

Ground Investigation



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STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION

Factual Report

for
Willmott Dixon Construction
Limited

Engineer : Ramboll UK Limited

Project Number PN204140

November 2020

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Ground Investigation
at

Factual Report

**STOCKPORT INTERCHANGE -
SUPPLEMENTARY GROUND
INVESTIGATION**

for
Willmott Dixon Construction Limited

Engineer :
Ramboll UK Limited

Project No:
PN204140
November 2020

DRAFT

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1.0 INTRODUCTION

A geotechnical and geo-environmental investigation was undertaken by Geotechnics Limited at the site of proposed development works at the existing Stockport Bus Interchange. The investigation was carried out to the instructions of the Engineer, Ramboll Limited on behalf of the Client, Willmott Dixon Construction Limited. This report describes the work undertaken and presents the data obtained.

2.0 OBJECT AND SCOPE OF THE INVESTIGATION

The object of the investigation was to obtain information on the ground and groundwater conditions relating to the design of the proposed works within the limitations posed by trial hole numbers, locations, depths, methods adopted and the scope of approved in situ and laboratory testing. The investigation comprised hand-excavated trial pits, machine-excavated trial pits, cable percussion boreholes with rotary cored follow-on boreholes and dynamic sample boreholes, in situ and laboratory testing and reporting. A Factual Report was also commissioned.

3.0 PRESENTATION

A description of the site and a summary of the procedures followed during the investigation process are presented in Sections 4 to 6. The factual data so obtained are presented in Appendices 2 to 14 of this report. Attention is drawn to the General Notes and Investigation Procedures presented in Appendix 15 to aid an understanding of the procedures followed and the context in which the report should be read.

In addition, data in electronic format in accordance with "The Electronic Transfer of Geotechnical Data from Ground Investigations" published by the AGS (the AGS Format) are presented separately.

4.0 THE SITE

4.1 Location

The site is located in Stockport town centre, extending from Daw Bank northwards to the River Mersey and from Swaine Street eastwards to Mersey Square. The approximate Ordnance Survey National Grid Reference for the centre of the site is SJ 892 902 and an extract from the relevant 1:50,000 Scale O.S. Map is included as Appendix I.

4.2 Description

The site is irregular in shape with maximum dimensions of approximately 120m (north-west to south-east) and 220m (north-east to south-west). The River Mersey bounds the northernmost part of the site. Ground levels across the site generally fall towards the river, from around 47mOD on Daw Bank to around 42mOD on the banks of the River Mersey.

The site comprises Stockport Bus Station which remained operational at the time of the investigation works. The A6 Wellington Road crosses the easternmost part of the site on a viaduct running trends roughly north-west to south-east. Beyond this viaduct lies the primarily hard landscaped public open space of Mersey Square. The River Mersey flows in culvert below Mersey Square.

The Site is bounded to the north by the River Mersey, to the east/south-east by Mersey Square and Daw Bank and to the west by Swaine Street.

4.3 Site Geology

The 1:50,000 scale map of Stockport published by the British Geological Survey, Sheet 98 Drift edition dated 1962, shows the site to be underlain by Glacial Till (recorded on the map as Boulder Clay). Towards the River Mersey, River Terrace Deposits are indicated (recorded on the map as First Terrace).

The 1:50,000 Solid edition map (dated 1977) indicates

that the site is underlain by rocks of the Chester Formation (recorded on the map as Chester Pebble Beds Formation), part of the Sherwood Sandstone Group of Triassic age. The conjectured trace of a north-north-west to south-south-east trending fault is shown approximately 150m west of Swaine Street, the strata to the east of this fault being downthrown. The conjectured trace of a second fault is shown approximately 200m to the east of the site. This fault trends roughly parallel to the other fault and the strata to the east are again downthrown.

The British Geological Survey maps do not show the presence of Made Ground would be expected below the site. However, given the historical land use of the site, a thickness of Made Ground for which the British Geological Survey have no records or which are too shallow for incorporation into the maps.

4.4 Hydrogeology

The Government's DEFRA MagicMap website, <https://magic.defra.gov.uk/MagicMap.aspx>, accessed on 12th October 2020, shows the Glacial Till to be classed as a Secondary (undifferentiated) Aquifer. The River Terrace Deposits are shown to be classed as a Secondary A Aquifer whilst the underlying Chester Formation is shown to be classed as a Principal Aquifer.

5.0 PROCEDURE

5.1 Commissioning

The work was awarded following submission of a tender for work designed by the Engineer for ground investigation of the site in accordance with the Client's requirements.

5.2 General

The procedures followed in this site investigation are based on *BS 5930: 2015 – Code of Practice for Site Investigations* and *BS 10175:2011+A2:2017 - Investigation of Potentially Contaminated Sites*. The soils and rocks encountered have been described in accordance with BS5930:2015 and BS EN ISO 14688-1:2018 and BS EN ISO 14689:2018.

The Exploratory Hole locations were specified by the Engineer and their positions are shown on the Exploratory Hole Location Plan in Appendix 14. The co-ordinates and levels shown on the Exploratory Hole Records were measured using a Leica GPS survey device. The depths quoted on the exploratory

hole records are in metres below ground level.

Prior to the investigation, a survey was carried out by Subscan Technology Limited utilising Ground Penetrating Radar (GPR) to check for the presence of buried services at the proposed exploratory hole locations.

At each exploratory hole location, with the exception of the trial pits, an inspection pit was excavated using hand tools to a depth of 1.20m below ground level to check for the presence of underground services. Prior to and on completion of the excavation, the location was scanned using a cable avoidance tool (CAT). At those locations where concrete was present at ground level, 300mm diameter coring was used to advance the exploratory hole through the concrete and facilitate the excavation of the inspection pit. Details of the concrete coring is included on the appropriate exploratory hole records.

Aquifer protection measures were employed when drilling Boreholes BH400 to BH404 in order to preclude the creation of a pathway for contamination to migrate down towards the underlying aquifer. These protection measures comprised using 200mm diameter casing and tools to drill to the base of the Made Ground, then by installing a 1m thick bentonite plug, prior to reducing to 146mm diameter casing and commencing rotary coring.

5.3 Hand-Excavated Trial Pits

Five (5 No.) Trial Pits (numbered HP01 to HP05) were excavated to depths ranging between 0.15m and 1.00m below ground level using hand tools on 24th and 25th September 2020. This work was supervised on site by a geotechnical / geo-environmental engineer.

The profiles of strata or other features were recorded as excavation proceeded and measurements taken from ground level. Representative samples were taken, where appropriate, for laboratory examination and analysis and in addition, Environmental soil samples (ES) were recovered at the depths indicated on the Trial Pit Records. Samples were taken directly from excavated materials deposited at the surface. Groundwater observations and trench stability notes are included on the Hand-Excavated Trial Pit Records presented in Appendix 2. Photographs of the pits are presented in Appendix 3.

5.4 Machine-Excavated Trial Pits

Three (3 No.) Trial Pits were excavated to depths of 0.65m (OP400), 0.70m (OP401) and 1.00m (OP403) below ground level using a 5 tonne tracked excavator on 21st September 2020. This work was supervised on site by a geotechnical / geo-environmental engineer.

The profiles of strata or other features were recorded as excavation proceeded and measurements taken from ground level. Representative samples were taken, where appropriate, for laboratory examination and analysis and in addition, Environmental soil samples (ES) were recovered at the depths indicated on the Trial Pit Records. Samples were taken directly from excavated materials deposited at the surface. Groundwater observations and trench stability notes are included on the Machine-Excavated Trial Pit Records presented in Appendix 4. Photographs of the pits are presented in Appendix 5.

5.5 Dynamic Sample Boreholes

Three (3 No.) Dynamic Sample were undertaken at the site to depths of 3.43m (WS400 and WS401) and 3.35m (WS402) below ground level. The work was carried out on 8th September 2020.

The Dynamic Samples were taken using the super-heavy Dynamic Probe apparatus which drives lined steel tubes into the ground in 1m lengths. Samples are retrieved in the plastic liners. The retrieved liners were split and the recovered soils described before being sub-sampled into ES, D and B samples as shown on the Dynamic Sample Borehole Records presented in Appendix 6. The holes were cased and progress depended on the nature of the strata penetrated. Full details of the casing used are included on the Borehole Records.

Standard Penetration Tests (SPTs) were undertaken at the depths indicated on the borehole records in accordance with BS EN ISO 22476-3:2005+A1:2011 to obtain a measure of the engineering properties of the proved strata.

No groundwater was encountered during the drilling operations.

On completion, standpipes were installed in each of the Dynamic Sample Boreholes (see Section 5.8).

5.6 Cable Percussion with Rotary Cored Follow-On Boreholes

Five (5 No.), 200mm diameter boreholes (numbered BH400 to BH404) were sunk by Cable Percussion Tool techniques to depths ranging between 2.90m and 3.30m below ground level. The work was carried out between 9th and 11th September 2020.

Representative disturbed (D and B) and driven open-tube thin-walled (UT) samples of the soils encountered were obtained at regular intervals. Standard Penetration Tests (SPTs) were undertaken at the depths indicated on the borehole records in accordance with BS EN ISO 22476-3:2005+A1:2011 to obtain a measure of the engineering properties of the proved strata. In addition, environmental soil samples (ES) were recovered at the depths indicated on the Borehole Records presented in Appendix 7.

No groundwater strikes were noted during the drilling operations. It should be noted that the addition of water to the borehole as part of the drilling process may have masked the presence of groundwater in the borehole. Where water was added it has been noted on the Borehole Records.

Upon encountering bedrock within the Cable Percussion Boreholes, 146mm diameter rotary casing was installed within each of the boreholes to facilitate subsequent advancement using rotary coring techniques.

The boreholes were then further advanced utilising 102mm diameter rotary coring techniques to depths ranging between 6.20m and 20.30m below ground level. The rotary coring work was carried out between 14th and 25th September 2020.

The rotary drilling equipment on this particular contract utilised water as the flushing medium.

Rock cores were extruded horizontally in transparent liners and placed into suitable core boxes. Photographs of the individual core boxes are included in Appendix 8.

On completion, standpipes were installed in Boreholes BH401, BH402 and BH403 (see Section 5.8). Borehole BH400 was backfilled with bentonite pellets and the inspection pits was backfilled with arisings.

5.7 High Pressure Dilatometer Test

A single high pressure dilatometer test was carried out by In Situ Site Investigation Limited in Borehole BH402 in a 1.20m long 99mm diameter rock pocket at a depth of between 3.20m and 4.20m below ground level.

The high pressure dilatometer test results are presented in Appendix 9.

It should be noted that five (5 No.) further high pressure dilatometer tests were attempted; however, these were unsuccessful as the test pockets collapsed.

5.8 Instrumentation and Monitoring

Long-term monitoring of the gas and groundwater levels was made possible by the installation of standpipes as follows:

| Exploratory Hole | Standpipe Slotted Pipe & Filter Zone (m) |
|------------------|--|
| BH401 | 6.50 to 10.50 |
| BH402 | 4.50 to 10.50 |
| BH403 | 4.50 to 7.50 |
| BH404 | 4.50 to 7.50 |
| WS400 | 1.50 to 3.00 |
| WS401 | 1.50 to 3.00 |
| WS402 | 1.50 to 3.00 |

Monitoring of the gas and groundwater levels at the site is being arranged at intervals agreed with The Engineer.

6.0 LABORATORY TESTING

6.1 Geotechnical

The laboratory testing schedule was specified by the Engineer. Unless otherwise stated, the tests were carried out in Geotechnics Limited's UKAS accredited Laboratory (Testing No. 1365) and were undertaken in accordance with the appropriate Standards as indicated below and on the Laboratory Test Certificate in Appendix 11. Any descriptions, opinions and interpretations are outside the scope of UKAS accreditation.

The tests undertaken can be summarised as follows:

BS EN ISO 17892-1:2014

3 No. Water Content Determination

BS EN ISO 17892-4:2016

8 No. Particle Size Distribution Determination – Sieving Method

BS EN ISO 17892-8:2018

1 No. Unconsolidated Undrained Triaxial Test

BS EN ISO 17892-12:2018

2 No. Determination of Liquid and Plastic Limits

BS 1377:1990

Test No.

Test Description

Part 4

3.3

1 No.

Dry Density/Moisture Content relationship determination. Compaction Test - British Standard (2.5 kg Hammer)

ISRM Testing Methods

30 No. Point Load Determination

The following testing was carried out at the laboratories of Derwentside Environmental Testing services Limited (UKAS Accredited Laboratory, Number 2139).

BRE Special Digest I Suite

18 No. Suites comprising:-
Soluble Sulphate
Acid Soluble Sulphate
Total Sulphur
pH

The following testing was carried out at the laboratories of MATtest Limited (UKAS Accredited Laboratory, Number 2643).

ISRM Testing Methods

16 No. Point Load Determination

8 No. Unconfined Compressive Strength Determination

4 No. Unconfined Compressive Strength Determination, with measurement of stress and strain curves

Signed for and on behalf of Geotechnics Limited.

Prepared by:

BRE Special Digest I Suite

4 No. Suites comprising:-
Soluble Sulphate
Acid Soluble Sulphate
Total Sulphur
pH

Chris Bradley
BEng (Hons) FGS
Senior Engineer

The results of these tests are presented in Appendix II.

Reviewed by:

6.2 Contamination

Selected samples of soil were tested at the laboratories of Derwentside Environmental Testing Services Limited (UKAS Accredited Laboratory, Number 2139) for a number of determinands in order to check on potential site contamination. The determinands were specified by the Engineer and are detailed on the results sheets in Appendix 12 (Soil) and Appendix 13 (Groundwater) together with the test result as well as the test method, accreditation and detection limit.

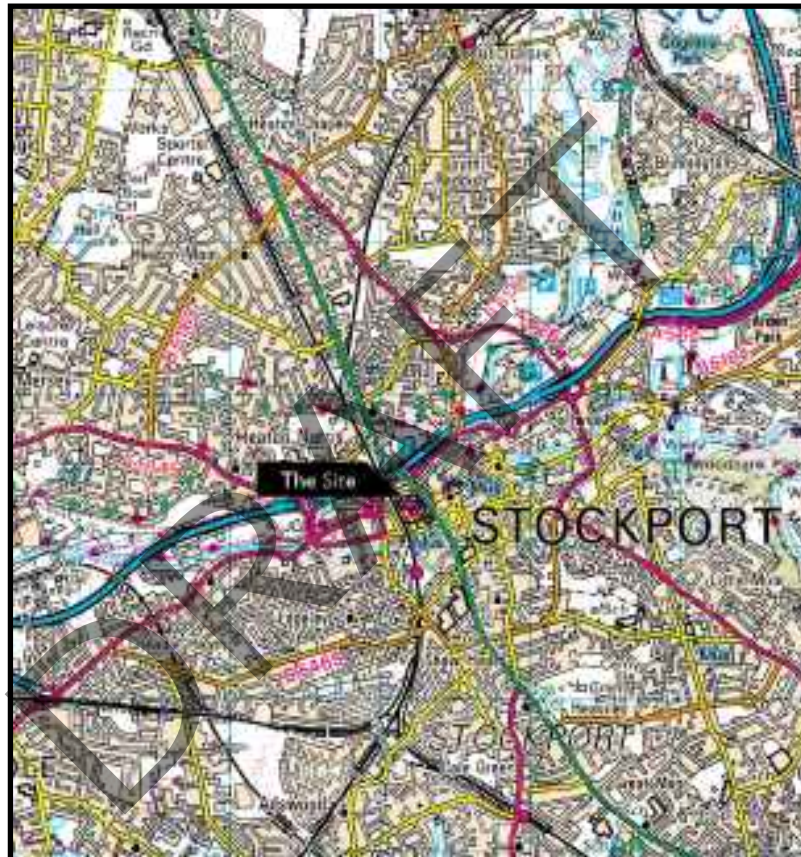
Aaron Field
BSc (Hons), MSc, FGS
Senior Engineer

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APPENDIX I
Site Location Plan

SITE LOCATION PLAN



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Ground Investigation
at
STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND
INVESTIGATION
for
Willmott Dixon Construction Limited

GEOTECHNICS
geotechnical and geoenvironmental specialists

APPENDIX 2
Hand-Excavated Trial Pit Records

DATA SHEET - Symbols and Abbreviations used on Records



Sample Types

| | |
|-----|--|
| B | Bulk disturbed sample |
| BLK | Block sample |
| C | Core sample |
| D | Small disturbed sample (tub/jar) |
| E | Environmental test sample |
| ES | Environmental soil sample |
| EW | Environmental water sample |
| G | Gas sample |
| L | Liner sample |
| LB | Large bulk disturbed sample |
| P | Piston sample (PF - failed P sample) |
| TW | Thin walled push in sample |
| U | Open Tube - 102mm diameter with blows to take sample. (UF - failed U sample) |
| UT | Thin wall open drive tube sampler - 102mm diameter with blows to take sample. (UTF - failed UT sample) |
| V | Vial sample |
| W | Water sample |
| # | Sample Not Recovered |

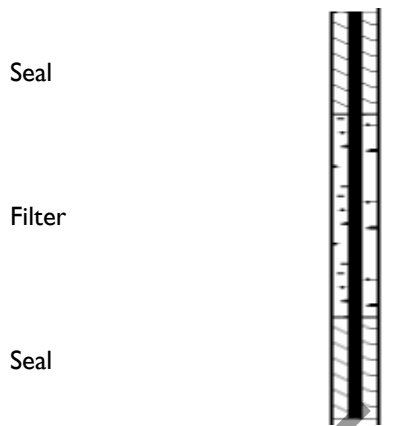
Insitu Testing / Properties

| | |
|---|--|
| CBRP | CBR using TRL probe |
| CHP | Constant Head Permeability Test |
| COND | Electrical conductivity |
| TC | Thermal Conductivity |
| TR | Thermal Resistivity |
| HV | Strength from Hand Vane |
| ICBR | CBR Test |
| IDEN | Density Test |
| IRES | Resistivity Test |
| MEX | CBR using Mexecon Probe Test |
| PKR | Packer Permeability Test |
| PLT | Plate Load Test |
| PP | Strength from Pocket Penetrometer |
| Temp | Temperature |
| VHP | Variable Head Permeability Test |
| VN | Strength from Insitu Vane |
| w% | Water content |
| (All other strengths from undrained triaxial testing) | |
| S | Standard Penetration Test (SPT) |
| C | SPT with cone |
| N | SPT Result |
| -/- | Blows/penetration (mm) after seating drive |
| -*/-(mm) | Total blows/penetration |
| () | Extrapolated value |

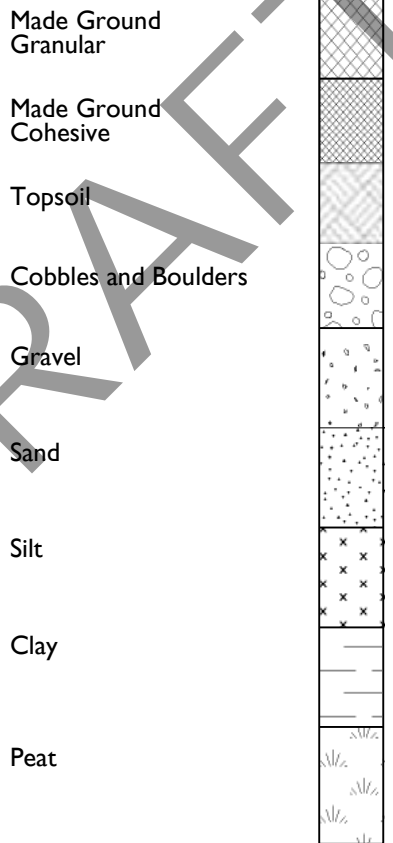
Groundwater

| | |
|---------------------|--|
| Water Strike | |
| Depth Water Rose To | |

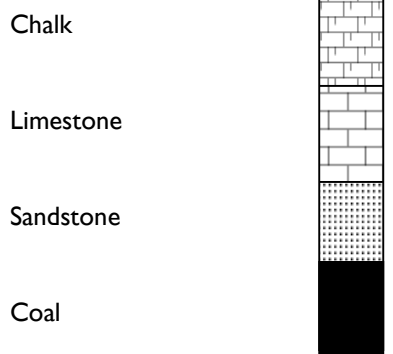
Instrumentation



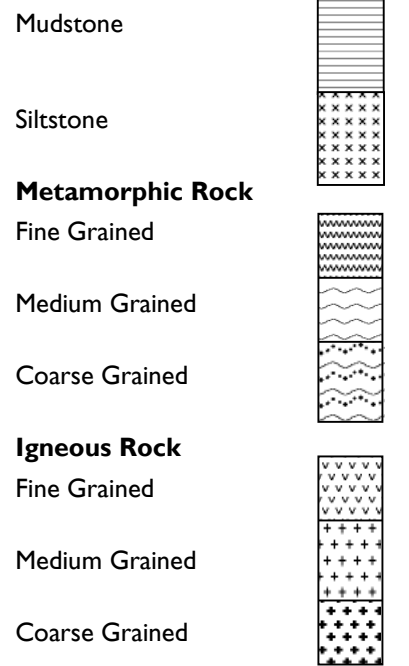
Strata



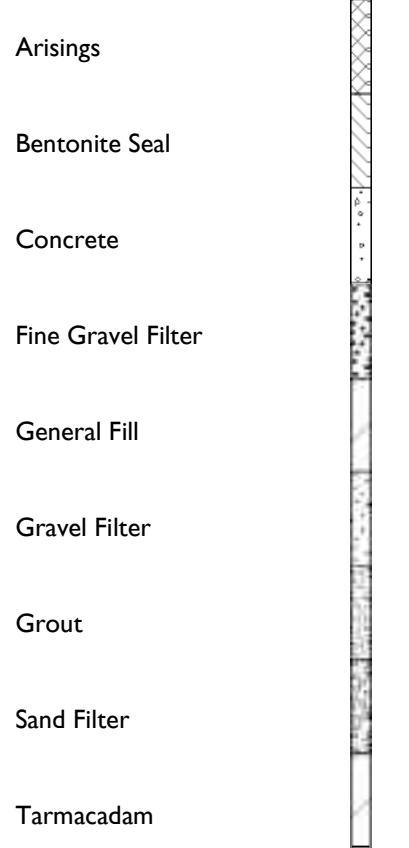
Note: Composite soil types shown by combined symbols



Strata, Continued



Backfill Materials



Rotary Core

| | |
|---|--|
| RQD | Rock Quality Designation (% of intact core >100mm) |
| FRACTURE INDEX | |
| Fractures/metre | |
| FRACTURE SPACING (m) | Maximum |
| NI | Non-intact core |
| NR | No core recovery |
| AZCL | Assumed zone of core loss |
| (where core recovery is unknown it is assumed to be at the base of the run) | |

Project STOCKPORT INTERCHANGE - SUPPLEMENTARY Engineer RAMBOLL UK LIMITED
GROUND INVESTIGATION

Trial Pit **HP01**
Project No PN204140

Client WILLMOTT DIXON CONSTRUCTION LIMITED National Grid Coordinates 389298.5 E
390258.8 N

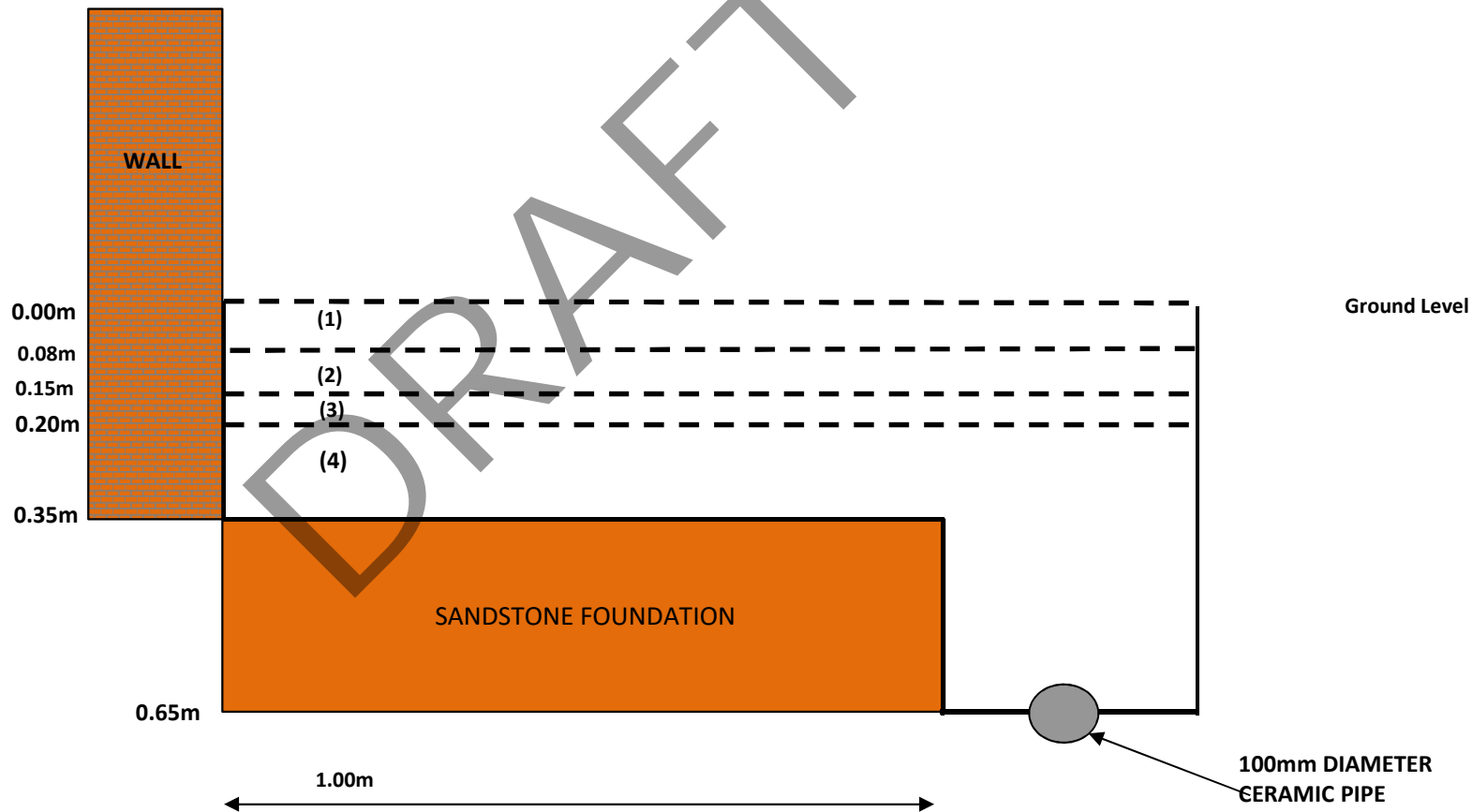
| Samples and Tests | | | | Strata | | Scale 1:50 | |
|-------------------|------|------------|---------|---|-------|------------|--|
| Depth | Type | Stratum No | Results | Description | Depth | Legend | |
| 0.20- 0.50 | B | | PID=0.0 | MADE GROUND: Brick setts. | G.L. | | |
| 0.20- 0.50 | D | | | MADE GROUND: Brown fine to coarse sand. | 0.08 | | |
| 0.20- 0.50 | ES | | | MADE GROUND: Grey sandy angular fine to coarse gravel of limestone. | 0.15 | | |
| 0.20- 0.50 | | | | MADE GROUND: Black gravelly fine to coarse sand including ash. Gravel is angular to subangular fine to coarse of various lithologies, concrete, glass and glassy vitrified tar. At 0.60m, ceramic pipe. End of Excavation | 0.20 | | |
| | | | | | 0.65 | | |

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| Excavation | | | | Groundwater | | |
|------------|---------------------------|-----------------|------------|----------------|--------------|-------------------|
| Plant | Hand tools. | Width (B) | 0.40 | Depth Observed | Depth of Pit | Details |
| Date | 24/09/2020 | Length (C) | 1.00 | | | None encountered. |
| Shoring | None. | Date Backfilled | 24/09/2020 | | | |
| Stability | stable during excavation. | | | | | |

Remarks Inspection pit hand excavated to 0.60m depth. Sandstone foundation outstand noted at 0.35m depth, extending 1.00m from base of wall. Logged by LP
 The Inspection Pit was terminated at 0.65m depth on encountering a 100mm diameter ceramic pipe at 0.60m depth. Figure 1 of 1
 ES sample = 1 x 60ml glass vial, 2 x 258ml amber glass jars. 24/11/2020

All dimensions are in metres. Logged in accordance with BS5930:2015



STRATA DESCRIPTIONS:

- (1) MADE GROUND: Brick setts.
- (2) MADE GROUND: Brown fine to coarse sand.
- (3) MADE GROUND: Grey sandy angular fine to coarse gravel of limestone.
- (4) MADE GROUND: Black gravelly fine to coarse sand including ash. Gravel is angular to subangular fine to coarse of various lithologies, concrete, glass and glassy vitrified tar.

REMARKS:

Inspection pit hand excavated to 0.60m depth.
 Sandstone foundation outstand noted at 0.35m depth, extending 1.00m from base of wall.
 The Inspection pit was terminated at 0.65m depth on encountering a 100mm diameter ceramic pipe at 0.60m depth.

NOT TO SCALE

All Measurements in Metres

All references to the origin and/or ownership of existing underground plant/services are based on the correlation of service drawings provided by the Client and visual inspection of underground plant/services during excavation. Actual origin and/or ownership remains unconfirmed.

Client:

Willmott Dixon
Construction Limited

Project:

STOCKPORT INTERCHANGE
SUPPLEMENTARY GROUND
INVESTIGATION

Project No:

PN204140

Title:

HP01

View:

Long Section

Excavated:

24th September 2020

Drawn by:

CPB

Date:

10th October 2020

Contact:

cbradley@geotechnics.co.uk



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Project STOCKPORT INTERCHANGE - SUPPLEMENTARY Engineer RAMBOLL UK LIMITED
GROUND INVESTIGATION



Trial Pit **HP02**
Project No PN204140

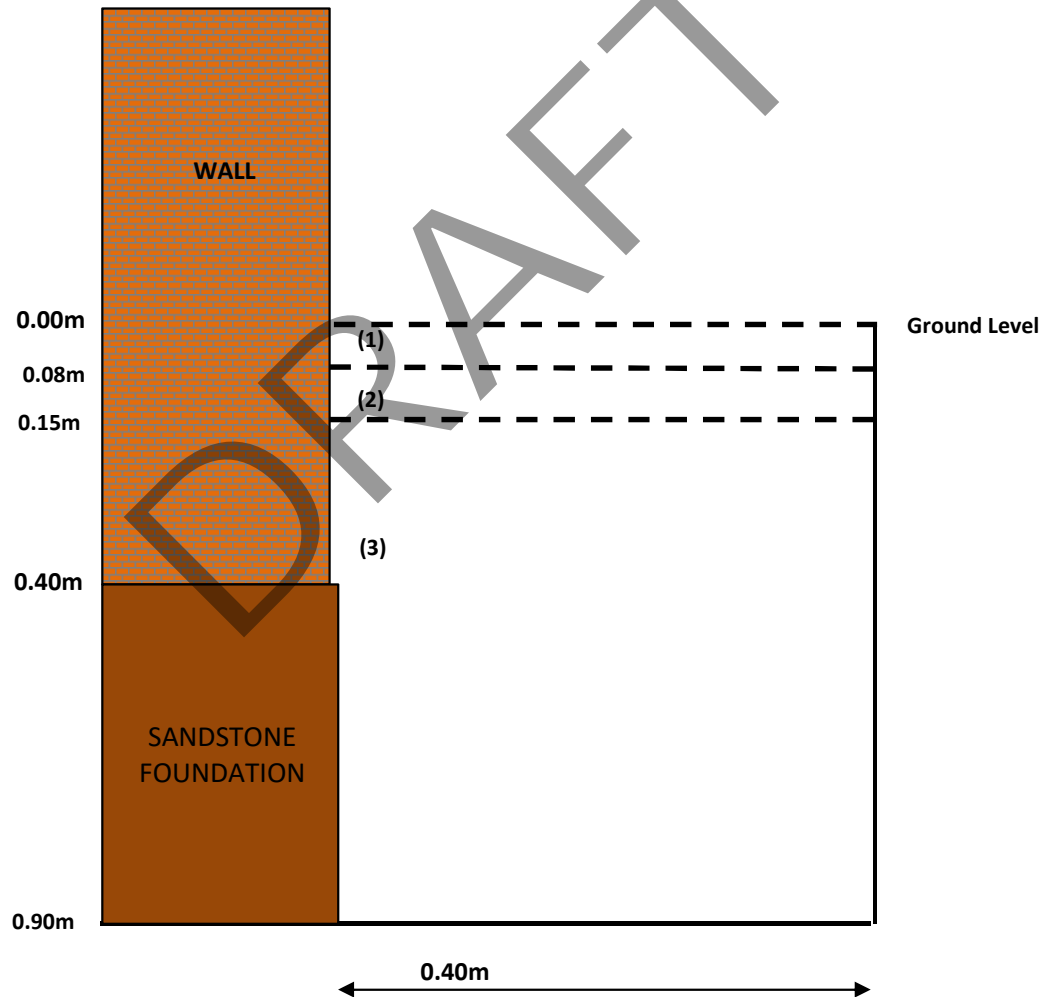
Client WILLMOTT DIXON CONSTRUCTION LIMITED National Grid Coordinates 389295.2 E 390264.4 N

| Samples and Tests | | | | Strata | | Scale 1:50 | |
|-------------------|------|------------|---------|---|-------|------------|--|
| Depth | Type | Stratum No | Results | Description | Depth | Legend | |
| 0.20- 0.90 | B | | PID=0.0 | MADE GROUND: Black tarmacadam. | G.L. | | |
| 0.20- 0.90 | D | | | MADE GROUND: Brown sandy angular fine to coarse gravel of limestone. | 0.08 | | |
| 0.20- 0.90 | ES | | | MADE GROUND: Dark brown gravelly fine to coarse sand with a medium cobble content of sandstone and bricks. Gravel is angular to subangular fine to coarse of sandstone concrete and brick fragments. Sand includes ash. | 0.15 | | |
| 0.20- 0.90 | | | | End of Excavation | 0.90 | | |

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| Excavation | | | | Groundwater | | |
|------------|---------------------------|-----------------|------------|----------------|--------------|-------------------|
| Plant | Hand tools. | Width (B) | 0.40 | Depth Observed | Depth of Pit | Details |
| Date | 25/09/2020 | Length (C) | 0.40 | | | None encountered. |
| Shoring | None. | Date Backfilled | 25/09/2020 | | | |
| Stability | stable during excavation. | | | | | |

Remarks  Inspection pit hand excavated to 0.90m depth. Sandstone foundation noted between 0.40-0.90m depth with no outstand. Logged by LP
 ES sample = 1 x 60ml glass vial, 2 x 258ml amber glass jars. Figure 1 of 1
 24/11/2020

 All dimensions are in metres. Logged in accordance with BS5930:2015



STRATA DESCRIPTIONS:

(1) MADE GROUND: Black tarmacadam.

(2) MADE GROUND: Brown sandy angular fine to coarse gravel of limestone.

(3) MADE GROUND: Dark brown gravelly fine to coarse sand with a medium cobble content of sandstone and bricks. Gravel is angular to subangular fine to coarse of sandstone, concrete and brick fragments. Sand includes ash.

REMARKS:

Inspection pit hand excavated to 0.90m depth.

Sandstone foundation outstand noted between 0.40-0.90m depth with no outstand.

NOT TO SCALE

All Measurements in Metres

All references to the origin and/or ownership of existing underground plant/services are based on the correlation of service drawings provided by the Client and visual inspection of underground plant/services during excavation. Actual origin and/or ownership remains unconfirmed.

