	0.0	20.8	-	0	0
BH01	1	50	4 (2)		---	10.00 to 20.00	210 secs	-	-	-	-	0.1	0.0	20.8	-	0	0
BH01	1	50	4 (2)		---	10.00 to 20.00	270 secs	-	-	-	-	0.1	0.0	20.8	-	0	0
BH01	1	50	4 (2)		---	10.00 to 20.00	330 secs	-	-	-	-	0.1	0.0	20.8	-	0	0
BH01	1	50	4 (3)	20.00	19.50	10.00 to 20.00	19/10/2017 10:32:00	-	-	-	17.45	-	-	-	-	-	-
BH02	1	50	1	30.00	---	20.00 to 30.00	28/09/2017	1003	1003	$0.0_{(I)}$	-	-	-	-	-	-	-
BH02	1	50	1		---	20.00 to 30.00	30 secs	-	-	$0.0_{(SS)}$	-	-	-	-	-	-	-
BH02	1	50	1 (2)	30.00	---	20.00 to 30.00	28/09/2017 00:01:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0
BH02	1	50	1 (2)		---	20.00 to 30.00	15 secs	-	-	-	-	0.2	0.0	20.6	0.0	1	0
BH02	1	50	1 (2)		---	20.00 to 30.00	30 secs	-	-	-	-	0.1	0.0	20.4	0.0	1	0
BH02	1	50	1 (2)		---	20.00 to 30.00	60 secs	-	-	-	-	0.1	0.0	20.4	0.0	2	0

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
BH02	1	50	1 (2)		---	20.00 to 30.00	90 secs	-	-	-	-	0.1	0.0	20.3	0.0	2	0
BH02	1	50	1 (2)		---	20.00 to 30.00	120 secs	-	-	-	-	0.1	0.0	20.3	0.0	2	0
BH02	1	50	1 (2)		---	20.00 to 30.00	180 secs	-	-	-	-	0.1	0.0	20.2	0.0	2	0
BH02	1	50	1 (2)		---	20.00 to 30.00	240 secs	-	-	-	-	0.1	0.0	20.2	0.0	2	0
BH02	1	50	1 (2)		---	20.00 to 30.00	300 secs	-	-	-	-	0.1	0.0	20.1	0.0	2	0
BH02	1	50	1 (3)	30.00	29.10	20.00 to 30.00	28/09/2017 00:07:00	-	-	-	20.21	-	-	-	-	-	-
BH02	1	50	2	30.00	---	20.00 to 30.00	05/10/2017 09:00:00	1003	1003	$0.0_{(I)}$	-	-	-	-	-	-	-
BH02	1	50	2		---	20.00 to 30.00	30 secs	-	-	$0.0_{(SS)}$	-	-	-	-	-	-	-
BH02	1	50	2 (2)	30.00	---	20.00 to 30.00	05/10/2017 09:01:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0
BH02	1	50	2 (2)		---	20.00 to 30.00	15 secs	-	-	-	-	0.1	0.0	20.6	0.0	1	0
BH02	1	50	2 (2)		---	20.00 to 30.00	30 secs	-	-	-	-	0.1	0.0	20.4	0.0	1	0
BH02	1	50	2 (2)		---	20.00 to 30.00	60 secs	-	-	-	-	0.1	0.0	20.4	0.0	1	0
BH02	1	50	2 (2)		---	20.00 to 30.00	90 secs	-	-	-	-	0.1	0.0	20.4	0.0	1	0
BH02	1	50	2 (2)		---	20.00 to 30.00	120 secs	-	-	-	-	0.1	0.0	20.4	0.0	1	0
BH02	1	50	2 (2)		---	20.00 to 30.00	180 secs	-	-	-	-	0.1	0.0	20.3	0.0	1	0
BH02	1	50	2 (2)		---	20.00 to 30.00	240 secs	-	-	-	-	0.1	0.0	20.2	0.0	1	0
BH02	1	50	2 (2)		---	20.00 to 30.00	300 secs	-	-	-	-	0.1	0.0	20.2	0.0	1	0
BH02	1	50	2 (3)	30.00	29.02	20.00 to 30.00	05/10/2017 09:07:00	-	-	-	20.15	-	-	-	-	-	-

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

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Abbey Park
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Coventry
CV3 4AQ

Compiled By	Date	Checked By	Date	Contract Ref:
MDStrange	26/10/17			313583

Contract: **Roade Bypass**

IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
BH02	1	50	3	30.00	---	20.00 to 30.00	13/10/2017 09:45:00	1007	1007	0.1 (I)	-	-	-	-	-	-	-
BH02	1	50	3		---	20.00 to 30.00	30 secs	-	-	0.1 (SS)	-	-	-	-	-	-	-
BH02	1	50	3 (2)	30.00	---	20.00 to 30.00	13/10/2017 09:46:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0
BH02	1	50	3 (2)		---	20.00 to 30.00	15 secs	-	-	-	-	0.4	0.0	19.5	0.0	1	0
BH02	1	50	3 (2)		---	20.00 to 30.00	30 secs	-	-	-	-	0.4	0.0	18.2	0.0	1	0
BH02	1	50	3 (2)		---	20.00 to 30.00	60 secs	-	-	-	-	0.4	0.0	18.4	0.0	1	0
BH02	1	50	3 (2)		---	20.00 to 30.00	93 secs	-	-	-	-	0.4	0.0	18.7	0.0	1	0
BH02	1	50	3 (2)		---	20.00 to 30.00	120 secs	-	-	-	-	0.4	0.0	18.8	0.0	1	0
BH02	1	50	3 (2)		---	20.00 to 30.00	180 secs	-	-	-	-	0.3	0.0	19.4	0.0	1	0
BH02	1	50	3 (2)		---	20.00 to 30.00	240 secs	-	-	-	-	0.2	0.0	19.7	0.0	1	0
BH02	1	50	3 (2)		---	20.00 to 30.00	300 secs	-	-	-	-	0.2	0.0	20.0	0.0	1	0
BH02	1	50	3 (3)	30.00	28.90	20.00 to 30.00	13/10/2017 09:52:00	-	-	-	20.15	-	-	-	-	-	-
BH02	1	50	4	30.00	---	20.00 to 30.00	19/10/2017 09:58:00	993	993	0.0 (I)	-	-	-	-	-	-	-
BH02	1	50	4		---	20.00 to 30.00	15 secs	-	-	0.0 (SS)	-	-	-	-	-	-	-
BH02	1	50	4 (2)	30.00	---	20.00 to 30.00	19/10/2017 09:58:30	-	-	-	-	0.1	0.0	20.1	-	0	0
BH02	1	50	4 (2)		---	20.00 to 30.00	30 secs	-	-	-	-	0.3	0.0	19.7	-	0	0
BH02	1	50	4 (2)		---	20.00 to 30.00	60 secs	-	-	-	-	0.4	0.0	16.9	-	0	0
BH02	1	50	4 (2)		---	20.00 to 30.00	90 secs	-	-	-	-	0.3	0.0	16.8	-	0	0

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
BH02	1	50	4 (2)		---	20.00 to 30.00	120 secs	-	-	-	-	0.3	0.0	17.8	-	0	0
BH02	1	50	4 (2)		---	20.00 to 30.00	150 secs	-	-	-	-	0.3	0.0	18.0	-	0	0
BH02	1	50	4 (2)		---	20.00 to 30.00	210 secs	-	-	-	-	0.3	0.0	18.2	-	0	0
BH02	1	50	4 (2)		---	20.00 to 30.00	270 secs	-	-	-	-	0.3	0.0	18.5	-	0	0
BH02	1	50	4 (2)		---	20.00 to 30.00	330 secs	-	-	-	-	0.2	0.0	18.7	-	0	0
BH02	1	50	4 (3)	30.00	28.85	20.00 to 30.00	19/10/2017 10:07:00	-	-	-	20.12	-	-	-	-	-	-
BH03	1	50	1	15.00	---	8.00 to 15.00	28/09/2017 10:11:00	1004	1004	$0.0_{(I)}$	-	-	-	-	-	-	-
BH03	1	50	1		---	8.00 to 15.00	30 secs	-	-	$0.0_{(SS)}$	-	-	-	-	-	-	-
BH03	1	50	1 (2)	15.00	---	8.00 to 15.00	28/09/2017 10:12:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0
BH03	1	50	1 (2)		---	8.00 to 15.00	15 secs	-	-	-	-	0.2	0.0	20.2	0.0	10	0
BH03	1	50	1 (2)		---	8.00 to 15.00	30 secs	-	-	-	-	0.3	0.0	19.1	0.0	10	0
BH03	1	50	1 (2)		---	8.00 to 15.00	60 secs	-	-	-	-	0.3	0.0	19.0	0.0	10	0
BH03	1	50	1 (2)		---	8.00 to 15.00	90 secs	-	-	-	-	0.3	0.0	19.0	0.0	9	0
BH03	1	50	1 (2)		---	8.00 to 15.00	120 secs	-	-	-	-	0.3	0.0	19.0	0.0	9	0
BH03	1	50	1 (2)		---	8.00 to 15.00	180 secs	-	-	-	-	0.3	0.0	19.0	0.0	9	0
BH03	1	50	1 (2)		---	8.00 to 15.00	240 secs	-	-	-	-	0.3	0.0	19.0	0.0	9	0
BH03	1	50	1 (2)		---	8.00 to 15.00	300 secs	-	-	-	-	0.3	0.0	19.0	0.0	9	0

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

RSK Environment Ltd
Abbey Park
Humber Road
Coventry
CV3 4AQ

Compiled By	Date	Checked By	Date	Contract Ref:
MDStrange	26/10/17			313583

Contract: **Roade Bypass**

IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
BH03	1	50	1 (3)	15.00	14.34	8.00 to 15.00	28/09/2017 10:18:00	-	-	-	12.33	-	-	-	-	-	-
BH03	1	50	2	15.00	---	8.00 to 15.00	06/10/2017 10:41:00	1001	1001	$0.0_{(I)}$	-	-	-	-	-	-	-
BH03	1	50	2		---	8.00 to 15.00	30 secs	-	-	$0.0_{(SS)}$	-	-	-	-	-	-	-
BH03	1	50	2 (2)	15.00	---	8.00 to 15.00	06/10/2017 10:42:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0
BH03	1	50	2 (2)		---	8.00 to 15.00	15 secs	-	-	-	-	0.6	0.0	20.5	0.0	2	0
BH03	1	50	2 (2)		---	8.00 to 15.00	30 secs	-	-	-	-	0.6	0.0	20.2	0.0	2	0
BH03	1	50	2 (2)		---	8.00 to 15.00	60 secs	-	-	-	-	0.6	0.0	20.1	0.0	2	0
BH03	1	50	2 (2)		---	8.00 to 15.00	90 secs	-	-	-	-	0.6	0.0	20.1	0.0	2	0
BH03	1	50	2 (2)		---	8.00 to 15.00	120 secs	-	-	-	-	0.6	0.0	20.1	0.0	1	0
BH03	1	50	2 (2)		---	8.00 to 15.00	180 secs	-	-	-	-	0.6	0.0	20.0	0.0	1	0
BH03	1	50	2 (2)		---	8.00 to 15.00	240 secs	-	-	-	-	0.6	0.0	20.0	0.0	1	0
BH03	1	50	2 (2)		---	8.00 to 15.00	300 secs	-	-	-	-	0.6	0.0	20.0	0.0	1	0
BH03	1	50	2 (3)	15.00	14.25	8.00 to 15.00	06/10/2017 10:48:00	-	-	-	12.38	-	-	-	-	-	-
BH03	1	50	3	15.00	---	8.00 to 15.00	13/10/2017 10:25:00	-	-	$0.0_{(I)}$	-	-	-	-	-	-	-
BH03	1	50	3		---	8.00 to 15.00	30 secs	-	-	$0.1_{(SS)}$	-	-	-	-	-	-	-
BH03	1	50	3		---	8.00 to 15.00	60 secs	-	-	-	-	0.1	0.0	20.9	-	0	0
BH03	1	50	3		---	8.00 to 15.00	180 secs	-	-	-	-	0.2	0.0	20.8	-	0	0
BH03	1	50	3		---	8.00 to 15.00	210 secs	-	-	-	-	0.2	0.0	20.7	-	0	0

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
BH03	1	50	3		---	8.00 to 15.00	225 secs	-	-	-	-	0.2	0.0	20.7	-	0	0
BH03	1	50	3		---	8.00 to 15.00	240 secs	-	-	-	-	0.2	0.0	20.6	-	0	0
BH03	1	50	3		---	8.00 to 15.00	270 secs	-	-	-	-	0.2	0.0	20.6	-	0	0
BH03	1	50	3		---	8.00 to 15.00	300 secs	-	-	-	-	0.2	0.0	20.6	-	0	0
BH03	1	50	3		---	8.00 to 15.00	360 secs	-	-	-	-	0.3	0.0	20.5	-	0	0
BH03	1	50	3		---	8.00 to 15.00	420 secs	-	-	-	-	0.3	0.0	20.4	-	0	0
BH03	1	50	3		---	8.00 to 15.00	480 secs	-	-	-	-	0.1	0.0	20.6	-	0	0
BH03	1	50	3		14.30	8.00 to 15.00	540 secs	-	-	-	12.55	-	-	-	-	-	-
BH03	1	50	4	15.00	---	8.00 to 15.00	18/10/2017 10:29:00	1002	1002	$0.0_{(I)}$	-	-	-	-	-	-	-
BH03	1	50	4		---	8.00 to 15.00	30 secs	-	-	$0.0_{(SS)}$	-	-	-	-	-	-	-
BH03	1	50	4 (2)	15.00	---	8.00 to 15.00	18/10/2017 10:30:00	-	-	-	-	0.1	0.0	20.9	-	0	0
BH03	1	50	4 (2)		---	8.00 to 15.00	60 secs	-	-	-	-	0.3	0.0	20.9	-	0	0
BH03	1	50	4 (2)		---	8.00 to 15.00	90 secs	-	-	-	-	0.3	0.0	20.8	-	0	0
BH03	1	50	4 (2)		---	8.00 to 15.00	105 secs	-	-	-	-	0.3	0.0	20.8	-	0	0
BH03	1	50	4 (2)		---	8.00 to 15.00	120 secs	-	-	-	-	0.3	0.0	20.8	-	0	0
BH03	1	50	4 (2)		---	8.00 to 15.00	150 secs	-	-	-	-	0.3	0.0	20.8	-	0	0
BH03	1	50	4 (2)		---	8.00 to 15.00	180 secs	-	-	-	-	0.3	0.0	20.8	-	0	0
BH03	1	50	4 (2)		---	8.00 to 15.00	240 secs	-	-	-	-	0.3	0.0	20.8	-	0	0