Client:

Willmott Dixon
Construction Limited

Project:

STOCKPORT INTERCHANGE
SUPPLEMENTARY GROUND
INVESTIGATION

Project No:

PN204140

Title:

HP02

View:

Long Section

Excavated:

25th September 2020

Drawn by:

CPB

Date:

10th October 2020

Contact:

cbradley@geotechnics.co.uk



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geotechnical and geoenvironmental specialists

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N^o

1

Project STOCKPORT INTERCHANGE - SUPPLEMENTARY Engineer RAMBOLL UK LIMITED
GROUND INVESTIGATION

Trial Pit **HP03**
Project No PN204140

Client WILLMOTT DIXON CONSTRUCTION LIMITED National Grid 389291.0 E
Coordinates 390270.4 N

| Samples and Tests | | | | Strata | | Scale 1:50 | |
|-------------------|------|------------|---------|--|-------|------------|--|
| Depth | Type | Stratum No | Results | Description | Depth | Legend | |
| 0.20- 0.50 | D | | | MADE GROUND: Concrete slab. | G.L. | | |
| 0.20- 0.50 | ES | | PID=0.0 | MADE GROUND: Grey sandy angular fine to medium gravel of sandstone. | 0.07 | | |
| 0.20- 0.50 | | | | | 0.18 | | |
| 0.60- 0.80 | D | | | MADE GROUND: Black gravelly fine to coarse sand. Gravel is angular fine to coarse of clinker and brick fragments. Sand includes ash. | 0.60 | | |
| 0.60- 0.80 | ES | | PID=0.0 | MADE GROUND: Black gravelly fine to coarse sand of ash. Gravel is angular fine to coarse of ash. | 0.80 | | |
| 0.60- 0.80 | | | | MADE GROUND: Reddish brown gravelly fine to coarse sand. Gravel is angular fine to coarse of brick fragments. | 1.10 | | |
| | | | | End of Excavation | | | |

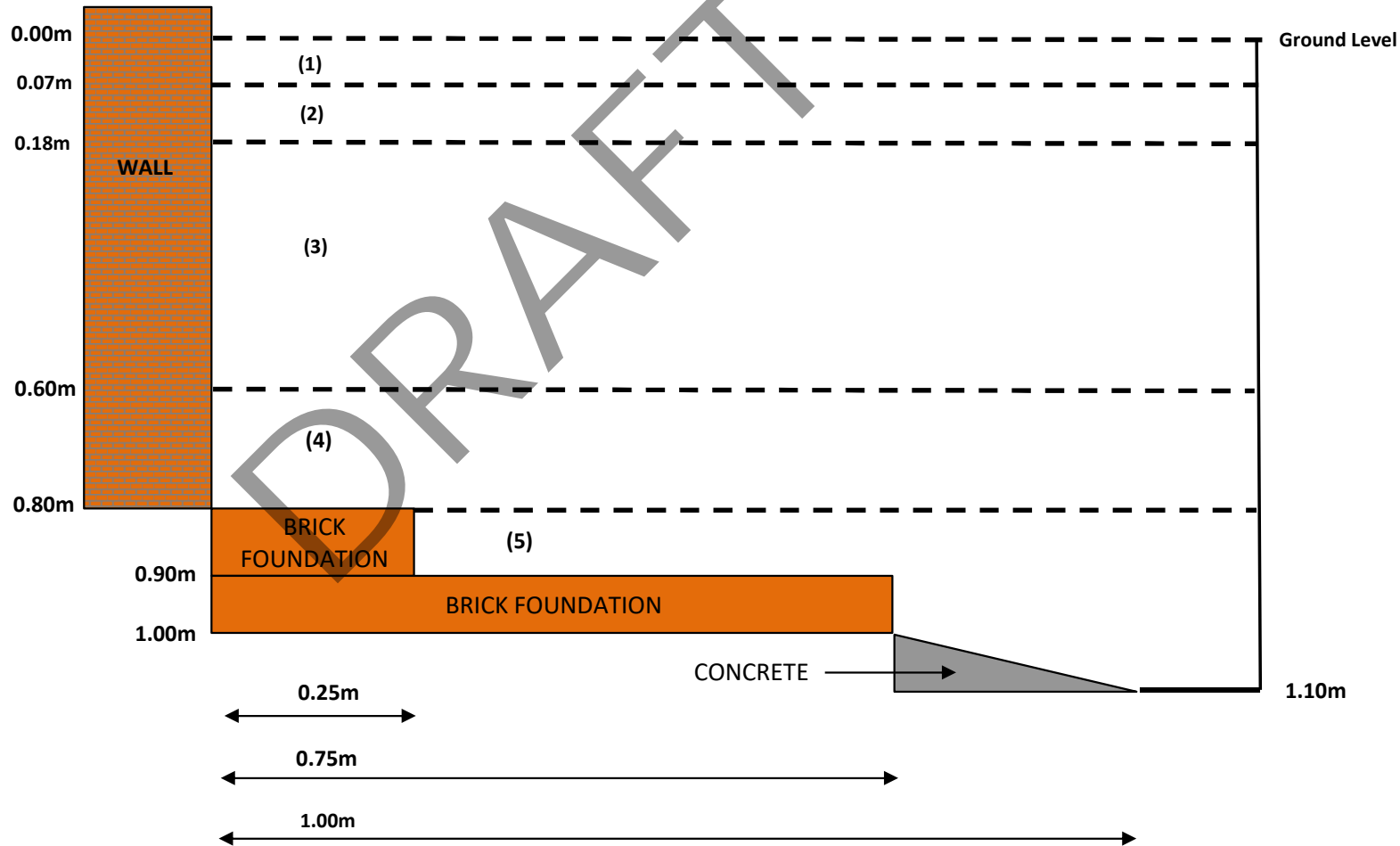
DRAFT

| Excavation | | | | Groundwater | | |
|------------|---------------------------|-----------------|------------|----------------|--------------|-------------------|
| Plant | Hand tools. | Width (B) | 0.40 | Depth Observed | Depth of Pit | Details |
| Date | 24/09/2020 | Length (C) | 1.00 | | | |
| Shoring | None. | Date Backfilled | 24/09/2020 | | | None encountered. |
| Stability | stable during excavation. | | | | | |

Remarks Inspection pit hand excavated to 1.10m depth. Brick foundation noted at 0.80m depth, stepping down to 0.90m depth, extending 0.75m from base of wall. Sloping rough concrete noted between 1.00-1.10m depth, extending 1.00m from base of wall.
ES sample = 1 x 60ml glass vial, 2 x 258ml amber glass jars.

Logged by LP
Figure 1 of 1
24/11/2020

All dimensions are in metres. Logged in accordance with BS5930:2015



STRATA DESCRIPTIONS:

- (1) MADE GROUND: Concrete slab.
- (2) MADE GROUND: Grey sandy angular fine to coarse gravel of limestone.
- (3) MADE GROUND: Black gravelly fine to coarse sand. Gravel is angular fine to coarse of clinker and brick fragments. Sand includes ash.
- (4) MADE GROUND: Black gravelly fine to coarse sand of ash. Gravel is angular fine to coarse of ash.
- (5) MADE GROUND: Reddish brown gravelly fine to coarse sand. Gravel is angular fine to coarse of brick fragments.

REMARKS:

Inspection pit hand excavated to 1.10m depth.
 Brick foundation outstand noted at 0.80m depth, stepping down to 0.90m depth, extending 0.75m from base of wall. Sloping rough concrete noted beyond brick foundation between 1.00-1.10m depth, extending 1.00m from base of wall.

NOT TO SCALE

All Measurements in Metres

All references to the origin and/or ownership of existing underground plant/services are based on the correlation of service drawings provided by the Client and visual inspection of underground plant/services during excavation. Actual origin and/or ownership remains unconfirmed.

Client:

Willmott Dixon
Construction Limited

Project:

STOCKPORT INTERCHANGE
SUPPLEMENTARY GROUND
INVESTIGATION

Project No:

PN204140

Title:

HP03

View:

Long Section

Excavated:

24th September 2020

Drawn by:

CPB

Date:

10th October 2020

Contact:

cbradley@geotechnics.co.uk



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Project STOCKPORT INTERCHANGE - SUPPLEMENTARY Engineer RAMBOLL UK LIMITED
GROUND INVESTIGATION

Trial Pit **HP04**
Project No PN204140

Client WILLMOTT DIXON CONSTRUCTION LIMITED National Grid Coordinates 389282.2 E 390283.3 N

| Samples and Tests | | | | Strata | | Scale 1:50 | |
|-------------------|------|------------|---------|--|----------------------|------------|--|
| Depth | Type | Stratum No | Results | Description | Depth | Legend | |
| | | | | MADE GROUND: Grey concrete. MADE GROUND: Grey and brown subrounded to rounded fine to medium gravel of various lithologies. At 0.15m, concrete. End of Excavation | G.L. 0.08 0.15 | | |

DRAFT

| Excavation | | | | Groundwater | | |
|------------|---------------------------|-----------------|------------|----------------|--------------|-------------------|
| Plant | Hand tools. | Width (B) | 0.40 | Depth Observed | Depth of Pit | Details |
| Date | 25/09/2020 | Length (C) | 0.40 | | | None encountered. |
| Shoring | None. | Date Backfilled | 25/09/2020 | | | |
| Stability | stable during excavation. | | | | | |

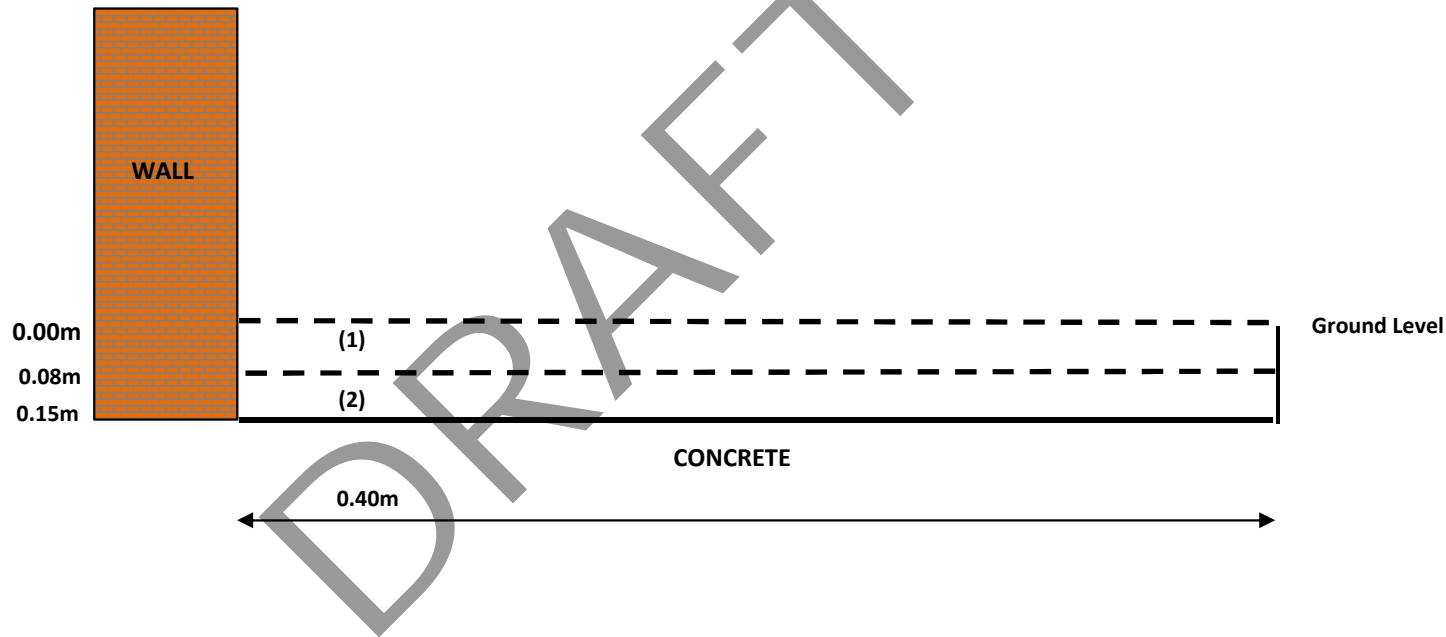
Remarks Inspection pit hand excavated to 0.15m depth and no services were found. The Inspection Pit was terminated at 0.15m depth on encountering concrete across base of the pit. No geotechnical or environmental samples taken.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres.

Logged in accordance with BS5930:2015

Logged by LP
Figure 1 of 1
24/11/2020



STRATA DESCRIPTIONS:

(1) MADE GROUND: Concrete slab.

(2) MADE GROUND: Grey and brown subrounded to rounded fine to medium gravel of various lithologies.

REMARKS:

Inspection pit hand excavated to 0.15m depth and no services were found.

The inspection pit was terminated at 0.15m depth on encountering concrete across the base of the pit.

NOT TO SCALE

All Measurements in Metres

All references to the origin and/or ownership of existing underground plant/services are based on the correlation of service drawings provided by the Client and visual inspection of underground plant/services during excavation. Actual origin and/or ownership remains unconfirmed.

Client:

Willmott Dixon
Construction Limited

Project:

STOCKPORT INTERCHANGE
SUPPLEMENTARY GROUND
INVESTIGATION

Project No:

PN204140

Title:

HP04

View:

Long Section

Excavated:

25th September 2020

Drawn by:

CPB

Date:

10th October 2020

Contact:

cbradley@geotechnics.co.uk



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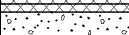

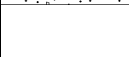
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Project STOCKPORT INTERCHANGE - SUPPLEMENTARY Engineer RABOLL UK LIMITED
GROUND INVESTIGATION


Trial Pit **HP05**
Project No PN204140

Client WILLMOTT DIXON CONSTRUCTION LIMITED National Grid Coordinates 389306.3 E 390248.0 N


| Samples and Tests | | | | Strata | | Scale 1:50 | |
|-------------------|------|------------|---------|---|-------|---|--|
| Depth | Type | Stratum No | Results | Description | Depth | Legend | |
| 0.25- 0.80 | B | | PID=0.0 | MADE GROUND: Brick setts. | G.L. |  | |
| 0.25- 0.80 | D | | | MADE GROUND: Brown fine to medium sand. | 0.08 |  | |
| 0.25- 0.80 | ES | | | MADE GROUND: Pinkish grey sandy angular fine to coarse gravel of limestone. | 0.20 |  | |
| 0.25- 0.80 | | | | MADE GROUND: Black gravelly fine to coarse sand of ash with a medium cobble content of bricks. Gravel is angular fine to coarse of brick fragments. | 0.25 |  | |
| | | | | End of Excavation | 0.80 | | |

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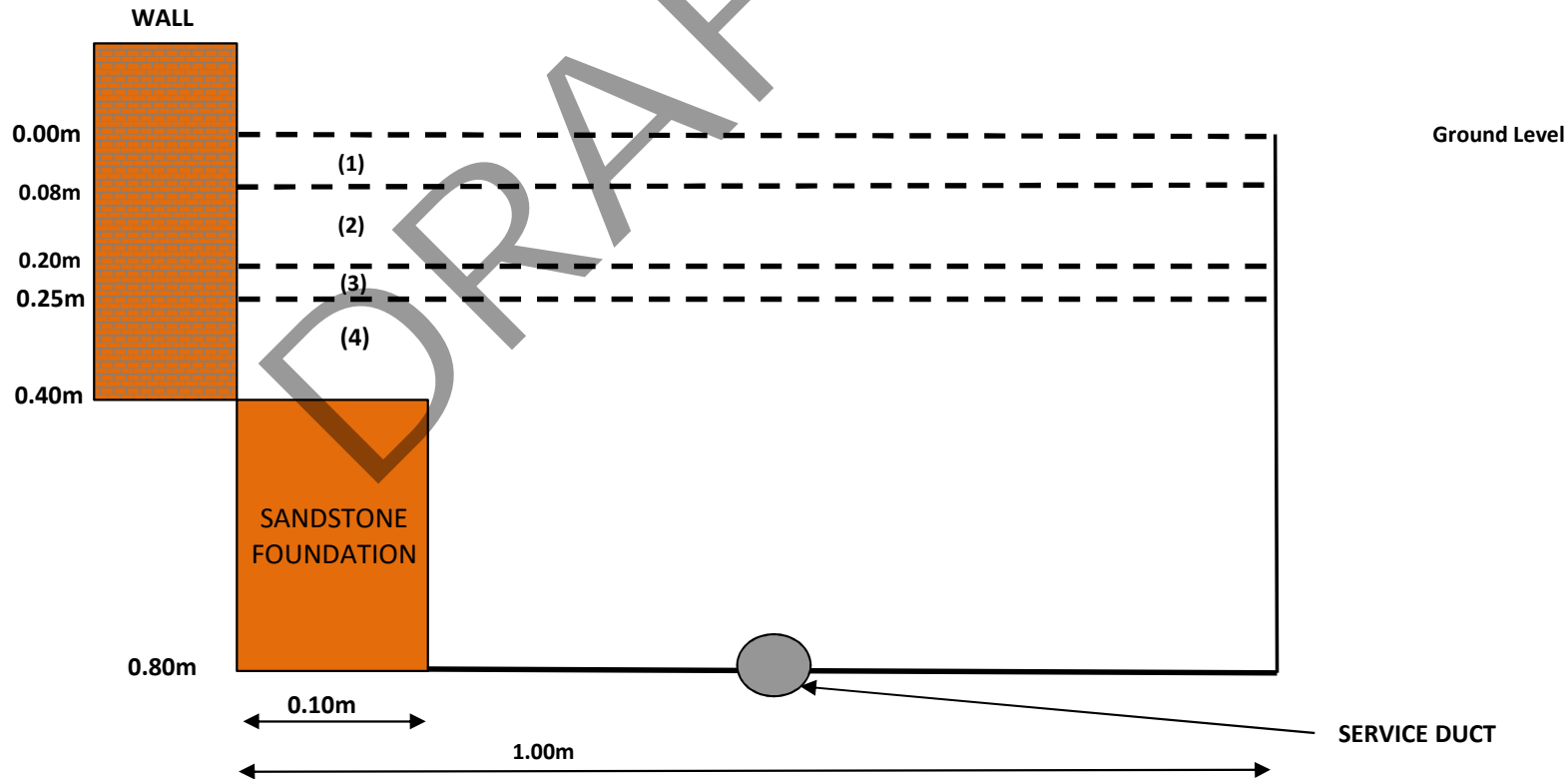
| Excavation | | | | Groundwater | | |
|------------|---------------------------|-----------------|------------|----------------|--------------|-------------------|
| Plant | Hand tools. | Width (B) | 0.50 | Depth Observed | Depth of Pit | Details |
| Date | 25/09/2020 | Length (C) | 1.00 | | | None encountered. |
| Shoring | None. | Date Backfilled | 25/09/2020 | | | |
| Stability | stable during excavation. | | | | | |

Remarks  Inspection pit hand excavated to 0.80m depth. Sandstone foundation noted at 0.40m depth, extending 0.10m from base of wall.
The Inspection Pit was terminated at 0.80m depth on encountering a service duct.
ES sample = 1 x 60ml glass vial, 2 x 258ml amber glass jars.

Logged by LP
Figure 1 of 1
24/11/2020



All dimensions are in metres. Logged in accordance with BS5930:2015



STRATA DESCRIPTIONS:

- (1) MADE GROUND: Brick setts.
- (2) MADE GROUND: Brown fine to medium sand.
- (3) MADE GROUND: Pinkish grey sandy angular fine to coarse gravel of limestone.
- (4) MADE GROUND: Black gravelly fine to coarse sand of ash with a medium cobble content of bricks. Gravel is angular fine to coarse of brick fragments.

REMARKS:

Inspection pit hand excavated to 0.80m depth.
 Sandstone foundation outstand noted at 0.40m depth, extending 0.10m from base of wall.
 The Inspection pit was terminated at 0.80m depth on encountering a service duct.

NOT TO SCALE

All Measurements in Metres

All references to the origin and/or ownership of existing underground plant/services are based on the correlation of service drawings provided by the Client and visual inspection of underground plant/services during excavation. Actual origin and/or ownership remains unconfirmed.

Client:

Willmott Dixon
 Construction Limited

Project:

STOCKPORT INTERCHANGE
 SUPPLEMENTARY GROUND
 INVESTIGATION

Project No:

PN204140

Title:

HP05

View:

Long Section

Excavated:

25th September 2020

Drawn by:

CPB

Date:

10th October 2020

Contact:

cbradley@geotechnics.co.uk



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APPENDIX 3
Hand-Excavated Trial Pit Photographs

PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION.



HP01

PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION.



HP01, Detail

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PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION.



HP02

PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION.



HP02, Detail

PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION.



HP03

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PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION.



HP03, Detail

PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION.



HP04

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PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION.



HP05

DRAFT

PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION.



HP05, Detail

DRAFT

APPENDIX 4
Machine-Excavated Trial Pit Records

DATA SHEET - Symbols and Abbreviations used on Records



Sample Types

| | |
|-----|--|
| B | Bulk disturbed sample |
| BLK | Block sample |
| C | Core sample |
| D | Small disturbed sample (tub/jar) |
| E | Environmental test sample |
| ES | Environmental soil sample |
| EW | Environmental water sample |
| G | Gas sample |
| L | Liner sample |
| LB | Large bulk disturbed sample |
| P | Piston sample (PF - failed P sample) |
| TW | Thin walled push in sample |
| U | Open Tube - 102mm diameter with blows to take sample. (UF - failed U sample) |
| UT | Thin wall open drive tube sampler - 102mm diameter with blows to take sample. (UTF - failed UT sample) |
| V | Vial sample |
| W | Water sample |
| # | Sample Not Recovered |

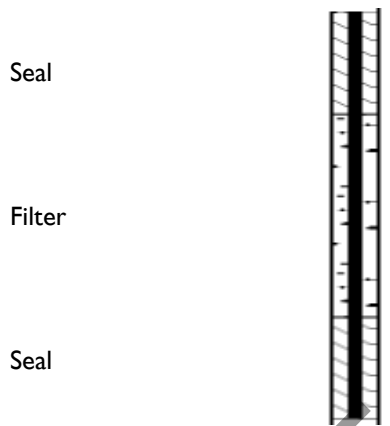
Insitu Testing / Properties

| | |
|---|--|
| CBRP | CBR using TRL probe |
| CHP | Constant Head Permeability Test |
| COND | Electrical conductivity |
| TC | Thermal Conductivity |
| TR | Thermal Resistivity |
| HV | Strength from Hand Vane |
| ICBR | CBR Test |
| IDEN | Density Test |
| IRES | Resistivity Test |
| MEX | CBR using Mexecon Probe Test |
| PKR | Packer Permeability Test |
| PLT | Plate Load Test |
| PP | Strength from Pocket Penetrometer |
| Temp | Temperature |
| VHP | Variable Head Permeability Test |
| VN | Strength from Insitu Vane |
| w% | Water content |
| (All other strengths from undrained triaxial testing) | |
| S | Standard Penetration Test (SPT) |
| C | SPT with cone |
| N | SPT Result |
| -/- | Blows/penetration (mm) after seating drive |
| -*/-(mm) | Total blows/penetration |
| () | Extrapolated value |

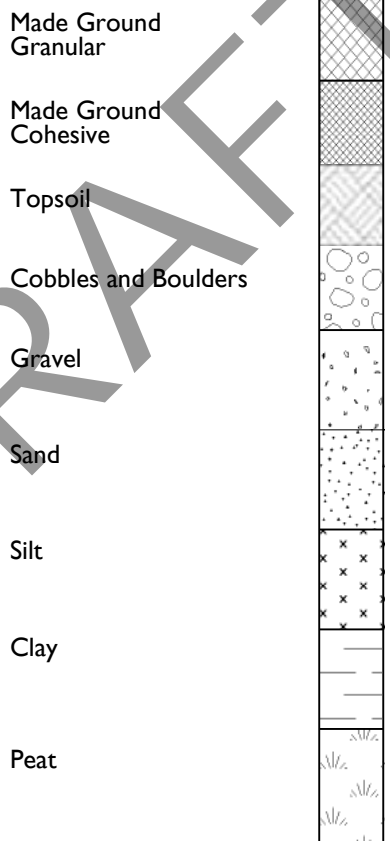
Groundwater

| | |
|---------------------|--|
| Water Strike | |
| Depth Water Rose To | |

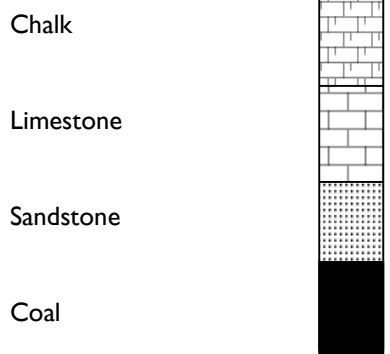
Instrumentation



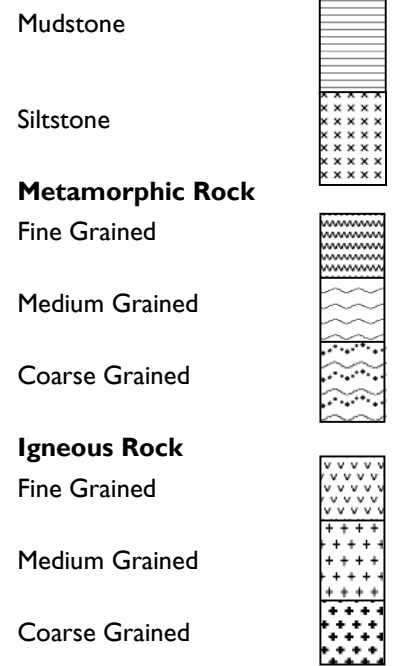
Strata



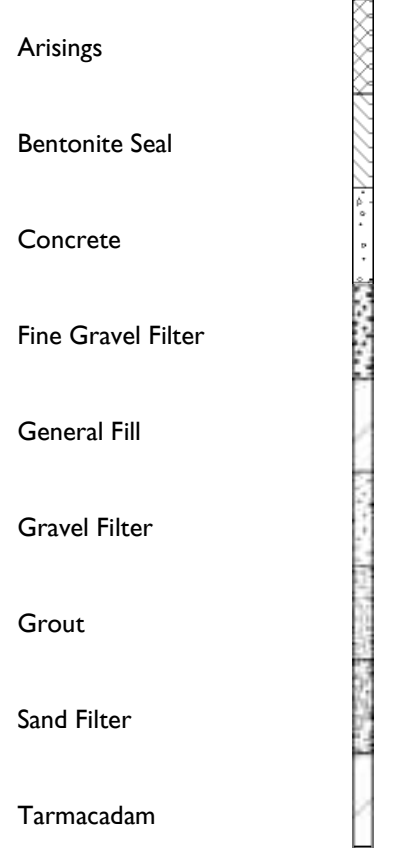
Note: Composite soil types shown by combined symbols



Strata, Continued



Backfill Materials



Rotary Core

| | |
|---|--|
| RQD | Rock Quality Designation (% of intact core >100mm) |
| FRACTURE INDEX | |
| Fractures/metre | |
| FRACTURE SPACING (m) | Maximum |
| NI | Non-intact core |
| NR | No core recovery |
| AZCL | Assumed zone of core loss |
| (where core recovery is unknown it is assumed to be at the base of the run) | |

Project STOCKPORT INTERCHANGE - SUPPLEMENTARY Engineer RAMBOLL UK LIMITED
GROUND INVESTIGATION

Trial Pit **OP400**
Project No PN204140

Client WILLMOTT DIXON CONSTRUCTION LIMITED National Grid 389228.9 E
Coordinates 390143.3 N

| Samples and Tests | | | | Strata | | Scale 1:50 | |
|-------------------|------|------------|---------|--|-------|------------|--|
| Depth | Type | Stratum No | Results | Description | Depth | Legend | |
| 0.25- 0.60 | B | | | MADE GROUND: Black tarmacadam. | G.L. | | |
| 0.25- 0.60 | D | | | MADE GROUND: Pinkish brown sandy angular fine to coarse gravel of limestone. | 0.08 | | |
| 0.25 | ES | | PID=0.0 | | 0.25 | | |
| 0.25 | | | PID=0.0 | MADE GROUND: Brown sandy angular to subrounded fine to coarse gravel of sandstone, limestone, concrete and brick fragments. Some rootlets. | 0.65 | | |
| 0.50 | ES | | PID=0.0 | At 0.65m, concrete across base of pit. | | | |
| 0.50 | | | | End of Excavation | | | |

DRAFT

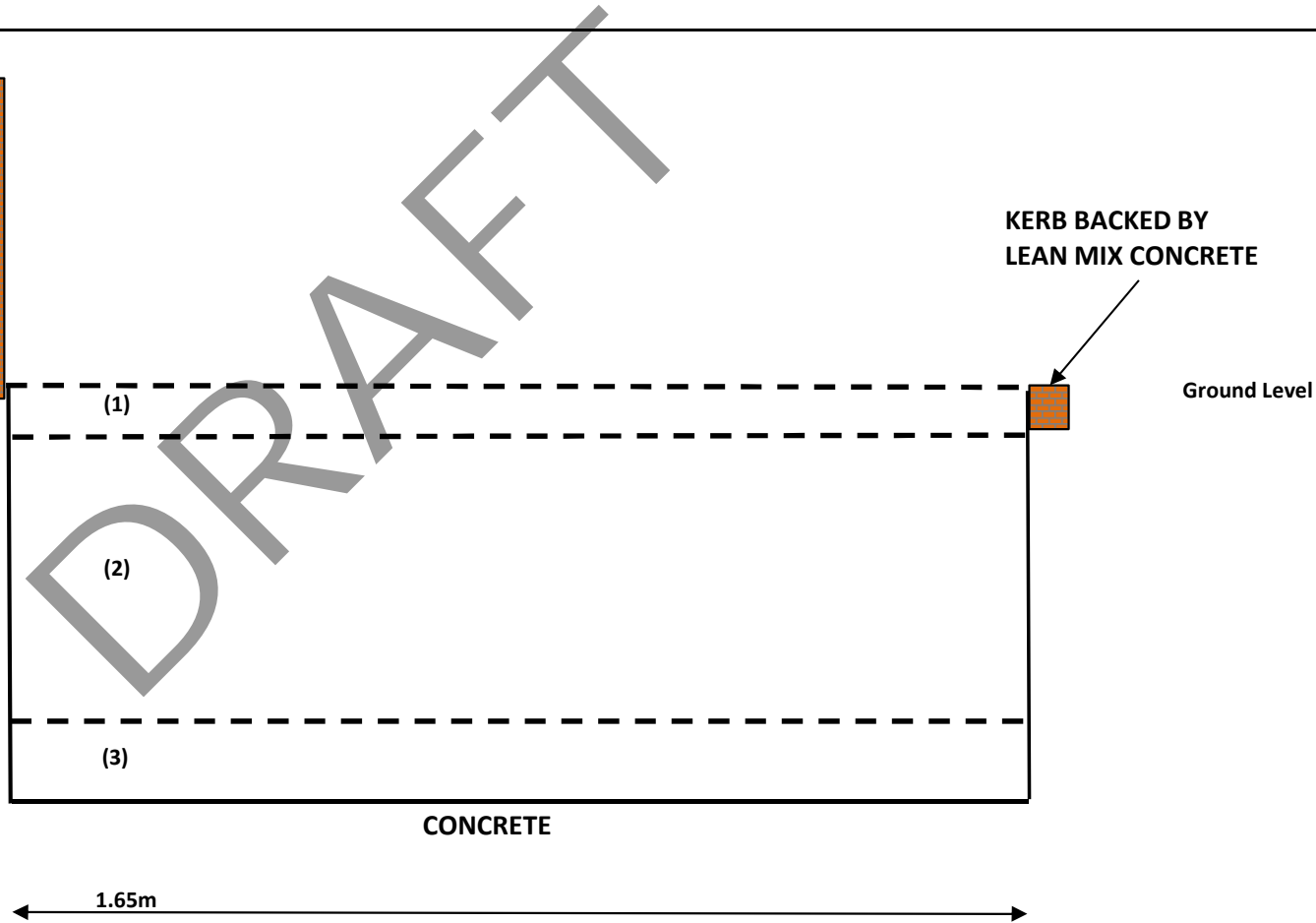
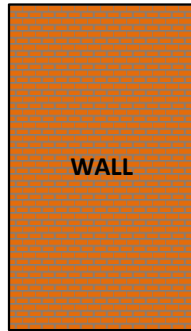
| Excavation | | | | Groundwater | | |
|------------|----------------------------|-----------------|------------|----------------|--------------|-------------------|
| Plant | 5 Tonne tracked excavator. | Width (B) | 0.50 | Depth Observed | Depth of Pit | Details |
| Date | 21/09/2020 | Length (C) | 1.65 | | | None encountered. |
| Shoring | None. | Date Backfilled | 21/09/2020 | | | |
| Stability | stable during excavation. | | | | | |

Remarks The Trial Pit was terminated at 0.65m depth on encountering concrete across base of pit.
ES sample = 1 x 60ml glass vial, 2 x 258ml amber glass jars.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres. Logged in accordance with BS5930:2015

Logged by LP
Figure 1 of 1
24/11/2020



STRATA DESCRIPTIONS:

- (1) MADE GROUND: Black tarmacadam.
- (2) MADE GROUND: Pinkish brown sandy angular fine to coarse gravel of limestone.
- (3) MADE GROUND: Brown sandy angular to subrounded fine to coarse gravel of sandstone, limestone, concrete and brick fragments. Some rootlets.

REMARKS:

Trial trench excavated to 0.65m depth using 5 Tonne tracked excavator and no services encountered.
Concrete encountered across base of trench.

NOT TO SCALE

All Measurements in Metres

All references to the origin and/or ownership of existing underground plant/services are based on the correlation of service drawings provided by the Client and visual inspection of underground plant/services during excavation. Actual origin and/or ownership remains unconfirmed.

Client:

Willmott Dixon
Construction Limited

Project:

STOCKPORT INTERCHANGE
SUPPLEMENTARY GROUND
INVESTIGATION

Project No:

PN204140

Title:

OP400

View:

Long Section

Excavated:

21st September 2020

Drawn by:

CPB

Date:

10th October 2020

Contact:

cbradley@geotechnics.co.uk



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Project STOCKPORT INTERCHANGE - SUPPLEMENTARY Engineer RAMBOLL UK LIMITED
GROUND INVESTIGATION


Trial Pit **OP401**
Project No PN204140


Client WILLMOTT DIXON CONSTRUCTION LIMITED National Grid Coordinates 389241.5 E
390152.9 N

| Samples and Tests | | | | Strata | Scale 1:50 | |
|-------------------|------|------------|---------|--|------------|--------|
| Depth | Type | Stratum No | Results | Description | Depth | Legend |
| 0.20- 0.60 | B | | | MADE GROUND: Black tarmacadam. | G.L. | |
| 0.20- 0.60 | D | | | MADE GROUND: Pinkish brown sandy angular fine to coarse gravel of limestone. | 0.08 | |
| 0.25 | ES | | PID=0.0 | | 0.18 | |
| 0.25 | | | | MADE GROUND: Brown gravelly clayey fine to coarse sand with a medium cobble content of concrete and bricks. Gravel is angular to subrounded fine to coarse of sandstone, limestone, concrete and brick fragments. Some rootlets. | 0.75 | |
| 0.60 | ES | | PID=0.0 | | | |
| 0.60 | | | | Between 0.55-075m, concrete across base of pit, stepping down from 0.55m to 0.75m depth level with spilt in wall along back of trial trench. | | |
| | | | | End of Excavation | | |

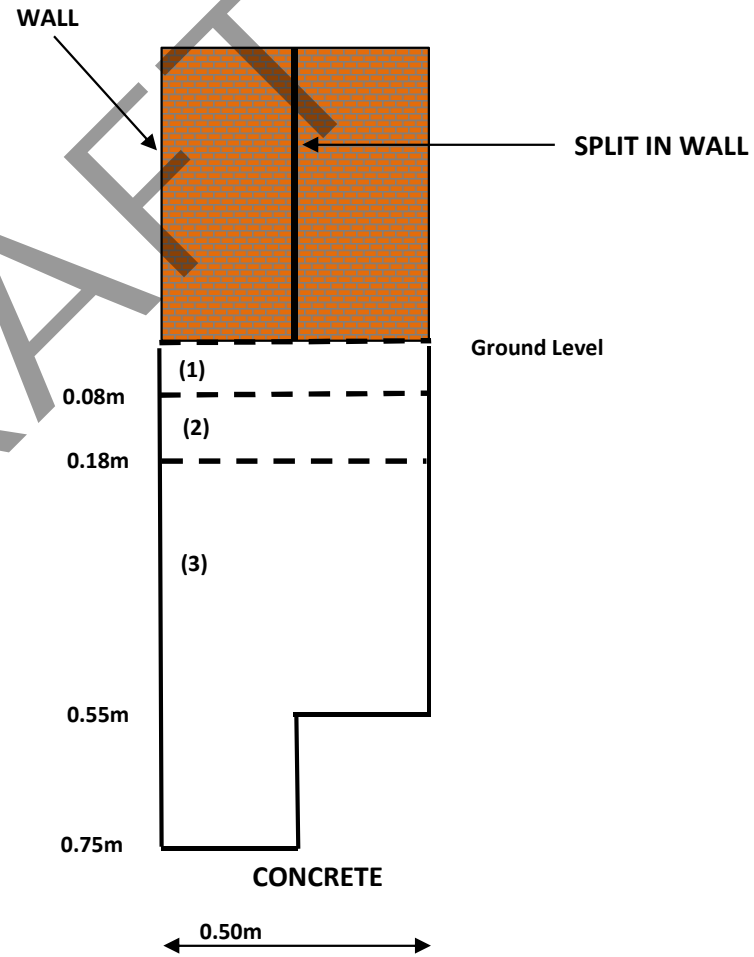
DRAFT

| Excavation | | | | Groundwater | | |
|------------|----------------------------|-----------------|------------|----------------|--------------|-------------------|
| Plant | 5 Tonne tracked excavator. | Width (B) | 0.50 | Depth Observed | Depth of Pit | Details |
| Date | 21/09/2020 | Length (C) | 1.10 | | | |
| Shoring | None. | Date Backfilled | 21/09/2020 | | | None encountered. |
| Stability | stable during excavation. | | | | | |

Remarks  The Trial Pit was terminated at 0.75m depth on encountering concrete across base of pit. Concrete stepping down from 0.55m to 0.75m depth level with spilt in wall along back of trial trench.
 Symbols and abbreviations are explained on the accompanying key sheet.
 ES sample = 1 x 60ml glass vial, 2 x 258ml amber glass jars.
 All dimensions are in metres. Logged in accordance with BS5930:2015

Logged by LP
 Figure 1 of 1
 24/11/2020


DRAFT



STRATA DESCRIPTIONS:

- (1) MADE GROUND: Black tarmacadam.
- (2) MADE GROUND: Pinkish brown sandy angular fine to coarse gravel of limestone.
- (3) MADE GROUND: Brown gravelly clayey fine to coarse sand with a medium cobble content of concrete and bricks. Gravel is angular to subrounded fine to coarse of sandstone, limestone, concrete and brick fragments. Some rootlets.

REMARKS:

Trial trench excavated to 0.75m depth using 5 Tonne tracked excavator and no services encountered.
 Concrete encountered across base of trench stepping down from 0.55m depth to 0.75m depth along line of split in wall.

NOT TO SCALE

All Measurements in Metres

All references to the origin and/or ownership of existing underground plant/services are based on the correlation of service drawings provided by the Client and visual inspection of underground plant/services during excavation. Actual origin and/or ownership remains unconfirmed.

Client:

Willmott Dixon
Construction Limited

Project:

STOCKPORT INTERCHANGE
SUPPLEMENTARY GROUND
INVESTIGATION

Project No:

PN204140

Title:

OP401

View:

End Section

Excavated:

21st September 2020

Drawn by:

CPB

Date:

10th October 2020

Contact:

cbradley@geotechnics.co.uk



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Project STOCKPORT INTERCHANGE - SUPPLEMENTARY Engineer RAMBOLL UK LIMITED
GROUND INVESTIGATION

Trial Pit **OP403**
Project No PN204140

Client WILLMOTT DIXON CONSTRUCTION LIMITED National Grid Coordinates 389267.0 E
390178.4 N

| Samples and Tests | | | | Strata | | Scale 1:50 | |
|-------------------|------|------------|---------|--|-------|------------|--|
| Depth | Type | Stratum No | Results | Description | Depth | Legend | |
| | | | | MADE GROUND: Black tarmacadam. | G.L. | | |
| 0.30- 0.60 | B | | | | 0.08 | | |
| 0.30- 0.60 | D | | | MADE GROUND: Pinkish brown sandy angular fine to coarse gravel of limestone. | 0.20 | | |
| 0.30- 0.60 | ES | | | | | | |
| 0.30- 0.60 | | | PID=0.0 | | 0.65 | | |
| 1.00 | D | | | MADE GROUND: Brown gravelly clayey fine to coarse sand with a medium cobble content of concrete and bricks. Gravel is angular to subrounded fine to coarse of sandstone, limestone, concrete and brick fragments. Some rootlets. | 1.00 | | |
| 1.00 | ES | | | | | | |
| 1.00 | | | PID=0.0 | | | | |
| | | | | MADE GROUND: Pinkish brown sandy angular fine to coarse gravel of limestone. | | | |
| | | | | End of Excavation | | | |

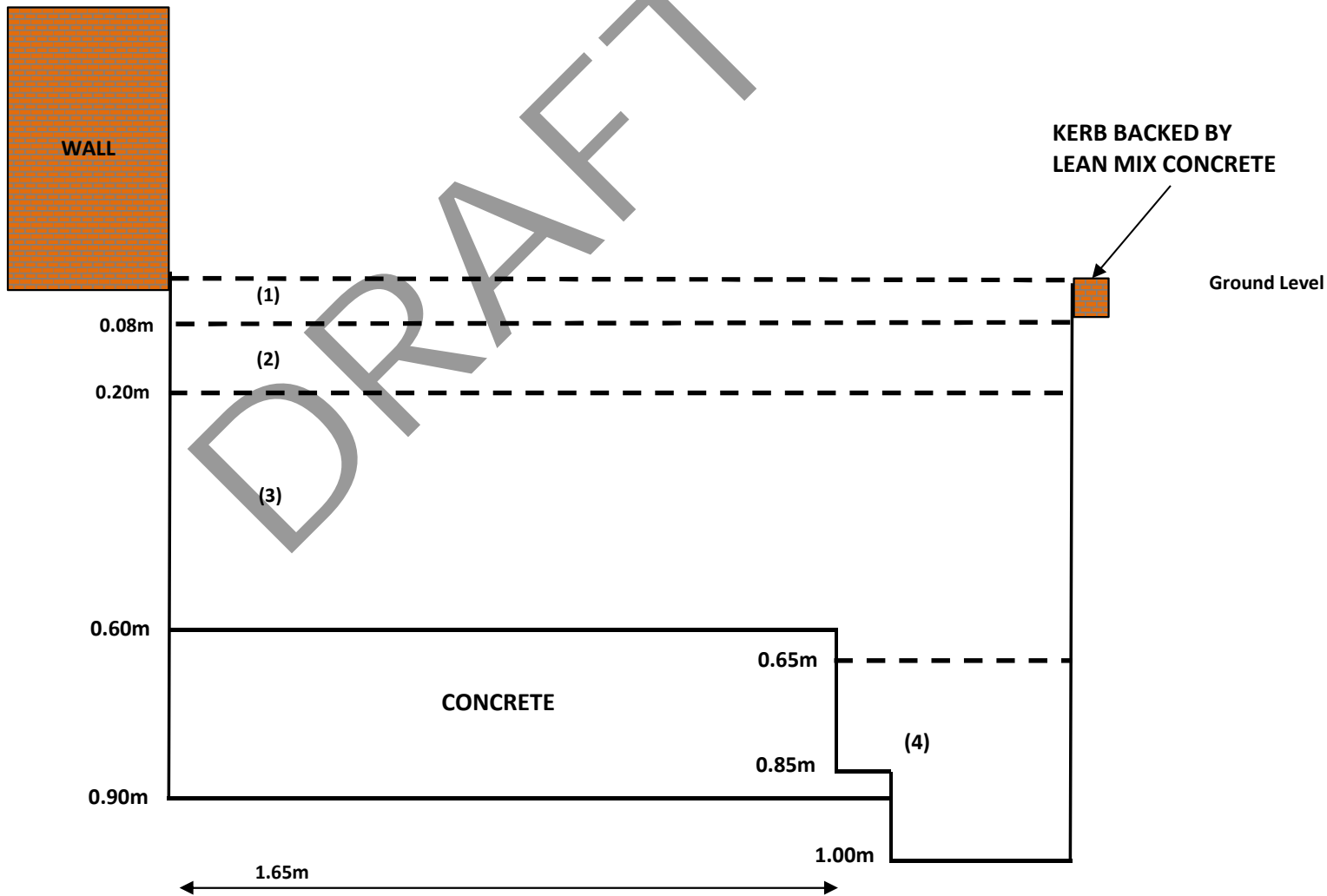
DRAFT

| Excavation | | | | Groundwater | | |
|------------|----------------------------|-----------------|------------|----------------|--------------|-------------------|
| Plant | 5 Tonne tracked excavator. | Width (B) | 0.50 | Depth Observed | Depth of Pit | Details |
| Date | 21/09/2020 | Length (C) | 1.70 | | | |
| Shoring | None. | Date Backfilled | 21/09/2020 | | | None encountered. |
| Stability | stable during excavation. | | | | | |

Remarks Concrete encountered at 0.60m depth extending 1.75m from base of wall. The Trial trench was extended beyond the end of the concrete and was terminated at 1.00m depth when there was not enough space to advance the trial trench deeper down the side of the concrete. Logged by LP

Symbols and abbreviations are explained on the accompanying key sheet. ES sample = 1 x 60ml glass vial, 2 x 258ml amber glass jars. Figure 1 of 1
24/11/2020

All dimensions are in metres. Logged in accordance with BS5930:2015



STRATA DESCRIPTIONS:

- (1) MADE GROUND: Black tarmacadam.
- (2) MADE GROUND: Pinkish brown sandy angular fine to coarse gravel of limestone.
- (3) MADE GROUND: Brown gravelly clayey fine to coarse sand with a medium cobble content of concrete and bricks. Gravel is angular to subrounded fine to coarse of sandstone, limestone, concrete and brick fragments. Some rootlets.
- (4) MADE GROUND: Pinkish brown sandy angular fine to coarse gravel of limestone.

REMARKS:

Trial trench excavated to 0.60m depth extending to 1.75m from base of wall using 5 Tonne tracked excavator and no services encountered. Concrete encountered across base of trench. The Trial trench was extended beyond the end of the concrete and was terminated at 1.00m depth when there was not enough space to advance the trial trench deeper down the side of the concrete.

NOT TO SCALE

All Measurements in Metres

All references to the origin and/or ownership of existing underground plant/services are based on the correlation of service drawings provided by the Client and visual inspection of underground plant/services during excavation. Actual origin and/or ownership remains unconfirmed.

Client:

Willmott Dixon
Construction Limited

Project:

STOCKPORT INTERCHANGE
SUPPLEMENTARY GROUND
INVESTIGATION

Project No:

PN204140

Title:

OP403

View:

Long Section

Excavated:

21st September 2020

Drawn by:

CPB

Date:

10th October 2020

Contact:

cbradley@geotechnics.co.uk



GEOTECHNICS
geotechnical and geoenvironmental specialists

The Geotechnical Centre
Unit 1 Borders Industrial Park
River Lane
Saltney
Chester
CH4 8RJ

Tel.

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Fax.

01244 671122

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APPENDIX 5
Machine-Excavated Trial Pit Photographs

PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION.



OP400, Pit

PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION.



OP400, Side

PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION.



OP400, Detail

PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION.



OP401, Pit

PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION.



OP401, Side

PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION.



OP401, Detail

DRAFT

PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION.



OP403, Pit

PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION.



OP403, Side Detail

PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION.



OP403, Detail

APPENDIX 6

**Dynamic Sample Borehole Records, SPT Results Summary
Sheets and SPT Hammer Energy Test Report**

DATA SHEET - Symbols and Abbreviations used on Records



Sample Types

| | |
|-----|--|
| B | Bulk disturbed sample |
| BLK | Block sample |
| C | Core sample |
| D | Small disturbed sample (tub/jar) |
| E | Environmental test sample |
| ES | Environmental soil sample |
| EW | Environmental water sample |
| G | Gas sample |
| L | Liner sample |
| LB | Large bulk disturbed sample |
| P | Piston sample (PF - failed P sample) |
| TW | Thin walled push in sample |
| U | Open Tube - 102mm diameter with blows to take sample. (UF - failed U sample) |
| UT | Thin wall open drive tube sampler - 102mm diameter with blows to take sample. (UTF - failed UT sample) |
| V | Vial sample |
| W | Water sample |
| # | Sample Not Recovered |

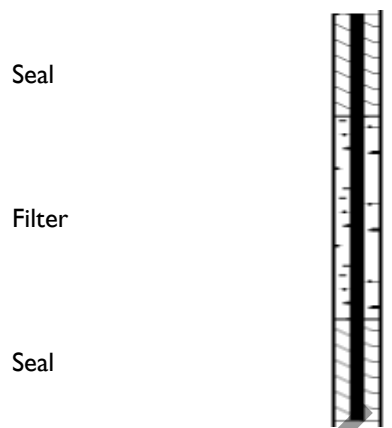
Insitu Testing / Properties

| | |
|---|--|
| CBRP | CBR using TRL probe |
| CHP | Constant Head Permeability Test |
| COND | Electrical conductivity |
| TC | Thermal Conductivity |
| TR | Thermal Resistivity |
| HV | Strength from Hand Vane |
| ICBR | CBR Test |
| IDEN | Density Test |
| IRES | Resistivity Test |
| MEX | CBR using Mexecon Probe Test |
| PKR | Packer Permeability Test |
| PLT | Plate Load Test |
| PP | Strength from Pocket Penetrometer |
| Temp | Temperature |
| VHP | Variable Head Permeability Test |
| VN | Strength from Insitu Vane |
| w% | Water content |
| (All other strengths from undrained triaxial testing) | |
| S | Standard Penetration Test (SPT) |
| C | SPT with cone |
| N | SPT Result |
| -/- | Blows/penetration (mm) after seating drive |
| -*/-(mm) | Total blows/penetration |
| () | Extrapolated value |

Groundwater

| | |
|---------------------|--|
| Water Strike | |
| Depth Water Rose To | |

Instrumentation



Strata

| | |
|----------------------|--|
| Made Ground Granular | |
| Made Ground Cohesive | |
| Topsoil | |
| Cobbles and Boulders | |
| Gravel | |
| Sand | |
| Silt | |
| Clay | |
| Peat | |

Note: Composite soil types shown by combined symbols

| | |
|-----------|--|
| Chalk | |
| Limestone | |
| Sandstone | |
| Coal | |

Strata, Continued

| | |
|-------------------------|--|
| Mudstone | |
| Siltstone | |
| Metamorphic Rock | |
| Fine Grained | |
| Medium Grained | |
| Coarse Grained | |
| Igneous Rock | |
| Fine Grained | |
| Medium Grained | |
| Coarse Grained | |

Backfill Materials

| | |
|--------------------|--|
| Arisings | |
| Bentonite Seal | |
| Concrete | |
| Fine Gravel Filter | |
| General Fill | |
| Gravel Filter | |
| Grout | |
| Sand Filter | |
| Tarmacadam | |

Rotary Core

| | |
|---|--|
| RQD | Rock Quality Designation (% of intact core >100mm) |
| FRACTURE INDEX | |
| Fractures/metre | |
| FRACTURE SPACING (m) | Maximum |
| NI | Non-intact core |
| NR | No core recovery |
| AZCL | Assumed zone of core loss |
| (where core recovery is unknown it is assumed to be at the base of the run) | |

BOREHOLE RECORD - Dynamic Sampler

Draft

Project STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION Engineer RAMBOLL UK LIMITED

Borehole Project No **WS400** PN204140

Client WILLMOTT DIXON CONSTRUCTION LIMITED

National Grid Coordinates 389256.1 E 390220.1 N

Ground Level 43.29 m OD

| Sampling | | | Properties | | | Strata | | | Scale 1:50 | | |
|------------|-------------|--------------------------|--------------|---------|-----------------|---|-------|--------|------------|--|--|
| Depth | Sample Type | Depth Cased & (to Water) | Strength kPa | w % | SPT N | Description | Depth | Legend | Level m OD | | |
| | | | | | | MADE GROUND: Grey concrete slab.. | G.L. | | 43.29 | | |
| 0.30- 0.45 | B | | | | | MADE GROUND: Grey sandy angular to subangular fine to coarse gravel of limestone. | 0.30 | | 42.99 | | |
| 0.30- 0.45 | D | | | | 42.84 | | | | | | |
| 0.30- 0.45 | ES | | PID=0.0 | | | MADE GROUND: Pink very sandy silty angular to subangular fine to coarse gravel of limestone. | 0.45 | | 42.84 | | |
| 0.30- 0.45 | B | | | | 42.09 | | | | | | |
| 0.45- 1.20 | D | | | | | Very soft to soft dark brown organic CLAY. | 1.20 | | 42.09 | | |
| 0.45- 1.20 | ES | | PID=0.0 | S7 | 41.69 | | | | | | |
| 0.45- 1.20 | B | | | | | Soft brown very sandy CLAY. | 1.60 | | 41.69 | | |
| 0.45- 1.20 | D | 1.20 (DRY) | | | 41.29 | | | | | | |
| 1.20- 1.65 | D | | | | | Medium dense orangish brown very gravelly fine to coarse SAND. Gravel is angular to subrounded fine to coarse of sandstone and quartz. | 2.00 | | 41.29 | | |
| 1.20- 1.60 | ES | | PID=0.0 | S15 | 39.99 | | | | | | |
| 1.20- 1.60 | D | | | | | Below 3.00m, very dense. | 3.30 | | 39.86 | | |
| 1.21- 1.60 | D | 2.00 (DRY) | | | 39.86 | | | | | | |
| 1.60- 1.80 | D | | | | | Orangish brown and reddish brown very gravelly fine to medium SAND. Gravel is angular to subrounded fine to coarse of sandstone and quartz. | 3.43 | | 39.86 | | |
| 1.60- 1.80 | D | | | | End of Borehole | | | | | | |
| 1.80- 2.00 | D | | | | | | | | | | |
| 2.00- 3.00 | B | | | | | | | | | | |
| 2.00- 2.45 | D | 3.00 (DRY) | | S50/275 | | | | | | | |
| 3.00- 3.43 | D | | | | | | | | | | |

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| Boring | | | | Progress | | | | | Groundwater | | | | | |
|--------|----------|-----------------|-------|---------------|-------------|----------------|----------|-------|--------------|-------------|---------|---------|--------------|------------------------|
| Depth | Hole Dia | Technique | Crew | Depth of Hole | Depth Cased | Depth to Water | Date | Time | Depth Struck | Depth Cased | Rose to | in Mins | Depth Sealed | Remarks on Groundwater |
| 0.30 | 0.30 | Concrete Core | KW | G.I. | | | 08/09/20 | 08:00 | | | | | | None encountered. |
| 1.20 | 0.30 | Inspection Pit | NS/KS | 3.43 | 3.00 | DRY | 08/09/20 | 18:00 | | | | | | |
| 3.43 | 0.10 | Dynamic Sampler | NS/KS | | | | | | | | | | | |

Remarks A concrete core was drilled to 0.30m depth and an inspection pit hand excavated in the base of the core hole to 1.20m depth and no services were found.
 ES sample = 1 x 60ml glass vial, 2 x 258ml amber glass jars.
 The Dynamic Sample Borehole was terminated at 3.43m depth on refusal.
 A 50mm standpipe was installed to 3.00m with a geowrapped slotted section from 1.50m to 3.00m with flush lockable protective cover. Backfill details from base of hole: gravel filter up to 1.50m, bentonite seal up to 0.50m, concrete up to ground level.

Logged by LP
 Figure 1 of 1
 24/11/2020

All dimensions are in metres. Logged in accordance with BS5930:2015

BOREHOLE RECORD - Dynamic Sampler

Draft

Project STOCKPORT INTERCHANGE - SUPPLEMENTARY Engineer RABOLL UK LIMITED
GROUND INVESTIGATION

Borehole WS401
Project No PN204140

Client WILLMOTT DIXON CONSTRUCTION LIMITED

National Grid Coordinates 389212.0 E
390203.5 N

Ground Level 42.86 m OD

| Sampling | | | Properties | | | Strata | | Scale 1:50 | | |
|------------|-------------|--------------------------|--------------|---------|-------|--|-------|------------|------------|--|
| Depth | Sample Type | Depth Cased & (to Water) | Strength kPa | w % | SPT N | Description | Depth | Legend | Level m OD | |
| | | | | | | MADE GROUND: Grey reinforced concrete slab. | G.L. | | 42.86 | |
| 0.30- 0.80 | D | | | | | MADE GROUND: Pinkish grey sandy angular to subangular fine to coarse gravel of limestone. | 0.30 | | 42.56 | |
| 0.30- 0.80 | ES | | PID=0.0 | | | | | | | |
| 0.30- 0.80 | | | | | | | | | | |
| 0.80- 1.20 | D | | | | | Medium dense greyish brown sandy SILT. Between 1.20-1.40m, occasional black staining. | 1.20 | | 41.66 | |
| 0.80- 1.20 | ES | | PID=0.0 | S11 | | | | | | |
| 1.20- 1.65 | D | 1.20 (DRY) | | | | | | | | |
| 1.20- 1.40 | ES | | PID=0.0 | | | Medium dense brown slightly gravelly to gravelly fine to coarse SAND. Gravel is subangular to subrounded fine to coarse of sandstone and quartz. | 1.60 | | 41.26 | |
| 1.20- 1.40 | | | | | | | | | | |
| 1.40- 1.60 | D | | | | | | | | | |
| 1.60- 2.00 | B | | | | | Very dense orangish brown very gravelly fine to coarse SAND. Gravel is angular to subrounded fine to coarse of sandstone and quartz. | 2.70 | | 40.16 | |
| 2.00- 2.45 | D | 2.00 (DRY) | | S28 | | | | | | |
| 2.45- 2.70 | D | | | | | | | | | |
| 2.70- 3.00 | D | | | | | End of Borehole | 3.43 | | 39.43 | |
| 3.00- 3.43 | D | 3.00 (DRY) | | S50/275 | | | | | | |

DRAFT


| Boring | | | | Progress | | | | | Groundwater | | | | | |
|--------|----------|-----------------|-------|---------------|-------------|----------------|----------|-------|--------------|-------------|---------|---------|--------------|------------------------|
| Depth | Hole Dia | Technique | Crew | Depth of Hole | Depth Cased | Depth to Water | Date | Time | Depth Struck | Depth Cased | Rose to | in Mins | Depth Sealed | Remarks on Groundwater |
| 0.30 | 0.30 | Concrete Core | KW | G.I. | | | 08/09/20 | 08:00 | | | | | | None encountered. |
| 1.20 | 0.30 | Inspection Pit | NS/KS | 3.43 | 3.00 | DRY | 08/09/20 | 18:00 | | | | | | |
| 3.43 | 0.10 | Dynamic Sampler | NS/KS | | | | | | | | | | | |

Remarks A concrete core was drilled to 0.30m depth and an inspection pit hand excavated in the base of the core hole to 1.20m depth and no services were found.
 ES sample = 1 x 60ml glass vial, 2 x 258ml amber glass jars.
 The Dynamic Sample Borehole was terminated at 3.43m depth on refusal.
 A 50mm standpipe was installed to 3.00m with a geowrapped slotted section from 1.50m to 3.00m with flush lockable protective cover. Backfill details from base of hole: gravel filter up to 1.50m, bentonite seal up to 0.50m, concrete up to ground level.

Logged by LP
 Figure 1 of 1
 24/11/2020

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres. Logged in accordance with BS5930:2015



BOREHOLE RECORD - Dynamic Sampler

Draft

Project STOCKPORT INTERCHANGE - SUPPLEMENTARY Engineer RAMBOLL UK LIMITED
GROUND INVESTIGATION

Borehole WS402
Project No PN204140

Client WILLMOTT DIXON CONSTRUCTION LIMITED

National Grid Coordinates 389220.9 E
390227.9 N

Ground Level 42.36 m OD

| Sampling | | | Properties | | | Strata | | Scale 1:50 | | |
|------------|-------------|--------------------------|--------------|-----|---------|--|-------|------------|------------|--|
| Depth | Sample Type | Depth Cased & (to Water) | Strength kPa | w % | SPT N | Description | Depth | Legend | Level m OD | |
| | | | | | | MADE GROUND: Block paving over reddish brown fine to coarse sand. | G.L. | | 42.36 | |
| | | | | | | MADE GROUND: Grey concrete. | 0.12 | | 42.24 | |
| 0.40- 1.20 | B | | | | | | 0.40 | | 41.96 | |
| 0.40- 1.20 | D | | | | | | | | | |
| 0.40- 1.20 | ES | | | | | MADE GROUND: Grey sandy silty angular to subangular fine to coarse gravel of limestone. | | | | |
| | | | PID=0.0 | | | | | | | |
| 1.20- 1.65 | D | 1.20 (DRY) | | | S15 | Medium dense grey silty fine SAND with occasional black speckling. | 1.20 | | 41.16 | |
| 1.20- 1.50 | ES | | | | | | | | | |
| 1.20- 1.50 | | | PID=0.0 | | | | | | | |
| 1.21- 1.50 | D | | | | | | | | | |
| 1.50- 1.80 | D | | | | | | | | | |
| 1.80- 2.00 | D | | | | | | 1.80 | | 40.56 | |
| 2.00- 3.00 | B | | | | | Dense orangish brown and reddish brown very gravelly fine to coarse SAND with a low cobble content of sandstone. Gravel is subangular to rounded fine to coarse of sandstone and quartz. | | | | |
| 2.00- 2.45 | D | 2.00 (DRY) | | | S43 | | | | | |
| | | | | | | | | | | |
| 3.00- 3.35 | D | 3.00 (DRY) | | | S50/200 | Below 3.00m, very dense. | | | | |
| | | | | | | | 3.35 | | 39.01 | |
| | | | | | | End of Borehole | | | | |

DRAFT

| Boring | | | | Progress | | | | | Groundwater | | | | | |
|--------|----------|-----------------|-------|---------------|-------------|----------------|----------|-------|--------------|-------------|---------|---------|--------------|------------------------|
| Depth | Hole Dia | Technique | Crew | Depth of Hole | Depth Cased | Depth to Water | Date | Time | Depth Struck | Depth Cased | Rose to | in Mins | Depth Sealed | Remarks on Groundwater |
| 0.40 | 0.30 | Concrete Core | KW | G.I. | | | 08/09/20 | 08:00 | | | | | | None encountered. |
| 1.20 | 0.30 | Inspection Pit | NS/KS | 3.35 | 3.00 | DRY | 08/09/20 | 18:00 | | | | | | |
| 3.35 | 0.10 | Dynamic Sampler | NS/KS | | | | | | | | | | | |

Remarks A concrete core was drilled to 0.40m depth and an inspection pit hand excavated in the base of the core hole to 1.20m depth and no services were found.
 ES sample = 1 x 60ml glass vial, 2 x 258ml amber glass jars.
 The Dynamic Sample Borehole was terminated at 3.35m depth on refusal.
 A 50mm standpipe was installed to 3.00m with a geowrapped slotted section from 1.50m to 3.00m with flush lockable protective cover. Backfill details from base of hole: gravel filter up to 1.50m, bentonite seal up to 0.50m, concrete up to ground level.

Logged by LP
 Figure 1 of 1
 24/11/2020

geotechnics

All dimensions are in metres. Logged in accordance with BS5930:2015

Fieldwork Results - SPT Results Summary

Project STOCKPORT INTERCHANGE - SUPPLEMENTARY
GROUND INVESTIGATION

Project No PN204140

Client WILLMOTT DIXON CONSTRUCTION LIMITED

| Hole | Depth m bgl | Level m OD | Type | SWP (mm) | Seating Drive | | Test Drive | | | | SPT 'N' Value | Uncorrected SPT 'N' | | | | | |
|-----------------------------|----------------|---------------|---------------|-------------|---------------|----------------|--------------|----------------|-----------------|-----------------|------------------|------------------------|----|----|----|----|---|
| | | | | | 0-75 (mm) | 75-150 (mm) | 0-75 (mm) | 75-150 (mm) | 150-225 (mm) | 225-300 (mm) | | 10 | 20 | 30 | 40 | 50 | |
| WS400 | 1.20 | 42.09 | S | - | 3 | 2 | 3 | 2 | 1 | 1 | 7 | * | | | | | |
| WS400 | 2.00 | 41.29 | S | - | 2 | 2 | 3 | 3 | 4 | 5 | 15 | * | | | | | |
| WS400 | 3.00 | 40.29 | S | - | 7 | 9 | 14 | 17 | 17 | 2/50 | 50/275 | | | | | | > |
| Driller | | | Nathan Slater | | | Remarks | | | | | | | | | | | |
| Hammer No. | | | DART428 | | | | | | | | | | | | | | |
| Energy Ratio, Er (%) | | | 65.00 | | | | | | | | | | | | | | |
| Calibration Date | | | 27/01/2020 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |

-/- Blows/penetration (mm) after seating

-*/- Total blows/penetration (mm)

SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)

C - SPT with cone

L - Split Spoon with liner used

GEOTECHNICS



Fieldwork Results - SPT Results Summary

Project STOCKPORT INTERCHANGE - SUPPLEMENTARY
GROUND INVESTIGATION

Project No PN204140

Client WILLMOTT DIXON CONSTRUCTION LIMITED

| Hole | Depth m bgl | Level m OD | Type | SWP (mm) | Seating Drive | | Test Drive | | | | SPT 'N' Value | Uncorrected SPT 'N' | | | | | |
|--|----------------|---------------|---------------|-------------|---------------|----------------|--------------|----------------|-----------------|-----------------|------------------|------------------------|----|----|----|----|---|
| | | | | | 0-75 (mm) | 75-150 (mm) | 0-75 (mm) | 75-150 (mm) | 150-225 (mm) | 225-300 (mm) | | 10 | 20 | 30 | 40 | 50 | |
| WS401 | 1.20 | 41.66 | S | - | 3 | 2 | 2 | 3 | 3 | 3 | 11 | * | | | | | |
| WS401 | 2.00 | 40.86 | S | - | 4 | 6 | 7 | 7 | 7 | 7 | 28 | | * | | | | |
| WS401 | 3.00 | 39.86 | S | - | 11 | 10 | 13 | 15 | 18 | 4/50 | 50/275 | | | | | | > |
| <div style="font-size: 48px; opacity: 0.3; transform: rotate(-30deg); pointer-events: none;">DRAFT</div> | | | | | | | | | | | | | | | | | |
| Driller | | | Nathan Slater | | | Remarks | | | | | | | | | | | |
| Hammer No. | | | DART428 | | | | | | | | | | | | | | |
| Energy Ratio, Er (%) | | | 65.00 | | | | | | | | | | | | | | |
| Calibration Date | | | 27/01/2020 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |

-/- Blows/penetration (mm) after seating

*/- Total blows/penetration (mm)

SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)

C - SPT with cone

L - Split Spoon with liner used

GEOTECHNICS

Fieldwork Results - SPT Results Summary

Project STOCKPORT INTERCHANGE - SUPPLEMENTARY
GROUND INVESTIGATION

Project No PN204140

Client WILLMOTT DIXON CONSTRUCTION LIMITED

| Hole | Depth m bgl | Level m OD | Type | SWP (mm) | Seating Drive | | Test Drive | | | | SPT 'N' Value | Uncorrected SPT 'N' | | | | | | |
|-----------------------------|----------------|---------------|---------------|-------------|---------------|----------------|--------------|----------------|-----------------|-----------------|------------------|------------------------|----|----|----|----|--|---|
| | | | | | 0-75 (mm) | 75-150 (mm) | 0-75 (mm) | 75-150 (mm) | 150-225 (mm) | 225-300 (mm) | | 10 | 20 | 30 | 40 | 50 | | |
| WS402 | 1.20 | 41.16 | S | - | 5 | 6 | 6 | 4 | 2 | 3 | 15 | | * | | | | | |
| WS402 | 2.00 | 40.36 | S | - | 10 | 12 | 10 | 10 | 11 | 12 | 43 | | | | | * | | |
| WS402 | 3.00 | 39.36 | S | - | 11 | 13 | 19 | 22 | 9/50 | | 50/200 | | | | | | | > |
| Driller | | | Nathan Slater | | | Remarks | | | | | | | | | | | | |
| Hammer No. | | | DART428 | | | | | | | | | | | | | | | |
| Energy Ratio, Er (%) | | | 65.00 | | | | | | | | | | | | | | | |
| Calibration Date | | | 27/01/2020 | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |

-/- Blows/penetration (mm) after seating
 -*/- Total blows/penetration (mm)
 SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)
 C - SPT with cone
 L - Split Spoon with liner used

GEOTECHNICS



SPT Hammer Energy Test Report

In accordance with BSEN ISO 22476-3:2005

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

SPT Hammer Ref: DART428
Test Date: 27/01/2020
Report Date: 27/01/2020
File Name: DART428.spt
Test Operator: CM

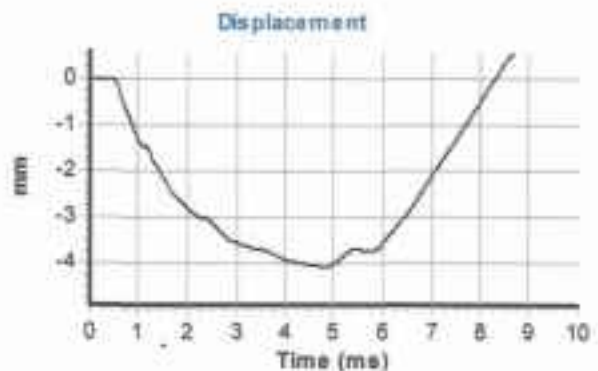
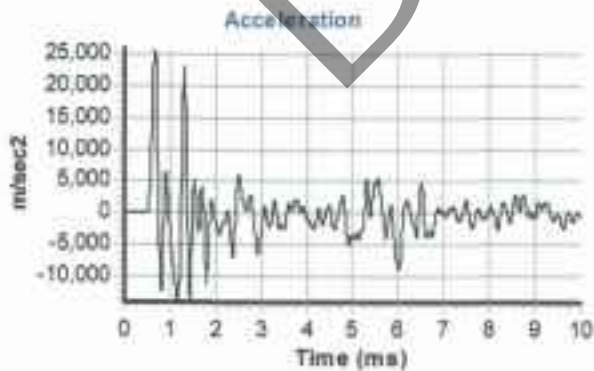
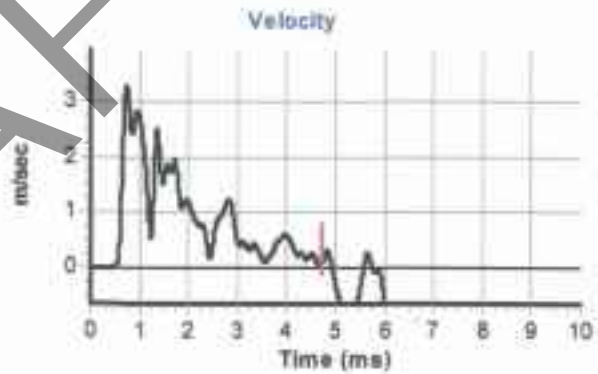
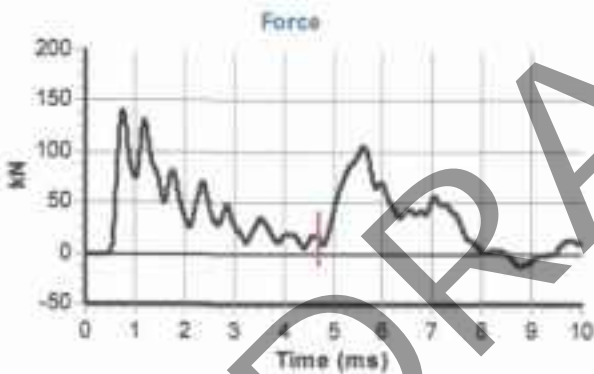
Instrumented Rod Data

Diameter d_r (mm): 54
Wall Thickness t_r (mm): 6.5
Assumed Modulus E_a (GPa): 208
Accelerometer No.1: 7080
Accelerometer No.2: 11609

SPT Hammer Information

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

Comments / Location



Calculations

Area of Rod A (mm²): 970
Theoretical Energy E_{theor} (J): 473
Measured Energy E_{meas} (J): 309

Energy Ratio E_r (%): **65**

Signed: C. McCLUSKEY
Title: FITTER

The recommended calibration interval is 12 months

APPENDIX 7

Cable Percussion with Rotary Cored Follow-On Borehole Records, SPT Results Summary Sheets and SPT Hammer Energy Test Report

DATA SHEET - Symbols and Abbreviations used on Records



Sample Types

| | |
|-----|--|
| B | Bulk disturbed sample |
| BLK | Block sample |
| C | Core sample |
| D | Small disturbed sample (tub/jar) |
| E | Environmental test sample |
| ES | Environmental soil sample |
| EW | Environmental water sample |
| G | Gas sample |
| L | Liner sample |
| LB | Large bulk disturbed sample |
| P | Piston sample (PF - failed P sample) |
| TW | Thin walled push in sample |
| U | Open Tube - 102mm diameter with blows to take sample. (UF - failed U sample) |
| UT | Thin wall open drive tube sampler - 102mm diameter with blows to take sample. (UTF - failed UT sample) |
| V | Vial sample |
| W | Water sample |
| # | Sample Not Recovered |

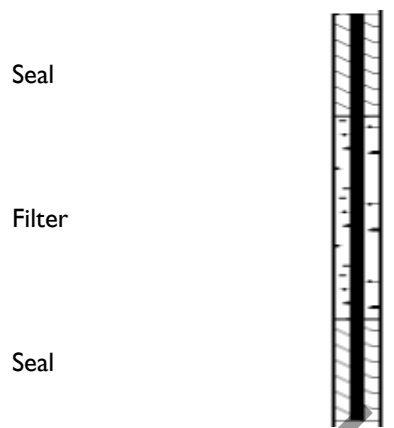
Insitu Testing / Properties

| | |
|---|--|
| CBRP | CBR using TRL probe |
| CHP | Constant Head Permeability Test |
| COND | Electrical conductivity |
| TC | Thermal Conductivity |
| TR | Thermal Resistivity |
| HV | Strength from Hand Vane |
| ICBR | CBR Test |
| IDEN | Density Test |
| IRES | Resistivity Test |
| MEX | CBR using Mexecon Probe Test |
| PKR | Packer Permeability Test |
| PLT | Plate Load Test |
| PP | Strength from Pocket Penetrometer |
| Temp | Temperature |
| VHP | Variable Head Permeability Test |
| VN | Strength from Insitu Vane |
| w% | Water content |
| (All other strengths from undrained triaxial testing) | |
| S | Standard Penetration Test (SPT) |
| C | SPT with cone |
| N | SPT Result |
| -/- | Blows/penetration (mm) after seating drive |
| -*/-(mm) | Total blows/penetration |
| () | Extrapolated value |

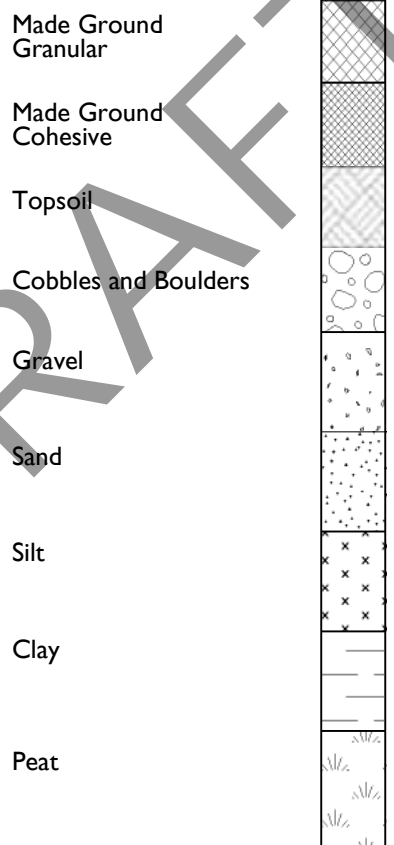
Groundwater

| | |
|---------------------|--|
| Water Strike | |
| Depth Water Rose To | |

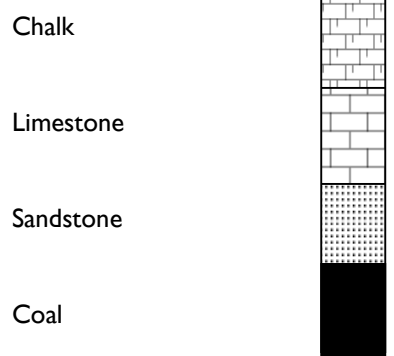
Instrumentation



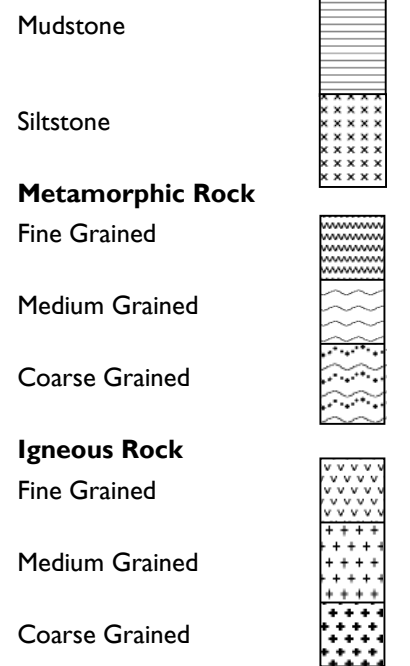
Strata



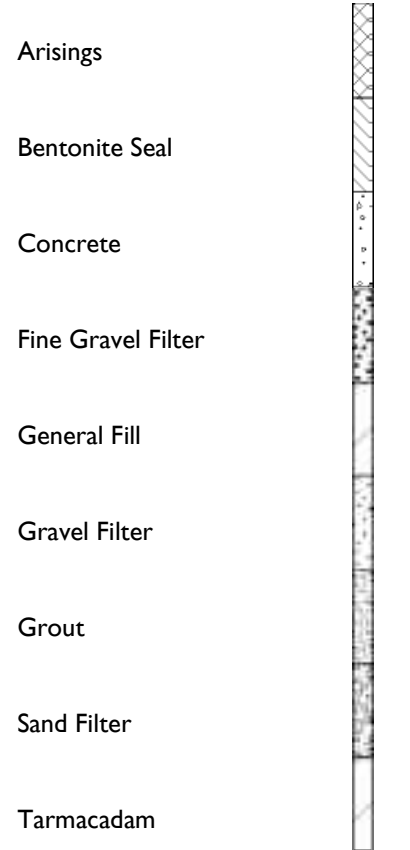
Note: Composite soil types shown by combined symbols



Strata, Continued



Backfill Materials



Rotary Core

| | |
|---|--|
| RQD | Rock Quality Designation (% of intact core >100mm) |
| FRACTURE INDEX | |
| Fractures/metre | |
| FRACTURE SPACING (m) | Maximum |
| NI | Non-intact core |
| NR | No core recovery |
| AZCL | Assumed zone of core loss |
| (where core recovery is unknown it is assumed to be at the base of the run) | |

BOREHOLE RECORD - Cable Percussion and Rotary

Draft

Project STOCKPORT INTERCHANGE - SUPPLEMENTARY Engineer RAMBOLL UK LIMITED
GROUND INVESTIGATION

Borehole BH400
Project No PN204140

Client WILLMOTT DIXON CONSTRUCTION LIMITED National Grid Coordinates 389211.8 E
390166.1 N

Ground Level 44.46 m OD

| Sampling | | | Properties | | | Strata | | Scale 1:50 | | |
|--------------------------------|--------------|--------------------------|----------------|-------|-------|--|-------|------------|------------|--|
| Depth | Sample Type | Depth Cased & (to Water) | Strength kPa | w % | SPT N | Description | Depth | Legend | Level m OD | |
| 0.35- 1.00 | B | | | 5.0 | | MADE GROUND: Grey reinforced concrete slab. | G.L. | | 44.46 | |
| 0.35 | D | | | | | | 0.35 | | 44.11 | |
| 0.35 | ES | | | | | MADE GROUND: Grey sandy angular to subangular fine to coarse gravel of limestone. | 0.45 | | 44.01 | |
| 1.00- 1.20 | B | | | | | MADE GROUND: Pink slightly sandy angular to subangular fine to coarse gravel of limestone. | 1.00 | | 43.46 | |
| 1.20- 1.65 | B | | | | | MADE GROUND: Dark brown and black angular fine to coarse gravel of sandstone and brick fragments. | 1.20 | | 43.26 | |
| 1.20- 1.65 | D | 1.20 (DRY) | | | S5 | | | | | |
| 1.50 | ES | | | | | Soft grey very sandy CLAY. | 1.60 | | 42.86 | |
| 1.50 | | | | | | | | | | |
| 2.00- 2.45 | B | | | | | Very loose to loose brown fine to coarse SAND with bands of soft brown sandy clay. | | | | |
| 2.00- 2.45 | D | 2.00 (DRY) | | | S4 | | | | | |
| | | | | | | | | | | |
| | | | | | | Very soft greyish brown sandy CLAY with pockets of amorphous peat. | 2.70 | | 41.76 | |
| | | | | | | | 2.90 | | 41.56 | |
| Core Run/Depth (Core Dia/Time) | Depth Cased | TCR/SCR / Type | Length Max/Min | RQD % | | Continued by Rotary techniques General | | Detail | | |
| 2.90- 4.70 (102mm) | 2.90 (ADDED) | 0 | | 0 | | Very stiff greyish brown and reddish brown slightly sandy gravelly CLAY. Gravel is subangular to rounded fine to coarse of sandstone and quartz. | | | | |
| 4.70- 6.20 (102mm) | 4.70 (ADDED) | 0 | | 0 | | Very stiff greyish brown slightly sandy gravelly CLAY with a low boulder content of sandstone. Gravel is subangular to rounded fine to coarse of sandstone and quartz. | 4.70 | | 39.76 | |
| | | | | | | | | | | |
| | | | | | | End of Borehole | 6.20 | | 38.26 | |

| Boring | | | | Progress | | | | | Groundwater | | | | | |
|--------|------|------------------|-------|---------------|-------------|----------------|----------|-------|--------------|-------------|---------|---------|--------------|------------------------|
| Depth | Dia | Technique | Crew | Depth of Hole | Depth Cased | Depth to Water | Date | Time | Depth Struck | Depth Cased | Rose to | in Mins | Depth Sealed | Remarks on Groundwater |
| 0.35 | 0.30 | Concrete Core | KW | G.I. | | | 10/09/20 | 08:00 | | | | | | None encountered. |
| 1.20 | 0.30 | Inspection Pit | LM/MP | 2.90 | 2.90 | DRY | 10/09/20 | 18:00 | | | | | | |
| 2.90 | 0.20 | Cable Percussion | LM/MP | 2.90 | 2.90 | DRY | 23/09/20 | 08:00 | | | | | | |
| 6.20 | 0.10 | Rotary Core | SP/RC | 6.20 | 6.20 | ADDED | 23/09/20 | 18:00 | | | | | | |

Remarks
 A concrete core was drilled to 0.35m depth and an inspection pit hand excavated in the base of the core hole to 1.20m depth and no services were found.
 ES sample = 1 x 60ml glass vial, 2 x 258ml amber glass jars.
 Ground conditions encountered between 2.90-6.20m depth unsuitable for High Pressure Dilatometer (HPD) Tests.
 Backfill details from base of hole: bentonite seal up to 1.20m, concrete up to ground level.