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
BH03	1	50	4 (2)		---	8.00 to 15.00	300 secs	-	-	-	-	0.3	0.0	20.8	-	0	0
BH03	1	50	4 (3)	15.00	14.25	8.00 to 15.00	18/10/2017 10:40:00	-	-	-	12.56	-	-	-	-	-	-
BH04	1	50	1	11.00	---	7.00 to 11.00	28/09/2017 12:48:00	1004	1004	$0.0_{(I)}$	-	-	-	-	-	-	-
BH04	1	50	1		---	7.00 to 11.00	30 secs	-	-	$0.0_{(SS)}$	-	-	-	-	-	-	-
BH04	1	50	1 (2)	11.00	---	7.00 to 11.00	28/09/2017 12:49:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0
BH04	1	50	1 (2)		---	7.00 to 11.00	15 secs	-	-	-	-	0.1	0.0	20.7	0.0	0	0
BH04	1	50	1 (2)		---	7.00 to 11.00	30 secs	-	-	-	-	0.1	0.0	20.7	0.0	0	0
BH04	1	50	1 (2)		---	7.00 to 11.00	60 secs	-	-	-	-	0.1	0.0	20.7	0.0	0	0
BH04	1	50	1 (2)		---	7.00 to 11.00	90 secs	-	-	-	-	0.1	0.0	20.6	0.0	0	0
BH04	1	50	1 (2)		---	7.00 to 11.00	120 secs	-	-	-	-	0.1	0.0	20.6	0.0	0	0
BH04	1	50	1 (2)		---	7.00 to 11.00	180 secs	-	-	-	-	0.1	0.0	20.6	0.0	0	0
BH04	1	50	1 (2)		---	7.00 to 11.00	240 secs	-	-	-	-	0.1	0.0	20.5	0.0	0	0
BH04	1	50	1 (2)		---	7.00 to 11.00	300 secs	-	-	-	-	0.1	0.0	20.5	0.0	0	0
BH04	1	50	1 (3)	11.00	11.00	7.00 to 11.00	28/09/2017 12:55:00	-	-	-	10.12	-	-	-	-	-	-
BH04	1	50	2	11.00	---	7.00 to 11.00	06/10/2017 13:05:00	1003	1003	$-0.1_{(I)}$	-	-	-	-	-	-	-
BH04	1	50	2		---	7.00 to 11.00	30 secs	-	-	$-0.1_{(SS)}$	-	-	-	-	-	-	-
BH04	1	50	2 (2)	11.00	---	7.00 to 11.00	06/10/2017 13:06:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
BH04	1	50	2 (2)		---	7.00 to 11.00	15 secs	-	-	-	-	0.8	0.0	20.2	0.0	0	0
BH04	1	50	2 (2)		---	7.00 to 11.00	30 secs	-	-	-	-	0.8	0.0	20.1	0.0	0	0
BH04	1	50	2 (2)		---	7.00 to 11.00	60 secs	-	-	-	-	0.9	0.0	20.0	0.0	0	0
BH04	1	50	2 (2)		---	7.00 to 11.00	90 secs	-	-	-	-	0.9	0.0	20.0	0.0	0	0
BH04	1	50	2 (2)		---	7.00 to 11.00	120 secs	-	-	-	-	0.9	0.0	20.0	0.0	0	0
BH04	1	50	2 (2)		---	7.00 to 11.00	180 secs	-	-	-	-	0.9	0.0	20.0	0.0	0	0
BH04	1	50	2 (2)		---	7.00 to 11.00	240 secs	-	-	-	-	0.9	0.0	20.0	0.0	0	0
BH04	1	50	2 (2)		---	7.00 to 11.00	300 secs	-	-	-	-	0.9	0.0	20.0	0.0	0	0
BH04	1	50	2 (3)	11.00	10.87	7.00 to 11.00	06/10/2017 13:12:00	-	-	-	9.92	-	-	-	-	-	-
BH04	1	50	3	11.00	---	7.00 to 11.00	13/10/2017 12:37:00	1010	1010	$0.0_{(I)}$	-	-	-	-	-	-	-
BH04	1	50	3		---	7.00 to 11.00	15 secs	-	-	$0.0_{(SS)}$	-	-	-	-	-	-	-
BH04	1	50	3 (2)	11.00	---	7.00 to 11.00	13/10/2017 12:37:30	-	-	-	-	0.1	0.0	20.9	-	0	0
BH04	1	50	3 (2)		---	7.00 to 11.00	30 secs	-	-	-	-	0.1	0.0	20.9	-	0	0
BH04	1	50	3 (2)		---	7.00 to 11.00	60 secs	-	-	-	-	0.1	0.0	20.9	-	0	0
BH04	1	50	3 (2)		---	7.00 to 11.00	90 secs	-	-	-	-	0.1	0.0	20.9	-	0	0
BH04	1	50	3 (2)		---	7.00 to 11.00	120 secs	-	-	-	-	0.1	0.0	20.9	-	0	0
BH04	1	50	3 (2)		---	7.00 to 11.00	150 secs	-	-	-	-	0.1	0.0	20.9	-	0	0
BH04	1	50	3 (2)		---	7.00 to 11.00	210 secs	-	-	-	-	0.1	0.0	20.9	-	0	0

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
BH04	1	50	3 (2)		---	7.00 to 11.00	270 secs	-	-	-	-	0.1	0.0	20.9	-	0	0
BH04	1	50	3 (2)		---	7.00 to 11.00	330 secs	-	-	-	-	0.1	0.0	20.9	-	0	0
BH04	1	50	3 (2)		---	7.00 to 11.00	345 secs	-	-	-	-	0.1	0.0	20.9	-	0	0
BH04	1	50	3 (2)		---	7.00 to 11.00	360 secs	-	-	-	-	0.1	0.0	20.9	-	0	0
BH04	1	50	3 (2)		---	7.00 to 11.00	390 secs	-	-	-	-	0.1	0.0	20.9	-	0	0
BH04	1	50	3 (2)		---	7.00 to 11.00	450 secs	-	-	-	-	0.1	0.0	20.9	-	0	0
BH04	1	50	3 (2)		---	7.00 to 11.00	480 secs	-	-	-	-	0.1	0.0	20.9	-	0	0
BH04	1	50	3 (3)	11.00	9.44	7.00 to 11.00	13/10/2017 12:47:00	-	-	-	9.44	-	-	-	-	-	-
BH04	1	50	4	11.00	---	7.00 to 11.00	19/10/2017 12:27:00	993	993	$0.0_{(I)}$	-	-	-	-	-	-	-
BH04	1	50	4		---	7.00 to 11.00	30 secs	-	-	$0.0_{(SS)}$	-	-	-	-	-	-	-
BH04	1	50	4 (2)	11.00	---	7.00 to 11.00	19/10/2017 12:28:00	-	-	-	-	0.1	0.0	20.9	-	0	0
BH04	1	50	4 (2)		---	7.00 to 11.00	60 secs	-	-	-	-	0.3	0.0	20.8	-	0	0
BH04	1	50	4 (2)		---	7.00 to 11.00	90 secs	-	-	-	-	0.3	0.0	20.6	-	0	0
BH04	1	50	4 (2)		---	7.00 to 11.00	105 secs	-	-	-	-	0.3	0.0	20.6	-	0	0
BH04	1	50	4 (2)		---	7.00 to 11.00	120 secs	-	-	-	-	0.3	0.0	20.6	-	0	0
BH04	1	50	4 (2)		---	7.00 to 11.00	150 secs	-	-	-	-	0.3	0.0	20.6	-	0	0
BH04	1	50	4 (2)		---	7.00 to 11.00	180 secs	-	-	-	-	0.3	0.0	20.6	-	0	0
BH04	1	50	4 (2)		---	7.00 to 11.00	240 secs	-	-	-	-	0.3	0.0	20.6	-	0	0

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
BH04	1	50	4 (2)		---	7.00 to 11.00	300 secs	-	-	-	-	0.3	0.0	20.6	-	0	0
BH04	1	50	4 (3)	11.00	9.40	7.00 to 11.00	19/10/2017 12:36:00	-	-	-	9.40	-	-	-	-	-	-
BH05	1	50	1	12.00	---	8.00 to 12.00	28/09/2017	1008	1008	-0.1$_{(I)}$	-	-	-	-	-	-	-
BH05	1	50	1		---	8.00 to 12.00	30 secs	-	-	-0.1$_{(SS)}$	-	-	-	-	-	-	-
BH05	1	50	1 (2)	12.00	---	8.00 to 12.00	28/09/2017 00:01:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0
BH05	1	50	1 (2)		---	8.00 to 12.00	15 secs	-	-	-	-	0.4	0.0	19.2	0.0	45	0
BH05	1	50	1 (2)		---	8.00 to 12.00	30 secs	-	-	-	-	0.4	0.0	18.3	0.0	61	0
BH05	1	50	1 (2)		---	8.00 to 12.00	60 secs	-	-	-	-	0.5	0.0	18.3	0.0	63	0
BH05	1	50	1 (2)		---	8.00 to 12.00	90 secs	-	-	-	-	0.5	0.0	18.3	0.0	63	0
BH05	1	50	1 (2)		---	8.00 to 12.00	120 secs	-	-	-	-	0.5	0.0	18.3	0.0	63	0
BH05	1	50	1 (2)		---	8.00 to 12.00	180 secs	-	-	-	-	0.5	0.0	18.3	0.0	63	0
BH05	1	50	1 (2)		---	8.00 to 12.00	240 secs	-	-	-	-	0.5	0.0	18.3	0.0	63	0
BH05	1	50	1 (2)		---	8.00 to 12.00	300 secs	-	-	-	-	0.5	0.0	18.3	0.0	63	0
BH05	1	50	1 (3)	12.00	9.78	8.00 to 12.00	28/09/2017 00:07:00	-	-	-	6.85	-	-	-	-	-	-
BH05	1	50	2	12.00	---	8.00 to 12.00	05/10/2017 12:55:00	1007	1008	-0.2$_{(I)}$	-	-	-	-	-	-	-
BH05	1	50	2		---	8.00 to 12.00	30 secs	-	-	-0.2$_{(SS)}$	-	-	-	-	-	-	-
BH05	1	50	2 (2)	12.00	---	8.00 to 12.00	05/10/2017 12:56:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
BH05	1	50	2 (2)		---	8.00 to 12.00	15 secs	-	-	-	-	0.3	0.0	20.1	0.0	14	0
BH05	1	50	2 (2)		---	8.00 to 12.00	30 secs	-	-	-	-	0.4	0.0	19.3	0.0	18	0
BH05	1	50	2 (2)		---	8.00 to 12.00	60 secs	-	-	-	-	0.4	0.0	19.2	0.0	19	0
BH05	1	50	2 (2)		---	8.00 to 12.00	90 secs	-	-	-	-	0.4	0.0	19.2	0.0	19	0
BH05	1	50	2 (2)		---	8.00 to 12.00	120 secs	-	-	-	-	0.4	0.0	19.1	0.0	19	0
BH05	1	50	2 (2)		---	8.00 to 12.00	180 secs	-	-	-	-	0.4	0.0	19.1	0.0	19	0
BH05	1	50	2 (2)		---	8.00 to 12.00	240 secs	-	-	-	-	0.4	0.0	19.1	0.0	20	0
BH05	1	50	2 (2)		---	8.00 to 12.00	300 secs	-	-	-	-	0.4	0.0	19.1	0.0	20	0
BH05	1	50	2 (3)	12.00	9.78	8.00 to 12.00	05/10/2017 13:02:00	-	-	-	6.92	-	-	-	-	-	-
BH05	1	50	3	12.00	---	8.00 to 12.00	13/10/2017 11:05:00	1006	1007	-2.7 (I)	-	-	-	-	-	-	-
BH05	1	50	3		---	8.00 to 12.00	240 secs	-	-	-0.2	-	-	-	-	-	-	-
BH05	1	50	3 (2)	12.00	---	8.00 to 12.00	13/10/2017 11:10:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0
BH05	1	50	3 (2)		---	8.00 to 12.00	15 secs	-	-	-	-	0.3	0.0	20.5	0.0	4	0
BH05	1	50	3 (2)		---	8.00 to 12.00	30 secs	-	-	-	-	0.4	0.0	20.2	0.0	6	0
BH05	1	50	3 (2)		---	8.00 to 12.00	60 secs	-	-	-	-	0.5	0.0	20.0	0.0	7	0
BH05	1	50	3 (2)		---	8.00 to 12.00	90 secs	-	-	-	-	0.5	0.0	20.0	0.0	7	0
BH05	1	50	3 (2)		---	8.00 to 12.00	120 secs	-	-	-	-	0.5	0.0	20.0	0.0	7	0
BH05	1	50	3 (2)		---	8.00 to 12.00	180 secs	-	-	-	-	0.5	0.0	20.0	0.0	7	0