Logged by LP
 Figure 1 of 1
 24/11/2020

geotechnics

All dimensions are in metres. Logged in accordance with BS5930:2015

BOREHOLE RECORD - Cable Percussion and Rotary

Draft

Project STOCKPORT INTERCHANGE - SUPPLEMENTARY Engineer RAMBOLL UK LIMITED
GROUND INVESTIGATION

Borehole BH401
Project No PN204140

Client WILLMOTT DIXON CONSTRUCTION LIMITED National Grid Coordinates 389232.0 E
390183.2 N

Ground Level 44.20 m OD

| Drilling | | Properties/Sampling | | | | Strata | | Scale 1:50 | | |
|-----------------------------------|-----------------------------|---------------------|-------------------|----------|--------------|---|--|------------|--------|---------------|
| Core Run/Depth (Core Dia/Time) | Depth Cased & (to Water) | Type TCR/SCR% | Length Max/Min | RQD % | SPT N (F) | Description General | Description Detail | Depth | Legend | Level m OD |
| 10.70-12.20 (102mm) | 10.70 (ADDED) | 100 | 0.30 | 54 | | Gravel is subrounded to rounded fine to coarse of quartz. Discontinuities are very closely to medium spaced horizontal occasionally subhorizontal undulating rough occasionally planar rough with sand infill (up to 1mm thick). | | | | |
| 11.00-11.12 | | 100 | 0.01 | | (10) | | | | | |
| 11.80-12.10 | | C | | | | | | | | |
| 12.20-13.70 (102mm) | 12.20 (ADDED) | 87 | 0.18 | 49 | | Very weak to weak reddish brown fine to coarse grained SANDSTONE with widely spaced subrounded fine to medium quartz gravel. Discontinuities are very closely to medium spaced horizontal occasionally subhorizontal undulating rough with sand infill (up to 2mm thick). | Between 15.20-16.10m, assumed zone of core loss. | 15.20 | 29.00 | |
| 13.10-13.18 | | 84 | 0.03 | | (11) | | | | | |
| 13.70-15.20 (102mm) | 13.70 (ADDED) | 90 | 0.14 | 34 | | | | | | |
| 14.65-14.80 | | 90 | 0.01 | | (11) | | | | | |
| 15.20-16.70 (102mm) | 15.20 (ADDED) | 43 | 0.18 | 30 | | Very weak to weak reddish brown fine to coarse grained SANDSTONE with widely spaced subrounded fine to medium quartz gravel. Discontinuities are very closely to medium spaced horizontal occasionally subhorizontal undulating rough with sand infill (up to 2mm thick). | Between 18.20-19.10m, assumed zone of core loss. | | 24.20 | |
| 16.45-16.62 | | 43 | 0.05 | | (9) | | | | | |
| 16.70-18.20 (102mm) | 16.70 (ADDED) | 84 | 0.22 | 42 | | | | | | |
| 17.50-17.62 | | 84 | 0.03 | | (8) | | | | | |
| 18.20-19.70 (102mm) | 18.20 (ADDED) | 40 | 0.18 | 18 | | (AZCL) | | | | |
| 19.55-19.70 | | 38 | 0.01 | | (9) | | | | | |
| 19.70-20.00 (102mm) | 19.70 (ADDED) | 84 | 0.09 | 0 | (9) | | | | | |
| | | 84 | 0.06 | | | End of Borehole | | 20.00 | | |

| Drilling | | | | Progress | | | | | Groundwater | | | | | |
|----------|----------|-----------|------|---------------|-------------|----------------|------|------|--------------|-------------|---------|---------|--------------|------------------------|
| Depth | Hole Dia | Technique | Crew | Depth of Hole | Depth Cased | Depth to Water | Date | Time | Depth Struck | Depth Cased | Rose to | in Mins | Depth Sealed | Remarks on Groundwater |
| | | | | | | | | | | | | | | |

Remarks **Ground level.**
ABSF Flush: 3.30-20.00m, Water, 100% return.

Symbols and abbreviations are explained on the accompanying key sheet.
 All dimensions are in metres. Logged in accordance with BS5930:2015

Logged by LP
 Figure 2 of 2
 24/11/2020

geotechnics

BOREHOLE RECORD - Cable Percussion and Rotary

Draft

Project STOCKPORT INTERCHANGE - SUPPLEMENTARY Engineer RAMBOLL UK LIMITED
GROUND INVESTIGATION

Borehole BH402
Project No PN204140

Client WILLMOTT DIXON CONSTRUCTION LIMITED

National Grid Coordinates 389278.7 E
390214.6 N

Ground Level 44.04 m OD

| Sampling | | | Properties | | | Strata | | | Scale 1:50 | | | | | |
|---|--------------|--------------------------|----------------|---------------|-------------|--|----------|--------|--------------|-------------|---------|---------|---------------|------------------------|
| Depth | Sample Type | Depth Cased & (to Water) | Strength kPa | w % | SPT N (FI) | Description | Depth | Legend | Level m OD | | | | | |
| 0.20- 0.90 | B | | | | | MADE GROUND: Block paving over reddish brown fine to coarse sand. | G.L. | | 44.04 | | | | | |
| 0.20 | D | | | | | | 0.20 | | 43.84 | | | | | |
| 0.20 | ES | | PID=0.0 | | | MADE GROUND: Grey very sandy silty angular to subangular fine to coarse gravel of limestone. | | | | | | | | |
| 0.20 | | | | | | | | | | | | | | |
| 0.50 | ES | | PID=0.0 | | | | 0.90 | | 43.14 | | | | | |
| 0.50 | | | | | | | | | | | | | | |
| 0.90- 1.20 | B | | | | | MADE GROUND: Medium dense reddish brown and grey clayey fine to coarse sand and angular to subangular fine to coarse gravel of brick fragments, sandstone, quartz and mudstone. High cobble content of bricks. | | | | | | | | |
| 0.90 | D | | | | | | | | | | | | | |
| 0.90 | ES | | PID=0.0 | | | | | | | | | | | |
| 0.90 | | | | | | | | | | | | | | |
| 1.20- 1.65 | B | | | | S19 | | | | | | | | | |
| 1.20- 1.65 | D | 1.20 (DRY) | | | | | | | | | | | | |
| 2.00- 2.45 | B | | | | | | | | | | | | | |
| 2.00- 2.45 | D | 2.00 (DRY) | | | S19 | | | | | | | | | |
| 2.00 | ES | | PID=0.0 | | | | | | | | | | | |
| 2.00 | | | | | | | | | | | | | | |
| 2.50 | ES | | PID=0.0 | | | Soft black slightly organic sandy CLAY. | 2.50 | | 41.54 | | | | | |
| 2.50 | | | | | | | 2.60 | | 41.44 | | | | | |
| 2.60 | D | | | | | Grey and brown clayey SAND and subangular to rounded fine to coarse GRAVEL of sandstone, siltstone, mudstone quartz. Low to medium cobble and boulder content of sandstone. | | | | | | | | |
| | | | | | | | 3.20 | | 40.84 | | | | | |
| Core Run/Depth (Core Dia/Time) | Depth Cased | TCR/SCR / Type | Length Max/Min | ROD % | SPT (FI) | Continued by Rotary techniques General | | | | | | | | |
| 3.20- 4.40 (102mm) | 3.20 (ADDED) | 100 | 0.14 | 14 | (12) | Very weak reddish brown fine to medium grained SANDSTONE with very closely spaced black laminations. Discontinuities are extremely closely to closely spaced horizontal planar rough clean. | | | | | | | | |
| 3.65- 3.80 | | 97 C | 0.01 | | | | | | | | | | | |
| 4.40- 5.90 (102mm) | 4.40 (ADDED) | 0 | 0 | 0 | | | | | | | | | | |
| | | 0 | 0 | 0 | | | | | | | | | | |
| 5.90- 7.40 (102mm) | 5.90 (ADDED) | 0 | 0 | 0 | (AZCL) | | | | | | | | | |
| | | 0 | 0 | 0 | | | | | | | | | | |
| 7.40- 8.60 (102mm) | 7.40 (ADDED) | 33 | 0.06 | 0 | | | | | | | | | | |
| | | 20 | 0.01 | | | | | | | | | | | |
| | | | | | (>30) | Very weak reddish brown fine to coarse grained SANDSTONE with bands of rounded fine to coarse gravel of quartz. Discontinuities are extremely closely to very closely spaced horizontal planar rough with sand infill. | 8.20 | | 35.84 | | | | | |
| 8.60- 9.80 (102mm) | 8.60 (ADDED) | 58 | 0.12 | 10 | (AZCL) | | | | | | | | | |
| | | 32 | 0.01 | | | | | | | | | | | |
| | | | | | (>30) | | | | | | | | | |
| 9.56- 9.70 | | C | | | (10) | Very weak to weak reddish brown fine to coarse grained SANDSTONE. | 9.40 | | 34.64 | | | | | |
| 9.80-11.30 (102mm) | 9.80 (ADDED) | 88 | 0.12 | 45 | | | | | | | | | | |
| | | 88 | 0.08 | | | | | | | | | | | |
| Boring | | | Progress | | | Ground water | | | | | | | | |
| Depth | Dia | Technique | Crew | Depth of Hole | Depth Cased | Depth to Water | Date | Time | Depth Struck | Depth Cased | Rose to | in Mins | Depth Sealed | Remarks on Groundwater |
| 0.20 | 0.30 | Concrete Core | KW | G.I. | | | 11/09/20 | 08:00 | | | | | | None encountered |
| 1.20 | 0.30 | Inspection Pit | LM/MP | 3.20 | 3.20 | DRY | 11/09/20 | 18:00 | | | | | | - minor inflows |
| 3.20 | 0.20 | Cable Percussion | LM/MP | 3.20 | 3.20 | DRY | 21/09/20 | 08:00 | | | | | | possibly masked |
| 20.30 | 0.10 | Rotary Core | AW/PB | 8.60 | 8.60 | ADDED | 21/09/20 | 18:00 | | | | | | by drilling |
| | | | | 8.60 | 8.60 | ADDED | 22/09/20 | 08:00 | | | | | | flush below |
| | | | | 20.30 | 20.30 | ADDED | 22/09/20 | 18:00 | | | | | | 3.20m depth. |
| Remarks | | | | | | | | | | | | | Logged by LP | |
| A concrete core was drilled to 0.20 depth and an inspection pit hand excavated in the base of the core hole to 1.20m depth and no services were found. Slow digging noted between 0.90-1.20m depth. | | | | | | | | | | | | | Figure 1 of 3 | |
| Symbols and abbreviations are explained on the accompanying key sheet. | | | | | | | | | | | | | 24/11/2020 | |
| ES sample = 1 x 60ml glass vial, 2 x 258ml amber glass jars. | | | | | | | | | | | | | geotechnics | |
| Water was added to assist boring between 2.60-3.00m depth. | | | | | | | | | | | | | | |
| High Pressure Dilatometer (HPD) Test carried out at 4.20m depth. HPD Test attempted at 8.60m depth but test pocket collapsed and no test was possible. | | | | | | | | | | | | | | |
| A 50mm standpipe was installed to 10.50m with a geowrapped slotted section from 4.50m to | | | | | | | | | | | | | | |
| All dimensions are in metres. | | | | | | | | | | | | | | |
| Logged in accordance with BS5930:2015 | | | | | | | | | | | | | | |

BOREHOLE RECORD - Cable Percussion and Rotary

Draft

Project STOCKPORT INTERCHANGE - SUPPLEMENTARY Engineer RAMBOLL UK LIMITED
GROUND INVESTIGATION

Borehole BH402
Project No PN204140

Client WILLMOTT DIXON CONSTRUCTION LIMITED National Grid Coordinates 389278.7 E
390214.6 N

Ground Level 44.04 m OD


| Drilling | | Properties/Sampling | | | | Strata | | Scale 1:50 | | |
|---------------------------------------|-----------------------------|---------------------|-------------------|----------|--------------|---|---|------------|--------|---------------|
| Core Run/Depth (Core Dia/Time) | Depth Cased & (to Water) | Type TCR/SCR% | Length Max/Min | RQD % | SPT N (F) | Description General | Description Detail | Depth | Legend | Level m OD |
| 10.70-10.80 | | C | | | (10) | Discontinuities are very closely to closely spaced horizontal to subhorizontal planar rough clean. | | | | |
| 11.30-12.80 (102mm) 11.45-11.55 | 11.30 (ADDED) | 78 78 C | 0.12 0.05 | 15 | (11) | | | | | |
| | | | | | (10) | | | | | |
| 12.80-14.30 (102mm) | 12.80 (ADDED) | 69 60 | 0.18 0.01 | 12 | (AZCL) | Very weak reddish brown fine to medium grained SANDSTONE with occasional black laminations. Discontinuities are extremely closely spaced horizontal planar rough with micaceous deposits on discontinuity surfaces. | Between 12.80-13.20m, assumed zone of core loss. | 12.70 | | 31.34 |
| | | | | | (12) | | | 13.50 | | 30.54 |
| 14.12-14.30 | | C | | | (30) | | | 14.00 | | 30.04 |
| 14.30-15.80 (102mm) 14.60-14.70 | 14.30 (ADDED) | 93 88 C | 0.16 0.01 | 50 | (10) | Very weak reddish brown fine to coarse grained SANDSTONE with medium spaced slightly gravelly bands of rounded fine to coarse gravel of quartz. Discontinuities are extremely closely to very closely spaced horizontal undulating rough with sand infill. | | | | |
| 15.45-15.65 | | C | | | | | | | | |
| 15.80-17.30 (102mm) | 15.80 (ADDED) | 83 83 | 0.19 0.04 | 28 | (11) | Very weak to weak reddish brown fine to coarse grained SANDSTONE with widely spaced slightly gravelly bands of rounded fine to coarse gravel of quartz. Discontinuities are extremely closely to closely spaced horizontal undulating rough with silty smear and black speckling on discontinuity surfaces. | Between 15.35-15.45m, clayey. | | | |
| 17.10-17.30 | | C | | | | | | | | |
| 17.30-18.80 (102mm) | 17.30 (ADDED) | 14 14 | 0.05 0.01 | 0 | (AZCL) | | Between 17.30-18.60m, assumed zone of core loss. | | | |
| | | | | | (12) | | Between 18.65-18.70m, black staining. Between 18.80-19.30m, assumed zone of core loss. | | | |
| 18.80-20.30 (102mm) | 18.80 (ADDED) | 54 50 | 0.14 0.01 | 17 | (AZCL) | | | | | |
| 19.80-19.92 | | C | | | (14) | | Between 19.80-19.92m, extremely weak to weak. | | | |

| Drilling | | | | Progress | | | | | Groundwater | | | | | |
|----------|----------|-----------|------|---------------|-------------|----------------|------|------|--------------|-------------|---------|---------|--------------|------------------------|
| Depth | Hole Dia | Technique | Crew | Depth of Hole | Depth Cased | Depth to Water | Date | Time | Depth Struck | Depth Cased | Rose to | in Mins | Depth Sealed | Remarks on Groundwater |
| | | | | | | | | | | | | | | |

Remarks **ABS** 10.50m with flush lockable protective cover. Backfill details from base of hole: bentonite seal up to 10.50m, gravel filter up to 4.50m, bentonite seal up to 0.50m, concrete up to ground level.
Flush: 3.20-20.30m, Water, 100% return.

Symbols and abbreviations are explained on the accompanying key sheet.
All dimensions are in metres. Logged in accordance with BS5930:2015

Logged by LP
Figure 2 of 3
24/11/2020



BOREHOLE RECORD - Cable Percussion and Rotary

Draft

Project STOCKPORT INTERCHANGE - SUPPLEMENTARY Engineer RAMBOLL UK LIMITED
GROUND INVESTIGATION

Borehole BH402
Project No PN204140

Client WILLMOTT DIXON CONSTRUCTION LIMITED National Grid Coordinates 389278.7 E
390214.6 N

Ground Level 44.04 m OD

| Drilling | | Properties/Sampling | | | | Strata | | Scale 1:50 | | |
|-----------------------------------|-----------------------------|---------------------|-------------------|----------|---------------|------------------------|-----------------------|------------|--------|---------------|
| Core Run/Depth (Core Dia/Time) | Depth Cased & (to Water) | Type TCR/SCR% | Length Max/Min | RQD % | SPT N (FI) | Description General | Description Detail | Depth | Legend | Level m OD |
| | | | | | | End of Borehole | | 20.30 | | 23.74 |

DRAFT

| Drilling | | | | Progress | | | | | Groundwater | | | | | |
|----------|----------|-----------|------|---------------|-------------|----------------|------|------|--------------|-------------|---------|---------|--------------|------------------------|
| Depth | Hole Dia | Technique | Crew | Depth of Hole | Depth Cased | Depth to Water | Date | Time | Depth Struck | Depth Cased | Rose to | in Mins | Depth Sealed | Remarks on Groundwater |
| | | | | | | | | | | | | | | |

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres. Logged in accordance with BS5930:2015

Logged by LP
Figure 3 of 3
24/11/2020

BOREHOLE RECORD - Cable Percussion and Rotary

Draft

Project STOCKPORT INTERCHANGE - SUPPLEMENTARY Engineer RAMBOLL UK LIMITED
GROUND INVESTIGATION

Borehole BH403
Project No PN204140

Client WILLMOTT DIXON CONSTRUCTION LIMITED

National Grid Coordinates 389229.0 E
390267.4 N

Ground Level 42.32 m OD

| Sampling | | | Properties | | | Strata | | Scale 1:50 | | |
|--------------------------------|--------------|--------------------------|----------------|-------|------------|---|-------|------------|------------|-------|
| Depth | Sample Type | Depth Cased & (to Water) | Strength kPa | w % | SPT N (FI) | Description | Depth | Legend | Level m OD | |
| 0.30- 0.80 | B | | | | | MADE GROUND: Grey reinforced concrete slab. | G.L. | | 42.32 | |
| 0.30 | D | | | | | MADE GROUND: Grey sandy silty angular fine to coarse gravel of limestone. | 0.30 | | 42.02 | |
| 0.30 | ES | | | | | | 0.60 | | 41.72 | |
| 0.80- 1.00 | B | | PID=0.0 | | | MADE GROUND: Dark brown very sandy angular fine to coarse gravel of limestone, concrete and brick fragments. | | | | |
| 0.80 | D | | | | | | | | | |
| 0.80 | ES | | | | | Very dense brown very gravelly fine to coarse SAND with a high subrounded cobble content of sandstone. Gravel is subangular to rounded fine to coarse of sandstone and quartz. | 1.20 | | 41.12 | |
| 1.00- 1.20 | B | | PID=0.0 | | | | | | | |
| 1.00 | D | | | | | | | | | |
| 1.00 | ES | | | | | S50/160 | | | | |
| 1.20- 1.50 | B | 1.20 (DRY) | | | | | | | | |
| 1.20- 1.51 | D | | | | | S50/170 | | | | |
| 1.50- 1.82 | D | 1.50 (DRY) | | | | PID=0.0 | | | | |
| 2.00 | ES | | | | | | | | | |
| 2.50- 2.95 | B | | | | | S50/265 | | | | |
| 2.50- 2.92 | D | 2.50 (DRY) | | | | | | | | |
| 3.00- 3.20 | D | 3.00 (DRY) | | | | S50/125 | 3.00 | | 39.32 | |
| | | | | | | Extremely weak reddish brown fine to coarse grained SANDSTONE. | 3.20 | | 39.12 | |
| Core Run/Depth (Core Dia/Time) | Depth Cased | TCR/SCR / Type | Length Max/Min | ROD % | SPT (FI) | Continued by Rotary techniques General | | | | |
| 3.20- 3.50 (102mm) | 3.10 (ADDED) | 0 | 0 | 0 | (AZCL) | Very weak reddish brown fine to coarse grained SANDSTONE. Discontinuities are extremely closely spaced randomly orientated. | | | | |
| 3.50- 4.90 (102mm) | 3.50 (ADDED) | 50 | 0.12 | 8 | | (>30) | | | | |
| 4.70- 4.83 | | C | | | | | | 4.50 | | 37.82 |
| 4.90- 6.40 (102mm) | 4.90 (ADDED) | 98 | 0.18 | 54 | (8) | Very weak thin bedded reddish brown micaceous fine to medium grained SANDSTONE. Discontinuities are extremely closely spaced horizontal undulating rough clean. | 4.65 | | 37.67 | |
| 5.10- 5.20 | | C | | | (9) | Very weak to weak reddish brown fine to medium grained SANDSTONE with occasional subhorizontal black laminations. | 4.90 | | 37.42 | |
| 5.90- 6.18 | | C | | | | | | | | |
| 6.40- 7.90 (102mm) | 6.40 (ADDED) | 97 | 0.18 | 19 | | Very weak to weak reddish brown fine to coarse grained SANDSTONE with widely spaced slightly gravelly bands (up to 20mm thick). Gravel is subrounded fine to medium of quartz. Discontinuities are very closely to medium spaced horizontal to subhorizontal occasionally inclined planar and undulating rough with sand infill (up to 1mm thick) and occasional black spackling on discontinuity surfaces. | | | | |
| 7.10- 7.30 | | C | | | (15) | | | | | |
| 7.90- 9.40 (102mm) | 7.90 (ADDED) | 92 | 0.29 | 48 | | Weak reddish brown fine to coarse grained SANDSTONE. Discontinuities are very closely to medium spaced horizontal planar rough clean. | | | | |
| 8.94- 9.08 | | C | | | (11) | | | | | |
| 9.40-10.90 (102mm) | 9.40 (ADDED) | 84 | 0.30 | 64 | | Between 7.60-7.90m, very weak. | | | | |
| 10.00-10.30 | | C | 0.04 | | (7) | | | 9.10 | | 33.22 |

| Boring | | | | Progress | | | | | Ground water | | | | | |
|--------|------|------------------|-------|---------------|-------------|----------------|----------|-------|--------------|-------------|---------|---------|--------------|------------------------|
| Depth | Dia | Technique | Crew | Depth of Hole | Depth Cased | Depth to Water | Date | Time | Depth Struck | Depth Cased | Rose to | in Mins | Depth Sealed | Remarks on Groundwater |
| 0.30 | 0.30 | Concrete Core | KW | G.I. | | | 09/09/20 | 08:00 | | | | | | None encountered |
| 1.20 | 0.30 | Inspection Pit | LM/KP | 1.50 | 1.50 | DRY | 09/09/20 | 18:00 | | | | | | minor inflows |
| 3.20 | 0.20 | Cable Percussion | LM/MP | 1.50 | 1.50 | DRY | 10/09/20 | 08:00 | | | | | | possibly masked |
| 20.00 | 0.10 | Rotary Core | AW/PB | 3.20 | 3.20 | DRY | 10/09/20 | 18:00 | | | | | | by drilling |
| | | | | 3.20 | 3.20 | DRY | 16/09/20 | 08:00 | | | | | | flush below |
| | | | | 12.40 | 12.40 | ADDED | 16/09/20 | 18:00 | | | | | | 3.20m depth. |

Remarks
A concrete core was drilled to 0.30m depth and an inspection pit hand excavated in the base of the core hole to 1.20m depth and no services were found.
ES sample = 1 x 60ml glass vial, 2 x 258ml amber glass jars.
A 50mm standpipe was installed to 7.50m with a geowrapped slotted section from 4.50m to 7.50m with flush lockable protective cover. Backfill details from base of hole: bentonite seal up to 7.50m, gravel filter up to 4.50m, bentonite seal up to 0.50m, concrete up to ground level.
Chiselling: 1.50-1.65m for 60 minutes.

Logged by LP
Figure 1 of 2
24/11/2020

geotechnics

All dimensions are in metres. Logged in accordance with BS5930:2015

BOREHOLE RECORD - Cable Percussion and Rotary

Draft

Project STOCKPORT INTERCHANGE - SUPPLEMENTARY Engineer RAMBOLL UK LIMITED
GROUND INVESTIGATION


Borehole BH403
Project No PN204140

Client WILLMOTT DIXON CONSTRUCTION LIMITED National Grid Coordinates 389229.0 E
390267.4 N

Ground Level 42.32 m OD

| Drilling | | Properties/Sampling | | | | Strata | | Scale 1:50 | | |
|---------------------------------------|--------------------------------|---------------------|-------------------|----------|--------------|--|---|------------|--------|---------------|
| Core Run/Depth (Core Dia/Time) | Depth Cased & (to Water) | Type TCR/SCR% | Length Max/Min | RQD % | SPT N (F) | Description General | Description Detail | Depth | Legend | Level m OD |
| 10.90-12.40 (102mm) | 10.90 (ADDED) | 98 92 | 0.45 0.01 | 75 | (4) | | | | | |
| 12.00-12.25 | | C | | | (8) | Very weak to weak reddish brown fine to coarse grained SANDSTONE. Discontinuities are very closely to medium spaced subhorizontal to inclined planar rough with clayey smear on discontinuity surfaces. | Between 11.50-11.55m, thin band of weak reddish brown mudstone with rounded fine to medium quartz gravel. | 11.50 | | 30.82 |
| 12.40-14.00 (102mm) | 12.40 (ADDED) | 0 0 | 0 0 | 0 | (AZCL) | | Between 12.40-14.00m, assumed zone of core loss. | | | |
| 14.00-15.50 (102mm) 14.00-14.20 | 14.00 (ADDED) | 100 98 C | 0.30 0.02 | 67 | (8) | Very weak to weak reddish brown fine to coarse grained SANDSTONE with medium to widely spaced slightly gravelly bands. Gravel is subrounded fine to coarse of quartz. #Discontinuities are closely to medium spaced horizontal to subhorizontal planar rough with sand infill (up to 2mm thick). | | 14.00 | | 28.32 |
| 15.25-15.42 | | C | | | | | | | | |
| 15.50-17.00 (102mm) | 15.50 (ADDED) | 86 74 | 0.23 0.02 | 67 | (NI) | | Between 15.50-15.85m, very gravelly. non-intact. | | | |
| 16.10-16.30 | | C | | | (8) | | | | | |
| 17.00-18.50 (102mm) | 17.00 (ADDED) | 97 85 | 0.18 0.01 | 54 | (8) | | | | | |
| 17.40-17.57 | | C | | | | | | | | |
| 18.50-20.00 (102mm) | 18.50 (ADDED) | 94 94 | 0.19 0.02 | 54 | (9) | | | | | |
| 19.45-19.58 | | C | | | | | | | | |
| End of Borehole | | | | | | | | 20.00 | | 22.32 |


| Drilling | | | | Progress | | | | | Groundwater | | | | | |
|----------|----------|-----------|------|---------------|-------------|----------------|----------|-------|--------------|-------------|---------|---------|--------------|------------------------|
| Depth | Hole Dia | Technique | Crew | Depth of Hole | Depth Cased | Depth to Water | Date | Time | Depth Struck | Depth Cased | Rose to | in Mins | Depth Sealed | Remarks on Groundwater |
| | | | | 12.40 | 12.40 | ADDED | 17/09/20 | 08:00 | | | | | | |
| | | | | 20.00 | 20.00 | ADDED | 17/09/20 | 18:00 | | | | | | |

Remarks  Flush: 3.20-20.00m, Water, 100% return.

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres. Logged in accordance with BS5930:2015

Logged by LP
Figure 2 of 2
24/11/2020



BOREHOLE RECORD - Cable Percussion and Rotary

Draft

Project STOCKPORT INTERCHANGE - SUPPLEMENTARY Engineer RAMBOLL UK LIMITED
GROUND INVESTIGATION

Borehole BH404
Project No PN204140

Client WILLMOTT DIXON CONSTRUCTION LIMITED
National Grid Coordinates 389266.1 E
390283.2 N

Ground Level 42.70 m OD


| Sampling | | | Properties | | | Strata | | Scale 1:50 | | |
|--------------------------------|--------------|--------------------------|----------------|----------------|-----------|---|--|------------|------------|--|
| Depth | Sample Type | Depth Cased & (to Water) | Strength kPa | w % | SPT N (F) | Description | Depth | Legend | Level m OD | |
| 0.30- 1.20 | B | | | | | MADE GROUND: Grey reinforced concrete slab. | G.L. | | 42.70 | |
| 0.30 | D | | | | | MADE GROUND: Grey and brown silty fine to coarse sand and angular to subrounded fine to coarse gravel of various lithologies and brick fragments. Low cobble content of concrete Below 1.20m, medium dense. | 0.30 | | 42.40 | |
| 0.30 | ES | | | | | | | | | |
| 0.30 | | | | | | | | | | |
| | | | | | | | | | | |
| 1.20- 1.65 | B | | | | | MADE GROUND: Red bricks. (possible foundations) | 1.50 | | 41.20 | |
| 1.20- 1.65 | D | 1.20 (DRY) | | | S16 | | | | | |
| 1.50 | D | | | | | | | | | |
| 2.00- 2.45 | B | | | | | Extremely weak to very weak reddish brown fine to coarse grained SANDSTONE. | 2.80 | | 39.90 | |
| 2.00- 2.05 | D | 2.00 (DRY) | | | S50/20 | | | | | |
| 2.00- 2.45 | ES | | | | | | | | | |
| 2.00- 2.45 | | | | | | | | | | |
| 2.01 | D | | | | | | | | | |
| 2.80 | D | 3.00 (DRY) | | | | | 2.80 | | 39.90 | |
| 3.00- 3.20 | D | | | | | | 3.20 | | 39.50 | |
| Core Run/Depth (Core Dia/Time) | | Depth Cased | TCR/SCR / Type | Length Max/Min | RQD % | SPT (F) | Continued by Rotary techniques | | | |
| | | | | | | | General | Detail | | |
| 3.20- 3.70 (102mm) | 3.00 (ADDED) | 100 | 0.02 | 29 | (NI) | Extremely weak to very weak reddish brown fine to coarse grained SANDSTONE with occasional thin beds of rounded to subrounded fine to coarse gravel of quartz. Discontinuities are very closely to closely spaced subhorizontal undulating occasionally planar rough and clean. | Between 3.20-3.38m, 3.65-3.70m, 4.17-4.96m, non-intact. | | | |
| 3.41- 3.48 | | 44 | 0.01 | | (16) | | Between 3.70-4.17m, assumed zone of core loss. | | | |
| 3.70- 5.20 (102mm) | 3.70 (ADDED) | 69 | 0.01 | 7 | (NI) | | Between 5.00-5.16m, discontinuity is inclined planar smooth and clean. | | | |
| | | 11 | 0.01 | | (AZCL) | | Between 5.10-5.20m, 5.69-6.70m, non-intact. | | | |
| | | | | | (NI) | | Between 5.20-5.69m, assumed zone of core loss. | | | |
| 5.00- 5.05 | | C | | | (30) | | Below 6.70m, weak. Between 6.70-7.89m, assumed zone of core loss. | | | |
| 5.20- 6.70 (102mm) | 5.20 (ADDED) | 67 | 0.01 | 0 | (NI) | | Between 8.20-8.94m, assumed zone of core loss. | | | |
| | | 0 | 0.01 | | (AZCL) | | Between 9.70-10.34m, assumed zone of core loss. | | | |
| 6.70- 8.20 (102mm) | 6.70 (ADDED) | 21 | 0.09 | 0 | (AZCL) | | Between 8.20-8.94m, assumed zone of core loss. | | | |
| | | 17 | 0.02 | | (15) | | Between 9.70-10.34m, assumed zone of core loss. | | | |
| 8.20- 9.70 (102mm) | 8.20 (ADDED) | 51 | 0.12 | 21 | (AZCL) | | Between 9.70-10.34m, assumed zone of core loss. | | | |
| | | 45 | 0.03 | | (20) | | | | | |
| 9.56- 9.70 | | C | | | | | | | | |
| 9.70-11.20 (102mm) | 9.70 (ADDED) | 57 | 0.14 | 9 | (AZCL) | | | | | |
| | | 43 | 0.01 | | | | | | | |

| Boring | | | | Progress | | | | | Ground water | | | | | |
|--------|------|------------------|-------|---------------|-------------|----------------|----------|-------|--------------|-------------|---------|---------|--------------|--|
| Depth | Dia | Technique | Crew | Depth of Hole | Depth Cased | Depth to Water | Date | Time | Depth Struck | Depth Cased | Rose to | in Mins | Depth Sealed | Remarks on Groundwater |
| 0.30 | 0.30 | Concrete Core | KW | G.I. | | | 09/09/20 | 08:00 | | | | | | None encountered but minor inflows possibly masked by drilling flush below 3.00m |
| 1.20 | 0.30 | Inspection Pit | LM/MP | 3.20 | 3.00 | DRY | 09/09/20 | 18:00 | | | | | | |
| 3.20 | 0.20 | Cable Percussion | LM/MP | 3.20 | 3.00 | DRY | 14/09/20 | 08:00 | | | | | | |
| 20.20 | 0.10 | Rotary Core | AW/PB | 9.70 | 9.70 | ADDED | 14/09/20 | 18:00 | | | | | | |
| | | | | 9.70 | 9.70 | ADDED | 15/09/20 | 08:00 | | | | | | |
| | | | | 20.20 | 20.20 | ADDED | 15/09/20 | 18:00 | | | | | | |

Remarks
A concrete core was drilled to 0.30m depth and an inspection pit hand excavated in the base of the core hole to 1.20m depth and no services were found.
ES sample = 1 x 60ml glass vial, 2 x 258ml amber glass jars.
Water was added to assist boring between 1.20-1.50m depth.
A 50mm standpipe was installed to 7.50m with a geowrapped slotted section from 4.50m to 7.50m with flush lockable protective cover. Backfill details from base of hole: bentonite seal up to 7.50m, gravel filter up to 4.50m, bentonite seal up to 0.50m, concrete up to ground level.

Logged in accordance with BS5930:2015

Logged by LP
Figure 1 of 3
24/11/2020



BOREHOLE RECORD - Cable Percussion and Rotary

Draft

Project STOCKPORT INTERCHANGE - SUPPLEMENTARY Engineer RAMBOLL UK LIMITED
GROUND INVESTIGATION

Borehole BH404
Project No PN204140

Client WILLMOTT DIXON CONSTRUCTION LIMITED National Grid Coordinates 389266.1 E
390283.2 N

Ground Level 42.70 m OD

| Drilling | | Properties/Sampling | | | | Strata | | Scale 1:50 | | |
|-----------------------------------|-----------------------------|---------------------|-------------------|----------|-----------------------|------------------------|--|------------|--------|---------------|
| Core Run/Depth (Core Dia/Time) | Depth Cased & (to Water) | Type TCR/SCR% | Length Max/Min | RQD % | SPT N (FI) | Description General | Description Detail | Depth | Legend | Level m OD |
| 10.58-10.71 | | C | | | (NI) (13) | | Between 10.34-10.58m, 12.42-12.47m, 14.09-14.14m, non-intact. | | | |
| 11.20-12.70 (102mm) | 11.20 (ADDED) | 80 66 | 0.17 0.01 | 29 | (AZCL) | | Between 11.20-11.50m, assumed zone of core loss. | | | |
| 11.65-11.82 | | C | | | (13) (NI) (20) | | | | | |
| 12.70-14.20 (102mm) | 12.70 (ADDED) | 63 51 | 0.16 0.01 | 33 | (AZCL) | | Between 12.70-13.250m, assumed zone of core loss. | | | |
| 13.64-13.76 | | C | | | (12) (NI) | | | | | |
| 14.20-15.70 (102mm) | 14.20 (ADDED) | 65 60 | 0.30 0.05 | 20 | (>30) (AZCL) | | At 14.10m, very thin bed of rounded to subrounded fine to coarse gravel of quartz. Between 14.20-15.70m, discontinuities are closely to medium spaced. Between 14.20-14.72m, assumed zone of core loss. | | | |
| 15.03-15.21 | | C | | | (10) | | | | | |
| 15.70-17.20 (102mm) | 15.70 (ADDED) | 71 51 | 0.13 0.01 | 16 | (AZCL) | | Below 15.70m, weak to medium strong. Between 15.70-16.13m, assumed zone of core loss. | | | |
| 16.54-16.67 | | C | | | (>30) (NI) (16) | | | | | |
| 17.20-18.70 (102mm) | 17.20 (ADDED) | 65 54 | 0.23 0.01 | 45 | (AZCL) | | Between 16.91-16.97m, 18.14-14.17m, non-intact. At 16.93m, thick laminae of subrounded to rounded fine to coarse gravel of quartz. Between 16.93-17.07m, thin bed of extremely weak red mudstone. Between 17.20-17.72m, assumed zone of core loss. | | | |
| 17.75-17.97 | | C | | | (21) (NI) (10) | | | | | |
| 18.70-20.20 (102mm) | 18.70 (ADDED) | 87 85 | 0.14 0.02 | 45 | (AZCL) | | Below 18.70m, dark red, micaceous. Between 18.70-18.90m, assumed zone of core loss. | | | |
| 19.15-19.27 | | C | | | (10) | | | | | |

| Drilling | | | | Progress | | | | | Groundwater | | | | | |
|----------|----------|-----------|------|---------------|-------------|----------------|------|------|--------------|-------------|---------|---------|--------------|------------------------|
| Depth | Hole Dia | Technique | Crew | Depth of Hole | Depth Cased | Depth to Water | Date | Time | Depth Struck | Depth Cased | Rose to | in Mins | Depth Sealed | Remarks on Groundwater |
| | | | | | | | | | | | | | | |

Remarks **Chiselling:** 1.50-2.40m for 120 minutes.
Flush: 3.00-20.20m, Water, 100% return.

Logged by LP

Symbols and abbreviations are explained on the accompanying key sheet.

Figure 2 of 3
24/11/2020

All dimensions are in metres.

Logged in accordance with BS5930:2015



BOREHOLE RECORD - Cable Percussion and Rotary

Draft

Project STOCKPORT INTERCHANGE - SUPPLEMENTARY Engineer RAMBOLL UK LIMITED
GROUND INVESTIGATION

Borehole BH404
Project No PN204140

Client WILLMOTT DIXON CONSTRUCTION LIMITED National Grid Coordinates 389266.1 E
390283.2 N

Ground Level 42.70 m OD

| Drilling | | Properties/Sampling | | | | Strata | | Scale 1:50 | | |
|-----------------------------------|-----------------------------|---------------------|-------------------|----------|---------------|------------------------|-----------------------|------------|--------|---------------|
| Core Run/Depth (Core Dia/Time) | Depth Cased & (to Water) | Type TCR/SCR% | Length Max/Min | RQD % | SPT N (FI) | Description General | Description Detail | Depth | Legend | Level m OD |
| 20.08-20.20 | | c | | | | | | 20.20 | | 22.50 |
| End of Borehole | | | | | | | | | | |

DRAFT

| Drilling | | | | Progress | | | | | Groundwater | | | | | |
|----------|----------|-----------|------|---------------|-------------|----------------|------|------|--------------|-------------|---------|---------|--------------|------------------------|
| Depth | Hole Dia | Technique | Crew | Depth of Hole | Depth Cased | Depth to Water | Date | Time | Depth Struck | Depth Cased | Rose to | in Mins | Depth Sealed | Remarks on Groundwater |
| | | | | | | | | | | | | | | |

Remarks

Symbols and abbreviations are explained on the accompanying key sheet.

All dimensions are in metres. Logged in accordance with BS5930:2015

Logged by LP
Figure 3 of 3
24/11/2020

Fieldwork Results - SPT Results Summary

Project STOCKPORT INTERCHANGE - SUPPLEMENTARY
GROUND INVESTIGATION

Project No PN204140

Client WILLMOTT DIXON CONSTRUCTION LIMITED

| Hole | Depth m bgl | Level m OD | Type | SWP (mm) | Seating Drive | | Test Drive | | | | SPT 'N' Value | Uncorrected SPT 'N' | | | | | |
|-----------------------------|----------------|---------------|------------|-------------|---------------|----------------|--------------|----------------|-----------------|-----------------|------------------|------------------------|----|----|----|----|--|
| | | | | | 0-75 (mm) | 75-150 (mm) | 0-75 (mm) | 75-150 (mm) | 150-225 (mm) | 225-300 (mm) | | 10 | 20 | 30 | 40 | 50 | |
| BH400 | 1.20 | 43.26 | S | - | 1 | 2 | 1 | 2 | 1 | 1 | 5 | * | | | | | |
| BH400 | 2.00 | 42.46 | S | - | 1 | - | 1 | 1 | 1 | 1 | 4 | * | | | | | |
| DRAFT | | | | | | | | | | | | | | | | | |
| Driller | | | Lee Murphy | | | Remarks | | | | | | | | | | | |
| Hammer No. | | | AR1926 | | | | | | | | | | | | | | |
| Energy Ratio, Er (%) | | | 66.00 | | | | | | | | | | | | | | |
| Calibration Date | | | 08/07/2020 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |

-/- Blows/penetration (mm) after seating

-*/- Total blows/penetration (mm)

SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)

C - SPT with cone

L - Split Spoon with liner used

GEOTECHNICS



Fieldwork Results - SPT Results Summary

Project STOCKPORT INTERCHANGE - SUPPLEMENTARY
GROUND INVESTIGATION

Project No PN204140

Client WILLMOTT DIXON CONSTRUCTION LIMITED

| Hole | Depth m bgl | Level m OD | Type | SWP (mm) | Seating Drive | | Test Drive | | | | SPT 'N' Value | Uncorrected SPT 'N' | | | | | |
|---|----------------|---------------|------------|-------------|---------------|----------------|--------------|----------------|-----------------|-----------------|------------------|------------------------|----|----|----|----|--|
| | | | | | 0-75 (mm) | 75-150 (mm) | 0-75 (mm) | 75-150 (mm) | 150-225 (mm) | 225-300 (mm) | | 10 | 20 | 30 | 40 | 50 | |
| BH401 | 1.20 | 43.00 | S | - | 2 | 1 | 1 | 1 | 1 | 1 | 4 | * | | | | | |
| BH401 | 2.00 | 42.20 | S | - | 1 | - | 1 | 1 | 1 | 1 | 4 | * | | | | | |
| <div style="font-size: 100px; opacity: 0.3; transform: rotate(-30deg); pointer-events: none;">DRAFT</div> | | | | | | | | | | | | | | | | | |
| Driller | | | Lee Murphy | | | Remarks | | | | | | | | | | | |
| Hammer No. | | | AR1926 | | | | | | | | | | | | | | |
| Energy Ratio, Er (%) | | | 66.00 | | | | | | | | | | | | | | |
| Calibration Date | | | 08/07/2020 | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |

-/- Blows/penetration (mm) after seating

-*/- Total blows/penetration (mm)

SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)

C - SPT with cone

L - Split Spoon with liner used

GEOTECHNICS



Fieldwork Results - SPT Results Summary

Project STOCKPORT INTERCHANGE - SUPPLEMENTARY
GROUND INVESTIGATION

Project No PN204140

Client WILLMOTT DIXON CONSTRUCTION LIMITED

| Hole | Depth m bgl | Level m OD | Type | SWP (mm) | Seating Drive | | Test Drive | | | | SPT 'N' Value | Uncorrected SPT 'N' | | | | | | |
|-----------------------------|----------------|---------------|------------|-------------|---------------|----------------|--------------|----------------|-----------------|-----------------|------------------|------------------------|----|----|----|----|--|--|
| | | | | | 0-75 (mm) | 75-150 (mm) | 0-75 (mm) | 75-150 (mm) | 150-225 (mm) | 225-300 (mm) | | 10 | 20 | 30 | 40 | 50 | | |
| BH402 | 1.20 | 42.84 | S | - | 7 | 4 | 4 | 3 | 5 | 7 | 19 | | * | | | | | |
| BH402 | 2.00 | 42.04 | S | - | 5 | 4 | 6 | 4 | 5 | 4 | 19 | | * | | | | | |
| DRAFT | | | | | | | | | | | | | | | | | | |
| Driller | | | Lee Murphy | | | Remarks | | | | | | | | | | | | |
| Hammer No. | | | AR1926 | | | | | | | | | | | | | | | |
| Energy Ratio, Er (%) | | | 66.00 | | | | | | | | | | | | | | | |
| Calibration Date | | | 08/07/2020 | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |

-/- Blows/penetration (mm) after seating

-*/- Total blows/penetration (mm)

SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)

C - SPT with cone

L - Split Spoon with liner used

GEOTECHNICS



Fieldwork Results - SPT Results Summary

Project STOCKPORT INTERCHANGE - SUPPLEMENTARY
GROUND INVESTIGATION

Project No PN204140

Client WILLMOTT DIXON CONSTRUCTION LIMITED

| Hole | Depth m bgl | Level m OD | Type | SWP (mm) | Seating Drive | | Test Drive | | | | SPT 'N' Value | Uncorrected SPT 'N' | | | | | | |
|---|----------------|---------------|------------|-------------|---------------|----------------|----------------|----------------|-----------------|-----------------|------------------|------------------------|----|----|----|----|--|---|
| | | | | | 0-75 (mm) | 75-150 (mm) | 0-75 (mm) | 75-150 (mm) | 150-225 (mm) | 225-300 (mm) | | 10 | 20 | 30 | 40 | 50 | | |
| BH404 | 1.20 | 41.50 | S | - | 2 | 3 | 4 | 4 | 4 | 4 | 16 | | * | | | | | |
| BH404 | 2.00 | 40.70 | S | - | 25/30 | | 50/20 | | | | 50/20 | | | | | | | > |
| BH404 | 3.00 | 39.70 | S | - | 17 | 8/10 | 33 | 17/40 | | | 50/115 | | | | | | | > |
| <div style="font-size: 100px; opacity: 0.3; transform: rotate(-30deg); pointer-events: none;">DRAFT</div> | | | | | | | | | | | | | | | | | | |
| Driller | | | Lee Murphy | | | | Remarks | | | | | | | | | | | |
| Hammer No. | | | AR1926 | | | | | | | | | | | | | | | |
| Energy Ratio, Er (%) | | | 66.00 | | | | | | | | | | | | | | | |
| Calibration Date | | | 08/07/2020 | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |

-/- Blows/penetration (mm) after seating

-*/- Total blows/penetration (mm)

SWP Penetration under own weight (mm)

S - Standard Penetration Test (SPT)

C - SPT with cone

L - Split Spoon with liner used

GEOTECHNICS



SPT Hammer Energy Test Report

In accordance with BS EN ISO 22476-3:2005

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

SPT Hammer Ref: AR1926
Test Date: 06/07/2020
Report Date: 06/07/2020
File Name: AR1926.spt
Test Operator: CM

Instrumented Rod Data

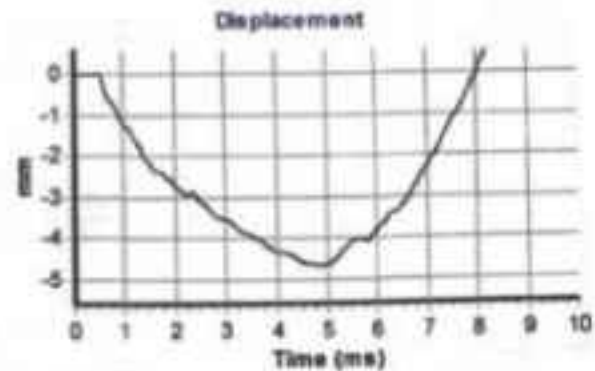
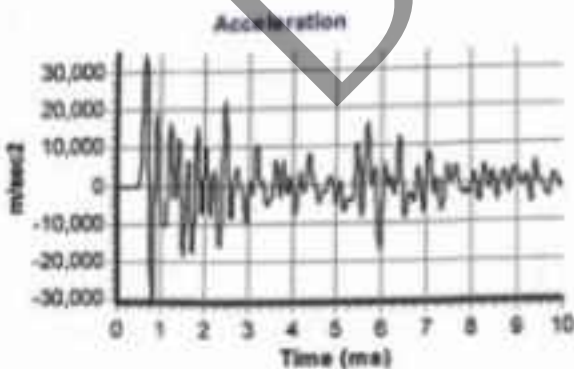
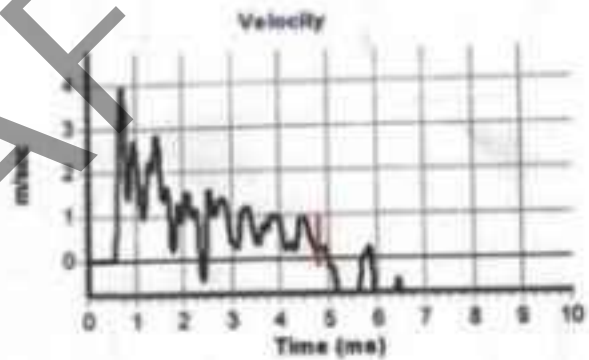
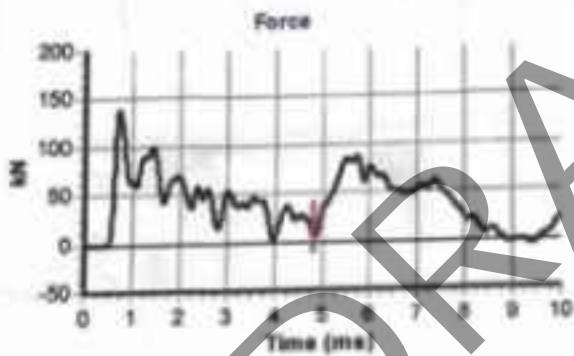
Diameter d_r (mm): 54
Wall Thickness t_r (mm): 6.0
Assumed Modulus E_s (GPa): 208
Accelerometer No.1: 7080
Accelerometer No.2: 11609

SPT Hammer Information

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

Comments / Location

D.M W/71443



Calculations

Area of Rod A (mm^2): 905
Theoretical Energy E_{theor} (J): 473
Measured Energy E_{meas} (J): 311

Energy Ratio E_r (%): **66**

Signed: C. McCluskey

Title: FITTER

The recommended calibration interval is 12 months

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APPENDIX 8
Rock Core Photographs

PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION



BH400, Box I, Depth 2.90-6.20m

PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION



BH401, Box 1, Depth 3.30-5.10m

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PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION



BH401, Box 2, Depth 6.00-7.50m

PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION



BH401, Box 3, Depth 7.50-9.20m

PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION



BH401, Box 4, Depth 9.20-12.20m

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PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION



BH401, Box 5, Depth 12.20-15.20m

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PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION



BH401, Box 6, Depth 15.20-18.20m

DRAFT

PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION



BH401, Box 7, Depth 18.20-20.00m

DRAFT

PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION



BH402, Box 1, Depth 3.20-8.60m

DRAFT

PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION



BH402, Box 2, Depth 8.60-11.30m

DRAFT

PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION



BH402, Box 3, Depth 11.30-14.30m

DRAFT

PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION



BH402, Box 4, Depth 14.30-17.30m

PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION



BH402, Box 5, Depth 17.30-20.30m

PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION



BH403, Box I, Depth 3.50-6.40m

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PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION



BH403, Box 2, Depth 6.40-9.40m

DRAFT

PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION



BH403, Box 3, Depth 9.40-12.40m

DRAFT

PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION



BH403, Box 4, Depth 14.00-17.00m

DRAFT

PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION



BH403, Box 5, Depth 17.00-20.00m

DRAFT

PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION



BH404, Box I, Depth 3.00-5.20m

DRAFT

PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION



BH404, Box 2, Depth 5.20-9.70m

PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION



BH404, Box 3, Depth 9.70-12.70m

PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION



BH404, Box 4, Depth 12.70-15.70m

DRAFT

PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION



BH404, Box 5, Depth 15.70-18.70m

DRAFT

PHOTOGRAPHS

Project Number : PN204140

Project : STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION



BH404, Box 6, Depth 18.70-20.20m

APPENDIX 9
High Pressure Dilatometer Test Results

Pressuremeter Results Summary



| Test | Depth (m) | Material description from borehole log | Max. test pressure (MPa) | p _o (kPa) | Undrained strength | | | G _i (MPa) | Loop No. | G _{ur} (MPa) | ε _c (%) | Non linear stiffness | | Secant shear modulus G (MPa) | | |
|------|-----------|--|--------------------------|----------------------|--------------------------------|----------------------|----------------------|----------------------|----------|-----------------------|--------------------|----------------------|-------|------------------------------|-------|--------|
| | | | | | S _{u (M&R)} (kPa) | S _u (kPa) | P _L (kPa) | | | | | α (MPa) | β | Shear strain | | |
| | | | | | | | | | | | | | | 0.1% | 0.01% | 0.001% |
| 1 | 4.20 | Weathered SANDSTONE. | 8928 | 1569 | 5893 | 5893 | 25694 | 130.0 | 1 | 460.6 | 0.070 | 172.475 | 0.867 | 431 | 585 | 795 |
| | | | | | | | | | 2 | 666.4 | 0.085 | 199.258 | 0.833 | 632 | 928 | 1364 |
| | | | | | | | | | 3 | 753.6 | 0.113 | 277.638 | 0.850 | 783 | 1106 | 1562 |
| | | | | | | | | | 4 | 580.1 | 0.184 | 172.117 | 0.822 | 590 | 889 | 1340 |

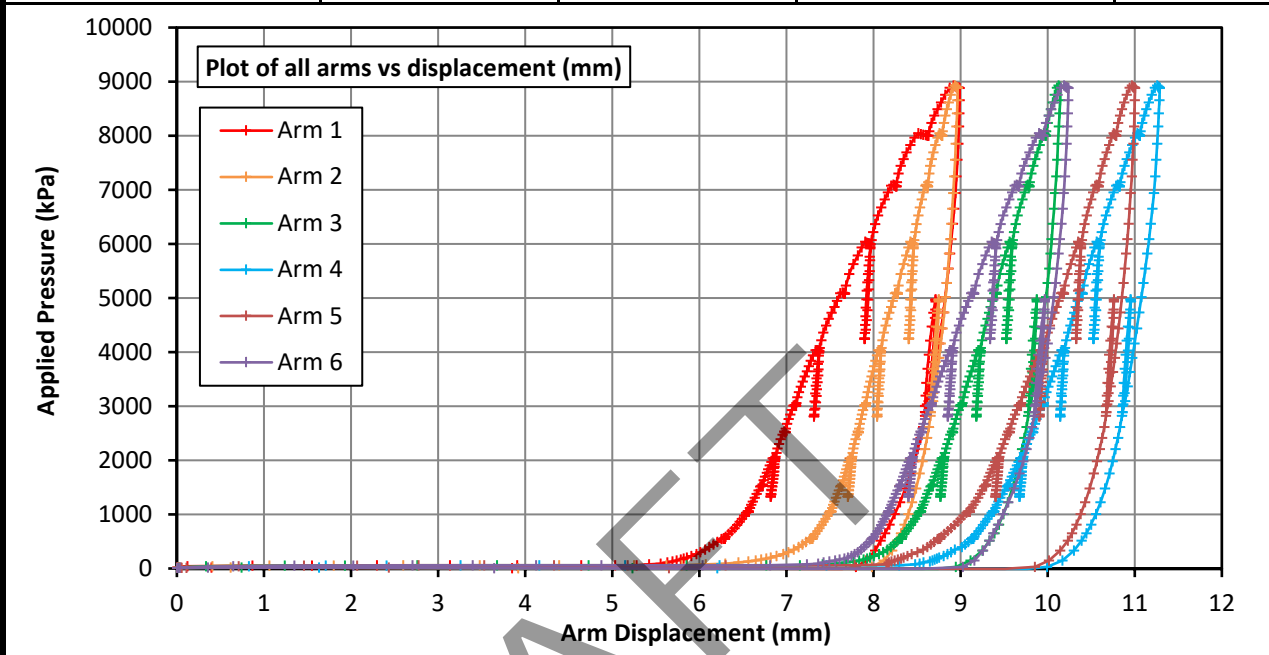
DRAFT

| | | | |
|--------------------|---------------------------|-------------------|-------|
| Project | Stockport Interchange HPP | Figure No. | BH402 |
| Client | Geotechnics | | |
| Project No. | P1200119 | | |

Pressuremeter Test Overview High Pressure Dilatometer (HPD)



| | | | |
|------------------------|------------|-----------------------|------|
| Test Date | 21/09/2020 | Test No. | 1 |
| Borehole | BH402 | Test Depth (m) | 4.20 |
| Coordinates (m) | - | Elevation (m) | - |



Material description from borehole log:
Weathered SANDSTONE.

Test pocket conditions:

| | | | |
|---------------------------|-----|--------------------------|-------------------|
| Total core recovery: | 0 % | Test pocket depth range: | |
| Solid core recovery: | 0 % | From: | 3.20 m to: 5.90 m |
| Rock quality designation: | 0 % | Flush: | Water |

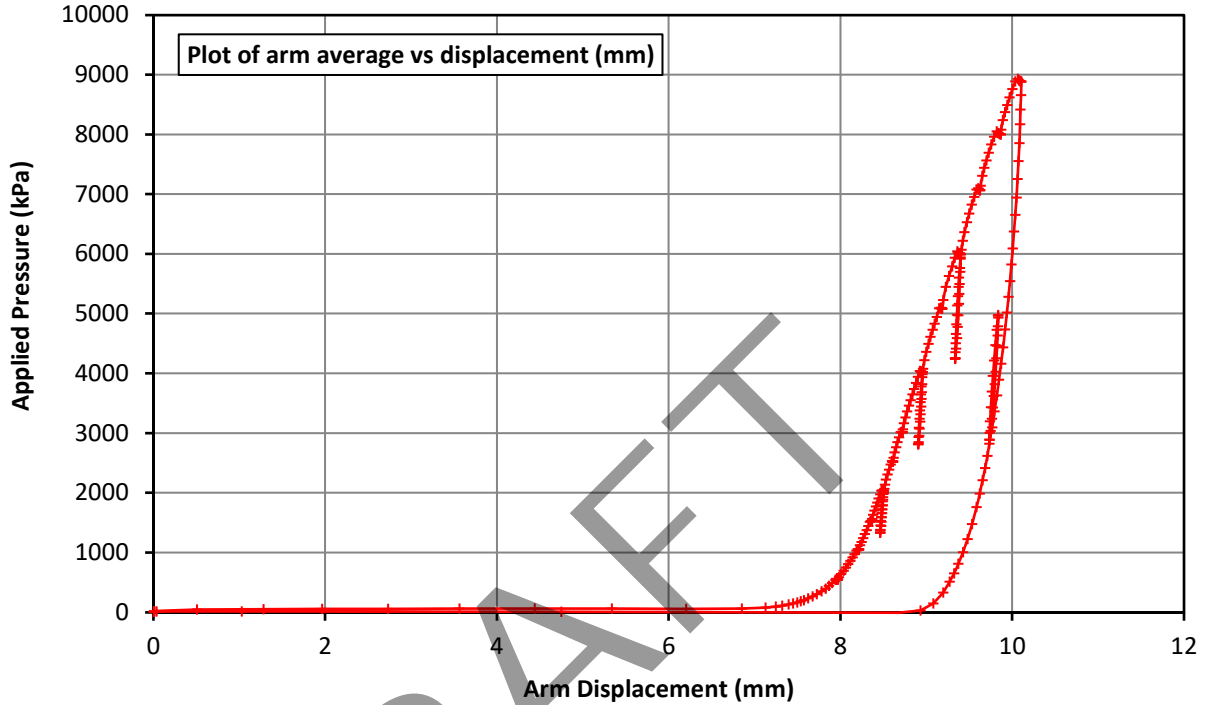
Test comment:
The test pocket was oversize with arms lifting off between 6.5 to 9.5mm. The p_0 was estimated to be at 1569kPa, with the following loading section being long and linear, with material yield interpreted at 7462kPa. The test was taken to a pressure of 8928kPa. The displacement-pressure response was generally consistent on all arms through the test, with only some variation in expansion. Analysis of three unload-reload loops provides increasing modulus values from 461 to 754MPa, with a lower value of 580MPa from a loop on the unloading section. Derived undrained shear strength analysis provides a value of 5893kPa.

| Test details: | | Instrument: | | Walley (160208) | |
|----------------------|---------------|--------------------|---------|-----------------|----------------|
| Drilling method: | Rotary coring | | mV | mV/mm | mV |
| Casing depth: | 3.20 m | Arm 1: | -2013.9 | 146.5 | TPC A: -1606.3 |
| Water level: | - m | Arm 2: | -2657.3 | 139.0 | TPC B: -2056.5 |
| | | Arm 3: | -2293.7 | 146.3 | |
| Test time: | | Arm 4: | -2045.9 | 140.5 | |
| Start (probe in): | 09:25 hrs | Arm 5: | -2329.6 | 139.9 | |
| Finish (probe out): | 10:25 hrs | Arm 6: | -2044.6 | 126.0 | |

| | | | |
|--------------------|---------------------------|-------------------|---------------------------|
| Project | Stockport Interchange HPD | Figure No. | BH402 T01 - 01 |
| Client | Geotechnics | | |
| Project No. | P1200119 | | |

Pressuremeter Test Overview

| | | | |
|------------------|------------|-----------------------|------|
| Test Date | 21/09/2020 | Test No. | 1 |
| Borehole | BH402 | Test Depth (m) | 4.20 |

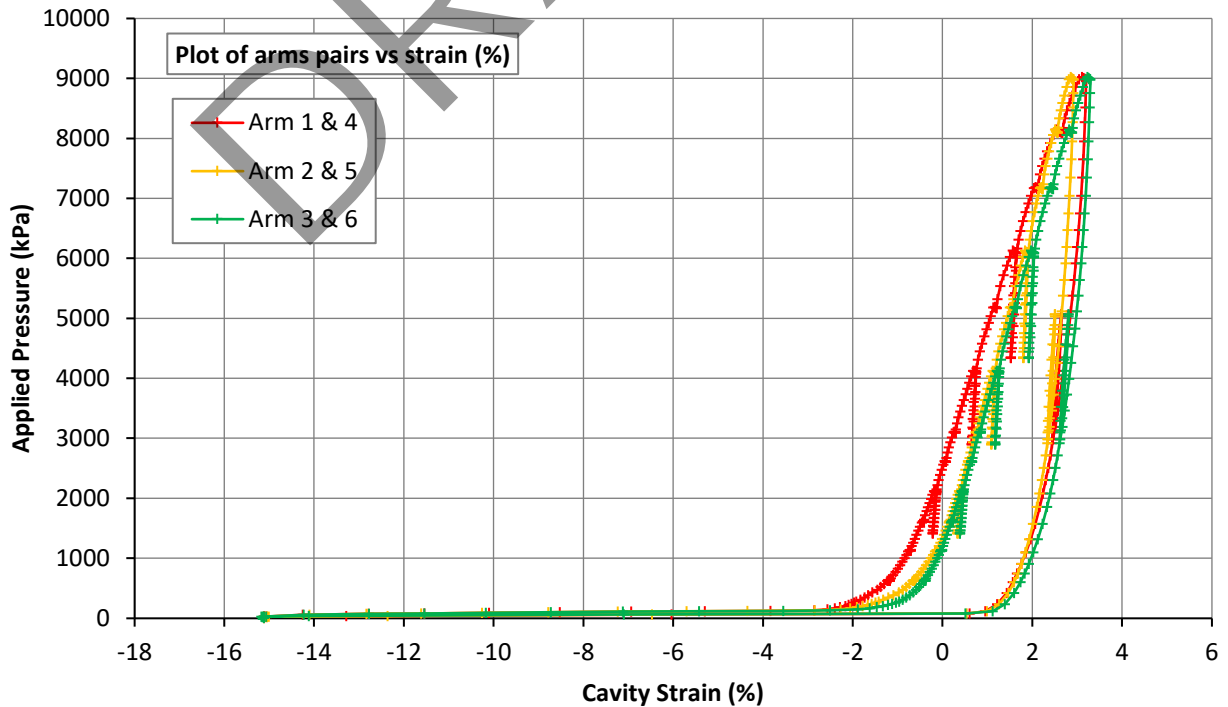
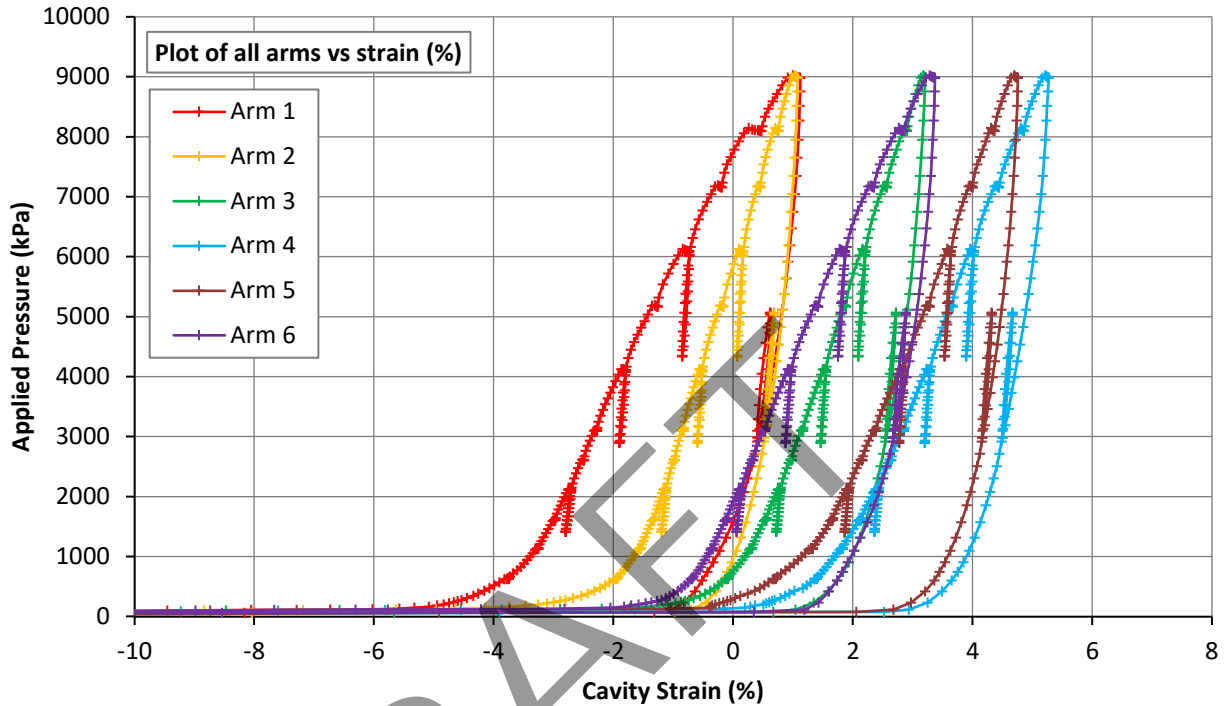


| | | | |
|--------------------|---------------------------|-------------------|---------------------------|
| Project | Stockport Interchange HPD | Figure No. | BH402 T01 - 02 |
| Client | Geotechnics | | |
| Project No. | P1200119 | | |

Pressuremeter Test - Arm Displacement vs Strain (%)



| | | | |
|------------------|------------|-----------------------|------|
| Test Date | 21/09/2020 | Test No. | 1 |
| Borehole | BH402 | Test Depth (m) | 4.20 |

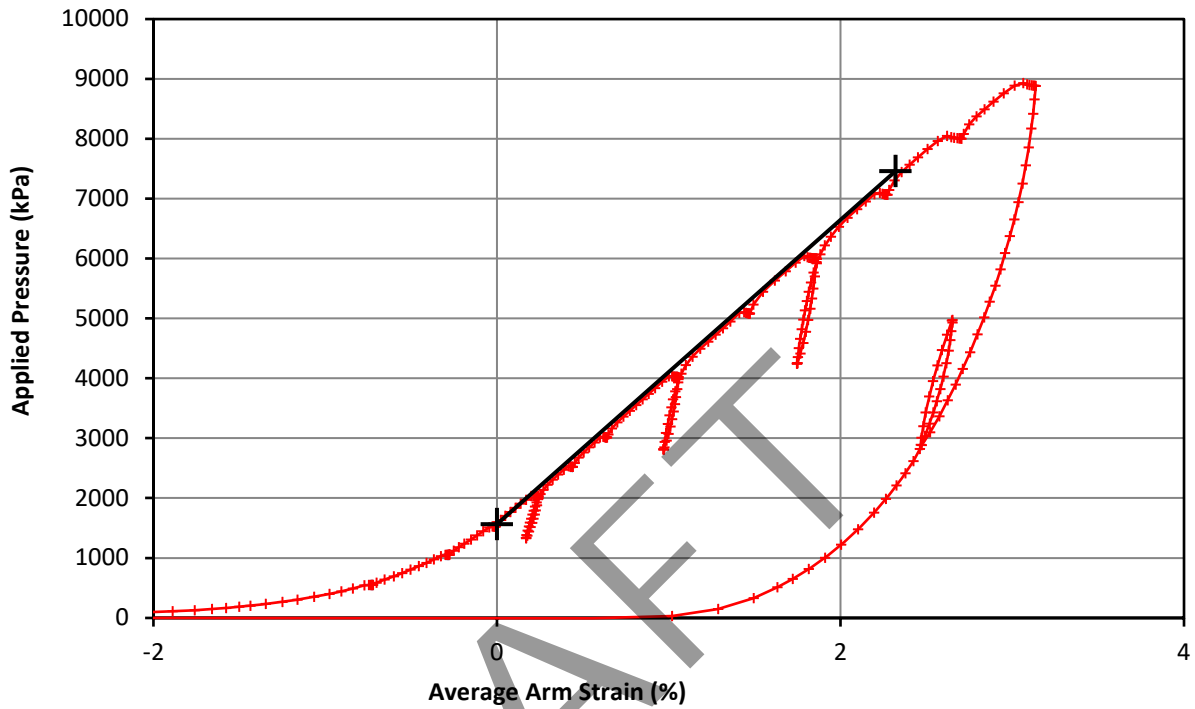


| | | | |
|--------------------|---------------------------|-------------------|---------------------------|
| Project | Stockport Interchange HPD | Figure No. | BH402 T01 - 03 |
| Client | Geotechnics | | |
| Project No. | P1200119 | | |

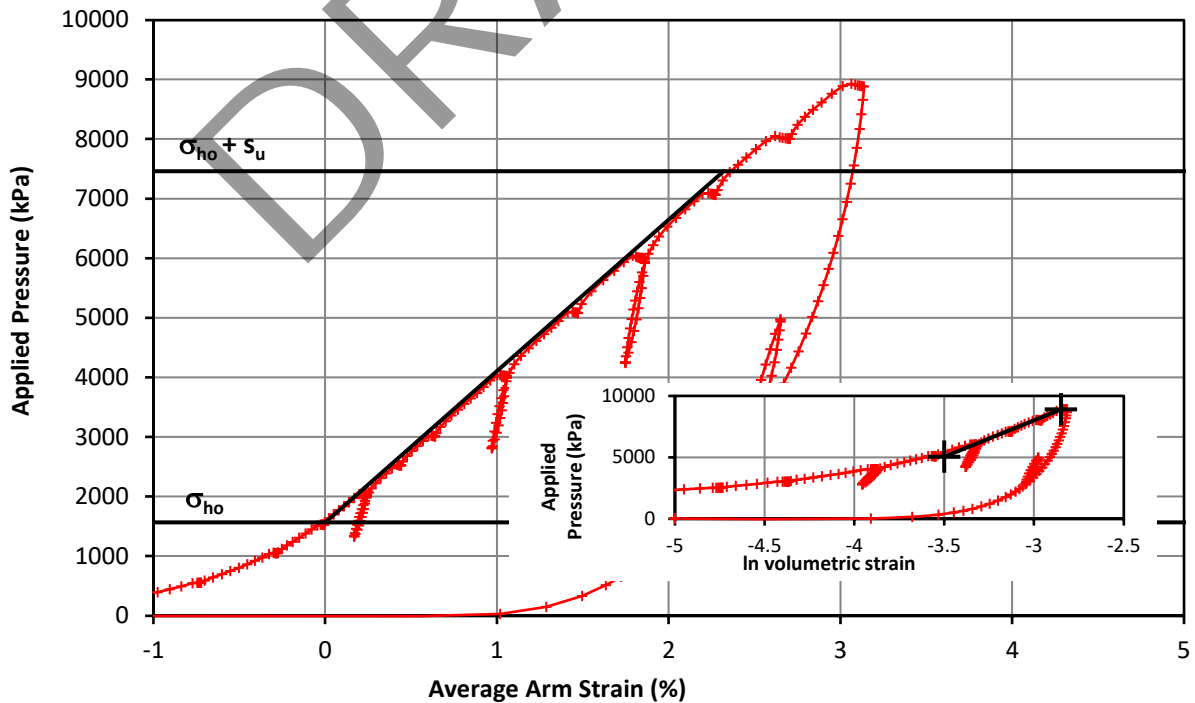
Pressuremeter Test Initial Modulus & In Situ Horizontal Stress



| | | | |
|-----------|------------|----------------|------|
| Test Date | 21/09/2020 | Test No. | 1 |
| Borehole | BH402 | Test Depth (m) | 4.20 |



| | | |
|------------------------|---------------|-----------|
| Initial Modulus | Shear Modulus | 130.0 MPa |
|------------------------|---------------|-----------|