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
BH05	1	50	3 (2)		---	8.00 to 12.00	240 secs	-	-	-	-	0.5	0.0	20.0	0.0	7	0
BH05	1	50	3 (2)		---	8.00 to 12.00	300 secs	-	-	-	-	0.5	0.0	20.0	0.0	7	0
BH05	1	50	3 (3)	12.00	9.84	8.00 to 12.00	13/10/2017 11:16:00	-	-	-	7.06	-	-	-	-	-	-
BH05	1	50	4	12.00	---	8.00 to 12.00	19/10/2017 11:46:00	1000	996	$0.0_{(I)}$	-	-	-	-	-	-	-
BH05	1	50	4		---	8.00 to 12.00	15 secs	-	-	$0.0_{(SS)}$	-	-	-	-	-	-	-
BH05	1	50	4 (2)	12.00	---	8.00 to 12.00	19/10/2017 11:46:30	-	-	-	-	0.1	0.0	20.9	-	0	0
BH05	1	50	4 (2)		---	8.00 to 12.00	15 secs	-	-	-	-	0.5	0.0	20.5	-	4	0
BH05	1	50	4 (2)		---	8.00 to 12.00	30 secs	-	-	-	-	0.5	0.0	19.9	-	5	0
BH05	1	50	4 (2)		---	8.00 to 12.00	60 secs	-	-	-	-	0.5	0.0	19.9	-	6	0
BH05	1	50	4 (2)		---	8.00 to 12.00	90 secs	-	-	-	-	0.5	0.0	19.9	-	6	0
BH05	1	50	4 (2)		---	8.00 to 12.00	120 secs	-	-	-	-	0.5	0.0	19.9	-	6	0
BH05	1	50	4 (2)		---	8.00 to 12.00	150 secs	-	-	-	-	0.5	0.0	19.9	-	6	0
BH05	1	50	4 (2)		---	8.00 to 12.00	210 secs	-	-	-	-	0.5	0.0	19.9	-	6	0
BH05	1	50	4 (3)	12.00	9.80	8.00 to 12.00	19/10/2017 11:52:00	-	-	-	7.10	-	-	-	-	-	-
WS01	1	50	1	2.50	---	1.50 to 2.50	28/09/2017 09:24:00	1001	1001	$0.0_{(I)}$	-	-	-	-	-	-	-
WS01	1	50	1		---	1.50 to 2.50	30 secs	-	-	$0.0_{(SS)}$	-	-	-	-	-	-	-
WS01	1	50	1 (2)	2.50	---	1.50 to 2.50	28/09/2017 09:25:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
WS01	1	50	1 (2)		---	1.50 to 2.50	15 secs	-	-	-	-	1.1	0.0	12.2	0.0	2	0
WS01	1	50	1 (2)		---	1.50 to 2.50	30 secs	-	-	-	-	1.0	0.0	10.6	0.0	2	0
WS01	1	50	1 (2)		---	1.50 to 2.50	60 secs	-	-	-	-	1.0	0.0	10.3	0.0	2	0
WS01	1	50	1 (2)		---	1.50 to 2.50	90 secs	-	-	-	-	1.0	0.0	10.2	0.0	2	0
WS01	1	50	1 (2)		---	1.50 to 2.50	120 secs	-	-	-	-	1.1	0.0	10.1	0.0	1	0
WS01	1	50	1 (2)		---	1.50 to 2.50	180 secs	-	-	-	-	1.1	0.0	10.1	0.0	1	0
WS01	1	50	1 (2)		---	1.50 to 2.50	240 secs	-	-	-	-	1.0	0.0	10.1	0.0	1	0
WS01	1	50	1 (2)		---	1.50 to 2.50	300 secs	-	-	-	-	1.0	0.0	10.1	0.0	1	0
WS01	1	50	1 (3)	2.50	2.48	1.50 to 2.50	28/09/2017 09:31:00	-	-	-	DRY	-	-	-	-	-	-
WS01	1	50	2	2.50	---	1.50 to 2.50	05/10/2017 07:30:00	1001	1001	$0.0_{(I)}$	-	-	-	-	-	-	-
WS01	1	50	2		---	1.50 to 2.50	30 secs	-	-	$0.0_{(SS)}$	-	-	-	-	-	-	-
WS01	1	50	2 (2)	2.50	---	1.50 to 2.50	05/10/2017 07:31:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0
WS01	1	50	2 (2)		---	1.50 to 2.50	15 secs	-	-	-	-	1.7	0.0	12.9	0.0	1	0
WS01	1	50	2 (2)		---	1.50 to 2.50	30 secs	-	-	-	-	1.7	0.0	5.1	0.0	1	0
WS01	1	50	2 (2)		---	1.50 to 2.50	60 secs	-	-	-	-	1.7	0.0	4.4	0.0	1	0
WS01	1	50	2 (2)		---	1.50 to 2.50	90 secs	-	-	-	-	1.7	0.0	4.3	0.0	0	0
WS01	1	50	2 (2)		---	1.50 to 2.50	120 secs	-	-	-	-	1.7	0.0	4.3	0.0	0	0
WS01	1	50	2 (2)		---	1.50 to 2.50	180 secs	-	-	-	-	1.7	0.0	4.3	0.0	0	0

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
WS01	1	50	2 (2)		---	1.50 to 2.50	240 secs	-	-	-	-	1.7	0.0	4.2	0.0	0	0
WS01	1	50	2 (2)		---	1.50 to 2.50	300 secs	-	-	-	-	1.7	0.0	4.2	0.0	0	0
WS01	1	50	2 (3)	2.50	2.48	1.50 to 2.50	05/10/2017 07:37:00	-	-	-	DRY	-	-	-	-	-	-
WS01	1	50	3	2.50	---	1.50 to 2.50	13/10/2017 10:00:00	1007	1007	$0.2_{(I)}$	-	-	-	-	-	-	-
WS01	1	50	3		---	1.50 to 2.50	30 secs	-	-	$0.2_{(SS)}$	-	-	-	-	-	-	-
WS01	1	50	3 (2)	2.50	---	1.50 to 2.50	13/10/2017 10:01:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0
WS01	1	50	3 (2)		---	1.50 to 2.50	15 secs	-	-	-	-	1.7	0.0	13.1	0.0	0	0
WS01	1	50	3 (2)		---	1.50 to 2.50	30 secs	-	-	-	-	1.7	0.0	3.6	0.0	0	0
WS01	1	50	3 (2)		---	1.50 to 2.50	60 secs	-	-	-	-	1.7	0.0	3.0	0.0	0	0
WS01	1	50	3 (2)		---	1.50 to 2.50	90 secs	-	-	-	-	1.7	0.0	2.9	0.0	0	0
WS01	1	50	3 (2)		---	1.50 to 2.50	120 secs	-	-	-	-	1.7	0.0	2.9	0.0	0	0
WS01	1	50	3 (2)		---	1.50 to 2.50	180 secs	-	-	-	-	1.7	0.0	2.9	0.0	0	0
WS01	1	50	3 (2)		---	1.50 to 2.50	240 secs	-	-	-	-	1.7	0.0	2.8	0.0	0	0
WS01	1	50	3 (2)		---	1.50 to 2.50	300 secs	-	-	-	-	1.7	0.0	2.8	0.0	0	0
WS01	1	50	3 (3)	2.50	2.48	1.50 to 2.50	13/10/2017 10:07:00	-	-	-	DRY	-	-	-	-	-	-
WS01	1	50	4	2.50	---	1.50 to 2.50	19/10/2017 10:38:00	-	-	$0.1_{(I)}$	-	-	-	-	-	-	-
WS01	1	50	4		---	1.50 to 2.50	30 secs	-	-	$0.1_{(SS)}$	-	-	-	-	-	-	-
WS01	1	50	4 (2)	2.50	---	1.50 to 2.50	19/10/2017 10:38:45	-	-	-	-	0.1	0.0	20.9	-	0	-

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IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
WS01	1	50	4 (2)		---	1.50 to 2.50	15 secs	-	-	-	-	1.8	0.0	17.0	-	0	0
WS01	1	50	4 (2)		---	1.50 to 2.50	45 secs	-	-	-	-	1.7	0.0	5.8	-	0	0
WS01	1	50	4 (2)		---	1.50 to 2.50	75 secs	-	-	-	-	1.7	0.0	4.8	-	0	0
WS01	1	50	4 (2)		---	1.50 to 2.50	105 secs	-	-	-	-	1.7	0.0	4.5	-	0	0
WS01	1	50	4 (2)		---	1.50 to 2.50	135 secs	-	-	-	-	1.7	0.0	4.4	-	0	0
WS01	1	50	4 (2)		---	1.50 to 2.50	195 secs	-	-	-	-	1.7	0.0	4.1	-	0	0
WS01	1	50	4 (2)		---	1.50 to 2.50	255 secs	-	-	-	-	1.7	0.0	4.0	-	0	0
WS01	1	50	4 (2)		---	1.50 to 2.50	315 secs	-	-	-	-	1.7	0.0	3.9	-	0	0
WS01	1	50	4 (2)		---	1.50 to 2.50	375 secs	-	-	-	-	1.7	0.0	3.9	-	0	0
WS01	1	50	4 (3)	2.50	2.48	1.50 to 2.50	19/10/2017 10:48:00	-	-	-	DRY	-	-	-	-	-	-
WS02	1	50	1	5.00	---	3.00 to 5.00	02/09/2017 10:02:00	1004	1004	$0.1_{(I)}$	-	-	-	-	-	-	-
WS02	1	50	1		---	3.00 to 5.00	30 secs	-	-	$0.1_{(SS)}$	-	-	-	-	-	-	-
WS02	1	50	1 (2)	5.00	---	3.00 to 5.00	02/09/2017 10:03:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0
WS02	1	50	1 (2)		---	3.00 to 5.00	15 secs	-	-	-	-	1.7	0.0	17.6	0.0	2	0
WS02	1	50	1 (2)		---	3.00 to 5.00	30 secs	-	-	-	-	1.6	0.0	15.8	0.0	2	0
WS02	1	50	1 (2)		---	3.00 to 5.00	60 secs	-	-	-	-	1.6	0.0	15.8	0.0	2	0
WS02	1	50	1 (2)		---	3.00 to 5.00	93 secs	-	-	-	-	1.6	0.0	15.8	0.0	2	0

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

RSK Environment Ltd
Abbey Park
Humber Road
Coventry
CV3 4AQ

Compiled By	Date	Checked By	Date	Contract Ref:
MDStrange	26/10/17			313583

Contract: **Roade Bypass**

IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
WS02	1	50	1 (2)		---	3.00 to 5.00	120 secs	-	-	-	-	1.6	0.0	15.8	0.0	2	0
WS02	1	50	1 (2)		---	3.00 to 5.00	180 secs	-	-	-	-	1.6	0.0	15.8	0.0	2	0
WS02	1	50	1 (2)		---	3.00 to 5.00	240 secs	-	-	-	-	1.6	0.0	15.8	0.0	2	0
WS02	1	50	1 (2)		---	3.00 to 5.00	300 secs	-	-	-	-	1.6	0.0	15.8	0.0	2	0
WS02	1	50	1 (3)	5.00	4.98	3.00 to 5.00	02/09/2017 10:09:00	-	-	-	1.18	-	-	-	-	-	-
WS02	1	50	2	5.00	---	3.00 to 5.00	05/10/2017 10:25:00	1018	1005	$15.4_{(I)}$	-	-	-	-	-	-	-
WS02	1	50	2		---	3.00 to 5.00	420 secs	-	-	$0.2_{(SS)}$	-	-	-	-	-	-	-
WS02	1	50	2 (2)	5.00	---	3.00 to 5.00	05/10/2017 10:33:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0
WS02	1	50	2 (2)		---	3.00 to 5.00	15 secs	-	-	-	-	2.1	0.0	18.6	0.0	0	0
WS02	1	50	2 (2)		---	3.00 to 5.00	30 secs	-	-	-	-	2.1	0.0	17.7	0.0	0	0
WS02	1	50	2 (2)		---	3.00 to 5.00	60 secs	-	-	-	-	2.1	0.0	17.6	0.0	0	0
WS02	1	50	2 (2)		---	3.00 to 5.00	90 secs	-	-	-	-	2.1	0.0	17.6	0.0	0	0
WS02	1	50	2 (2)		---	3.00 to 5.00	120 secs	-	-	-	-	2.1	0.0	17.6	0.0	0	0
WS02	1	50	2 (2)		---	3.00 to 5.00	180 secs	-	-	-	-	2.1	0.0	17.6	0.0	0	0
WS02	1	50	2 (2)		---	3.00 to 5.00	240 secs	-	-	-	-	2.1	0.0	17.6	0.0	0	0
WS02	1	50	2 (2)		---	3.00 to 5.00	300 secs	-	-	-	-	2.1	0.0	17.6	0.0	0	0
WS02	1	50	2 (3)	5.00	5.00	3.00 to 5.00	05/10/2017 10:39:00	-	-	-	2.77	-	-	-	-	-	-
WS02	1	50	3	5.00	---	3.00 to 5.00	13/10/2017 10:18:00	1051	1009	$18.2_{(I)}$	-	-	-	-	-	-	-

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
WS02	1	50	3		---	3.00 to 5.00	30 secs	-	-	0.3 (SS)	-	-	-	-	-	-	-
WS02	1	50	3 (2)	5.00	---	3.00 to 5.00	13/10/2017 10:19:00	-	-	-	-	0.1	0.0	20.9	-	0	0
WS02	1	50	3 (2)		---	3.00 to 5.00	30 secs	-	-	-	-	1.9	0.0	20.1	-	1	0
WS02	1	50	3 (2)		---	3.00 to 5.00	60 secs	-	-	-	-	2.2	0.0	19.4	-	1	0
WS02	1	50	3 (2)		---	3.00 to 5.00	90 secs	-	-	-	-	2.2	0.0	17.5	-	1	0
WS02	1	50	3 (2)		---	3.00 to 5.00	105 secs	-	-	-	-	2.2	0.0	17.3	-	1	0
WS02	1	50	3 (2)		---	3.00 to 5.00	120 secs	-	-	-	-	2.2	0.0	17.3	-	1	0
WS02	1	50	3 (2)		---	3.00 to 5.00	150 secs	-	-	-	-	2.2	0.0	17.3	-	1	0
WS02	1	50	3 (2)		---	3.00 to 5.00	180 secs	-	-	-	-	2.1	0.0	17.4	-	1	0
WS02	1	50	3 (3)	5.00	4.98	3.00 to 5.00	13/10/2017 10:24:00	-	-	-	3.05	-	-	-	-	-	-
WS02	1	50	4	5.00	---	3.00 to 5.00	18/10/2017 10:12:00	1002	1002	17.8 (I)	-	-	-	-	-	-	-
WS02	1	50	4		---	3.00 to 5.00	30 secs	-	-	0.2 (SS)	-	-	-	-	-	-	-
WS02	1	50	4 (2)	5.00	---	3.00 to 5.00	18/10/2017 10:16:00	-	-	-	-	0.1	0.0	20.9	-	0	0
WS02	1	50	4 (2)		---	3.00 to 5.00	60 secs	-	-	-	-	2.2	0.0	20.1	-	0	0
WS02	1	50	4 (2)		---	3.00 to 5.00	90 secs	-	-	-	-	2.1	0.0	17.7	-	0	0
WS02	1	50	4 (2)		---	3.00 to 5.00	120 secs	-	-	-	-	2.1	0.0	17.3	-	0	0
WS02	1	50	4 (2)		---	3.00 to 5.00	150 secs	-	-	-	-	2.1	0.0	17.3	-	0	0
WS02	1	50	4 (2)		---	3.00 to 5.00	180 secs	-	-	-	-	2.1	0.0	17.3	-	0	0