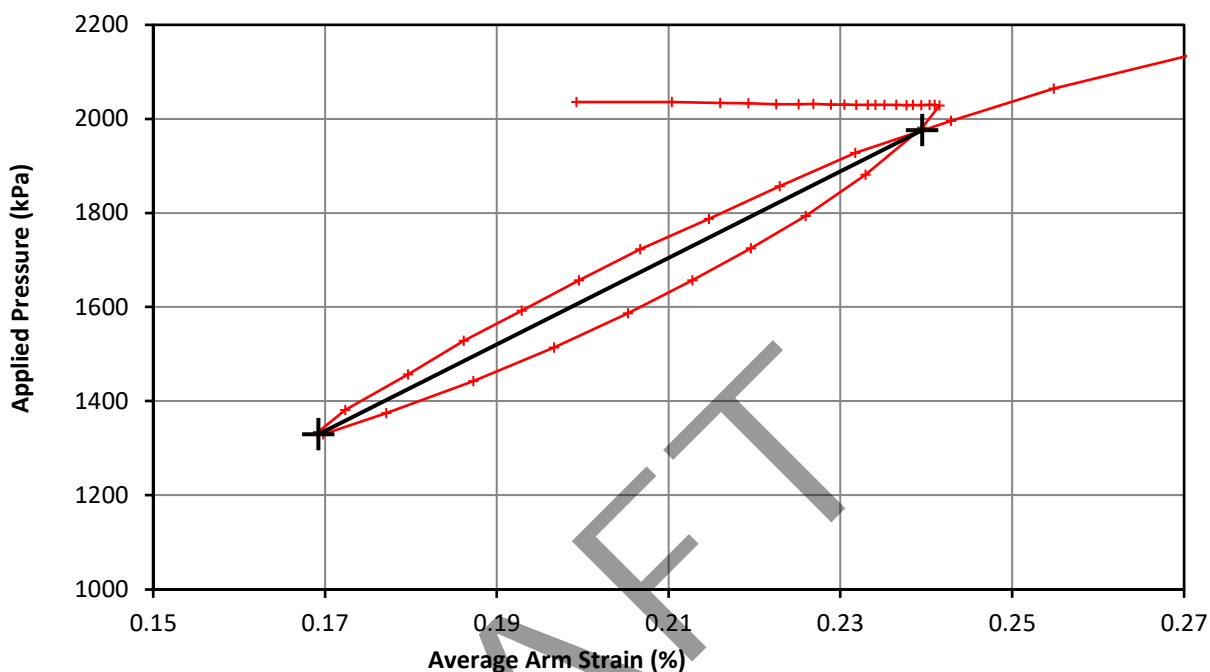
| | | |
|--------------------------------|---------------------------|----------|
| Marsland & Randolph | In situ horizontal stress | 1569 kPa |
| | Undrained Strength | 5893 kPa |

| | | | |
|--------------------|---------------------------|-------------------|---------------------------|
| Project | Stockport Interchange HPD | Figure No. | BH402 T01 - 04 |
| Client | Geotechnics | | |
| Project No. | P1200119 | | |

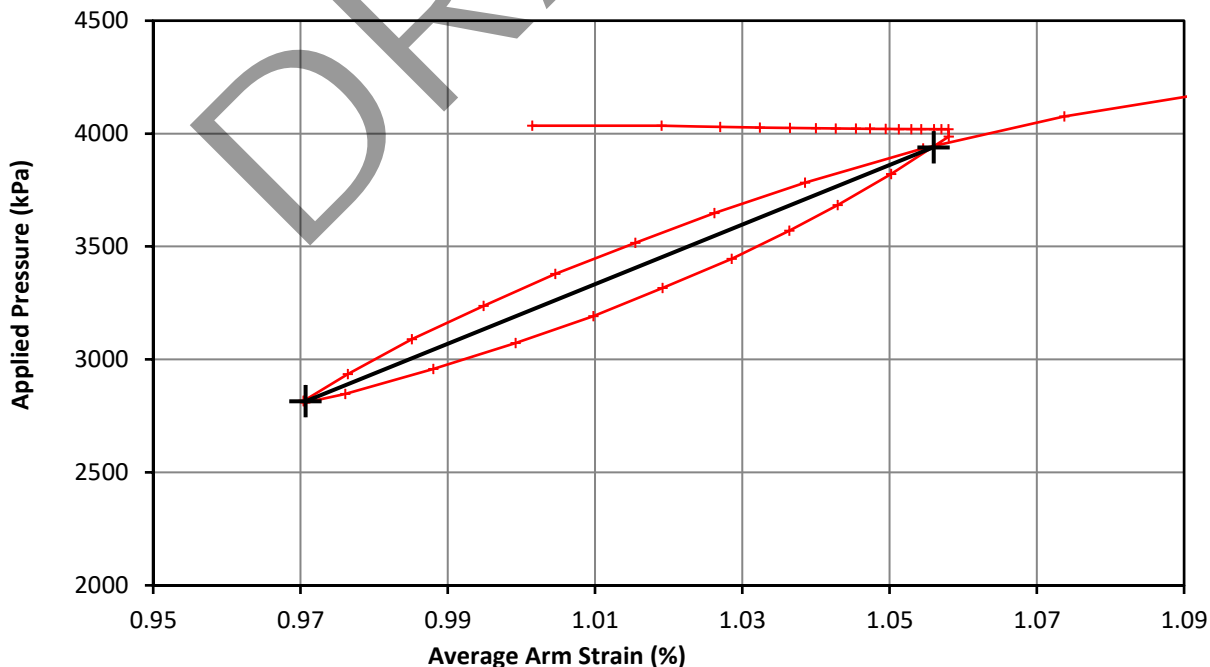
Pressuremeter Test Unload Reload Loop



| | | | |
|------------------|------------|-----------------------|------|
| Test Date | 21/09/2020 | Test No. | 1 |
| Borehole | BH402 | Test Depth (m) | 4.20 |



| | | |
|---------------|---------------------|-----------|
| Loop 1 | Shear Modulus | 460.6 MPa |
| | Cavity Strain Range | 0.070 % |



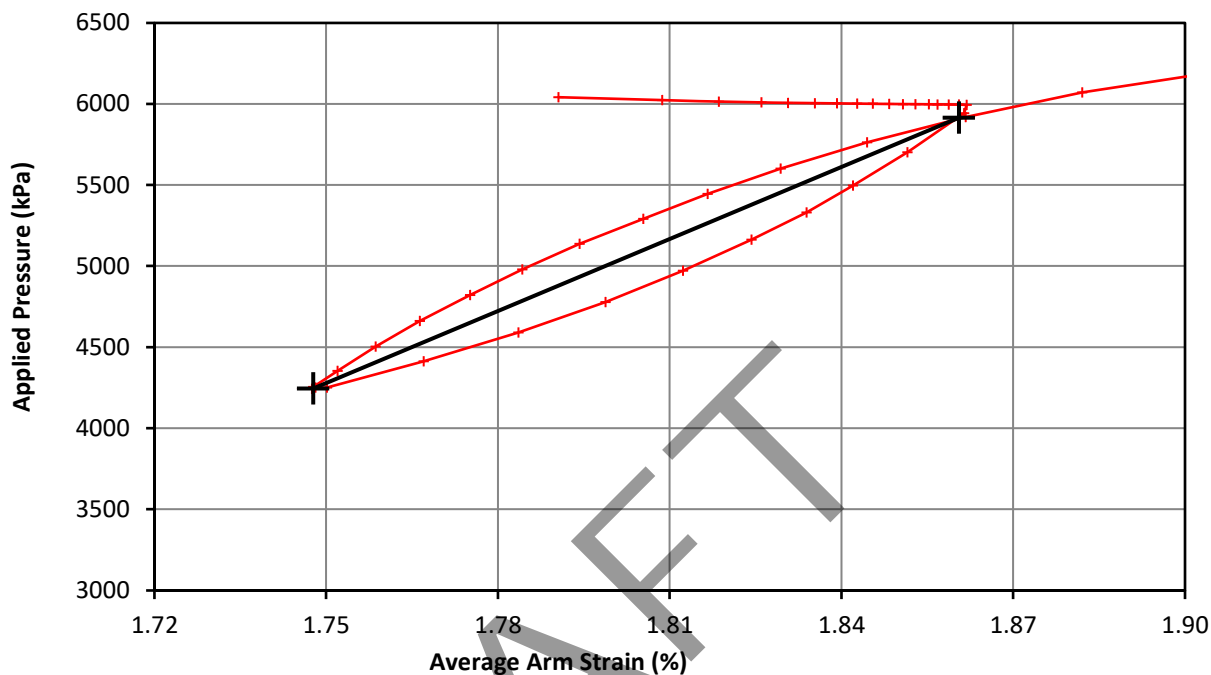
| | | |
|---------------|---------------------|-----------|
| Loop 2 | Shear Modulus | 666.4 MPa |
| | Cavity Strain Range | 0.085 % |

| | | | |
|--------------------|---------------------------|-------------------|---------------------------|
| Project | Stockport Interchange HPD | Figure No. | BH402 T01 - 05 |
| Client | Geotechnics | | |
| Project No. | P1200119 | | |

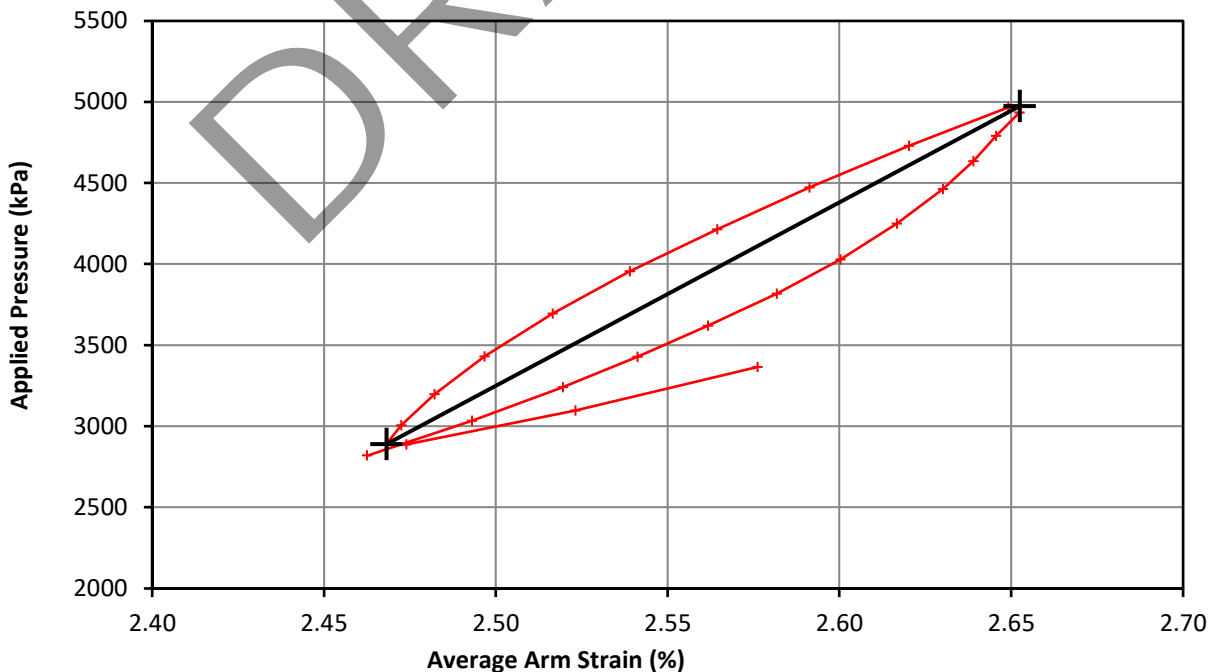
Pressuremeter Test Unload Reload Loop



| | | | |
|------------------|------------|-----------------------|------|
| Test Date | 21/09/2020 | Test No. | 1 |
| Borehole | BH402 | Test Depth (m) | 4.20 |



| | | |
|---------------|---------------------|-----------|
| Loop 3 | Shear Modulus | 753.6 MPa |
| | Cavity Strain Range | 0.113 % |



| | | |
|---------------|---------------------|-----------|
| Loop 4 | Shear Modulus | 580.1 MPa |
| | Cavity Strain Range | 0.184 % |

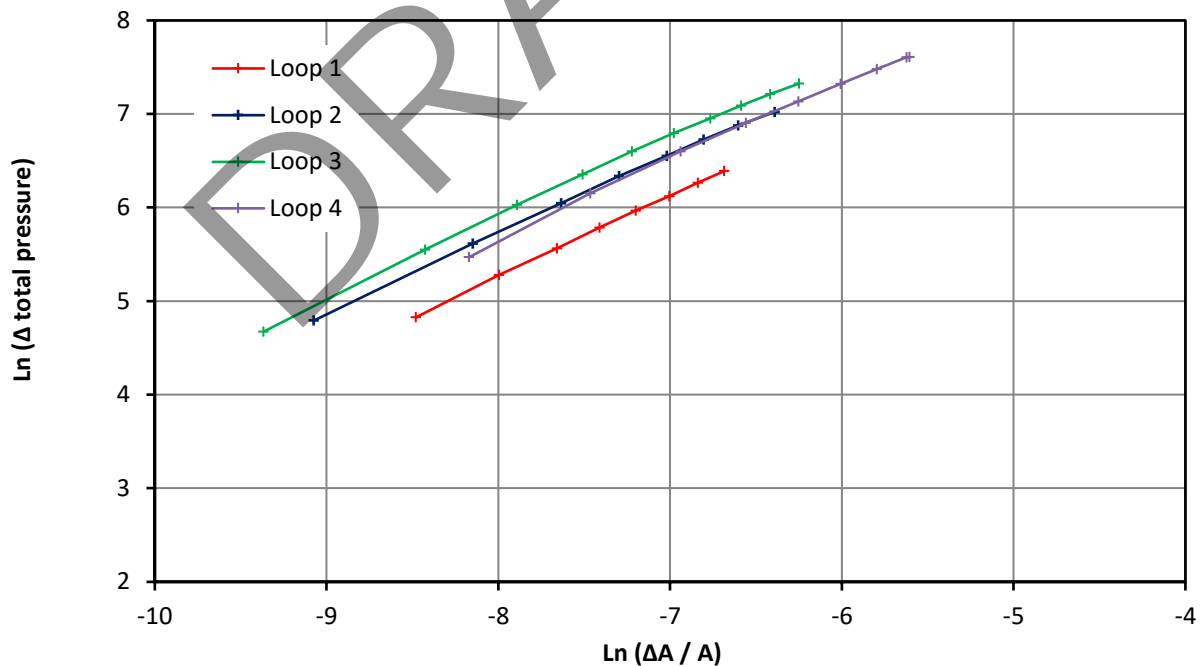
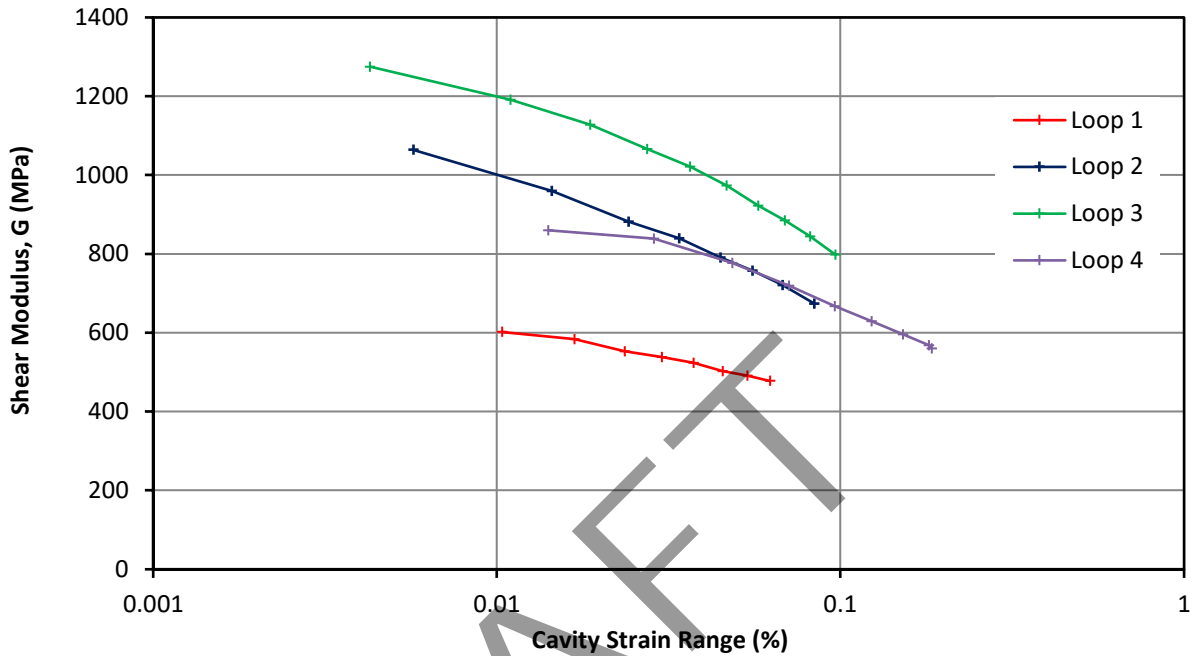
| | | | |
|--------------------|---------------------------|-------------------|---------------------------|
| Project | Stockport Interchange HPD | Figure No. | BH402 T01 - 06 |
| Client | Geotechnics | | |
| Project No. | P1200119 | | |

Pressuremeter Analysis

Small Strain Stiffness and Bolton and Whittle (1999)



| | | | |
|------------------|------------|-----------------------|------|
| Test Date | 21/09/2020 | Test No. | 1 |
| Borehole | BH402 | Test Depth (m) | 4.20 |



| Loop 1 | | Loop 2 | | Loop 3 | | Loop 4 | |
|---------------------|------------------|---------------------|------------------|---------------------|------------------|---------------------|------------------|
| Gradient(β) | Intercept | Gradient(β) | Intercept | Gradient(β) | Intercept | Gradient(β) | Intercept |
| 0.867 | 198.862 (MPa) | 0.833 | 239.228 (MPa) | 0.850 | 326.657 (MPa) | 0.822 | 209.459 (MPa) |

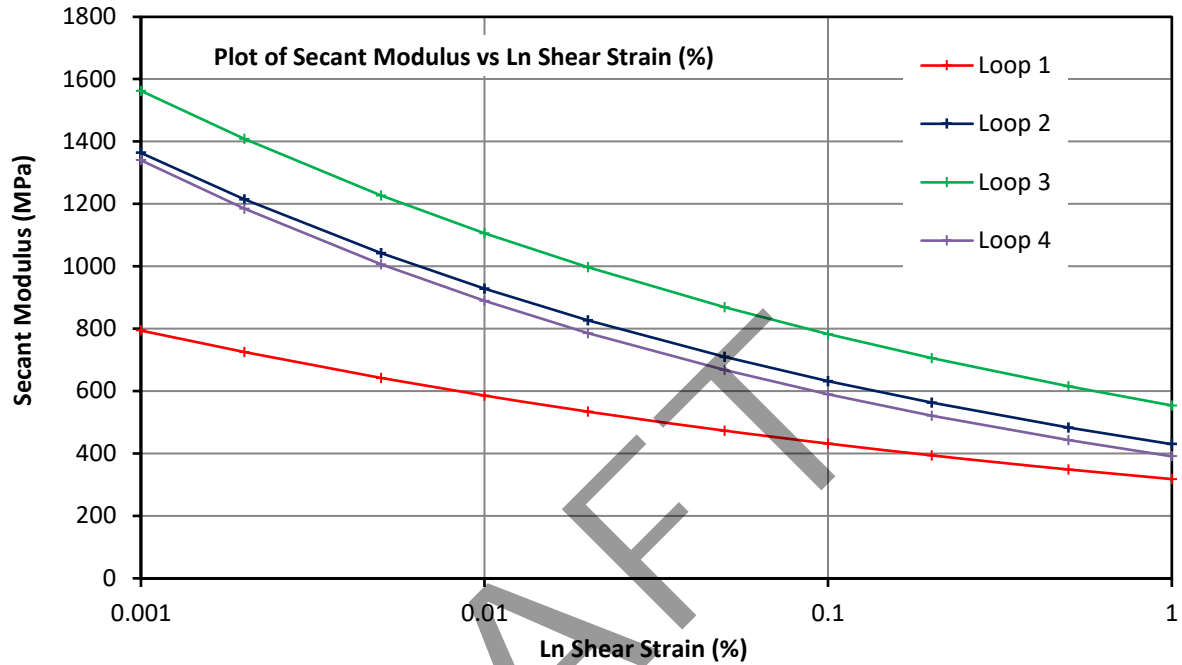
| | | | |
|--------------------|---------------------------|-------------------|---------------------------|
| Project | Stockport Interchange HPD | Figure No. | BH402 T01 - 07 |
| Client | Geotechnics | | |
| Project No. | P1200119 | | |

Pressuremeter Analysis

Secant Modulus - Shear Strain (%)



| | | | |
|------------------|------------|-----------------------|------|
| Test Date | 21/09/2020 | Test No. | 1 |
| Borehole | BH402 | Test Depth (m) | 4.20 |



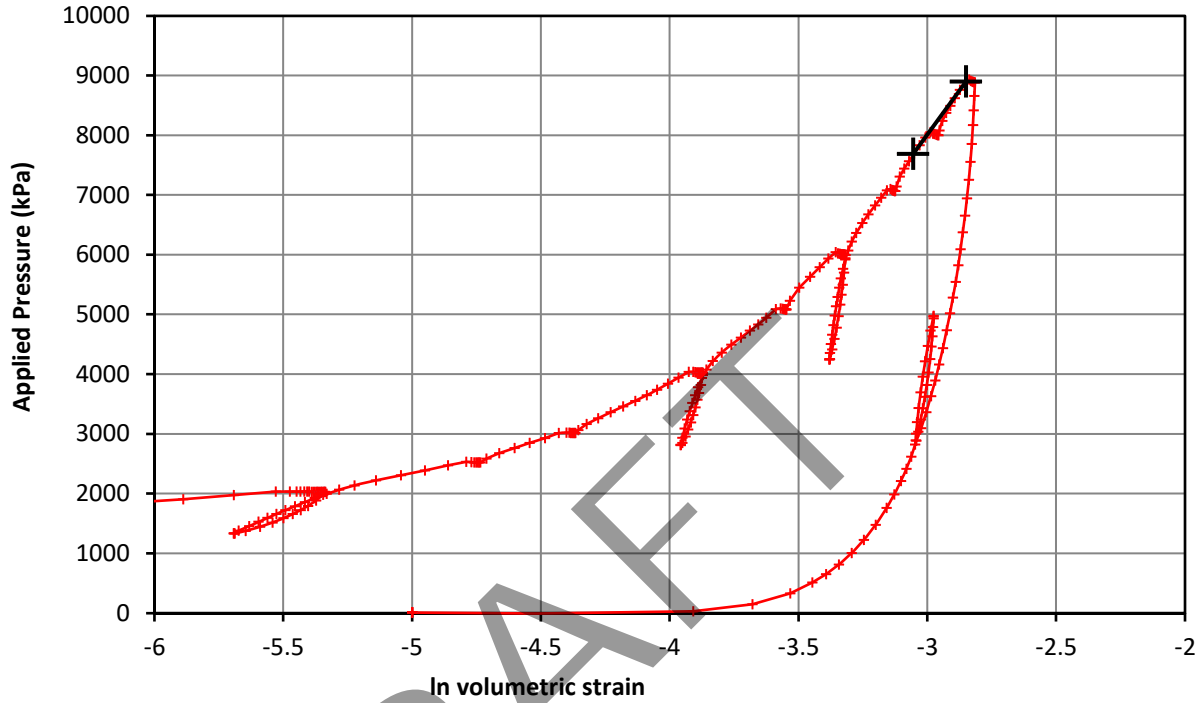
| Shear Strain | Loop 1 | Loop 2 | Loop 3 | Loop 4 |
|---------------|------------|-------------|-------------|-------------|
| 0.001% | 795 | 1364 | 1562 | 1340 |
| 0.002% | 725 | 1215 | 1408 | 1185 |
| 0.005% | 642 | 1042 | 1227 | 1006 |
| 0.010% | 585 | 928 | 1106 | 889 |
| 0.020% | 534 | 827 | 997 | 786 |
| 0.050% | 473 | 709 | 869 | 667 |
| 0.100% | 431 | 632 | 783 | 590 |
| 0.200% | 393 | 563 | 705 | 521 |
| 0.500% | 348 | 483 | 615 | 443 |
| 1.000% | 318 | 430 | 554 | 391 |

| | | | |
|--------------------|---------------------------|-------------------|-------------------|
| Project | Stockport Interchange HPD | Figure No. | BH402 T01 - 08 |
| Client | Geotechnics | | |
| Project No. | P1200119 | | |

Pressuremeter Test - Strength



| | | | |
|------------------|------------|-----------------------|------|
| Test Date | 21/09/2020 | Test No. | 1 |
| Borehole | BH402 | Test Depth (m) | 4.20 |



| | | |
|-----------------|-----------------|-----------|
| Strength | Undrained Shear | 5893 kPa |
| | Limit Pressure | 25694 kPa |

| | | | |
|--------------------|---------------------------|-------------------|---------------------------|
| Project | Stockport Interchange HPD | Figure No. | BH402 T01 - 09 |
| Client | Geotechnics | | |
| Project No. | P1200119 | | |

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APPENDIX 10
Monitoring Results

APPENDIX II
Laboratory Test Results - Geotechnical

Classification and Strength

| | | |
|-----------------------|--|---|
| Symbol | C - Clay (0 - containing organic matter) Plasticity | M - Silt L - Low I - Intermediate H - High V - Very High E - Extremely High |
| I_p | Plasticity Index | |
| % | % retained on 425 μ m sieve, shown under I_p value | |
| w_L | Liquid Limit | |
| w_p | Plastic Limit | |
| NP | Non-Plastic | |
| NAT | Sample tested in natural state | |
| w | Water Content | |
| ρ_d | Particle Density | |
| Test | Quick undrained triaxial tests | |
| | SS | Single stage - 102mm diameter. |
| | S3 | Single stage - set of 3 38mm diameter. |
| | MS | Multistage - 102mm diameter. |
| | D | Drained Test |
| | HV | Hand Vane |
| | PP | Pocket Penetrometer (kg/cm ²) |
| | NST | Not suitable for test |
| γ_b | Bulk Density | |
| σ_3 | Triaxial Cell Pressure | |
| $\sigma_1 - \sigma_3$ | Deviator Stress | |
| ## | Excessive Strain | |
| c_u | Undrained Cohesion | |
| c | Cohesion Intercept | |
| ϕ | Angle of Shearing Resistance | |
| Linear Shrink | Linear Shrinkage | |
| Stab add- | Stabiliser which is added | |

Consolidation

| | |
|-----------|---|
| m_v | Coefficient of Volume Compressibility |
| c_{v50} | Coefficient of Consolidation - Log t |
| c_{v90} | Coefficient of Consolidation - \sqrt{t} |

Rock

| | |
|----|----------------------|
| UF | Unacceptable Failure |
|----|----------------------|

Chemical Analysis

| | |
|-----------------|--|
| Acid Soluble | Total sulphate in specimen, expressed as SO ₃ %, value in brackets expressed as SO ₄ % |
| Water Soluble | Soluble sulphate in 2:1 water : soil extract, expressed as SO ₃ g/l, value in brackets expressed as SO ₄ g/l |
| In Water | Sulphate content of groundwater, expressed as SO ₃ g/l, value in brackets expressed as SO ₄ g/l |
| pH | pH value |
| Organic content | Organic content expressed as a percentage of dry weight |
| Chloride | Chloride Ion content expressed as a percentage of dry weight |

MCV, Compaction, CBR

| | |
|-----|---|
| MCV | Moisture Condition Value at natural water content |
| MCC | Moisture Condition Calibration |
| CCV | Chalk Crushing Value |

Compaction

| | |
|------|----------------------|
| Type | 2.5 = 2.5 kg Rammer |
| | 4.5 = 4.5 kg Rammer |
| | V = Vibrating Hammer |

γ_b Bulk Density

γ_d Dry Density

CBR California Bearing Ratio

| | |
|------|--|
| Type | 2.5 = Test on Specimen Recompacted using 2.5 kg Rammer |
| | 4.5 = As above but using 4.5 kg Rammer |
| | V = As above but using Vibrating Hammer |
| | M = Test on open drive mould specimen cut in field |
| | S = Soaked Specimen |

Top CBR at top of mould

Bottom CBR at bottom of mould

ND None Detected

* In the Sample Description denotes a laboratory only description

Laboratory Test Certificate

Form REP008 Rev 3

| | | | |
|---------------------------|--|----------------------------------|---------------------|
| Issued To | Geotechnics Ltd The Geotechnical Centre Unit 1B, Borders Industrial Estate River Lane, Saltney Chester CH4 8RJ | Date of issue | 04/11/2020 |
| | | Issue No. | 1 |
| | | Client Ref. No. | N/A |
| | | Samples / Material Source | |
| | | Samples Recv'd | 22/10/2020 |
| Testing Start Date | 22/10/2020 | Sample State | As received |
| Testing Complete | 04/11/2020 | Sampled by | Geotechnics Limited |
| Comments | | | |
| | | | |
| Project No | PN204140 | | |
| Project Name | STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION | | |

Summary of Tests

| Standard | Test Description | Test Quantity | UKAS |
|-----------------------------------|---|---------------|------|
| BS EN ISO 17892-1:2014 | Water Content | 3 | Yes |
| BS1377-2:1990 Cl. 4.4 & 5.0 | Liquid Limit and Plastic Limit (1 Point) | 2 | Yes |
| BS EN ISO 17892-4:2016 Cl. 5.2 | Particle Size Distribution by Sieving Method | 8 | Yes |
| ISRM Suggested Method (1985) | Point Load Strength of Rock | 30 | Yes |
| BS EN ISO 17892-8:2018 | Shear Strength by Unconsolidated Undrained Triaxial Test - Single Stage | 1 | Yes |
| BS 1377-4:1990 Cl. 3.3 | 2.5 kg Rammer Dry Density/Moisture Content Relationship (Compaction) | 1 | Yes |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Note: Any descriptions, opinions or interpretations are outside the scope of UKAS accreditation.
The results within this report relate only to the samples tested and received from the client.



Test Results checked and approved for issue.
Signed for and on behalf of Geotechnics Limited

Stephane Schiano (Laboratory Testing Manager)




203 Torrington Avenue, Tile Hill,
Coventry, CV4 9UT

LABORATORY RESULTS - Classification and Strength

Project STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION

Project No: PN204140


| Sample | | | | | Classification | | | | Strength | | | | | | |
|--------|-----------------------------------|------|---------------|--|----------------|--------------------------|------------|------------|-----------------------|------|--|---------------------------------|--|----------------------------|--------------------------------|
| Hole | Depth (Specimen Depth) m | Type | Sample Ref | Description | Symbol | I_p (>425) % | w_L % | w_p % | w (p_d) % | Test | γ_b (γ_d) ³ Mg/m ³ | σ_3 kN/m ² | $\sigma_1 - \sigma_3$ kN/m ² | c_u kN/m ² | c_{Avg} kN/m ² |
| BH400 | 0.35- 1.00 (0.35) | B | N81904 | MADE GROUND: Grey sandy fine to coarse gravel. | | | | | 5.0 | | | | | | |
| BH401 | 1.20- 1.65 (1.20) | B | N81907 | Dark brown slightly organic very clayey fine to coarse SAND. (See Test Remarks Sheet for further information) | | (40%) | 25 | NP | 14.1 | | | | | | |
| BH401 | 3.00- 3.30 (3.00- 3.22) | UT | N81908 | Brown slightly organic very clayey fine to medium SAND. (See Test Remarks Sheet for further information) | | (1%) | 33 | NP | 46.8 <38.3> | SS | 1.79 | 60 | 43 | 22 | 22 |
| DRAFT | | | | | | | | | | | | | | | |

Remarks  NST - Not suitable for Test
 For Standards followed see Laboratory Test Certificate
 $w\%$ - ^ = Rock water content test; x = Aggregate moisture content test
 QUT Water Contents: <Failure Zone>, [After test]

LABORATORY RESULTS - Atterberg Limit

Project STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION

Project No: PN204140


| Sample | | | | | Results | | | | | | | |
|--|-----------------------------------|------|---------------|--|--|---------------|------------------------|-------------|--------|---------------------|---------------------|---------------------|
| Hole | Depth (Specimen Depth) m | Type | Sample Ref | Description | Test Type | Point Data | | Sym- bol | p % | >425 sieve µm | w _L % | w _p % |
| | | | | | | Cone Pene. | Water % (Factor) | | | | | |
| BH401 | 1.20- 1.65 (1.20) | B | N81907 | Dark brown slightly organic very clayey fine to coarse SAND. Test Remark: 1-point cone | Fall Cone 1pt with water content, cone type: , washed over 425um sieve | 19.6 | 23.23 (0.000) | | | 40% | 25 | NP |
| BH401 | 3.00- 3.30 (3.00) | UT | N81908 | Brown slightly organic very clayey fine to medium SAND. Test Remark: 1-point cone Sample too unstable to test as BS EN ISO 17892-12:2018 | Fall Cone 1pt with water content, cone type: , washed over 425um sieve | 20.1 | 31.26 (0.000) | | | 1% | 33 | NP |
| <div style="font-size: 48px; opacity: 0.3; transform: rotate(-30deg); pointer-events: none;">DRAFT</div> | | | | | | | | | | | | |
| Remarks | | | | |  <small>geotechnical and geo-environmental specialists</small> | | | | | | | |

LABORATORY RESULTS - MCV, Compaction, CBR

Project STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION

Project No: PN204140

| Sample | | | | | MCV | | Compaction | | | | | CBR | | | | |
|--------|-----------------------------------|------|---------------|---|-----|--------|------------|--------------------------------------|-------------------------------|---------------------------------|--|------|----------|--------|----------|--------|
| Hole | Depth (Specimen Depth) m | Type | Sample Ref | Description | MCV | w % | Type | w (Opt) % | ρ_d Mg/m ³ | γ_b Mg/m ³ | γ_d (Max) Mg/m ³ | Type | Top | | Bottom | |
| | | | | | | | | | | | | | CBR % | w % | CBR % | w % |
| BH400 | 0.35- 1.00 (0.35- 1.00) | B | N81904 | MADE GROUND: Grey sandy fine to coarse gravel. | | | 2.5kg | (7.5) 4.2* 10.0 6.3 14.5 | 2.65a | *2.00 2.16 2.09 2.03 | (2.01) *1.92 1.96 1.97 1.78 | | | | | |
| DRAFT | | | | | | | | | | | | | | | | |

Remarks  Particle Density - a=assumed, m=measured
w% - * = at natural moisture content; x = aggregate moisture content
= stabilised, see relevant test plot for details
NST = Not suitable for Test
For Standards followed see Laboratory Test Certificate

LABORATORY RESULTS - Compaction

Project: STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION

Hole: BH400

Sample Depth: 0.35-1.00m

Project No: PN204140

Sample Type: B

Sample Ref: N81904



Optimum Moisture Content 7.5
Maximum Dry Density 2.01 Mg/m³

Particles retained on 37.5mm sieve 3 %
 20mm sieve 16 %

Particle Density 2.65 (Ass'm) Mg/m³
 Preparation Single Sample
 2.5kg Rammer

Description MADE GROUND: Grey sandy fine to coarse gravel.