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
WS02	1	50	4 (2)		---	3.00 to 5.00	240 secs	-	-	-	-	2.1	0.0	17.3	-	0	0
WS02	1	50	4 (2)		---	3.00 to 5.00	300 secs	-	-	-	-	2.1	0.0	17.3	-	0	0
WS02	1	50	4 (2)		---	3.00 to 5.00	360 secs	-	-	-	-	2.1	0.0	17.3	-	0	0
WS02	1	50	4 (3)	5.00	---	3.00 to 5.00	18/10/2017 10:23:00	-	-	-	-	-	-	-	-	-	-
WS03	1	50	1	3.00	---	1.00 to 3.00	28/09/2017 12:37:00	1005	1005	$0.0_{(I)}$	-	-	-	-	-	-	-
WS03	1	50	1		---	1.00 to 3.00	30 secs	-	-	$0.0_{(SS)}$	-	-	-	-	-	-	-
WS03	1	50	1 (2)	3.00	---	1.00 to 3.00	28/09/2017 12:38:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0
WS03	1	50	1 (2)		---	1.00 to 3.00	15 secs	-	-	-	-	2.2	0.0	18.6	0.0	0	1
WS03	1	50	1 (2)		---	1.00 to 3.00	30 secs	-	-	-	-	2.1	0.0	18.2	0.0	0	1
WS03	1	50	1 (2)		---	1.00 to 3.00	60 secs	-	-	-	-	2.1	0.0	18.2	0.0	0	1
WS03	1	50	1 (2)		---	1.00 to 3.00	90 secs	-	-	-	-	2.1	0.0	18.2	0.0	0	1
WS03	1	50	1 (2)		---	1.00 to 3.00	120 secs	-	-	-	-	2.1	0.0	18.2	0.0	0	1
WS03	1	50	1 (2)		---	1.00 to 3.00	180 secs	-	-	-	-	2.1	0.0	18.2	0.0	0	1
WS03	1	50	1 (2)		---	1.00 to 3.00	240 secs	-	-	-	-	2.1	0.0	18.2	0.0	0	1
WS03	1	50	1 (2)		---	1.00 to 3.00	300 secs	-	-	-	-	2.1	0.0	18.2	0.0	0	1
WS03	1	50	1 (3)	3.00	3.00	1.00 to 3.00	28/09/2017 12:44:00	-	-	-	DRY	-	-	-	-	-	-
WS03	1	50	2	3.00	---	1.00 to 3.00	06/10/2017 12:30:00	1003	1003	$0.3_{(I)}$	-	-	-	-	-	-	-

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IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
WS03	1	50	2		---	1.00 to 3.00	30 secs	-	-	0.3$_{(SS)}$	-	-	-	-	-	-	-
WS03	1	50	2 (2)	3.00	---	1.00 to 3.00	06/10/2017 12:31:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0
WS03	1	50	2 (2)		---	1.00 to 3.00	15 secs	-	-	-	-	2.4	0.0	19.3	0.0	0	0
WS03	1	50	2 (2)		---	1.00 to 3.00	30 secs	-	-	-	-	2.3	0.0	18.8	0.0	0	0
WS03	1	50	2 (2)		---	1.00 to 3.00	60 secs	-	-	-	-	2.2	0.0	18.7	0.0	0	0
WS03	1	50	2 (2)		---	1.00 to 3.00	90 secs	-	-	-	-	2.2	0.0	18.7	0.0	0	0
WS03	1	50	2 (2)		---	1.00 to 3.00	120 secs	-	-	-	-	2.2	0.0	18.7	0.0	0	0
WS03	1	50	2 (2)		---	1.00 to 3.00	180 secs	-	-	-	-	2.2	0.0	18.7	0.0	0	0
WS03	1	50	2 (2)		---	1.00 to 3.00	240 secs	-	-	-	-	2.2	0.0	18.6	0.0	0	0
WS03	1	50	2 (2)		---	1.00 to 3.00	300 secs	-	-	-	-	2.2	0.0	18.6	0.0	0	0
WS03	1	50	2 (3)	3.00	2.99	1.00 to 3.00	06/10/2017 12:37:00	-	-	-	DRY	-	-	-	-	-	-
WS03	1	50	3	3.00	---	1.00 to 3.00	13/10/2017 11:50:00	1009	1009	0.0$_{(I)}$	-	-	-	-	-	-	-
WS03	1	50	3		---	1.00 to 3.00	30 secs	-	-	0.0$_{(SS)}$	-	-	-	-	-	-	-
WS03	1	50	3 (2)	3.00	---	1.00 to 3.00	13/10/2017 11:51:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0
WS03	1	50	3 (2)		---	1.00 to 3.00	15 secs	-	-	-	-	2.1	0.0	20.0	0.0	0	0
WS03	1	50	3 (2)		---	1.00 to 3.00	30 secs	-	-	-	-	2.1	0.0	19.3	0.0	0	0
WS03	1	50	3 (2)		---	1.00 to 3.00	60 secs	-	-	-	-	2.1	0.0	19.2	0.0	0	0
WS03	1	50	3 (2)		---	1.00 to 3.00	90 secs	-	-	-	-	2.1	0.0	19.2	0.0	0	0

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IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
WS03	1	50	3 (2)		---	1.00 to 3.00	120 secs	-	-	-	-	2.1	0.0	19.3	0.0	0	0
WS03	1	50	3 (2)		---	1.00 to 3.00	180 secs	-	-	-	-	2.1	0.0	19.3	0.0	0	0
WS03	1	50	3 (2)		---	1.00 to 3.00	240 secs	-	-	-	-	2.1	0.0	19.3	0.0	0	0
WS03	1	50	3 (2)		---	1.00 to 3.00	300 secs	-	-	-	-	2.1	0.0	19.3	0.0	0	0
WS03	1	50	3 (3)	3.00	3.02	1.00 to 3.00	13/10/2017 11:57:00	-	-	-	DRY	-	-	-	-	-	-
WS03	1	50	4	3.00	---	1.00 to 3.00	19/10/2017 12:39:00	993	993	$0.0_{(I)}$	-	-	-	-	-	-	-
WS03	1	50	4		---	1.00 to 3.00	30 secs	993	993	$0.0_{(SS)}$	-	-	-	-	-	-	-
WS03	1	50	4 (2)	3.00	---	1.00 to 3.00	19/10/2017 12:40:00	-	-	-	-	0.1	0.0	20.9	-	0	0
WS03	1	50	4 (2)		---	1.00 to 3.00	30 secs	-	-	-	-	1.9	0.0	20.5	-	0	0
WS03	1	50	4 (2)		---	1.00 to 3.00	45 secs	-	-	-	-	1.8	0.0	19.7	-	0	0
WS03	1	50	4 (2)		---	1.00 to 3.00	60 secs	-	-	-	-	1.8	0.0	19.6	-	0	0
WS03	1	50	4 (2)		---	1.00 to 3.00	90 secs	-	-	-	-	1.8	0.0	19.6	-	0	0
WS03	1	50	4 (2)		---	1.00 to 3.00	120 secs	-	-	-	-	1.8	0.0	19.6	-	0	0
WS03	1	50	4 (2)		---	1.00 to 3.00	180 secs	-	-	-	-	1.8	0.0	19.6	-	0	0
WS03	1	50	4 (2)		---	1.00 to 3.00	240 secs	-	-	-	-	1.8	0.0	19.6	-	0	0
WS03	1	50	4 (2)		---	1.00 to 3.00	300 secs	-	-	-	-	1.8	0.0	19.6	-	0	0
WS03	1	50	4 (2)		---	1.00 to 3.00	360 secs	-	-	-	-	1.8	0.0	19.6	-	0	0
WS03	1	50	4 (3)	3.00	3.00	1.00 to 3.00	19/10/2017 12:50:00	-	-	-	3.00	-	-	-	-	-	-

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IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
WS04	1	50	1	2.00	---	1.00 to 2.00	28/09/2017 13:25:00	-	-	$0.1_{(I)}$	-	-	-	-	-	-	-
WS04	1	50	1		---	1.00 to 2.00	30 secs	-	-	$0.1_{(SS)}$	-	-	-	-	-	-	-
WS04	1	50	1 (2)	2.00	---	1.00 to 2.00	28/09/2017 13:26:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0
WS04	1	50	1 (2)		---	1.00 to 2.00	15 secs	-	-	-	-	1.2	0.0	19.4	0.0	0	0
WS04	1	50	1 (2)		---	1.00 to 2.00	30 secs	-	-	-	-	1.2	0.0	19.5	0.0	0	0
WS04	1	50	1 (2)		---	1.00 to 2.00	60 secs	-	-	-	-	1.1	0.0	19.4	0.0	0	0
WS04	1	50	1 (2)		---	1.00 to 2.00	90 secs	-	-	-	-	1.1	0.0	19.4	0.0	0	0
WS04	1	50	1 (2)		---	1.00 to 2.00	120 secs	-	-	-	-	1.1	0.0	19.4	0.0	0	0
WS04	1	50	1 (2)		---	1.00 to 2.00	180 secs	-	-	-	-	1.1	0.0	19.4	0.0	0	0
WS04	1	50	1 (2)		---	1.00 to 2.00	240 secs	-	-	-	-	1.1	0.0	19.4	0.0	0	0
WS04	1	50	1 (2)		---	1.00 to 2.00	300 secs	-	-	-	-	1.1	0.0	19.4	0.0	0	0
WS04	1	50	1 (3)	2.00	2.10	1.00 to 2.00	28/09/2017 13:32:00	-	-	-	DRY	-	-	-	-	-	-
WS04	1	50	2	2.00	---	1.00 to 2.00	06/10/2017 14:20:00	1008	1008	$0.0_{(I)}$	-	-	-	-	-	-	-
WS04	1	50	2		---	1.00 to 2.00	30 secs	-	-	$0.0_{(SS)}$	-	-	-	-	-	-	-
WS04	1	50	2 (2)	2.00	---	1.00 to 2.00	06/10/2017 14:21:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0
WS04	1	50	2 (2)		---	1.00 to 2.00	15 secs	-	-	-	-	0.1	0.0	20.7	0.0	1	0
WS04	1	50	2 (2)		---	1.00 to 2.00	30 secs	-	-	-	-	0.2	0.0	20.6	0.0	0	0

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
WS04	1	50	2 (2)		---	1.00 to 2.00	60 secs	-	-	-	-	0.2	0.0	20.5	0.0	0	0
WS04	1	50	2 (2)		---	1.00 to 2.00	90 secs	-	-	-	-	0.2	0.0	20.5	0.0	0	0
WS04	1	50	2 (2)		---	1.00 to 2.00	120 secs	-	-	-	-	0.3	0.0	20.4	0.0	0	0
WS04	1	50	2 (2)		---	1.00 to 2.00	180 secs	-	-	-	-	0.5	0.0	20.2	0.0	0	0
WS04	1	50	2 (2)		---	1.00 to 2.00	240 secs	-	-	-	-	0.6	0.0	20.0	0.0	0	0
WS04	1	50	2 (2)		---	1.00 to 2.00	300 secs	-	-	-	-	0.8	0.0	19.8	0.0	0	0
WS04	1	50	2 (2)		---	1.00 to 2.00	360 secs	-	-	-	-	1.0	0.0	19.7	0.0	0	0
WS04	1	50	2 (2)		---	1.00 to 2.00	420 secs	-	-	-	-	1.0	0.0	19.7	0.0	0	0
WS04	1	50	2 (3)	2.00	2.12	1.00 to 2.00	06/10/2017 14:29:00	-	-	-	1.90	-	-	-	-	-	-
WS04	1	50	3	2.00	---	1.00 to 2.00	13/10/2017 11:20:00	1007	1007	$0.0_{(I)}$	-	-	-	-	-	-	-
WS04	1	50	3		---	1.00 to 2.00	30 secs	-	-	$0.0_{(SS)}$	-	-	-	-	-	-	-
WS04	1	50	3 (2)	2.00	---	1.00 to 2.00	13/10/2017 11:21:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0
WS04	1	50	3 (2)		---	1.00 to 2.00	15 secs	-	-	-	-	1.3	0.0	20.4	0.0	1	0
WS04	1	50	3 (2)		---	1.00 to 2.00	30 secs	-	-	-	-	1.3	0.0	19.8	0.0	0	0
WS04	1	50	3 (2)		---	1.00 to 2.00	60 secs	-	-	-	-	1.3	0.0	19.8	0.0	0	0
WS04	1	50	3 (2)		---	1.00 to 2.00	90 secs	-	-	-	-	1.3	0.0	19.8	0.0	0	0
WS04	1	50	3 (2)		---	1.00 to 2.00	120 secs	-	-	-	-	1.3	0.0	19.8	0.0	0	0
WS04	1	50	3 (2)		---	1.00 to 2.00	180 secs	-	-	-	-	1.3	0.0	19.8	0.0	0	0

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
WS04	1	50	3 (2)		---	1.00 to 2.00	240 secs	-	-	-	-	1.3	0.0	19.8	0.0	0	0
WS04	1	50	3 (2)		---	1.00 to 2.00	300 secs	-	-	-	-	1.3	0.0	19.8	0.0	0	0
WS04	1	50	3 (3)	2.00	2.10	1.00 to 2.00	13/10/2017 11:27:00	-	-	-	1.87	-	-	-	-	-	-
WS04	1	50	4	2.00	---	1.00 to 2.00	19/10/2017 12:03:00	995	995	$0.0_{(I)}$	-	-	-	-	-	-	-
WS04	1	50	4		---	1.00 to 2.00	15 secs	-	-	$0.0_{(SS)}$	-	-	-	-	-	-	-
WS04	1	50	4 (2)	2.00	---	1.00 to 2.00	19/10/2017 12:03:30	-	-	-	-	0.1	0.0	20.9	-	0	0
WS04	1	50	4 (2)		---	1.00 to 2.00	30 secs	-	-	-	-	1.3	0.0	20.6	-	0	0
WS04	1	50	4 (2)		---	1.00 to 2.00	45 secs	-	-	-	-	1.2	0.0	19.9	-	0	0
WS04	1	50	4 (2)		---	1.00 to 2.00	60 secs	-	-	-	-	1.2	0.0	19.9	-	0	0
WS04	1	50	4 (2)		---	1.00 to 2.00	90 secs	-	-	-	-	1.2	0.0	19.9	-	0	0
WS04	1	50	4 (2)		---	1.00 to 2.00	105 secs	-	-	-	-	1.2	0.0	19.9	-	0	0
WS04	1	50	4 (2)		---	1.00 to 2.00	150 secs	-	-	-	-	1.2	0.0	19.9	-	0	0
WS04	1	50	4 (2)		---	1.00 to 2.00	210 secs	-	-	-	-	1.2	0.0	19.9	-	0	0
WS04	1	50	4 (2)		---	1.00 to 2.00	270 secs	-	-	-	-	1.2	0.0	19.9	-	0	0
WS04	1	50	4 (3)	2.00	2.10	1.00 to 2.00	19/10/2017 12:09:00	-	-	-	1.87	-	-	-	-	-	-
WS05	1	50	1	4.00	---	2.00 to 4.00	28/09/2017	1008	1008	$-0.1_{(I)}$	-	-	-	-	-	-	-
WS05	1	50	1		---	2.00 to 4.00	30 secs	-	-	$-0.1_{(SS)}$	-	-	-	-	-	-	-

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
WS05	1	50	1 (2)	4.00	---	2.00 to 4.00	28/09/2017 00:01:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0
WS05	1	50	1 (2)		---	2.00 to 4.00	15 secs	-	-	-	-	0.3	0.0	20.1	0.0	2	0
WS05	1	50	1 (2)		---	2.00 to 4.00	30 secs	-	-	-	-	0.3	0.0	19.7	0.0	2	0
WS05	1	50	1 (2)		---	2.00 to 4.00	60 secs	-	-	-	-	0.4	0.0	19.7	0.0	2	0
WS05	1	50	1 (2)		---	2.00 to 4.00	90 secs	-	-	-	-	0.4	0.0	19.6	0.0	2	0
WS05	1	50	1 (2)		---	2.00 to 4.00	120 secs	-	-	-	-	0.4	0.0	19.5	0.0	2	0
WS05	1	50	1 (2)		---	2.00 to 4.00	180 secs	-	-	-	-	0.5	0.0	19.4	0.0	1	0
WS05	1	50	1 (2)		---	2.00 to 4.00	240 secs	-	-	-	-	0.6	0.0	19.3	0.0	2	0
WS05	1	50	1 (2)		---	2.00 to 4.00	300 secs	-	-	-	-	0.6	0.0	19.2	0.0	1	0
WS05	1	50	1 (3)	4.00	4.07	2.00 to 4.00	28/09/2017 00:07:00	-	-	-	DRY	-	-	-	-	-	-
WS05	1	50	2	4.00	---	2.00 to 4.00	06/10/2017 13:10:00	1008	1008	$0.0_{(I)}$	-	-	-	-	-	-	-
WS05	1	50	2		---	2.00 to 4.00	30 secs	-	-	$0.0_{(SS)}$	-	-	-	-	-	-	-
WS05	1	50	2 (2)	4.00	---	2.00 to 4.00	06/10/2017 13:11:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0
WS05	1	50	2 (2)		---	2.00 to 4.00	15 secs	-	-	-	-	0.8	0.0	20.0	0.0	1	0
WS05	1	50	2 (2)		---	2.00 to 4.00	30 secs	-	-	-	-	0.8	0.0	19.0	0.0	0	0
WS05	1	50	2 (2)		---	2.00 to 4.00	60 secs	-	-	-	-	0.8	0.0	18.8	0.0	0	0
WS05	1	50	2 (2)		---	2.00 to 4.00	90 secs	-	-	-	-	0.8	0.0	18.8	0.0	0	0
WS05	1	50	2 (2)		---	2.00 to 4.00	120 secs	-	-	-	-	0.9	0.0	18.7	0.0	0	0

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IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
WS05	1	50	2 (2)		---	2.00 to 4.00	180 secs	-	-	-	-	0.9	0.0	18.6	0.0	0	0
WS05	1	50	2 (2)		---	2.00 to 4.00	240 secs	-	-	-	-	0.9	0.0	18.6	0.0	0	0
WS05	1	50	2 (2)		---	2.00 to 4.00	300 secs	-	-	-	-	0.9	0.0	18.6	0.0	0	0
WS05	1	50	2 (3)	4.00	4.10	2.00 to 4.00	06/10/2017 13:17:00	-	-	-	3.99	-	-	-	-	-	-
WS05	1	50	3	4.00	---	2.00 to 4.00	13/10/2017 11:12:00	-	-	$0.0_{(I)}$	-	-	-	-	-	-	-
WS05	1	50	3		---	2.00 to 4.00	30 secs	-	-	$0.0_{(SS)}$	-	-	-	-	-	-	-
WS05	1	50	3 (2)	4.00	---	2.00 to 4.00	13/10/2017 11:13:00	-	-	-	-	0.1	0.0	20.9	-	0	0
WS05	1	50	3 (2)		---	2.00 to 4.00	60 secs	-	-	-	-	1.7	0.0	19.6	-	0	0
WS05	1	50	3 (2)		---	2.00 to 4.00	120 secs	-	-	-	-	1.6	0.0	17.3	-	0	0
WS05	1	50	3 (2)		---	2.00 to 4.00	150 secs	-	-	-	-	1.6	0.0	17.2	-	0	0
WS05	1	50	3 (2)		---	2.00 to 4.00	180 secs	-	-	-	-	1.6	0.0	17.1	-	0	0
WS05	1	50	3 (2)		---	2.00 to 4.00	210 secs	-	-	-	-	1.6	0.0	17.1	-	0	0
WS05	1	50	3 (2)		---	2.00 to 4.00	240 secs	-	-	-	-	1.6	0.0	17.1	-	0	0
WS05	1	50	3 (2)		---	2.00 to 4.00	300 secs	-	-	-	-	1.6	0.0	17.1	-	0	0
WS05	1	50	3 (2)		---	2.00 to 4.00	360 secs	-	-	-	-	1.6	0.0	17.1	-	0	0
WS05	1	50	3 (3)	4.00	4.10	2.00 to 4.00	13/10/2017 11:21:00	-	-	-	3.97	-	-	-	-	-	-
WS05	1	50	4	4.00	---	2.00 to 4.00	19/10/2017 11:53:00	995	995	$0.0_{(I)}$	-	-	-	-	-	-	-
WS05	1	50	4		---	2.00 to 4.00	15 secs	-	-	$0.0_{(SS)}$	-	-	-	-	-	-	-

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
WS05	1	50	4 (2)	4.00	---	2.00 to 4.00	19/10/2017 11:53:30	-	-	-	-	0.1	0.0	20.9	-	0	0
WS05	1	50	4 (2)		---	2.00 to 4.00	30 secs	-	-	-	-	1.8	0.0	19.2	-	0	0
WS05	1	50	4 (2)		---	2.00 to 4.00	90 secs	-	-	-	-	1.7	0.0	17.3	-	0	0
WS05	1	50	4 (2)		---	2.00 to 4.00	120 secs	-	-	-	-	1.7	0.0	17.2	-	0	0
WS05	1	50	4 (2)		---	2.00 to 4.00	150 secs	-	-	-	-	1.7	0.0	17.2	-	0	0
WS05	1	50	4 (2)		---	2.00 to 4.00	180 secs	-	-	-	-	1.7	0.0	17.2	-	0	0
WS05	1	50	4 (2)		---	2.00 to 4.00	210 secs	-	-	-	-	1.7	0.0	17.2	-	0	0
WS05	1	50	4 (2)		---	2.00 to 4.00	270 secs	-	-	-	-	1.7	0.0	17.2	-	0	0
WS05	1	50	4 (2)		---	2.00 to 4.00	330 secs	-	-	-	-	1.7	0.0	17.2	-	0	0
WS05	1	50	4 (3)	4.00	4.07	2.00 to 4.00	19/10/2017 12:00:00	-	-	-	3.95	-	-	-	-	-	-
WS06	1	50	1	4.00	---	2.00 to 4.00	28/09/2017	1020	1008	19.4 (SS)	-	-	-	-	-	-	-
WS06	1	50	1		---	2.00 to 4.00	240 secs	-	-	0.2	-	-	-	-	-	-	-
WS06	1	50	1 (2)	4.00	---	2.00 to 4.00	28/09/2017 00:04:30	-	-	-	-	0.0	0.0	20.9	0.0	0	0
WS06	1	50	1 (2)		---	2.00 to 4.00	15 secs	-	-	-	-	1.2	0.0	18.5	0.0	2	0
WS06	1	50	1 (2)		---	2.00 to 4.00	30 secs	-	-	-	-	1.2	0.0	17.9	0.0	2	0
WS06	1	50	1 (2)		---	2.00 to 4.00	60 secs	-	-	-	-	1.2	0.0	17.9	0.0	2	0
WS06	1	50	1 (2)		---	2.00 to 4.00	90 secs	-	-	-	-	1.2	0.0	17.9	0.0	2	0

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
WS06	1	50	1 (2)		---	2.00 to 4.00	120 secs	-	-	-	-	1.2	0.0	17.9	0.0	2	0
WS06	1	50	1 (2)		---	2.00 to 4.00	180 secs	-	-	-	-	1.2	0.0	17.9	0.0	2	0
WS06	1	50	1 (2)		---	2.00 to 4.00	240 secs	-	-	-	-	1.2	0.0	17.8	0.0	2	0
WS06	1	50	1 (2)		---	2.00 to 4.00	300 secs	-	-	-	-	1.2	0.0	17.8	0.0	2	0
WS06	1	50	1 (3)	4.00	4.18	2.00 to 4.00	28/09/2017 00:10:30	-	-	-	2.45	-	-	-	-	-	-
WS06	1	50	2	4.00	---	2.00 to 4.00	05/10/2017 12:40:00	1009	1008	$2.2_{(I)}$	-	-	-	-	-	-	-
WS06	1	50	2		---	2.00 to 4.00	120 secs	-	-	$0.1_{(SS)}$	-	-	-	-	-	-	-
WS06	1	50	2 (2)	4.00	---	2.00 to 4.00	05/10/2017 12:43:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0
WS06	1	50	2 (2)		---	2.00 to 4.00	15 secs	-	-	-	-	1.1	0.0	19.3	0.0	2	0
WS06	1	50	2 (2)		---	2.00 to 4.00	30 secs	-	-	-	-	1.1	0.0	18.4	0.0	2	0
WS06	1	50	2 (2)		---	2.00 to 4.00	60 secs	-	-	-	-	1.1	0.0	18.3	0.0	2	0
WS06	1	50	2 (2)		---	2.00 to 4.00	90 secs	-	-	-	-	1.1	0.0	18.2	0.0	2	0
WS06	1	50	2 (2)		---	2.00 to 4.00	120 secs	-	-	-	-	1.1	0.0	18.2	0.0	2	0
WS06	1	50	2 (2)		---	2.00 to 4.00	180 secs	-	-	-	-	1.1	0.0	18.2	0.0	2	0
WS06	1	50	2 (2)		---	2.00 to 4.00	240 secs	-	-	-	-	1.1	0.0	18.2	0.0	2	0
WS06	1	50	2 (2)		---	2.00 to 4.00	300 secs	-	-	-	-	1.1	0.0	18.3	0.0	2	0
WS06	1	50	2 (3)	4.00	4.18	2.00 to 4.00	05/10/2017 12:49:00	-	-	-	2.36	-	-	-	-	-	-
WS06	1	50	3	4.00	---	2.00 to 4.00	13/10/2017 10:55:00	1007	1007	$-1.1_{(I)}$	-	-	-	-	-	-	-

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IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
WS06	1	50	3		---	2.00 to 4.00	30 secs	-	-	-0.1 (SS)	-	-	-	-	-	-	-
WS06	1	50	3 (2)	4.00	---	2.00 to 4.00	13/10/2017 10:56:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0
WS06	1	50	3 (2)		---	2.00 to 4.00	15 secs	-	-	-	-	0.9	0.0	19.7	0.0	2	0
WS06	1	50	3 (2)		---	2.00 to 4.00	30 secs	-	-	-	-	1.0	0.0	18.8	0.0	3	0
WS06	1	50	3 (2)		---	2.00 to 4.00	60 secs	-	-	-	-	1.0	0.0	18.7	0.0	3	0
WS06	1	50	3 (2)		---	2.00 to 4.00	90 secs	-	-	-	-	1.0	0.0	18.7	0.0	3	0
WS06	1	50	3 (2)		---	2.00 to 4.00	120 secs	-	-	-	-	1.0	0.0	18.7	0.0	3	0
WS06	1	50	3 (2)		---	2.00 to 4.00	180 secs	-	-	-	-	1.0	0.0	18.6	0.0	3	0
WS06	1	50	3 (2)		---	2.00 to 4.00	240 secs	-	-	-	-	1.0	0.0	18.6	0.0	3	0
WS06	1	50	3 (2)		---	2.00 to 4.00	300 secs	-	-	-	-	1.0	0.0	18.6	0.0	3	0
WS06	1	50	3 (3)	4.00	4.17	2.00 to 4.00	13/10/2017 11:02:00	-	-	-	2.40	-	-	-	-	-	-
WS06	1	50	4	4.00	---	2.00 to 4.00	19/10/2017 11:35:00	996	996	0.1 (I)	-	-	-	-	-	-	-
WS06	1	50	4		---	2.00 to 4.00	30 secs	-	-	0.1 (SS)	-	-	-	-	-	-	-
WS06	1	50	4 (2)	4.00	---	2.00 to 4.00	19/10/2017 11:36:00	-	-	-	-	0.1	0.0	20.9	-	0	0
WS06	1	50	4 (2)		---	2.00 to 4.00	15 secs	-	-	-	-	1.4	0.0	20.2	-	0	0
WS06	1	50	4 (2)		---	2.00 to 4.00	30 secs	-	-	-	-	1.4	0.0	18.7	-	0	0
WS06	1	50	4 (2)		---	2.00 to 4.00	60 secs	-	-	-	-	1.4	0.0	18.6	-	0	0
WS06	1	50	4 (2)		---	2.00 to 4.00	90 secs	-	-	-	-	1.4	0.0	18.6	-	0	0

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
WS06	1	50	4 (2)		---	2.00 to 4.00	120 secs	-	-	-	-	1.4	0.0	18.6	-	0	0
WS06	1	50	4 (2)		---	2.00 to 4.00	180 secs	-	-	-	-	1.4	0.0	18.7	-	0	0
WS06	1	50	4 (2)		---	2.00 to 4.00	240 secs	-	-	-	-	1.3	0.0	18.7	-	0	0
WS06	1	50	4 (2)		---	2.00 to 4.00	300 secs	-	-	-	-	1.3	0.0	18.7	-	0	0
WS06	1	50	4 (2)		---	2.00 to 4.00	360 secs	-	-	-	-	1.3	0.0	18.8	-	0	0
WS06	1	50	4 (3)	4.00	4.29	2.00 to 4.00	19/10/2017 11:43:00	-	-	-	2.62	-	-	-	-	-	-
WS07	1	50	1	2.50	---	1.00 to 2.50	28/09/2017	1008	1008	$-0.1_{(I)}$	-	-	-	-	-	-	-
WS07	1	50	1		---	1.00 to 2.50	30 secs	-	-	$-0.1_{(SS)}$	-	-	-	-	-	-	-
WS07	1	50	1 (2)	2.50	---	1.00 to 2.50	28/09/2017 00:01:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0
WS07	1	50	1 (2)		---	1.00 to 2.50	15 secs	-	-	-	-	1.4	0.0	17.2	0.0	1	0
WS07	1	50	1 (2)		---	1.00 to 2.50	30 secs	-	-	-	-	1.4	0.0	14.0	0.0	0	0
WS07	1	50	1 (2)		---	1.00 to 2.50	60 secs	-	-	-	-	1.4	0.0	13.7	0.0	0	0
WS07	1	50	1 (2)		---	1.00 to 2.50	90 secs	-	-	-	-	1.4	0.0	13.7	0.0	0	0
WS07	1	50	1 (2)		---	1.00 to 2.50	120 secs	-	-	-	-	1.4	0.0	13.7	0.0	0	0
WS07	1	50	1 (2)		---	1.00 to 2.50	180 secs	-	-	-	-	1.4	0.0	13.6	0.0	0	0
WS07	1	50	1 (2)		---	1.00 to 2.50	240 secs	-	-	-	-	1.4	0.0	13.5	0.0	0	0
WS07	1	50	1 (2)		---	1.00 to 2.50	300 secs	-	-	-	-	1.4	0.0	13.5	0.0	0	0