Remarks BS1377 Part 4 1990 : Clause 3.3 and 3.4

LABORATORY RESULTS - Particle Size Distribution

Project: STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION

Hole BH400

Sample Depth 2.00-2.45m

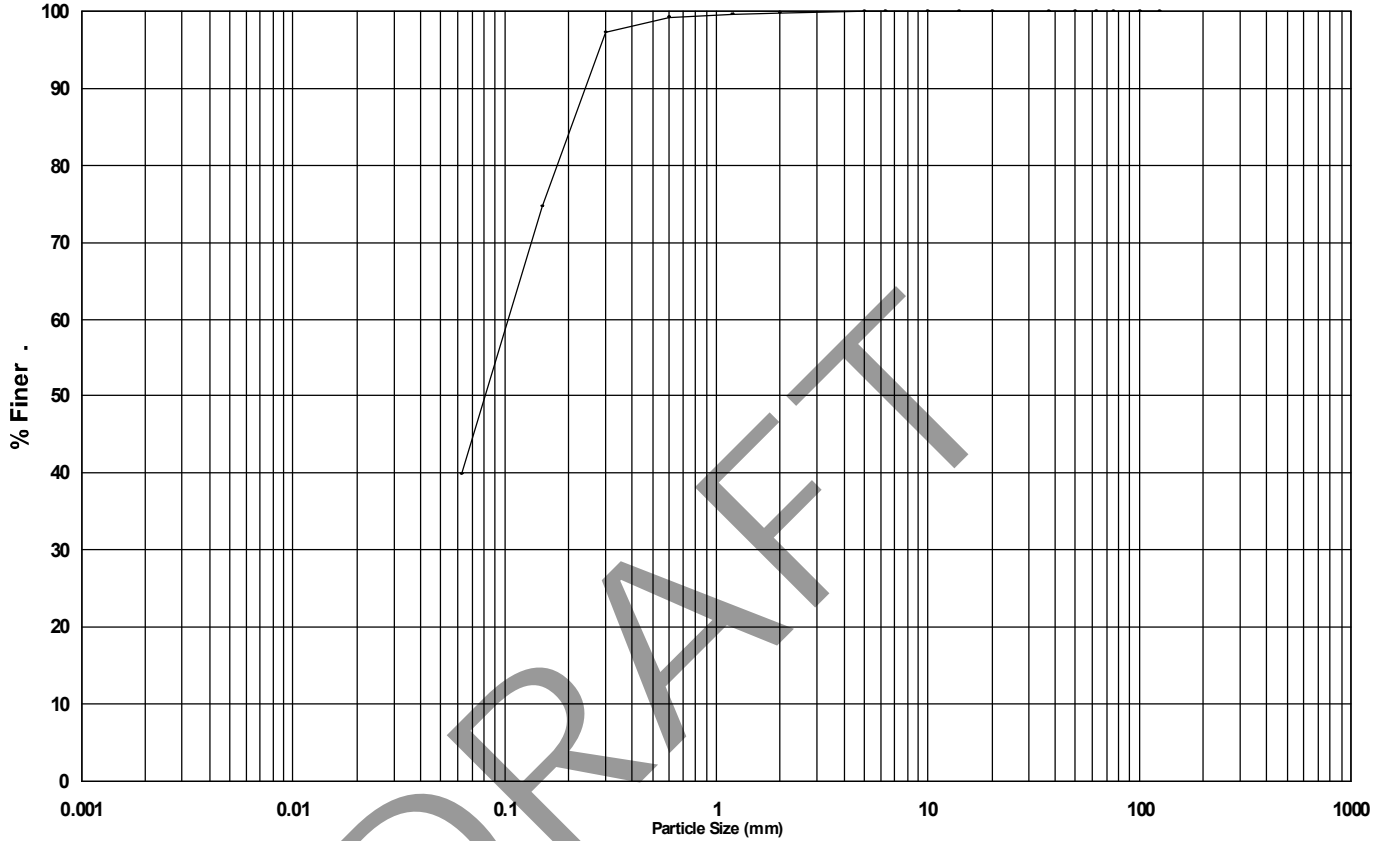
Project No: PN204140

Sample Type B

Sample Ref N81905

Sample Description

Soft brown sandy CLAY.



| Classification | CLAY | | | SILT | | | SAND | | | Gravel | | | Cobbles | Boulders |
|----------------|------|--------|--------|------|--------|--------|------|--------|--------|--------|--|--|---------|----------|
| | Fine | Medium | Coarse | Fine | Medium | Coarse | Fine | Medium | Coarse | | | | | |

| Classification | % of each |
|-----------------------|-----------|
| SILT (including CLAY) | 40 |
| SAND | 60 |
| GRAVEL | 0 |
| COBBLES | 0 |
| BOULDERS | 0 |

| Size | % Finer |
|---------|---------|
| 125 mm | 100 |
| 100 mm | 100 |
| 75 mm | 100 |
| 63 mm | 100 |
| 50 mm | 100 |
| 37.5 mm | 100 |
| 20 mm | 100 |
| 14 mm | 100 |
| 10 mm | 100 |
| 6.3 mm | 100 |
| 5 mm | 100 |
| 2 mm | 100 |
| 1.18 mm | 100 |
| 600 μm | 99 |
| 300 μm | 97 |
| 150 μm | 75 |

| Size | % Finer |
|-------|---------|
| 63 μm | 40 |

| Uniformity Coefficient | |
|-------------------------|--|
| Not Available | |
| Sieving Method | |
| Wet sieve | |
| Fine Particle Analysis | |
| Method | |
| Pre-treated with | |
| % loss on Pre-treatment | |
| Particle Density | |

Remarks Sieve:-Test performed in accordance with BS EN ISO 17892-4:2016

18/11/2020

LABORATORY RESULTS - Particle Size Distribution

Project: STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION

Hole BH401

Sample Depth 0.35-0.90m

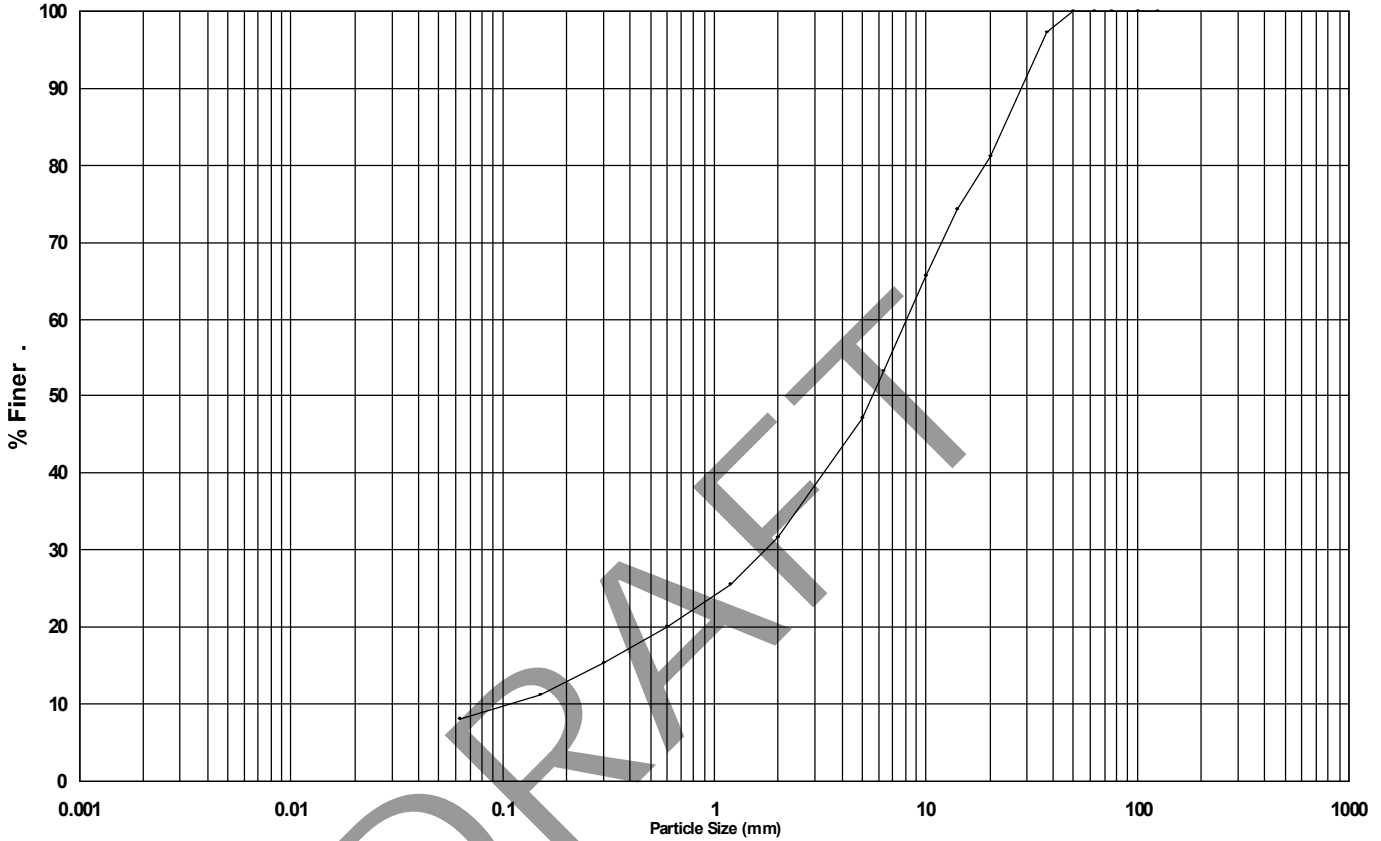
Project No: PN204140

Sample Type B

Sample Ref N81906

Sample Description

MADE GROUND: Pink very sandy silty fine to coarse gravel.



| Classification | CLAY | | | SILT | | | SAND | | | Gravel | | | Cobbles | Boulders |
|----------------|------|--------|--------|------|--------|--------|------|--------|--------|--------|--|--|---------|----------|
| | Fine | Medium | Coarse | Fine | Medium | Coarse | Fine | Medium | Coarse | | | | | |

| Classification | % of each |
|-----------------------|-----------|
| SILT (including CLAY) | 8 |
| SAND | 24 |
| GRAVEL | 68 |
| COBBLES | 0 |
| BOULDERS | 0 |

| Size | % Finer |
|---------|---------|
| 125 mm | 100 |
| 100 mm | 100 |
| 75 mm | 100 |
| 63 mm | 100 |
| 50 mm | 100 |
| 37.5 mm | 97 |
| 20 mm | 81 |
| 14 mm | 74 |
| 10 mm | 66 |
| 6.3 mm | 53 |
| 5 mm | 47 |
| 2 mm | 32 |
| 1.18 mm | 26 |
| 600 µm | 20 |
| 300 µm | 15 |
| 150 µm | 11 |

| Size | % Finer |
|-------|---------|
| 63 µm | 8 |

| Uniformity Coefficient | |
|-------------------------|--|
| 75.11 | |
| Sieving Method | |
| Wet sieve | |
| Fine Particle Analysis | |
| Method | |
| Pre-treated with | |
| % loss on Pre-treatment | |
| Particle Density | |

Remarks Sieve:-Test performed in accordance with BS EN ISO 17892-4:2016

18/11/2020

LABORATORY RESULTS - Particle Size Distribution

Project: STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION

Hole BH402

Sample Depth 0.20-0.90m

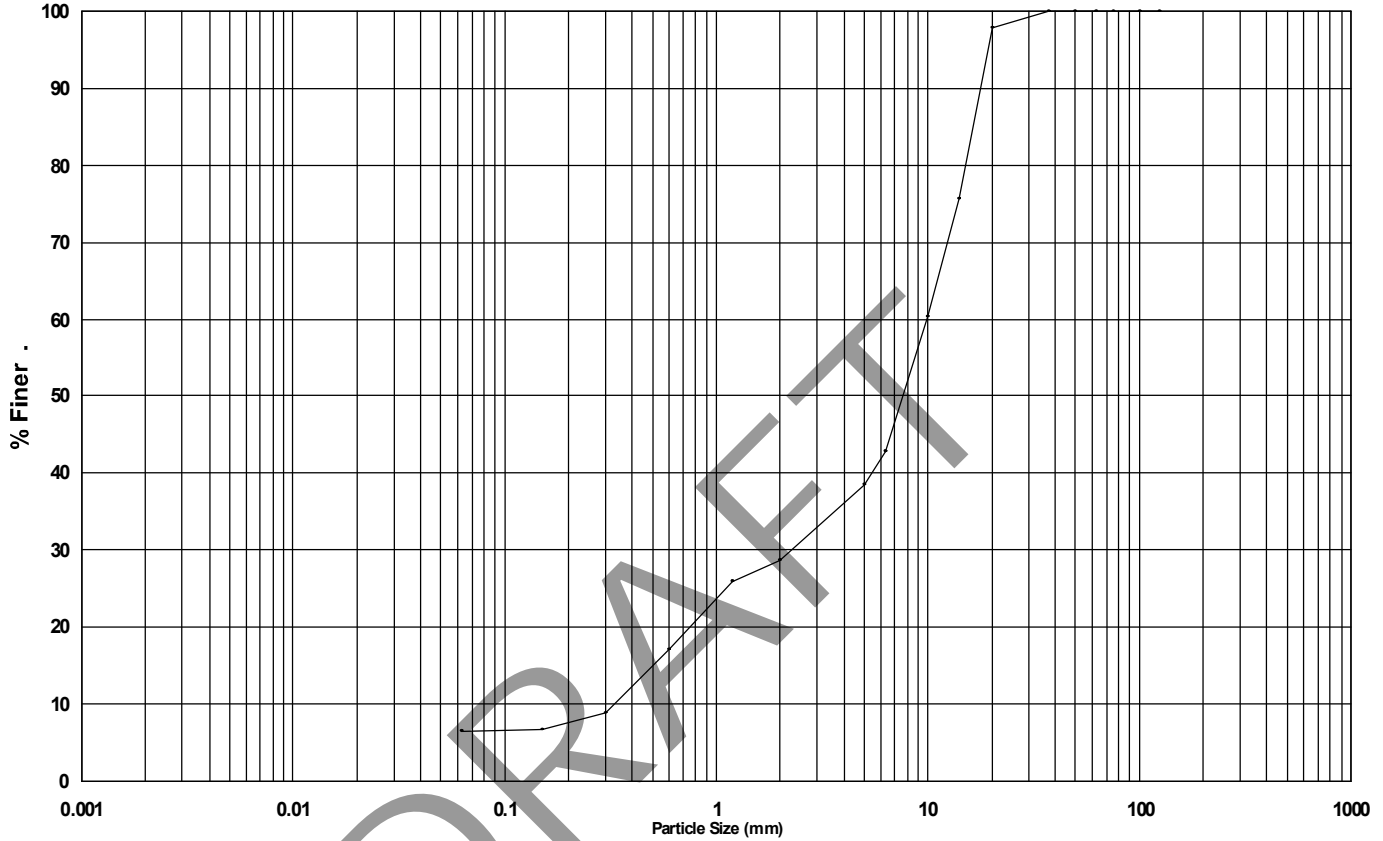
Project No: PN204140

Sample Type B

Sample Ref N81909

Sample Description

MADE GROUND: Grey very sandy silty fine to coarse gravel.



| Classification | CLAY | | | SILT | | | SAND | | | Gravel | | | Cobbles | Boulders |
|----------------|------|--------|--------|------|--------|--------|------|--------|--------|--------|--|--|---------|----------|
| | Fine | Medium | Coarse | Fine | Medium | Coarse | Fine | Medium | Coarse | | | | | |

| Classification | % of each |
|-----------------------|-----------|
| SILT (including CLAY) | 6 |
| SAND | 23 |
| GRAVEL | 71 |
| COBBLES | 0 |
| BOULDERS | 0 |

| Size | % Finer |
|---------|---------|
| 125 mm | 100 |
| 100 mm | 100 |
| 75 mm | 100 |
| 63 mm | 100 |
| 50 mm | 100 |
| 37.5 mm | 100 |
| 20 mm | 98 |
| 14 mm | 76 |
| 10 mm | 60 |
| 6.3 mm | 43 |
| 5 mm | 39 |
| 2 mm | 29 |
| 1.18 mm | 26 |
| 600 µm | 17 |
| 300 µm | 9 |
| 150 µm | 7 |

| Size | % Finer |
|-------|---------|
| 63 µm | 6 |

| Uniformity Coefficient | |
|-------------------------|--|
| 30.07 | |
| Sieving Method | |
| Wet sieve | |
| Fine Particle Analysis | |
| Method | |
| Pre-treated with | |
| % loss on Pre-treatment | |
| Particle Density | |

Remarks Sieve:-Test performed in accordance with BS EN ISO 17892-4:2016

18/11/2020

LABORATORY RESULTS - Particle Size Distribution

Project: STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION

Hole BH402

Sample Depth 1.20-1.65m

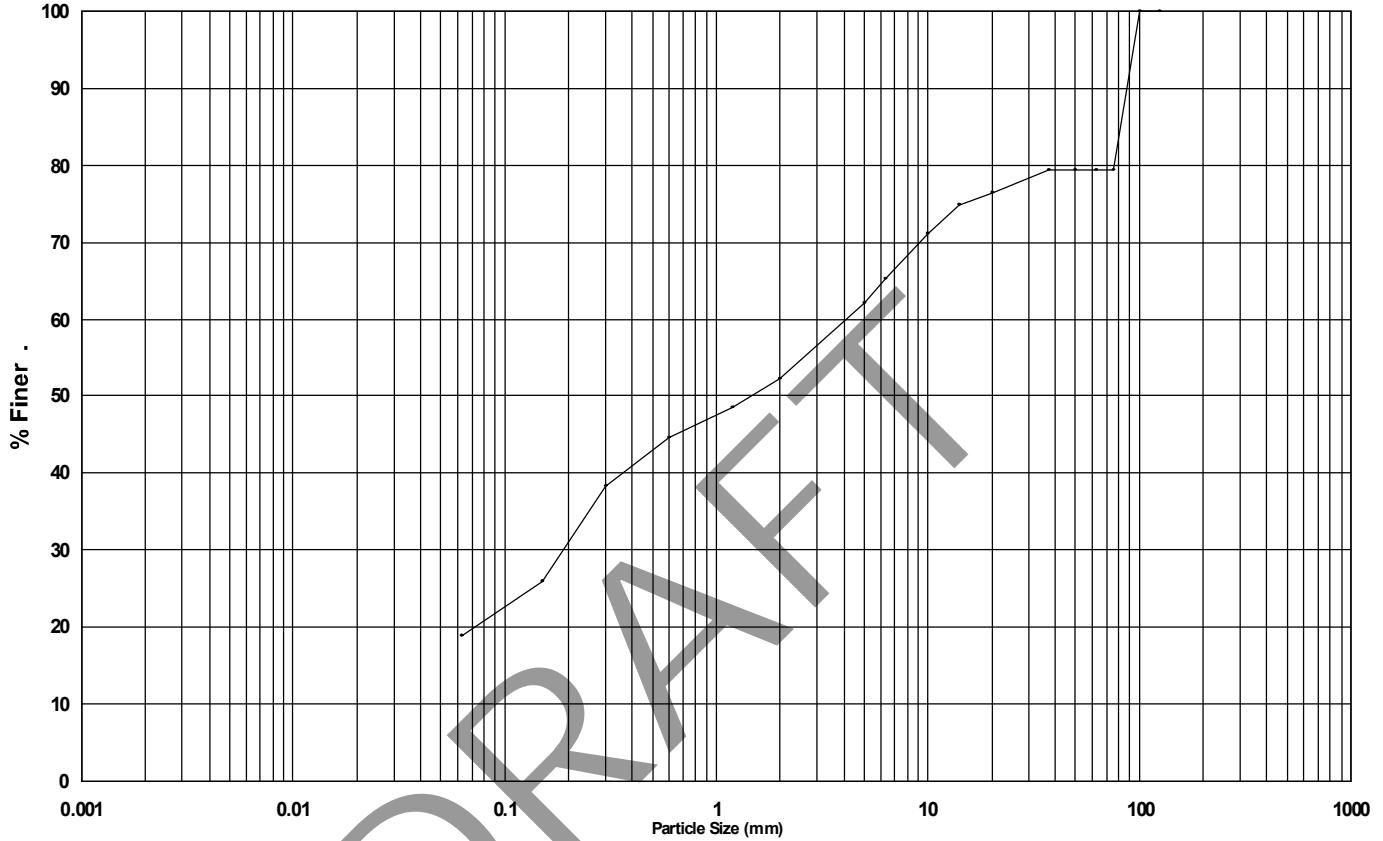
Project No: PN204140

Sample Type B

Sample Ref N81910

Sample Description

MADE GROUND: Reddish brown and grey clayey fine to coarse sand and fine to coarse gravel with a high cobble content.



| Classification | CLAY | Fine | Medium | Coarse | Fine | Medium | Coarse | Fine | Medium | Coarse | Cobbles | Boulders |
|----------------|------|------|--------|--------|------|--------|--------|--------|--------|--------|---------|----------|
| | | SILT | | | SAND | | | Gravel | | | | |

| Classification | % of each |
|-----------------------|-----------|
| SILT (including CLAY) | 19 |
| SAND | 33 |
| GRAVEL | 27 |
| COBBLES | 21 |
| BOULDERS | 0 |

| Size | % Finer |
|---------|---------|
| 125 mm | 100 |
| 100 mm | 100 |
| 75 mm | 79 |
| 63 mm | 79 |
| 50 mm | 79 |
| 37.5 mm | 79 |
| 20 mm | 76 |
| 14 mm | 75 |
| 10 mm | 71 |
| 6.3 mm | 65 |
| 5 mm | 62 |
| 2 mm | 52 |
| 1.18 mm | 48 |
| 600 μm | 45 |
| 300 μm | 38 |
| 150 μm | 26 |

| Size | % Finer |
|-------|---------|
| 63 μm | 19 |

| Uniformity Coefficient | |
|-------------------------|--|
| Not Available | |
| Sieving Method | |
| Wet sieve | |
| Fine Particle Analysis | |
| Method | |
| Pre-treated with | |
| % loss on Pre-treatment | |
| Particle Density | |

Remarks Sieve:-Test performed in accordance with BS EN ISO 17892-4:2016

18/11/2020

LABORATORY RESULTS - Particle Size Distribution

Project: STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION

Hole BH403

Sample Depth 0.30-0.80m

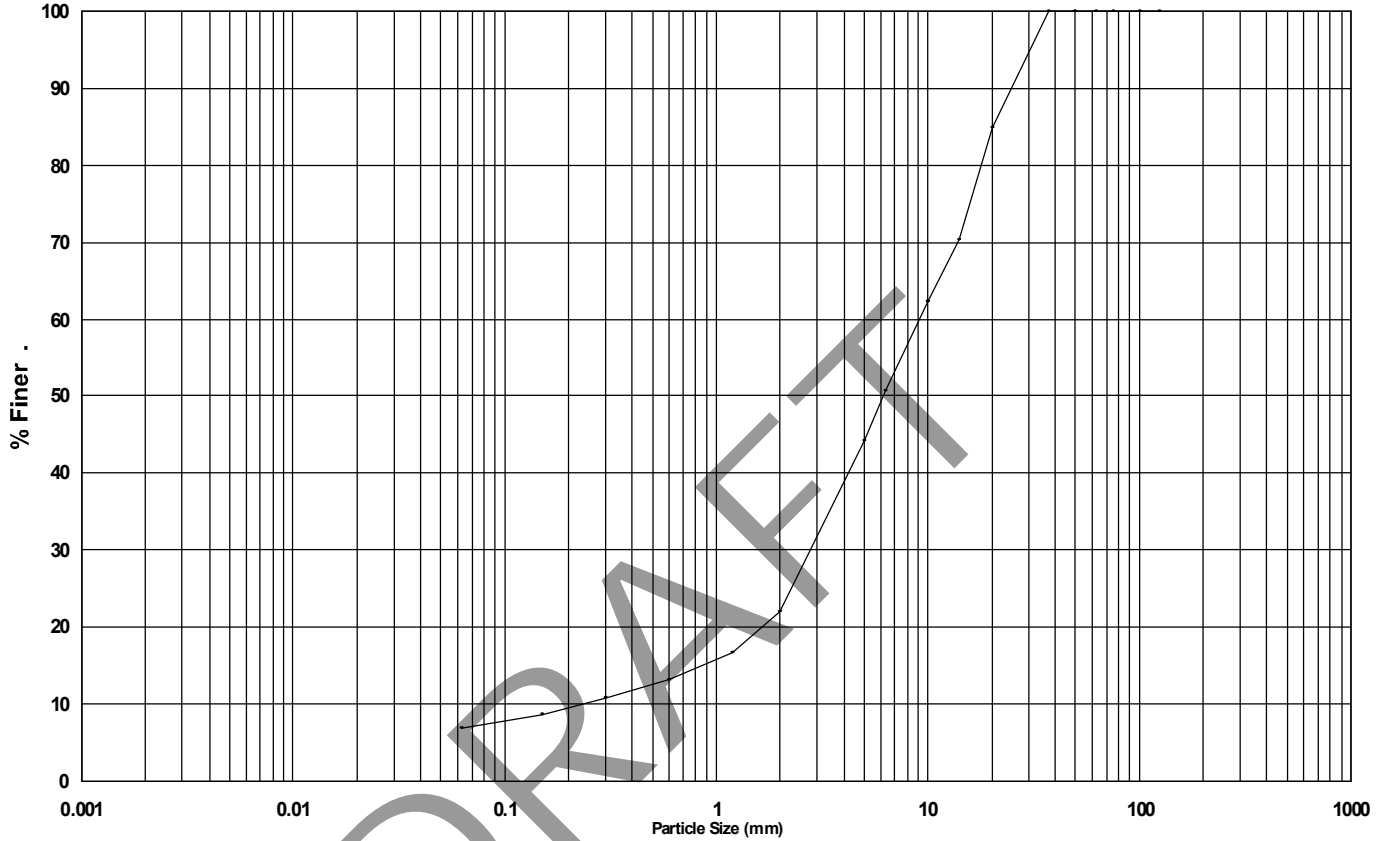
Project No: PN204140

Sample Type B

Sample Ref N81912

Sample Description

MADE GROUND: Grey sandy silty fine to coarse gravel.



| Classification | CLAY | Fine | Medium | Coarse | Fine | Medium | Coarse | Fine | Medium | Coarse | Cobbles | Boulders |
|----------------|------|------|--------|--------|------|--------|--------|------|--------|--------|---------|----------|
| | SILT | | | SAND | | | Gravel | | | | | |

| Classification | % of each |
|-----------------------|-----------|
| SILT (including CLAY) | 7 |
| SAND | 15 |
| GRAVEL | 78 |
| COBBLES | 0 |
| BOULDERS | 0 |

| Size | % Finer |
|---------|---------|
| 125 mm | 100 |
| 100 mm | 100 |
| 75 mm | 100 |
| 63 mm | 100 |
| 50 mm | 100 |
| 37.5 mm | 100 |
| 20 mm | 85 |
| 14 mm | 70 |
| 10 mm | 62 |
| 6.3 mm | 51 |
| 5 mm | 44 |
| 2 mm | 22 |
| 1.18 mm | 17 |
| 600 µm | 13 |
| 300 µm | 11 |
| 150 µm | 9 |

| Size | % Finer |
|-------|---------|
| 63 µm | 7 |

| Uniformity Coefficient | |
|-------------------------|--|
| 38.60 | |
| Sieving Method | |
| Wet sieve | |
| Fine Particle Analysis | |
| Method | |
| Pre-treated with | |
| % loss on Pre-treatment | |
| Particle Density | |

Remarks Sieve:-Test performed in accordance with BS EN ISO 17892-4:2016

18/11/2020

LABORATORY RESULTS - Particle Size Distribution

Project: STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION

Hole: BH404

Sample Depth: 0.30-1.20m

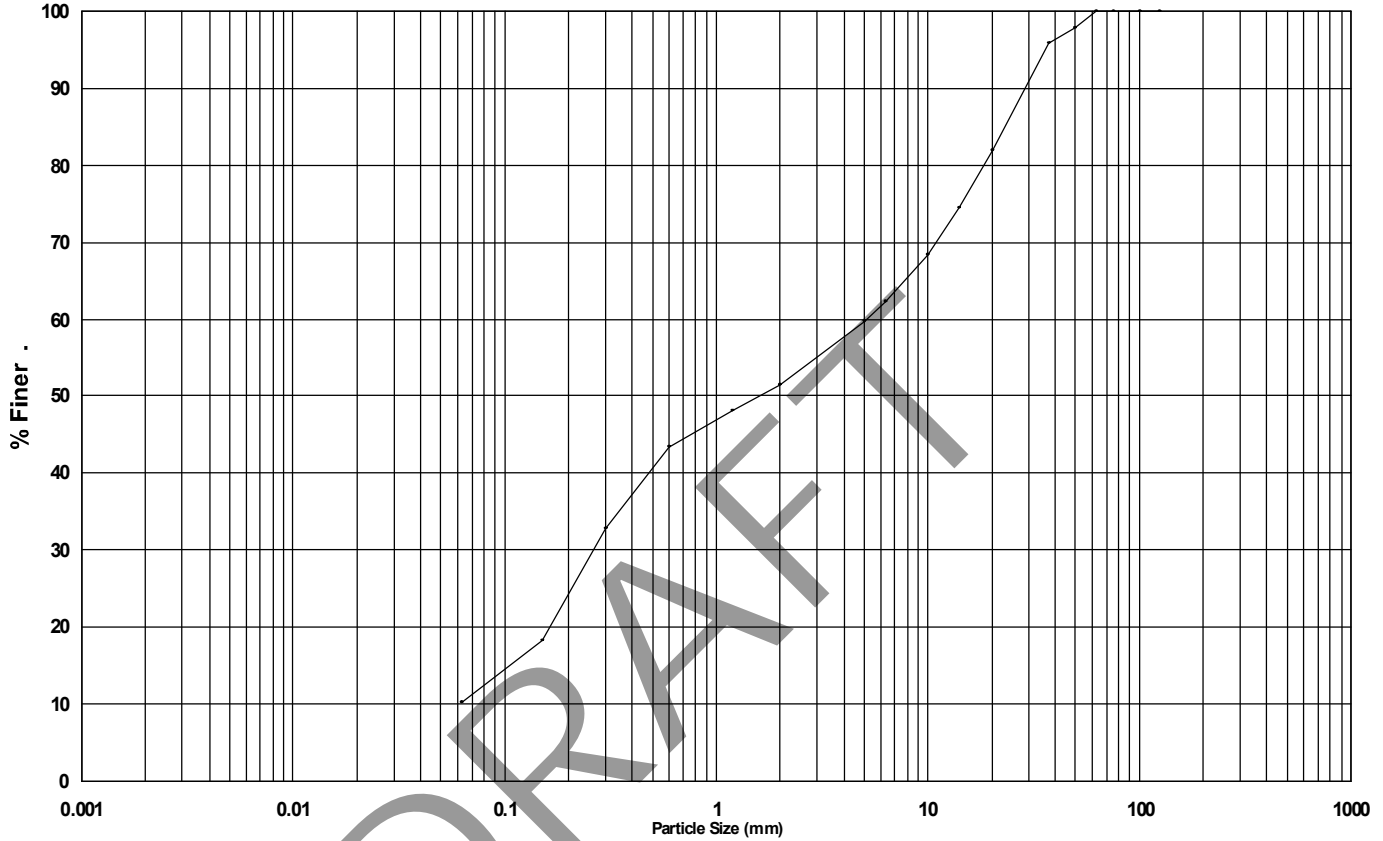
Project No: PN204140

Sample Type: B

Sample Ref: N81915

Sample Description

MADE GROUND: Grey and brown silty fine to coarse sand and fine to coarse gravel.



| Classification | CLAY | Fine | Medium | Coarse | Fine | Medium | Coarse | Fine | Medium | Coarse | Cobbles | Boulders |
|----------------|------|------|--------|--------|------|--------|--------|--------|--------|--------|---------|----------|
| | | SILT | | | SAND | | | Gravel | | | | |

| Classification | % of each |
|-----------------------|-----------|
| SILT (including CLAY) | 10 |
| SAND | 42 |
| GRAVEL | 48 |
| COBBLES | 0 |
| BOULDERS | 0 |

| Size | % Finer |
|---------|---------|
| 125 mm | 100 |
| 100 mm | 100 |
| 75 mm | 100 |
| 63 mm | 100 |
| 50 mm | 98 |
| 37.5 mm | 96 |
| 20 mm | 82 |
| 14 mm | 75 |
| 10 mm | 68 |
| 6.3 mm | 62 |
| 5 mm | 60 |
| 2 mm | 52 |
| 1.18 mm | 48 |
| 600 μm | 43 |
| 300 μm | 33 |
| 150 μm | 18 |

| Size | % Finer |
|-------|---------|
| 63 μm | 10 |

| Uniformity Coefficient | |
|-------------------------|--|
| Not Available | |
| Sieving Method | |
| Wet sieve | |
| Fine Particle Analysis | |
| Method | |
| Pre-treated with | |
| % loss on Pre-treatment | |
| Particle Density | |

Remarks: Sieve:-Test performed in accordance with BS EN ISO 17892-4:2016

18/11/2020

LABORATORY RESULTS - Particle Size Distribution

Project: STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION

Hole WS400

Sample Depth 0.45-1.20m

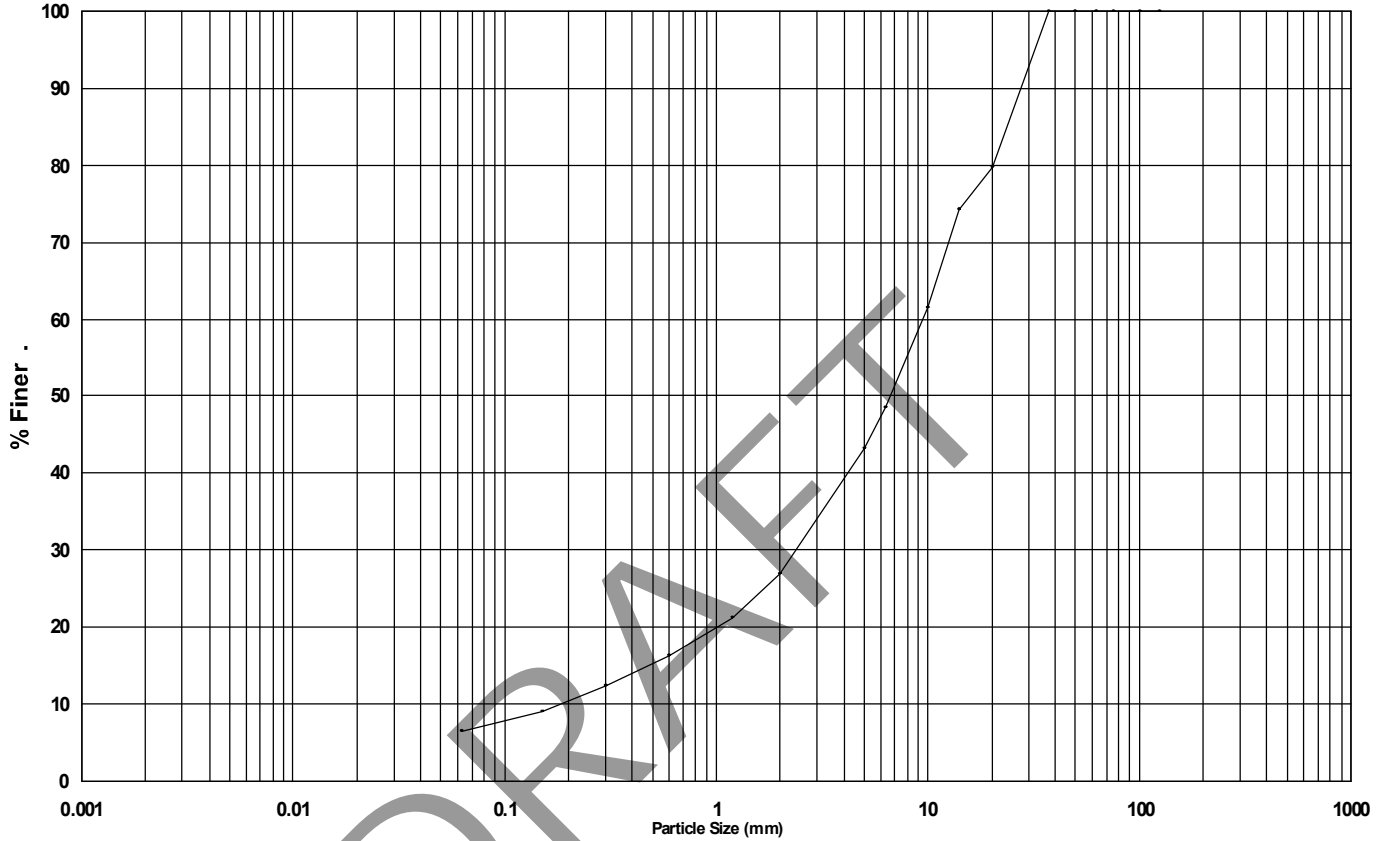
Project No: PN204140

Sample Type B

Sample Ref N81916

Sample Description

MADE GROUND: Pink very sandy silty fine to coarse gravel.



| Classification | CLAY | | | SILT | | | SAND | | | Gravel | | | Cobbles | Boulders |
|----------------|------|--------|--------|------|--------|--------|------|--------|--------|--------|--|--|---------|----------|
| | Fine | Medium | Coarse | Fine | Medium | Coarse | Fine | Medium | Coarse | | | | | |

| Classification | % of each |
|-----------------------|-----------|
| SILT (including CLAY) | 6 |
| SAND | 21 |
| GRAVEL | 73 |
| COBBLES | 0 |
| BOULDERS | 0 |

| Size | % Finer |
|---------|---------|
| 125 mm | 100 |
| 100 mm | 100 |
| 75 mm | 100 |
| 63 mm | 100 |
| 50 mm | 100 |
| 37.5 mm | 100 |
| 20 mm | 80 |
| 14 mm | 74 |
| 10 mm | 61 |
| 6.3 mm | 49 |
| 5 mm | 43 |
| 2 mm | 27 |
| 1.18 mm | 21 |
| 600 μm | 16 |
| 300 μm | 12 |
| 150 μm | 9 |

| Size | % Finer |
|-------|---------|
| 63 μm | 6 |

| Uniformity Coefficient | |
|-------------------------|--|
| 51.75 | |
| Sieving Method | |
| Wet sieve | |
| Fine Particle Analysis | |
| Method | |
| Pre-treated with | |
| % loss on Pre-treatment | |
| Particle Density | |