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
WS07	1	50	1 (3)	2.50	2.53	1.00 to 2.50	28/09/2017 00:07:00	-	-	-	1.91	-	-	-	-	-	-
WS07	1	50	2	2.50	---	1.00 to 2.50	05/10/2017 12:25:00	1008	1008	0.1$_{(I)}$	-	-	-	-	-	-	-
WS07	1	50	2		---	1.00 to 2.50	30 secs	-	-	0.1$_{(SS)}$	-	-	-	-	-	-	-
WS07	1	50	2 (2)	2.50	---	1.00 to 2.50	05/10/2017 12:26:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0
WS07	1	50	2 (2)		---	1.00 to 2.50	15 secs	-	-	-	-	1.8	0.0	17.3	0.0	0	0
WS07	1	50	2 (2)		---	1.00 to 2.50	30 secs	-	-	-	-	1.8	0.0	12.9	0.0	0	0
WS07	1	50	2 (2)		---	1.00 to 2.50	60 secs	-	-	-	-	1.8	0.0	12.5	0.0	0	0
WS07	1	50	2 (2)		---	1.00 to 2.50	90 secs	-	-	-	-	1.8	0.0	12.5	0.0	0	0
WS07	1	50	2 (2)		---	1.00 to 2.50	120 secs	-	-	-	-	1.8	0.0	12.5	0.0	0	0
WS07	1	50	2 (2)		---	1.00 to 2.50	180 secs	-	-	-	-	1.8	0.0	12.5	0.0	0	0
WS07	1	50	2 (2)		---	1.00 to 2.50	240 secs	-	-	-	-	1.8	0.0	12.4	0.0	0	0
WS07	1	50	2 (2)		---	1.00 to 2.50	300 secs	-	-	-	-	1.8	0.0	12.5	0.0	0	0
WS07	1	50	2 (3)	2.50	2.54	1.00 to 2.50	05/10/2017 12:32:00	-	-	-	1.94	-	-	-	-	-	-
WS07	1	50	3	2.50	---	1.00 to 2.50	13/10/2017 10:45:00	1007	1007	0.0$_{(I)}$	-	-	-	-	-	-	-
WS07	1	50	3		---	1.00 to 2.50	30 secs	-	-	0.0$_{(SS)}$	-	-	-	-	-	-	-
WS07	1	50	3 (2)	2.50	---	1.00 to 2.50	13/10/2017 10:46:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0
WS07	1	50	3 (2)		---	1.00 to 2.50	15 secs	-	-	-	-	1.8	0.0	18.1	0.0	0	0
WS07	1	50	3 (2)		---	1.00 to 2.50	30 secs	-	-	-	-	1.9	0.0	15.4	0.0	0	0

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
WS07	1	50	3 (2)		---	1.00 to 2.50	60 secs	-	-	-	-	1.9	0.0	15.1	0.0	0	0
WS07	1	50	3 (2)		---	1.00 to 2.50	90 secs	-	-	-	-	1.9	0.0	15.0	0.0	0	0
WS07	1	50	3 (2)		---	1.00 to 2.50	120 secs	-	-	-	-	1.9	0.0	15.0	0.0	0	0
WS07	1	50	3 (2)		---	1.00 to 2.50	180 secs	-	-	-	-	1.9	0.0	15.1	0.0	0	0
WS07	1	50	3 (2)		---	1.00 to 2.50	240 secs	-	-	-	-	1.9	0.0	15.1	0.0	0	0
WS07	1	50	3 (2)		---	1.00 to 2.50	300 secs	-	-	-	-	1.9	0.0	15.1	0.0	0	0
WS07	1	50	3 (3)	2.50	2.54	1.00 to 2.50	13/10/2017 10:52:00	-	-	-	2.05	-	-	-	-	-	-
WS07	1	50	4	2.50	---	1.00 to 2.50	19/10/2017 11:26:00	996	996	$0.3_{(I)}$	-	-	-	-	-	-	-
WS07	1	50	4		---	1.00 to 2.50	15 secs	-	-	$0.3_{(SS)}$	-	-	-	-	-	-	-
WS07	1	50	4 (2)	2.50	---	1.00 to 2.50	19/10/2017 11:26:30	-	-	-	-	0.1	0.0	20.8	-	0	0
WS07	1	50	4 (2)		---	1.00 to 2.50	30 secs	-	-	-	-	1.9	0.0	19.5	-	0	0
WS07	1	50	4 (2)		---	1.00 to 2.50	60 secs	-	-	-	-	1.8	0.0	17.1	-	0	0
WS07	1	50	4 (2)		---	1.00 to 2.50	90 secs	-	-	-	-	1.8	0.0	17.1	-	0	0
WS07	1	50	4 (2)		---	1.00 to 2.50	120 secs	-	-	-	-	1.8	0.0	17.1	-	0	0
WS07	1	50	4 (2)		---	1.00 to 2.50	150 secs	-	-	-	-	1.8	0.0	17.1	-	0	0
WS07	1	50	4 (2)		---	1.00 to 2.50	210 secs	-	-	-	-	1.8	0.0	17.1	-	0	0
WS07	1	50	4 (2)		---	1.00 to 2.50	270 secs	-	-	-	-	1.8	0.0	17.2	-	0	0
WS07	1	50	4 (2)		---	1.00 to 2.50	330 secs	-	-	-	-	1.8	0.0	17.2	-	0	0

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IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
WS07	1	50	4 (3)	2.50	2.54	1.00 to 2.50	19/10/2017 11:33:00	-	-	-	2.07	-	-	-	-	-	-
WS08	1	50	1	3.00	---	1.00 to 3.00	28/09/2017	1008	1008	$0.0_{(I)}$	-	-	-	-	-	-	-
WS08	1	50	1		---	1.00 to 3.00	30 secs	-	-	$0.0_{(SS)}$	-	-	-	-	-	-	-
WS08	1	50	1 (2)	3.00	---	1.00 to 3.00	28/09/2017 00:01:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0
WS08	1	50	1 (2)		---	1.00 to 3.00	15 secs	-	-	-	-	2.4	0.0	18.0	0.0	2	0
WS08	1	50	1 (2)		---	1.00 to 3.00	30 secs	-	-	-	-	2.4	0.0	15.3	0.0	0	0
WS08	1	50	1 (2)		---	1.00 to 3.00	60 secs	-	-	-	-	2.5	0.0	15.1	0.0	0	0
WS08	1	50	1 (2)		---	1.00 to 3.00	90 secs	-	-	-	-	2.5	0.0	15.0	0.0	0	0
WS08	1	50	1 (2)		---	1.00 to 3.00	120 secs	-	-	-	-	2.4	0.0	15.0	0.0	0	0
WS08	1	50	1 (2)		---	1.00 to 3.00	180 secs	-	-	-	-	2.4	0.0	14.9	0.0	0	0
WS08	1	50	1 (2)		---	1.00 to 3.00	240 secs	-	-	-	-	2.4	0.0	14.8	0.0	0	0
WS08	1	50	1 (2)		---	1.00 to 3.00	300 secs	-	-	-	-	2.4	0.0	14.8	0.0	0	0
WS08	1	50	1 (3)	3.00	3.10	1.00 to 3.00	28/09/2017 00:07:00	-	-	-	2.65	-	-	-	-	-	-
WS08	1	50	2	3.00	---	1.00 to 3.00	05/10/2017 12:15:00	1008	1008	$0.0_{(I)}$	-	-	-	-	-	-	-
WS08	1	50	2		---	1.00 to 3.00	30 secs	-	-	$0.0_{(SS)}$	-	-	-	-	-	-	-
WS08	1	50	2 (2)	3.00	---	1.00 to 3.00	05/10/2017 12:16:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0
WS08	1	50	2 (2)		---	1.00 to 3.00	15 secs	-	-	-	-	1.8	0.0	20.1	0.0	1	0

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IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
WS08	1	50	2 (2)		---	1.00 to 3.00	30 secs	-	-	-	-	1.8	0.0	19.5	0.0	0	0
WS08	1	50	2 (2)		---	1.00 to 3.00	60 secs	-	-	-	-	1.8	0.0	19.4	0.0	0	0
WS08	1	50	2 (2)		---	1.00 to 3.00	90 secs	-	-	-	-	1.8	0.0	19.4	0.0	0	0
WS08	1	50	2 (2)		---	1.00 to 3.00	120 secs	-	-	-	-	1.8	0.0	19.4	0.0	0	0
WS08	1	50	2 (2)		---	1.00 to 3.00	180 secs	-	-	-	-	1.8	0.0	19.4	0.0	0	0
WS08	1	50	2 (2)		---	1.00 to 3.00	240 secs	-	-	-	-	1.8	0.0	19.4	0.0	0	0
WS08	1	50	2 (2)		---	1.00 to 3.00	300 secs	-	-	-	-	1.8	0.0	19.4	0.0	0	0
WS08	1	50	2 (3)	3.00	3.09	1.00 to 3.00	05/10/2017 12:22:00	-	-	-	2.66	-	-	-	-	-	-
WS08	1	50	3	3.00	---	1.00 to 3.00	13/10/2017 13:35:00	1007	1007	$0.0_{(I)}$	-	-	-	-	-	-	-
WS08	1	50	3		---	1.00 to 3.00	30 secs	-	-	$0.0_{(SS)}$	-	-	-	-	-	-	-
WS08	1	50	3 (2)	3.00	---	1.00 to 3.00	13/10/2017 13:36:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0
WS08	1	50	3 (2)		---	1.00 to 3.00	15 secs	-	-	-	-	1.8	0.0	19.7	0.0	0	0
WS08	1	50	3 (2)		---	1.00 to 3.00	30 secs	-	-	-	-	1.8	0.0	18.9	0.0	0	0
WS08	1	50	3 (2)		---	1.00 to 3.00	60 secs	-	-	-	-	1.8	0.0	18.8	0.0	0	0
WS08	1	50	3 (2)		---	1.00 to 3.00	90 secs	-	-	-	-	1.9	0.0	18.8	0.0	0	0
WS08	1	50	3 (2)		---	1.00 to 3.00	120 secs	-	-	-	-	1.9	0.0	18.8	0.0	0	0
WS08	1	50	3 (2)		---	1.00 to 3.00	180 secs	-	-	-	-	1.9	0.0	18.8	0.0	0	0
WS08	1	50	3 (2)		---	1.00 to 3.00	240 secs	-	-	-	-	1.9	0.0	18.8	0.0	0	0

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IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
WS08	1	50	3 (2)		---	1.00 to 3.00	300 secs	-	-	-	-	1.9	0.0	18.8	0.0	0	0
WS08	1	50	3 (3)	3.00	3.09	1.00 to 3.00	13/10/2017 13:42:00	-	-	-	2.68	-	-	-	-	-	-
WS08	1	50	4	3.00	---	1.00 to 3.00	19/10/2017 11:17:00	996	996	$0.1_{(I)}$	-	-	-	-	-	-	-
WS08	1	50	4		---	1.00 to 3.00	15 secs	-	-	$0.1_{(SS)}$	-	-	-	-	-	-	-
WS08	1	50	4 (2)	3.00	---	1.00 to 3.00	19/10/2017 11:17:30	-	-	-	-	0.1	0.0	20.9	-	0	0
WS08	1	50	4 (2)		---	1.00 to 3.00	30 secs	-	-	-	-	2.3	0.0	18.3	-	1	0
WS08	1	50	4 (2)		---	1.00 to 3.00	60 secs	-	-	-	-	2.1	0.0	16.9	-	1	0
WS08	1	50	4 (2)		---	1.00 to 3.00	90 secs	-	-	-	-	2.1	0.0	16.9	-	1	0
WS08	1	50	4 (2)		---	1.00 to 3.00	120 secs	-	-	-	-	2.1	0.0	17.0	-	1	0
WS08	1	50	4 (2)		---	1.00 to 3.00	150 secs	-	-	-	-	2.1	0.0	17.0	-	1	0
WS08	1	50	4 (2)		---	1.00 to 3.00	210 secs	-	-	-	-	2.1	0.0	17.1	-	1	0
WS08	1	50	4 (2)		---	1.00 to 3.00	270 secs	-	-	-	-	2.1	0.0	17.2	-	1	0
WS08	1	50	4 (2)		---	1.00 to 3.00	330 secs	-	-	-	-	2.1	0.0	17.3	-	1	0
WS08	1	50	4 (3)	3.00	3.09	1.00 to 3.00	19/10/2017 11:24:00	-	-	-	2.70	-	-	-	-	-	-
WS09	1	50	1	3.00	---	1.00 to 3.00	28/09/2017 13:13:00	1006	1006	$0.1_{(I)}$	-	-	-	-	-	-	-
WS09	1	50	1		---	1.00 to 3.00	30 secs	-	-	$0.1_{(SS)}$	-	-	-	-	-	-	-
WS09	1	50	1 (2)	3.00	---	1.00 to 3.00	28/09/2017 13:14:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0

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IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
WS09	1	50	1 (2)		---	1.00 to 3.00	15 secs	-	-	-	-	1.0	0.0	19.6	0.0	0	0
WS09	1	50	1 (2)		---	1.00 to 3.00	30 secs	-	-	-	-	0.9	0.0	19.4	0.0	0	0
WS09	1	50	1 (2)		---	1.00 to 3.00	60 secs	-	-	-	-	0.9	0.0	19.4	0.0	0	0
WS09	1	50	1 (2)		---	1.00 to 3.00	90 secs	-	-	-	-	0.9	0.0	19.4	0.0	0	0
WS09	1	50	1 (2)		---	1.00 to 3.00	120 secs	-	-	-	-	0.9	0.0	19.4	0.0	0	0
WS09	1	50	1 (2)		---	1.00 to 3.00	180 secs	-	-	-	-	0.9	0.0	19.4	0.0	0	0
WS09	1	50	1 (2)		---	1.00 to 3.00	240 secs	-	-	-	-	0.9	0.0	19.5	0.0	0	0
WS09	1	50	1 (2)		---	1.00 to 3.00	300 secs	-	-	-	-	0.9	0.0	19.5	0.0	0	0
WS09	1	50	1 (3)	3.00	3.07	1.00 to 3.00	28/09/2017 13:20:00	-	-	-	DRY	-	-	-	-	-	-
WS09	1	50	2	3.00	---	1.00 to 3.00	06/10/2017 12:47:00	1003	1003	$0.0_{(I)}$	-	-	-	-	-	-	-
WS09	1	50	2		---	1.00 to 3.00	30 secs	-	-	$0.0_{(SS)}$	-	-	-	-	-	-	-
WS09	1	50	2 (2)	3.00	---	1.00 to 3.00	06/10/2017 12:48:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0
WS09	1	50	2 (2)		---	1.00 to 3.00	15 secs	-	-	-	-	0.5	0.0	20.3	0.0	0	0
WS09	1	50	2 (2)		---	1.00 to 3.00	30 secs	-	-	-	-	0.5	0.0	20.2	0.0	0	0
WS09	1	50	2 (2)		---	1.00 to 3.00	60 secs	-	-	-	-	0.5	0.0	20.2	0.0	0	1
WS09	1	50	2 (2)		---	1.00 to 3.00	90 secs	-	-	-	-	0.5	0.0	20.2	0.0	0	1
WS09	1	50	2 (2)		---	1.00 to 3.00	120 secs	-	-	-	-	0.5	0.0	20.2	0.0	0	1
WS09	1	50	2 (2)		---	1.00 to 3.00	180 secs	-	-	-	-	0.5	0.0	20.2	0.0	0	1

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
WS09	1	50	2 (2)		---	1.00 to 3.00	240 secs	-	-	-	-	0.5	0.0	20.2	0.0	0	1
WS09	1	50	2 (2)		---	1.00 to 3.00	300 secs	-	-	-	-	0.5	0.0	20.2	0.0	0	1
WS09	1	50	2 (3)	3.00	3.07	1.00 to 3.00	06/10/2017 12:54:00	-	-	-	DRY	-	-	-	-	-	-
WS09	1	50	3	3.00	---	1.00 to 3.00	13/10/2017 11:45:00	1010	1010	$0.0_{(I)}$	-	-	-	-	-	-	-
WS09	1	50	3		---	1.00 to 3.00	30 secs	-	-	$0.0_{(SS)}$	-	-	-	-	-	-	-
WS09	1	50	3 (2)	3.00	---	1.00 to 3.00	13/10/2017 11:46:00	-	-	-	-	0.1	0.0	20.9	-	0	0
WS09	1	50	3 (2)		---	1.00 to 3.00	60 secs	-	-	-	-	0.6	0.0	20.8	-	0	0
WS09	1	50	3 (2)		---	1.00 to 3.00	90 secs	-	-	-	-	0.5	0.0	20.4	-	0	0
WS09	1	50	3 (2)		---	1.00 to 3.00	120 secs	-	-	-	-	0.5	0.0	20.4	-	0	0
WS09	1	50	3 (2)		---	1.00 to 3.00	180 secs	-	-	-	-	0.5	0.0	20.4	-	0	0
WS09	1	50	3 (2)		---	1.00 to 3.00	210 secs	-	-	-	-	0.5	0.0	20.4	-	0	0
WS09	1	50	3 (2)		---	1.00 to 3.00	240 secs	-	-	-	-	0.5	0.0	20.4	-	0	0
WS09	1	50	3 (2)		---	1.00 to 3.00	300 secs	-	-	-	-	0.5	0.0	20.4	-	0	0
WS09	1	50	3 (2)		---	1.00 to 3.00	360 secs	-	-	-	-	0.5	0.0	20.4	-	0	0
WS09	1	50	3 (2)		---	1.00 to 3.00	420 secs	-	-	-	-	0.5	0.0	20.4	-	0	0
WS09	1	50	3 (3)	3.00	3.09	1.00 to 3.00	13/10/2017 11:56:00	-	-	-	3.09	-	-	-	-	-	-
WS09	1	50	4	3.00	---	1.00 to 3.00	19/10/2017 12:13:00	994	994	$0.0_{(I)}$	-	-	-	-	-	-	-
WS09	1	50	4		---	1.00 to 3.00	30 secs	-	-	$0.0_{(SS)}$	-	-	-	-	-	-	-

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
WS09	1	50	4 (2)	3.00	---	1.00 to 3.00	19/10/2017 12:13:45	-	-	-	-	0.1	0.0	20.9	-	0	0
WS09	1	50	4 (2)		---	1.00 to 3.00	15 secs	-	-	-	-	1.0	0.0	20.3	-	0	0
WS09	1	50	4 (2)		---	1.00 to 3.00	75 secs	-	-	-	-	1.0	0.0	18.5	-	0	0
WS09	1	50	4 (2)		---	1.00 to 3.00	105 secs	-	-	-	-	1.0	0.0	18.5	-	0	0
WS09	1	50	4 (2)		---	1.00 to 3.00	135 secs	-	-	-	-	1.0	0.0	18.5	-	0	0
WS09	1	50	4 (2)		---	1.00 to 3.00	165 secs	-	-	-	-	1.0	0.0	18.5	-	0	0
WS09	1	50	4 (2)		---	1.00 to 3.00	195 secs	-	-	-	-	1.0	0.0	18.5	-	0	0
WS09	1	50	4 (2)		---	1.00 to 3.00	255 secs	-	-	-	-	1.0	0.0	18.5	-	0	0
WS09	1	50	4 (2)		---	1.00 to 3.00	315 secs	-	-	-	-	1.0	0.0	18.5	-	0	0
WS09	1	50	4 (3)	3.00	3.08	1.00 to 3.00	19/10/2017 12:21:00	-	-	-	3.08	-	-	-	-	-	-
WS10	1	50	1	4.00	---	2.00 to 4.00	28/09/2017	1006	1006	$0.0_{(I)}$	-	-	-	-	-	-	-
WS10	1	50	1		---	2.00 to 4.00	30 secs	-	-	$0.0_{(SS)}$	-	-	-	-	-	-	-
WS10	1	50	1 (2)	4.00	---	2.00 to 4.00	28/09/2017 00:01:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0
WS10	1	50	1 (2)		---	2.00 to 4.00	15 secs	-	-	-	-	2.5	0.0	17.5	0.0	1	0
WS10	1	50	1 (2)		---	2.00 to 4.00	30 secs	-	-	-	-	2.5	0.0	14.8	0.0	1	0
WS10	1	50	1 (2)		---	2.00 to 4.00	60 secs	-	-	-	-	2.5	0.0	14.5	0.0	1	0
WS10	1	50	1 (2)		---	2.00 to 4.00	90 secs	-	-	-	-	2.5	0.0	14.5	0.0	1	0

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
WS10	1	50	1 (2)		---	2.00 to 4.00	120 secs	-	-	-	-	2.5	0.0	14.6	0.0	1	0
WS10	1	50	1 (2)		---	2.00 to 4.00	180 secs	-	-	-	-	2.5	0.0	14.6	0.0	1	0
WS10	1	50	1 (2)		---	2.00 to 4.00	240 secs	-	-	-	-	2.5	0.0	14.6	0.0	1	0
WS10	1	50	1 (2)		---	2.00 to 4.00	300 secs	-	-	-	-	2.5	0.0	14.6	0.0	1	0
WS10	1	50	1 (3)	4.00	4.03	2.00 to 4.00	28/09/2017 00:07:00	-	-	-	3.23	-	-	-	-	-	-
WS10	1	50	2	4.00	---	2.00 to 4.00	05/10/2017 10:10:00	1005	1005	$0.0_{(I)}$	-	-	-	-	-	-	-
WS10	1	50	2		---	2.00 to 4.00	30 secs	-	-	$0.0_{(SS)}$	-	-	-	-	-	-	-
WS10	1	50	2 (2)	4.00	---	2.00 to 4.00	05/10/2017 10:11:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0
WS10	1	50	2 (2)		---	2.00 to 4.00	15 secs	-	-	-	-	2.6	0.0	18.0	0.0	0	0
WS10	1	50	2 (2)		---	2.00 to 4.00	30 secs	-	-	-	-	2.6	0.0	14.7	0.0	0	0
WS10	1	50	2 (2)		---	2.00 to 4.00	60 secs	-	-	-	-	2.7	0.0	14.2	0.0	0	0
WS10	1	50	2 (2)		---	2.00 to 4.00	90 secs	-	-	-	-	2.7	0.0	14.1	0.0	0	0
WS10	1	50	2 (2)		---	2.00 to 4.00	120 secs	-	-	-	-	2.7	0.0	14.1	0.0	0	0
WS10	1	50	2 (2)		---	2.00 to 4.00	180 secs	-	-	-	-	2.7	0.0	14.1	0.0	0	0
WS10	1	50	2 (2)		---	2.00 to 4.00	240 secs	-	-	-	-	2.7	0.0	14.0	0.0	0	0
WS10	1	50	2 (2)		---	2.00 to 4.00	300 secs	-	-	-	-	2.7	0.0	14.0	0.0	0	0
WS10	1	50	2 (3)	4.00	4.04	2.00 to 4.00	05/10/2017 10:17:00	-	-	-	3.22	-	-	-	-	-	-
WS10	1	50	3	4.00	---	2.00 to 4.00	13/10/2017 10:36:00	1010	1010	$0.0_{(I)}$	-	-	-	-	-	-	-

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
WS10	1	50	3		---	2.00 to 4.00	30 secs	-	-	$0.0_{(SS)}$	-	-	-	-	-	-	-
WS10	1	50	3 (2)	4.00	---	2.00 to 4.00	13/10/2017 10:37:00	-	-	-	-	0.1	0.0	20.9	-	0	0
WS10	1	50	3 (2)		---	2.00 to 4.00	60 secs	-	-	-	-	0.9	0.0	20.3	-	0	0
WS10	1	50	3 (2)		---	2.00 to 4.00	75 secs	-	-	-	-	1.0	0.0	19.1	-	0	0
WS10	1	50	3 (2)		---	2.00 to 4.00	90 secs	-	-	-	-	1.4	0.0	18.4	-	0	0
WS10	1	50	3 (2)		---	2.00 to 4.00	120 secs	-	-	-	-	1.9	0.0	17.5	-	0	0
WS10	1	50	3 (2)		---	2.00 to 4.00	150 secs	-	-	-	-	2.2	0.0	16.8	-	0	0
WS10	1	50	3 (2)		---	2.00 to 4.00	240 secs	-	-	-	-	2.5	0.0	16.2	-	0	0
WS10	1	50	3 (2)		---	2.00 to 4.00	300 secs	-	-	-	-	2.5	0.0	16.0	-	0	0
WS10	1	50	3 (2)		---	2.00 to 4.00	360 secs	-	-	-	-	2.6	0.0	16.0	-	0	0
WS10	1	50	3 (2)		---	2.00 to 4.00	390 secs	-	-	-	-	2.6	0.0	16.0	-	0	0
WS10	1	50	3 (2)		---	2.00 to 4.00	420 secs	-	-	-	-	2.6	0.0	16.0	-	0	0
WS10	1	50	3 (2)		---	2.00 to 4.00	435 secs	-	-	-	-	2.6	0.0	16.0	-	0	0
WS10	1	50	3 (2)		---	2.00 to 4.00	450 secs	-	-	-	-	2.6	0.0	16.0	-	0	0
WS10	1	50	3 (2)		---	2.00 to 4.00	480 secs	-	-	-	-	2.6	0.0	16.0	-	0	0
WS10	1	50	3 (2)		---	2.00 to 4.00	510 secs	-	-	-	-	2.6	0.0	16.0	-	0	0
WS10	1	50	3 (2)		---	2.00 to 4.00	540 secs	-	-	-	-	2.6	0.0	16.1	-	0	0
WS10	1	50	3 (2)		---	2.00 to 4.00	600 secs	-	-	-	-	2.6	0.0	16.2	-	0	0

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
WS10	1	50	3 (2)		---	2.00 to 4.00	660 secs	-	-	-	-	2.5	0.0	16.3	-	0	0
WS10	1	50	3 (2)		---	2.00 to 4.00	720 secs	-	-	-	-	2.5	0.0	16.4	-	0	0
WS10	1	50	3 (3)	4.00	4.04	2.00 to 4.00	13/10/2017 10:53:00	-	-	-	3.15	-	-	-	-	-	-
WS10	1	50	4	4.00	---	2.00 to 4.00	18/10/2017 10:44:00	1002	1002	$0.3_{(I)}$	-	-	-	-	-	-	-
WS10	1	50	4		---	2.00 to 4.00	30 secs	-	-	$0.2_{(SS)}$	-	-	-	-	-	-	-
WS10	1	50	4 (2)	4.00	---	2.00 to 4.00	18/10/2017 10:44:45	-	-	-	-	0.1	0.0	20.9	-	0	-
WS10	1	50	4 (2)		---	2.00 to 4.00	15 secs	-	-	-	-	2.5	0.0	20.3	-	0	0
WS10	1	50	4 (2)		---	2.00 to 4.00	45 secs	-	-	-	-	2.5	0.0	18.0	-	0	0
WS10	1	50	4 (2)		---	2.00 to 4.00	75 secs	-	-	-	-	2.5	0.0	17.7	-	0	0
WS10	1	50	4 (2)		---	2.00 to 4.00	105 secs	-	-	-	-	2.6	0.0	17.7	-	0	0
WS10	1	50	4 (2)		---	2.00 to 4.00	135 secs	-	-	-	-	2.6	0.0	17.7	-	0	0
WS10	1	50	4 (2)		---	2.00 to 4.00	195 secs	-	-	-	-	2.6	0.0	17.7	-	0	0
WS10	1	50	4 (2)		---	2.00 to 4.00	255 secs	-	-	-	-	2.6	0.0	17.7	-	0	0
WS10	1	50	4 (2)		---	2.00 to 4.00	315 secs	-	-	-	-	2.6	0.0	17.8	-	0	0
WS10	1	50	4 (3)	4.00	4.04	2.00 to 4.00	18/10/2017 10:55:00	-	-	-	2.75	-	-	-	-	-	-
WS11	1	50	1	5.00	---	3.00 to 5.00	28/09/2017	1003	1003	$0.0_{(I)}$	-	-	-	-	-	-	-
WS11	1	50	1		---	3.00 to 5.00	30 secs	-	-	$0.0_{(SS)}$	-	-	-	-	-	-	-

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

RSK Environment Ltd
Abbey Park
Humber Road
Coventry
CV3 4AQ

Compiled By	Date	Checked By	Date	Contract Ref:
MDStrange	26/10/17			313583

Contract: **Roade Bypass**

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IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
WS11	1	50	1 (2)	5.00	---	3.00 to 5.00	28/09/2017 00:01:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0
WS11	1	50	1 (2)		---	3.00 to 5.00	15 secs	-	-	-	-	3.9	0.0	19.1	0.0	1	0
WS11	1	50	1 (2)		---	3.00 to 5.00	30 secs	-	-	-	-	4.0	0.0	14.6	0.0	1	0
WS11	1	50	1 (2)		---	3.00 to 5.00	60 secs	-	-	-	-	4.0	0.0	13.8	0.0	0	0
WS11	1	50	1 (2)		---	3.00 to 5.00	90 secs	-	-	-	-	4.0	0.0	13.7	0.0	0	0
WS11	1	50	1 (2)		---	3.00 to 5.00	120 secs	-	-	-	-	4.0	0.0	13.7	0.0	0	0
WS11	1	50	1 (2)		---	3.00 to 5.00	180 secs	-	-	-	-	4.0	0.0	13.6	0.0	0	0
WS11	1	50	1 (2)		---	3.00 to 5.00	240 secs	-	-	-	-	4.0	0.0	13.6	0.0	0	0
WS11	1	50	1 (2)		---	3.00 to 5.00	300 secs	-	-	-	-	4.0	0.0	13.6	0.0	0	0
WS11	1	50	1 (3)	5.00	4.48	3.00 to 5.00	28/09/2017 00:07:00	-	-	-	DRY	-	-	-	-	-	-
WS11	1	50	2	5.00	---	3.00 to 5.00	05/10/2017 08:40:00	1003	1003	$0.0_{(I)}$	-	-	-	-	-	-	-
WS11	1	50	2		---	3.00 to 5.00	30 secs	-	-	$0.0_{(SS)}$	-	-	-	-	-	-	-
WS11	1	50	2 (2)	5.00	---	3.00 to 5.00	05/10/2017 08:41:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0
WS11	1	50	2 (2)		---	3.00 to 5.00	15 secs	-	-	-	-	1.5	0.0	20.2	0.0	0	0
WS11	1	50	2 (2)		---	3.00 to 5.00	30 secs	-	-	-	-	1.5	0.0	19.7	0.0	0	0
WS11	1	50	2 (2)		---	3.00 to 5.00	60 secs	-	-	-	-	1.5	0.0	19.6	0.0	0	0
WS11	1	50	2 (2)		---	3.00 to 5.00	90 secs	-	-	-	-	1.5	0.0	19.6	0.0	0	0
WS11	1	50	2 (2)		---	3.00 to 5.00	120 secs	-	-	-	-	1.4	0.0	19.6	0.0	0	0

Key: I = Initial, P = Peak, SS = Steady State. Note: LEL = Lower Explosive Limit = 5% v/v.

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Abbey Park
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CV3 4AQ

Compiled By	Date	Checked By	Date	Contract Ref:
MDStrange	26/10/17			313583

Contract: **Roade Bypass**

IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
WS11	1	50	2 (2)		---	3.00 to 5.00	180 secs	-	-	-	-	1.4	0.0	19.7	0.0	0	0
WS11	1	50	2 (2)		---	3.00 to 5.00	240 secs	-	-	-	-	1.3	0.0	19.8	0.0	0	0
WS11	1	50	2 (2)		---	3.00 to 5.00	300 secs	-	-	-	-	1.2	0.0	19.9	0.0	0	0
WS11	1	50	2 (3)	5.00	4.52	3.00 to 5.00	05/10/2017 08:47:00	-	-	-	DRY	-	-	-	-	-	-
WS11	1	50	3	5.00	---	3.00 to 5.00	13/10/2017 10:00:00	1007	1007	$0.0_{(I)}$	-	-	-	-	-	-	-
WS11	1	50	3		---	3.00 to 5.00	30 secs	-	-	$0.0_{(SS)}$	-	-	-	-	-	-	-
WS11	1	50	3 (2)	5.00	---	3.00 to 5.00	13/10/2017 10:01:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0
WS11	1	50	3 (2)		---	3.00 to 5.00	15 secs	-	-	-	-	0.1	0.0	21.2	0.0	1	0
WS11	1	50	3 (2)		---	3.00 to 5.00	30 secs	-	-	-	-	0.1	0.0	21.2	0.0	0	0
WS11	1	50	3 (2)		---	3.00 to 5.00	60 secs	-	-	-	-	0.1	0.0	21.2	0.0	0	0
WS11	1	50	3 (2)		---	3.00 to 5.00	90 secs	-	-	-	-	0.1	0.0	21.3	0.0	0	0
WS11	1	50	3 (2)		---	3.00 to 5.00	120 secs	-	-	-	-	0.1	0.0	21.3	0.0	0	0
WS11	1	50	3 (2)		---	3.00 to 5.00	180 secs	-	-	-	-	0.1	0.0	21.3	0.0	0	0
WS11	1	50	3 (2)		---	3.00 to 5.00	240 secs	-	-	-	-	0.1	0.0	21.3	0.0	0	0
WS11	1	50	3 (2)		---	3.00 to 5.00	300 secs	-	-	-	-	0.1	0.0	21.3	0.0	0	0
WS11	1	50	3 (3)	5.00	4.53	3.00 to 5.00	13/10/2017 10:07:00	-	-	-	DRY	-	-	-	-	-	-
WS11	1	50	4	5.00	---	3.00 to 5.00	19/10/2017 09:49:00	993	993	$0.3_{(I)}$	-	-	-	-	-	-	-
WS11	1	50	4		---	3.00 to 5.00	30 secs	-	-	$0.2_{(SS)}$	-	-	-	-	-	-	-

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IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
WS11	1	50	4 (2)	5.00	---	3.00 to 5.00	19/10/2017 09:50:00	-	-	-	-	0.1	0.0	20.9	-	0	0
WS11	1	50	4 (2)		---	3.00 to 5.00	30 secs	-	-	-	-	1.8	0.0	20.6	-	0	0
WS11	1	50	4 (2)		---	3.00 to 5.00	60 secs	-	-	-	-	1.7	0.0	19.5	-	0	0
WS11	1	50	4 (2)		---	3.00 to 5.00	90 secs	-	-	-	-	1.7	0.0	19.2	-	0	0
WS11	1	50	4 (2)		---	3.00 to 5.00	120 secs	-	-	-	-	1.7	0.0	19.2	-	0	0
WS11	1	50	4 (2)		---	3.00 to 5.00	150 secs	-	-	-	-	1.7	0.0	19.2	-	0	0
WS11	1	50	4 (2)		---	3.00 to 5.00	180 secs	-	-	-	-	1.7	0.0	19.2	-	0	0
WS11	1	50	4 (2)		---	3.00 to 5.00	240 secs	-	-	-	-	1.7	0.0	19.1	-	0	0
WS11	1	50	4 (2)		---	3.00 to 5.00	300 secs	-	-	-	-	1.7	0.0	19.1	-	0	0
WS11	1	50	4 (3)	5.00	4.53	3.00 to 5.00	19/10/2017 09:56:00	-	-	-	4.53	-	-	-	-	-	-
WS12	1	50	1	5.00	---	3.00 to 5.00	28/09/2017 08:53:00	1001	1001	$0.0_{(I)}$	-	-	-	-	-	-	-
WS12	1	50	1		---	3.00 to 5.00	30 secs	-	-	$0.0_{(SS)}$	-	-	-	-	-	-	-
WS12	1	50	1 (2)	5.00	---	3.00 to 5.00	28/09/2017 08:54:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0
WS12	1	50	1 (2)		---	3.00 to 5.00	15 secs	-	-	-	-	4.1	0.0	17.2	0.0	1	0
WS12	1	50	1 (2)		---	3.00 to 5.00	30 secs	-	-	-	-	3.7	0.0	16.0	0.0	1	0
WS12	1	50	1 (2)		---	3.00 to 5.00	60 secs	-	-	-	-	3.8	0.0	15.7	0.0	1	0
WS12	1	50	1 (2)		---	3.00 to 5.00	90 secs	-	-	-	-	3.8	0.0	15.6	0.0	1	0

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IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
WS12	1	50	1 (2)		---	3.00 to 5.00	120 secs	-	-	-	-	3.8	0.0	15.6	0.0	1	0
WS12	1	50	1 (2)		---	3.00 to 5.00	180 secs	-	-	-	-	3.9	0.0	15.5	0.0	1	0
WS12	1	50	1 (2)		---	3.00 to 5.00	240 secs	-	-	-	-	3.9	0.0	15.5	0.0	1	0
WS12	1	50	1 (2)		---	3.00 to 5.00	300 secs	-	-	-	-	3.9	0.0	15.4	0.0	1	0
WS12	1	50	1 (3)	5.00	5.06	3.00 to 5.00	28/09/2017 09:00:00	-	-	-	3.58	-	-	-	-	-	-
WS12	1	50	2	5.00	---	3.00 to 5.00	05/10/2017 08:52:00	999	999	$0.0_{(I)}$	-	-	-	-	-	-	-
WS12	1	50	2		---	3.00 to 5.00	30 secs	-	-	$0.0_{(SS)}$	-	-	-	-	-	-	-
WS12	1	50	2 (2)	5.00	---	3.00 to 5.00	05/10/2017 08:53:00	-	-	-	-	0.0	0.0	20.9	0.0	0	0
WS12	1	50	2 (2)		---	3.00 to 5.00	15 secs	-	-	-	-	7.9	0.0	13.9	0.0	1	0
WS12	1	50	2 (2)		---	3.00 to 5.00	30 secs	-	-	-	-	7.5	0.0	12.4	0.0	1	0
WS12	1	50	2 (2)		---	3.00 to 5.00	60 secs	-	-	-	-	7.6	0.0	12.0	0.0	1	0
WS12	1	50	2 (2)		---	3.00 to 5.00	90 secs	-	-	-	-	7.7	0.0	11.9	0.0	1	0
WS12	1	50	2 (2)		---	3.00 to 5.00	120 secs	-	-	-	-	7.7	0.0	11.9	0.0	1	0
WS12	1	50	2 (2)		---	3.00 to 5.00	180 secs	-	-	-	-	7.7	0.0	11.8	0.0	1	0
WS12	1	50	2 (2)		---	3.00 to 5.00	240 secs	-	-	-	-	7.7	0.0	11.8	0.0	1	0
WS12	1	50	2 (2)		---	3.00 to 5.00	300 secs	-	-	-	-	7.7	0.0	11.8	0.0	1	0
WS12	1	50	2 (3)	5.00	5.07	3.00 to 5.00	05/10/2017 08:59:00	-	-	-	4.80	-	-	-	-	-	-
WS12	1	50	3	5.00	---	3.00 to 5.00	13/10/2017 09:43:00	1008	1008	$0.1_{(I)}$	-	-	-	-	-	-	-

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IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
WS12	1	50	3		---	3.00 to 5.00	30 secs	-	-	0.1 (SS)	-	-	-	-	-	-	-
WS12	1	50	3 (2)	5.00	---	3.00 to 5.00	13/10/2017 09:44:00	-	-	-	-	0.1	0.0	20.8	-	0	0
WS12	1	50	3 (2)		---	3.00 to 5.00	60 secs	-	-	-	-	9.1	0.0	17.0	-	0	0
WS12	1	50	3 (2)		---	3.00 to 5.00	90 secs	-	-	-	-	8.5	0.0	12.3	-	0	0
WS12	1	50	3 (2)		---	3.00 to 5.00	120 secs	-	-	-	-	8.7	0.0	11.4	-	0	0
WS12	1	50	3 (2)		---	3.00 to 5.00	150 secs	-	-	-	-	8.8	0.0	11.3	-	0	0
WS12	1	50	3 (2)		---	3.00 to 5.00	180 secs	-	-	-	-	8.8	0.0	11.2	-	0	0
WS12	1	50	3 (2)		---	3.00 to 5.00	240 secs	-	-	-	-	8.8	0.0	11.2	-	0	0
WS12	1	50	3 (2)		---	3.00 to 5.00	300 secs	-	-	-	-	8.8	0.0	11.2	-	0	0
WS12	1	50	3 (2)		---	3.00 to 5.00	360 secs	-	-	-	-	8.8	0.0	11.2	-	0	0
WS12	1	50	3 (2)		---	3.00 to 5.00	420 secs	-	-	-	-	8.8	0.0	11.2	-	0	0
WS12	1	50	3 (3)	5.00	5.08	3.00 to 5.00	13/10/2017 09:51:30	-	-	-	4.64	-	-	-	-	-	-
WS12	1	50	4	5.00	---	3.00 to 5.00	19/10/2017 10:13:00	994	994	0.1 (I)	-	-	-	-	-	-	-
WS12	1	50	4		---	3.00 to 5.00	15 secs	-	-	0.0 (SS)	-	-	-	-	-	-	-
WS12	1	50	4 (2)	5.00	---	3.00 to 5.00	19/10/2017 10:13:30	-	-	-	-	0.1	0.0	20.8	-	0	0
WS12	1	50	4 (2)		---	3.00 to 5.00	30 secs	-	-	-	-	8.7	0.0	18.1	-	1	0
WS12	1	50	4 (2)		---	3.00 to 5.00	60 secs	-	-	-	-	8.1	0.0	12.6	-	1	0
WS12	1	50	4 (2)		---	3.00 to 5.00	90 secs	-	-	-	-	8.4	0.0	11.4	-	1	0

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IN-SITU GAS MONITORING RESULTS

[Pressures] Previous During Start End Equipment Used & Remarks

Exploratory Position ID	Pipe ref	Pipe diameter (mm)	Monitoring Round	Reported Installation Depth (m)	Measured Installation Depth (mbgl)	Response Zone	Date & Time of Monitoring (elapsed time)	Borehole Pressure (mb)	Atmos Pressure (mb)	Gas Flow (l/hr)	Water Depth (mbgl)	Carbon Dioxide (% / vol)	Methane (% / vol)	Oxygen (% / vol)	LEL (%)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)
WS12	1	50	4 (2)		---	3.00 to 5.00	120 secs	-	-	-	-	8.4	0.0	11.3	-	1	0
WS12	1	50	4 (2)		---	3.00 to 5.00	150 secs	-	-	-	-	8.4	0.0	11.3	-	0	0
WS12	1	50	4 (2)		---	3.00 to 5.00	210 secs	-	-	-	-	8.4	0.0	11.2	-	0	0
WS12	1	50	4 (2)		---	3.00 to 5.00	270 secs	-	-	-	-	8.4	0.0	11.2	-	0	0
WS12	1	50	4 (2)		---	3.00 to 5.00	330 secs	-	-	-	-	8.4	0.0	11.2	-	0	0
WS12	1	50	4 (3)	5.00	5.08	3.00 to 5.00	19/10/2017 10:20:00	-	-	-	4.57	-	-	-	-	-	-

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