Remarks Sieve:-Test performed in accordance with BS EN ISO 17892-4:2016

18/11/2020

LABORATORY RESULTS - Particle Size Distribution

Project: STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION

Hole WS402

Sample Depth 0.40-1.20m

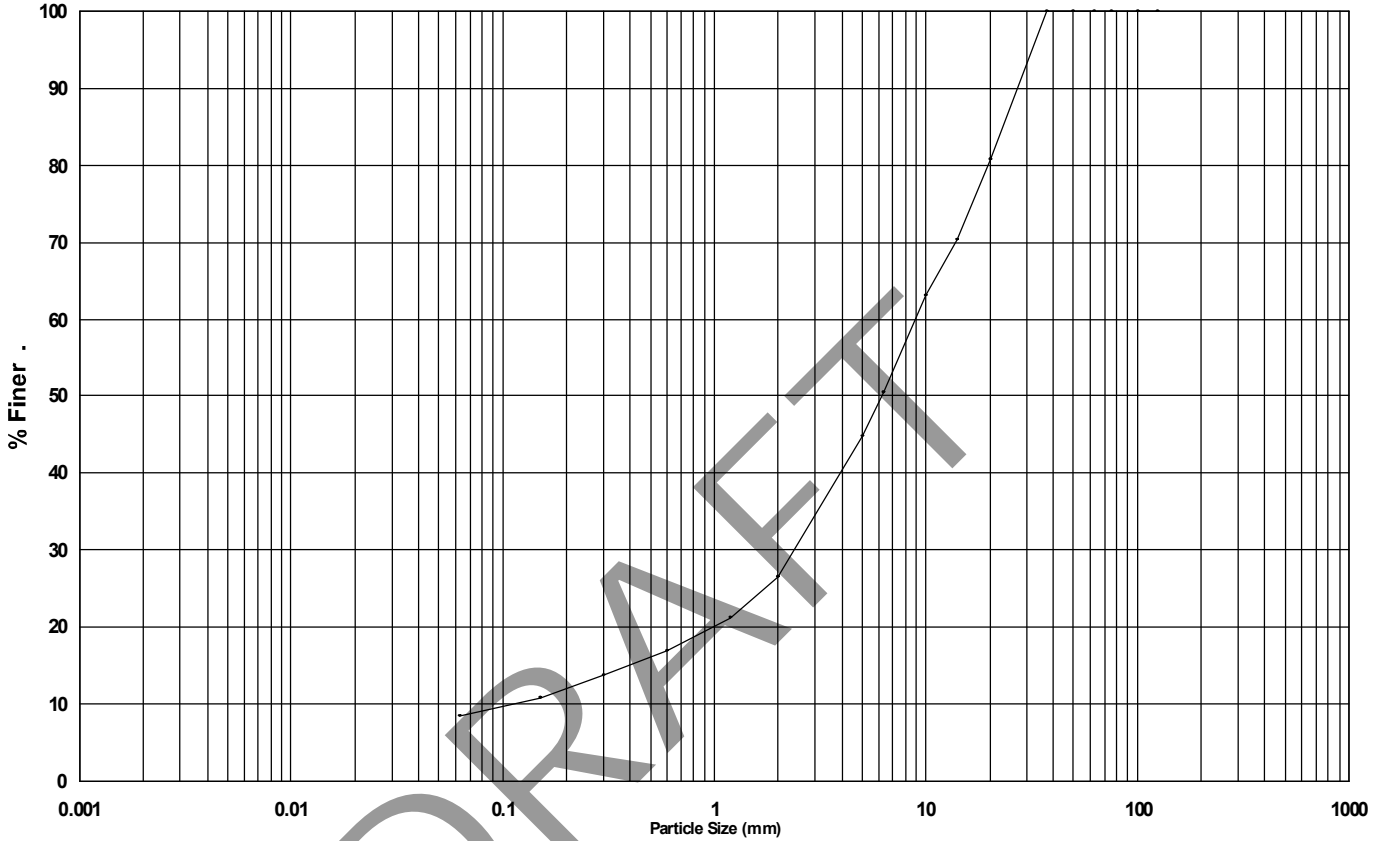
Project No: PN204140

Sample Type B

Sample Ref N81921

Sample Description

MADE GROUND: Grey sandy silty fine to coarse gravel.



| Classification | CLAY | | | SILT | | | SAND | | | Gravel | | | Cobbles | Boulders |
|----------------|------|--------|--------|------|--------|--------|------|--------|--------|--------|--|--|---------|----------|
| | Fine | Medium | Coarse | Fine | Medium | Coarse | Fine | Medium | Coarse | | | | | |

| Classification | % of each |
|-----------------------|-----------|
| SILT (including CLAY) | 8 |
| SAND | 19 |
| GRAVEL | 73 |
| COBBLES | 0 |
| BOULDERS | 0 |

| Size | % Finer |
|---------|---------|
| 125 mm | 100 |
| 100 mm | 100 |
| 75 mm | 100 |
| 63 mm | 100 |
| 50 mm | 100 |
| 37.5 mm | 100 |
| 20 mm | 81 |
| 14 mm | 70 |
| 10 mm | 63 |
| 6.3 mm | 50 |
| 5 mm | 45 |
| 2 mm | 27 |
| 1.18 mm | 21 |
| 600 μm | 17 |
| 300 μm | 14 |
| 150 μm | 11 |

| Size | % Finer |
|-------|---------|
| 63 μm | 8 |

| Uniformity Coefficient | |
|-------------------------|--|
| 78.67 | |
| Sieving Method | |
| Wet sieve | |
| Fine Particle Analysis | |
| Method | |
| Pre-treated with | |
| % loss on Pre-treatment | |
| Particle Density | |

Remarks Sieve:-Test performed in accordance with BS EN ISO 17892-4:2016

18/11/2020

LABORATORY RESULTS - Unconsolidated Undrained Triaxial Test

Project: STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION

Hole BH401

Sample Depth 3.00-3.30m

Project No: PN204140

Sample Type UT

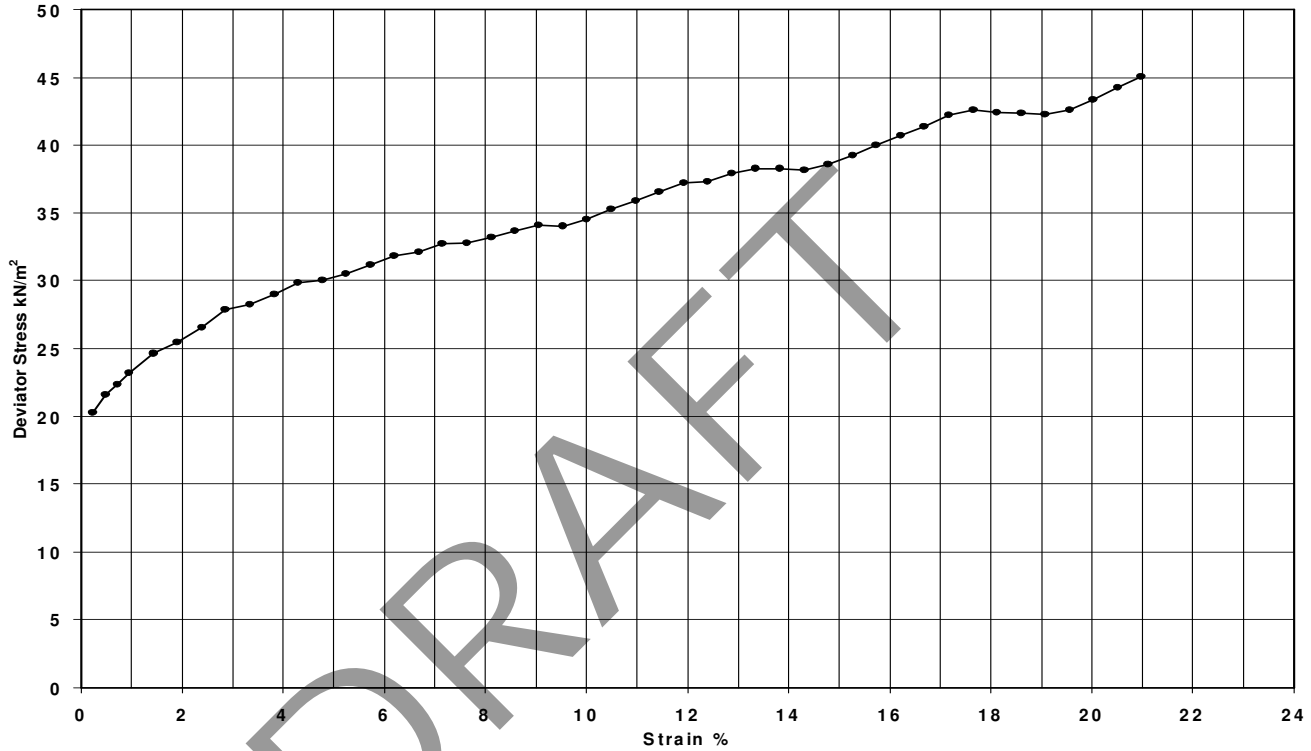
Sample Ref N81908

Sample Description

The following samples were combined to perform this test:

Brown slightly organic very clayey fine to medium SAND.

BS EN ISO 17892-8:2018



| | Stage 1 | Stage 2 | Stage 3 | Strain % | Corrected Deviator Stress kN/m ² | Strain % | Corrected Deviator Stress kN/m ² |
|---|--------------|---------|---------|----------|---|----------|---|
| Test Type | Single Stage | | | 0.2 | 20.3 | 10.0 | 34.5 |
| Sample Condition | Undisturbed | | | 0.5 | 21.6 | 10.5 | 35.3 |
| Orientation of sample | Vertical | | | 0.7 | 22.3 | 11.0 | 35.9 |
| Initial Diameter (mm) | 103.77 | | | 1.0 | 23.2 | 11.4 | 36.5 |
| Initial Length (mm) | 209.69 | | | 1.4 | 24.6 | 11.9 | 37.2 |
| Initial Water Content (%) | 46.8 | | | 1.9 | 25.5 | 12.4 | 37.3 |
| Initial Bulk Density (Mg/m ³) | 1.79 | | | 2.4 | 26.6 | 12.9 | 37.9 |
| Initial Dry Density (Mg/m ³) | 1.22 | | | 2.9 | 27.9 | 13.4 | 38.3 |
| Particle Density (Mg/m ³) | 2.65 Assumed | | | 3.3 | 28.2 | 13.8 | 38.3 |
| Cell Pressure (kPa) | 60 | | | 3.8 | 29.0 | 14.3 | 38.2 |
| 'Specimen Height' at start of Shearing Stage (mm) | 208.75 | | | 4.3 | 29.8 | 14.8 | 38.6 |
| Membrane Thickness/Correction (mm/kPa) | 100 / 0.0000 | | | 4.8 | 30.0 | 15.3 | 39.2 |
| Rate of Strain (%/min) | 1.9 | | | 5.2 | 30.5 | 15.7 | 40.0 |
| Corrected Deviator Stress (kPa) | 43 | | | 5.7 | 31.1 | 16.2 | 40.7 |
| Undrained Shear Strength (kPa) | 22 | | | 6.2 | 31.8 | 16.7 | 41.4 |
| Strain at Failure (%) | 20.1 | | | 6.7 | 32.1 | 17.2 | 42.2 |
| Failure Zone Water Content (%) | 38.3 | | | 7.2 | 32.7 | 17.6 | 42.6 |
| Water Content (after test) (%) | | | | 7.6 | 32.8 | 18.1 | 42.4 |
| Mode of Failure | Plastic | | | 8.1 | 33.2 | 18.6 | 42.3 |
| | | | | 8.6 | 33.7 | 19.1 | 42.3 |
| | | | | 9.1 | 34.1 | 19.6 | 42.6 |
| | | | | 9.5 | 34.0 | 20.0 | 43.4 |

Remarks

19/11/2020

GEOTECHNICS

LABORATORY RESULTS - Unconsolidated Undrained Triaxial Test

Project: STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION

Hole BH401
Sample Depth 3.00-3.30m
Sample Type UT
Sample Ref N81908

Project No: PN204140



Remarks 


19/11/2020

GEOTECHNICS

LABORATORY RESULTS - Test Remarks

Project STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION

Project No: PN204140

| Sample | | | | Laboratory Remark |
|---|-----------------------------------|------|---------------|--|
| Hole | Depth (Specimen Depth) m | Type | Sample Ref | |
| BH401 | 1.20- 1.65 (1.20- 1.65) | B | N81907 | Atterberg Limit Test - 1-point cone |
| BH401 | 3.00- 3.30 (3.00- 3.30) | UT | N81908 | Atterberg Limit Test - 1-point cone Sample too unstable to test as BS EN ISO 17892-12:2018 |
| <p style="font-size: 48px; opacity: 0.3; transform: rotate(-30deg);">DRAFT</p> | | | | |
| <p>Remarks </p> | | | | |
| <p>GEOTECHNICS geotechnical and geoenvironmental specialists</p> | | | | |



DETS

Certificate of Analysis

Certificate Number 20-21447

24-Nov-20

Client Geotechnics LTD
203 Torrington Avenue
Tile Hill
Coventry
CV4 9AP

Our Reference 20-21447

Client Reference PN204140

Order No AUTH-OL27160

Contract Title Stockport Interchange

Description 18 Soil samples

Date Received 23-Oct-20

Date Started 23-Oct-20

Date Completed 24-Nov-20

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

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

Approved By



Adam Fenwick
Contracts Manager



Summary of Chemical Analysis Soil Samples

Our Ref 20-21447

Client Ref PN204140

Contract Title Stockport Interchange

DRAFT

| Lab No | 1750370 | 1750371 | 1750372 | 1750373 | 1750374 | 1750375 | 1750376 | 1750377 | 1750378 |
|---------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Sample ID | BH400 | BH400 | BH401 | BH401 | BH401 | BH402 | BH402 | BH402 | BH403 |
| Depth | 0.35-1.00 | 2.00-2.45 | 0.35-0.90 | 1.20-1.65 | 3.00-3.30 | 0.20-0.90 | 1.20-1.65 | 2.00-2.45 | 0.30-0.80 |
| Other ID | | | | | | | | | |
| Sample Type | B | B | B | B | UT | B | B | B | B |
| Sampling Date | 10/09/2020 | 10/09/2020 | 10/09/2020 | 10/09/2020 | 10/09/2020 | 11/09/2020 | 11/09/2020 | 11/09/2020 | 09/09/2020 |
| Sampling Time | n/s | n/s | n/s | n/s | n/s | n/s | n/s | n/s | n/s |

| Test | Method | LOD | Units | | | | | | | | | |
|---------------------------------|-------------|------|-------|------|------|------|------|------|------|------|------|--------|
| Inorganics | | | | | | | | | | | | |
| pH | DETSC 2008# | | pH | 9.8 | 7.5 | 12.1 | 7.8 | 6.7 | 11.2 | 9.1 | 8.9 | 9.2 |
| Sulphate Aqueous Extract as SO4 | DETSC 2076# | 10 | mg/l | 67 | 14 | 13 | 10 | 43 | 210 | 52 | 58 | 12 |
| Sulphur as S, Total | DETSC 2320 | 0.01 | % | 0.02 | 0.02 | 0.05 | 0.02 | 0.04 | 0.07 | 0.02 | 0.04 | 0.04 |
| Sulphate as SO4, Total | DETSC 2321# | 0.01 | % | 0.07 | 0.03 | 0.13 | 0.01 | 0.05 | 0.22 | 0.06 | 0.07 | < 0.01 |

Summary of Chemical Analysis Soil Samples

Our Ref 20-21447

Client Ref PN204140

Contract Title Stockport Interchange

DRAFT

| Lab No | 1750379 | 1750380 | 1750381 | 1750382 | 1750383 | 1750384 | 1750385 | 1750386 | 1750387 |
|---------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Sample ID | BH403 | BH403 | BH404 | WS400 | WS400 | WS401 | WS401 | WS402 | WS402 |
| Depth | 0.80-1.00 | 1.20-1.50 | 0.30-1.20 | 0.45-1.20 | 1.21-1.60 | 0.30-0.80 | 1.40-1.60 | 0.40-1.20 | 1.21-1.50 |
| Other ID | | | | | | | | | |
| Sample Type | B | B | B | B | D | D | D | B | D |
| Sampling Date | 09/09/2020 | 09/09/2020 | 09/09/2020 | 08/09/2020 | 08/09/2020 | 08/09/2020 | 08/09/2020 | 08/09/2020 | 08/09/2020 |
| Sampling Time | n/s | n/s | n/s | n/s | n/s | n/s | n/s | n/s | n/s |

| Test | Method | LOD | Units | 1750379 | 1750380 | 1750381 | 1750382 | 1750383 | 1750384 | 1750385 | 1750386 | 1750387 |
|---------------------------------|-------------|------|-------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Inorganics | | | | | | | | | | | | |
| pH | DETSC 2008# | | pH | 9.1 | 8.7 | 9.0 | 10.4 | 6.8 | 10.1 | 8.1 | 10.4 | 7.4 |
| Sulphate Aqueous Extract as SO4 | DETSC 2076# | 10 | mg/l | 41 | 19 | 57 | 36 | 44 | 23 | 20 | 34 | 39 |
| Sulphur as S, Total | DETSC 2320 | 0.01 | % | 0.03 | 0.01 | 0.04 | 0.02 | 0.07 | 0.02 | 0.01 | 0.05 | 0.02 |
| Sulphate as SO4, Total | DETSC 2321# | 0.01 | % | 0.03 | 0.01 | 0.08 | 0.05 | 0.07 | 0.05 | 0.02 | 0.02 | 0.03 |

Information in Support of the Analytical Results

Our Ref 20-21447
 Client Ref PN204140
 Contract Stockport Interchange

Containers Received & Deviating Samples

| Lab No | Sample ID | Date Sampled | Containers Received | Holding time exceeded for tests | Inappropriate container for tests |
|---------|----------------------|--------------|---------------------|--|-----------------------------------|
| 1750370 | BH400 0.35-1.00 SOIL | 10/09/20 | PT 1L | Anions 2:1 (30 days), Total Sulphur ICP (7 days), Total Sulphate ICP (30 days), pH + Conductivity (7 days) | |
| 1750371 | BH400 2.00-2.45 SOIL | 10/09/20 | PT 1L | Anions 2:1 (30 days), Total Sulphur ICP (7 days), Total Sulphate ICP (30 days), pH + Conductivity (7 days) | |
| 1750372 | BH401 0.35-0.90 SOIL | 10/09/20 | PT 1L | Anions 2:1 (30 days), Total Sulphur ICP (7 days), Total Sulphate ICP (30 days), pH + Conductivity (7 days) | |
| 1750373 | BH401 1.20-1.65 SOIL | 10/09/20 | PT 1L | Anions 2:1 (30 days), Total Sulphur ICP (7 days), Total Sulphate ICP (30 days), pH + Conductivity (7 days) | |
| 1750374 | BH401 3.00-3.30 SOIL | 10/09/20 | PT 1L | Anions 2:1 (30 days), Total Sulphur ICP (7 days), Total Sulphate ICP (30 days), pH + Conductivity (7 days) | |
| 1750375 | BH402 0.20-0.90 SOIL | 11/09/20 | PT 1L | Anions 2:1 (30 days), Total Sulphur ICP (7 days), Total Sulphate ICP (30 days), pH + Conductivity (7 days) | |
| 1750376 | BH402 1.20-1.65 SOIL | 11/09/20 | PT 1L | Anions 2:1 (30 days), Total Sulphur ICP (7 days), Total Sulphate ICP (30 days), pH + Conductivity (7 days) | |
| 1750377 | BH402 2.00-2.45 SOIL | 11/09/20 | PT 1L | Anions 2:1 (30 days), Total Sulphur ICP (7 days), Total Sulphate ICP (30 days), pH + Conductivity (7 days) | |
| 1750378 | BH403 0.30-0.80 SOIL | 09/09/20 | PT 1L | Anions 2:1 (30 days), Total Sulphur ICP (7 days), Total Sulphate ICP (30 days), pH + Conductivity (7 days) | |
| 1750379 | BH403 0.80-1.00 SOIL | 09/09/20 | PT 1L | Anions 2:1 (30 days), Total Sulphur ICP (7 days), Total Sulphate ICP (30 days), pH + Conductivity (7 days) | |
| 1750380 | BH403 1.20-1.50 SOIL | 09/09/20 | PT 1L | Anions 2:1 (30 days), Total Sulphur ICP (7 days), Total Sulphate ICP (30 days), pH + Conductivity (7 days) | |
| 1750381 | BH404 0.30-1.20 SOIL | 09/09/20 | PT 1L | Anions 2:1 (30 days), Total Sulphur ICP (7 days), Total Sulphate ICP (30 days), pH + Conductivity (7 days) | |
| 1750382 | WS400 0.45-1.20 SOIL | 08/09/20 | PT 1L | Anions 2:1 (30 days), Total Sulphur ICP (7 days), Total Sulphate ICP (30 days), pH + Conductivity (7 days) | |
| 1750383 | WS400 1.21-1.60 SOIL | 08/09/20 | PT 1L | Anions 2:1 (30 days), Total Sulphur ICP (7 days), Total Sulphate ICP (30 days), pH + Conductivity (7 days) | |
| 1750384 | WS401 0.30-0.80 SOIL | 08/09/20 | PT 1L | Anions 2:1 (30 days), Total Sulphur ICP (7 days), Total Sulphate ICP (30 days), pH + Conductivity (7 days) | |
| 1750385 | WS401 1.40-1.60 SOIL | 08/09/20 | PT 1L | Anions 2:1 (30 days), Total Sulphur ICP (7 days), Total Sulphate ICP (30 days), pH + Conductivity (7 days) | |
| 1750386 | WS402 0.40-1.20 SOIL | 08/09/20 | PT 1L | Anions 2:1 (30 days), Total Sulphur ICP (7 days), Total Sulphate ICP (30 days), pH + Conductivity (7 days) | |

Information in Support of the Analytical Results

Our Ref 20-21447

Client Ref PN204140

Contract Stockport Interchange

| | | | | |
|---------|----------------------|----------|-------|--|
| 1750387 | WS402 1.21-1.50 SOIL | 08/09/20 | PT 1L | Anions 2:1 (30 days), Total Sulphur ICP (7 days), Total Sulphate ICP (30 days), pH + Conductivity (7 days) |
|---------|----------------------|----------|-------|--|

Key: P-Plastic T-Tub

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

Soil Analysis Notes

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

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

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

Disposal

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

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


End of Report

LABORATORY RESULTS - Point Load Strength Determination

Project STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION

Project No: PN204140

| Sample | | | | | w | W | D | Fail Load | Test Type/ Direction | De | De ² | Is | F | Is ₅₀ |
|--------|--------------------------------------|------|---------------|---|---|----------------------------|----------------------------|--------------------------------------|--------------------------------------|---|--|---|---|---|
| Hole | Depth (Specimen Depth) m | Type | Sample Ref | Description | % | mm | mm | kN | | mm | mm ² | MN/m ² | | MN/m ² |
| BH401 | 4.75- 4.85 (4.75- 4.85) | C | N81924 | Very weak reddish brown fine to coarse grained SANDSTONE. | | 75 | 71 | 1.05 | A/PD | 82.34 | 6780 | 0.155 | 1.252 | 0.195 |
| BH401 | 9.45- 9.55 (9.45- 9.55) | C | N81926 | Very weak to weak reddish brown fine to coarse grained SANDSTONE. | | 100 99 9 | 99 71 46 | 0.55 0.60 0.35 | D/PL A/PD A/PD | 99.00 94.60 22.96 | 9801 8950 527 | 0.057 0.067 0.656 | 1.360 1.332 0.705 | 0.077 0.090 0.462 |
| BH401 | 10.00- 10.20 (10.00- 10.20) | C | N81927 | Very weak reddish brown fine to coarse grained SANDSTONE. | | 97 95 95 95 | 95 95 72 82 | 0.92 0.92 0.97 1.21 | D/PL D/PL A/PD A/PD | 95.00 95.00 93.32 99.59 | 9025 9025 8709 9919 | 0.102 0.102 0.111 0.122 | 1.335 1.335 1.324 1.364 | 0.136 0.136 0.147 0.167 |
| BH401 | 11.80- 12.10 (11.80- 12.10) | C | N81929 | Very weak reddish brown fine to coarse grained SANDSTONE. | | 99 98 98 98 98 | 98 98 89 88 77 | 0.80 0.69 1.05 1.05 0.86 | D/PL D/PL A/PD A/PD A/PD | 98.00 98.00 105.38 104.79 98.02 | 9604 9604 11105 10980 9608 | 0.084 0.072 0.094 0.096 0.090 | 1.354 1.354 1.399 1.395 1.354 | 0.113 0.098 0.132 0.134 0.122 |
| BH401 | 13.10- 13.18 (13.10- 13.18) | C | N81930 | Very weak reddish brown fine to coarse grained SANDSTONE. | | 95 93 93 | 93 80 89 | 0.48 0.42 0.73 | D/PL A/PD A/PD | 93.00 97.33 102.66 | 8649 9473 10539 | 0.055 0.044 0.069 | 1.322 1.350 1.382 | 0.073 0.059 0.095 |
| BH401 | 14.65- 14.80 (14.65- 14.80) | C | N81931 | Very weak reddish brown fine to coarse grained SANDSTONE. | | 100 98 98 | 98 91 58 | 0.60 1.24 0.68 | D/PL A/PD A/PD | 98.00 106.56 85.07 | 9604 11355 7237 | 0.062 0.109 0.094 | 1.354 1.406 1.270 | 0.084 0.153 0.119 |
| BH401 | 17.50- 17.62 (17.50- 17.62) | C | N81933 | Very weak reddish brown fine to coarse grained SANDSTONE. | | 100 98 98 | 98 79 68 | 0.24 0.90 0.64 | D/PL A/PD A/PD | 98.00 99.28 92.11 | 9604 9857 8485 | 0.025 0.091 0.076 | 1.354 1.362 1.317 | 0.034 0.124 0.100 |
| BH401 | 19.55- 19.70 (19.55- 19.70) | C | N81934 | Very weak reddish brown fine to coarse grained SANDSTONE. | | 1 98 98 | 98 92 90 | 0.78 1.30 1.08 | D/PL A/PD A/PD | 98.00 107.14 105.97 | 9604 11480 11230 | 0.081 0.113 0.096 | 1.354 1.409 1.402 | 0.110 0.159 0.135 |
| BH402 | 10.70- 10.80 (10.70- 10.80) | C | N81937 | Very weak reddish brown fine to coarse grained SANDSTONE. | | 98 98 98 | 98 69 59 | 0.54 0.62 0.56 | D/PL A/PD A/PD | 98.00 92.79 85.80 | 9604 8610 7362 | 0.056 0.072 0.076 | 1.354 1.321 1.275 | 0.076 0.095 0.096 |
| BH402 | 11.45- 11.55 (11.45- 11.55) | C | N81938 | Very weak reddish brown fine to coarse grained SANDSTONE. | | 100 100 100 | 100 58 48 | 0.82 0.80 1.06 | D/PL A/PD A/PD | 100.00 85.93 78.18 | 10000 7385 6112 | 0.082 0.108 0.174 | 1.366 1.276 1.223 | 0.112 0.138 0.213 |
| BH402 | 14.60- 14.70 (14.60- 14.70) | C | N81940 | Very weak reddish brown fine to coarse grained SANDSTONE. | | 100 100 100 | 100 69 47 | 0.52 0.88 0.75 | D/PL A/PD A/PD | 100.00 93.73 77.36 | 10000 8785 5984 | 0.052 0.100 0.126 | 1.366 1.327 1.217 | 0.072 0.133 0.153 |

Remarks  Test Type D - Diametral, A - Axial, I - Lump or Irregular Test
 Direction PL - parallel to planes of weakness, R - Random or unknown orientation,
 PD - perpendicular to planes of weakness
 Fail Load UF - unacceptable failure
 For Standards followed see Laboratory Test Certificate


GEOTECHNICS
 geotechnical and geoenvironmental specialists

LABORATORY RESULTS - Point Load Strength Determination

Project STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION

Project No: PN204140

| Sample | | | | | w | W | D | Fail Load | Test Type/ Direction | De | De ² | Is | F | Is ₅₀ |
|--------|--------------------------------------|------|---------------|--|---|-----|-----|-----------|-------------------------|--------|-----------------|-------------------|-------|-------------------|
| Hole | Depth (Specimen Depth) m | Type | Sample Ref | Description | % | mm | mm | kN | | mm | mm ² | MN/m ² | | MN/m ² |
| BH402 | 15.45- 15.65 (15.45- 15.65) | C | N81941 | Very weak reddish brown fine to coarse grained SANDSTONE. | | 100 | 98 | 0.68 | D/PL | 98.00 | 9604 | 0.071 | 1.354 | 0.096 |
| | | | | | | 98 | 91 | 1.36 | A/PD | 106.56 | 11355 | 0.120 | 1.406 | 0.169 |
| | | | | | | 98 | 77 | 1.05 | A/PD | 98.02 | 9608 | 0.109 | 1.354 | 0.148 |
| BH402 | 19.80- 19.92 (19.80- 19.92) | C | N81943 | Extremely weak to weak reddish brown fine to coarse grained SANDSTONE. | | 98 | 97 | 0.10 | D/PL | 97.00 | 9409 | 0.011 | 1.347 | 0.015 |
| | | | | | | 97 | 70 | 2.15 | A/PD | 92.98 | 8645 | 0.248 | 1.322 | 0.328 |
| | | | | | | 97 | 64 | 1.77 | A/PD | 88.91 | 7904 | 0.224 | 1.296 | 0.290 |
| BH403 | 5.10- 5.20 (5.10- 5.20) | C | N81945 | Very weak reddish brown fine to coarse grained SANDSTONE. | | 100 | 99 | 0.31 | D/PL | 99.00 | 9801 | 0.032 | 1.360 | 0.044 |
| | | | | | | 99 | 52 | 0.37 | A/PD | 80.96 | 6555 | 0.057 | 1.242 | 0.070 |
| | | | | | | 99 | 49 | 0.46 | A/PD | 78.59 | 6176 | 0.074 | 1.226 | 0.090 |
| | | | | | | | 0 | 0.00 | / | 0.00 | 0 | 0.000 | 0.000 | 0.000 |
| BH403 | 5.90- 6.18 (5.90- 6.18) | C | N81946 | Very weak reddish brown fine to coarse grained SANDSTONE. | | 100 | 100 | 0.32 | D/PL | 100.00 | 10000 | 0.032 | 1.366 | 0.044 |
| | | | | | | 100 | 78 | 0.74 | A/PD | 99.66 | 9931 | 0.074 | 1.364 | 0.101 |
| | | | | | | 100 | 69 | 0.70 | A/PD | 93.73 | 8785 | 0.079 | 1.327 | 0.105 |
| BH403 | 7.10- 7.30 (7.10- 7.30) | C | N81947 | Very weak reddish brown fine to coarse grained SANDSTONE. | | 100 | 99 | 0.72 | D/PL | 99.00 | 9801 | 0.073 | 1.360 | 0.100 |
| | | | | | | 99 | 93 | 1.26 | A/PD | 108.27 | 11723 | 0.107 | 1.416 | 0.152 |
| | | | | | | 99 | 88 | 0.86 | A/PD | 105.32 | 11092 | 0.078 | 1.398 | 0.109 |
| | | | | | | | 0 | 0.00 | / | 0.00 | 0 | 0.000 | 0.000 | 0.000 |
| BH403 | 8.94- 9.08 (8.94- 9.08) | C | N81948 | Very weak reddish brown fine to coarse grained SANDSTONE. | | 100 | 100 | 1.38 | D/PL | 100.00 | 10000 | 0.138 | 1.366 | 0.188 |
| | | | | | | 100 | 73 | 1.44 | A/PD | 96.41 | 9295 | 0.155 | 1.344 | 0.209 |
| | | | | | | 100 | 71 | 1.59 | A/PD | 95.08 | 9040 | 0.175 | 1.335 | 0.234 |
| BH403 | 12.00- 12.25 (12.00- 12.25) | C | N81950 | Very weak reddish brown fine to coarse grained SANDSTONE. | | 100 | 100 | 0.51 | D/PL | 100.00 | 10000 | 0.051 | 1.366 | 0.070 |
| | | | | | | 100 | 70 | 1.25 | A/PD | 94.41 | 8913 | 0.140 | 1.331 | 0.186 |
| | | | | | | 100 | 58 | 1.34 | A/PD | 85.93 | 7385 | 0.181 | 1.276 | 0.231 |
| BH403 | 14.00- 14.20 (14.00- 14.20) | C | N81951 | Very weak reddish brown fine to coarse grained SANDSTONE. | | 100 | 98 | 0.54 | D/PL | 98.00 | 9604 | 0.056 | 1.354 | 0.076 |
| | | | | | | 98 | 82 | 0.87 | A/PD | 101.15 | 10232 | 0.085 | 1.373 | 0.116 |
| | | | | | | 98 | 79 | 0.83 | A/PD | 99.28 | 9857 | 0.084 | 1.362 | 0.115 |
| BH403 | 16.10- 16.30 (16.10- 16.30) | C | N81953 | Very weak reddish brown fine to coarse grained SANDSTONE. | | 100 | 100 | 0.59 | D/PL | 100.00 | 10000 | 0.059 | 1.366 | 0.081 |
| | | | | | | 100 | 100 | 0.62 | D/PL | 100.00 | 10000 | 0.062 | 1.366 | 0.084 |
| | | | | | | 100 | 81 | 0.75 | A/PD | 101.55 | 10313 | 0.072 | 1.376 | 0.100 |
| | | | | | | 100 | 80 | 0.98 | A/PD | 100.93 | 10186 | 0.096 | 1.372 | 0.132 |
| | | | | | | 100 | 74 | 0.74 | A/PD | 97.07 | 9422 | 0.079 | 1.348 | 0.106 |
| BH403 | 17.40- 17.57 (17.40- 17.57) | C | N81954 | Very weak reddish brown fine to coarse grained SANDSTONE. | | 100 | 98 | 0.56 | D/PL | 98.00 | 9604 | 0.058 | 1.354 | 0.078 |
| | | | | | | 98 | 86 | 0.65 | A/PD | 103.59 | 10731 | 0.060 | 1.388 | 0.084 |
| | | | | | | 98 | 79 | 0.51 | A/PD | 99.28 | 9857 | 0.052 | 1.362 | 0.070 |
| BH403 | 19.45- 19.58 (19.45- 19.58) | C | N81955 | Very weak reddish brown fine to coarse grained SANDSTONE. | | 97 | 97 | 0.64 | D/PL | 97.00 | 9409 | 0.068 | 1.347 | 0.092 |
| | | | | | | 97 | 80 | 1.01 | A/PD | 99.40 | 9880 | 0.102 | 1.362 | 0.139 |
| | | | | | | 97 | 79 | 0.98 | A/PD | 98.78 | 9757 | 0.100 | 1.359 | 0.136 |

Remarks  Test Type D - Diametral, A - Axial, I - Lump or Irregular Test
 Direction PL - parallel to planes of weakness, R - Random or unknown orientation,
 PD - perpendicular to planes of weakness
 Fail Load UF - unacceptable failure
 For Standards followed see Laboratory Test Certificate


GEOTECHNICS
 geotechnical and geoenvironmental specialists

LABORATORY RESULTS - Point Load Strength Determination

Project STOCKPORT INTERCHANGE - SUPPLEMENTARY GROUND INVESTIGATION

Project No: PN204140

| Sample | | | | | w % | W mm | D mm | Fail Load kN | Test Type/ Direction | De mm | De ² mm ² | Is MN/m ² | F | Is ₅₀ MN/m ² |
|--------|--------------------------------------|------|---------------|---|--------|---------|---------|--------------------|----------------------------|----------|------------------------------------|-------------------------|-------|---------------------------------------|
| Hole | Depth (Specimen Depth) m | Type | Sample Ref | Description | | | | | | | | | | |
| BH404 | 5.00- 5.05 (5.00- 5.05) | C | N81957 | Very weak reddish brown fine to coarse grained SANDSTONE. | | 100 | 49 | 0.26 | A/PD | 78.99 | 6239 | 0.042 | 1.229 | 0.052 |
| BH404 | 9.56- 9.70 (9.56- 9.70) | C | N81958 | Very weak reddish brown fine to coarse grained SANDSTONE. | | 100 | 100 | 0.52 | D/PL | 100.00 | 10000 | 0.052 | 1.366 | 0.071 |
| | | | | | | 100 | 64 | 0.79 | A/PD | 90.27 | 8149 | 0.097 | 1.305 | 0.127 |
| | | | | | | 100 | 63 | 0.47 | A/PD | 89.56 | 8021 | 0.059 | 1.300 | 0.076 |
| BH404 | 11.65- 11.82 (11.65- 11.82) | C | N81960 | Very weak reddish brown fine to coarse grained SANDSTONE. | | 100 | 98 | 0.47 | D/PL | 98.00 | 9604 | 0.049 | 1.354 | 0.066 |
| | | | | | | 98 | 80 | 0.87 | A/PD | 99.91 | 9982 | 0.087 | 1.366 | 0.119 |
| | | | | | | 98 | 79 | 1.13 | A/PD | 99.28 | 9857 | 0.115 | 1.362 | 0.157 |
| BH404 | 13.64- 13.76 (13.64- 13.76) | C | N81961 | Extremely weak to very weak reddish brown fine to coarse grained SANDSTONE. | | 100 | 100 | 0.20 | D/PL | 100.00 | 10000 | 0.020 | 1.366 | 0.027 |
| | | | | | | 100 | 68 | 1.35 | A/PD | 93.05 | 8658 | 0.156 | 1.323 | 0.207 |
| | | | | | | 100 | 56 | 0.50 | A/PD | 84.44 | 7130 | 0.070 | 1.266 | 0.089 |
| BH404 | 16.54- 16.67 (16.54- 16.67) | C | N81963 | Very weak reddish brown fine to coarse grained SANDSTONE. | | 98 | 97 | 0.42 | D/PL | 97.00 | 9409 | 0.044 | 1.347 | 0.060 |
| | | | | | | 97 | 75 | 0.57 | A/PD | 96.24 | 9263 | 0.062 | 1.343 | 0.083 |
| | | | | | | 97 | 64 | 0.45 | A/PD | 88.91 | 7904 | 0.057 | 1.296 | 0.073 |
| BH404 | 17.75- 17.97 (17.75- 17.97) | C | N81964 | Extremely weak to very weak reddish brown fine to coarse grained SANDSTONE. | | 100 | 100 | 0.19 | D/PL | 100.00 | 10000 | 0.019 | 1.366 | 0.026 |
| | | | | | | 100 | 100 | 0.46 | D/PL | 100.00 | 10000 | 0.046 | 1.366 | 0.063 |
| | | | | | | 100 | 78 | 0.64 | A/PD | 99.66 | 9931 | 0.064 | 1.364 | 0.088 |
| | | | | | | 100 | 58 | 0.47 | A/PD | 85.93 | 7385 | 0.064 | 1.276 | 0.081 |
| | | | | | | 100 | 59 | 0.74 | A/PD | 86.67 | 7512 | 0.099 | 1.281 | 0.127 |
| BH404 | 19.15- 19.27 (19.15- 19.27) | C | N81965 | Very weak reddish brown fine to coarse grained SANDSTONE. | | 98 | 75 | 0.37 | A/PD | 96.74 | 9358 | 0.040 | 1.346 | 0.053 |
| | | | | | | 98 | 64 | 0.29 | A/PD | 89.36 | 7986 | 0.036 | 1.299 | 0.047 |
| BH404 | 20.08- 20.20 (20.08- 20.20) | C | N81966 | Extremely weak to very weak reddish brown fine to coarse grained SANDSTONE. | | 10 | 97 | 0.12 | D/PL | 97.00 | 9409 | 0.013 | 1.347 | 0.017 |
| | | | | | | 97 | 59 | 0.63 | A/PD | 85.36 | 7287 | 0.086 | 1.272 | 0.110 |
| | | | | | | 97 | 40 | 0.48 | A/PD | 70.29 | 4940 | 0.097 | 1.166 | 0.113 |

Remarks  Test Type D - Diametral, A - Axial, I - Lump or Irregular Test
 Direction PL - parallel to planes of weakness, R - Random or unknown orientation,
 PD - perpendicular to planes of weakness
 Fail Load UF - unacceptable failure
 For Standards followed see Laboratory Test Certificate

GEOTECHNICS
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LABORATORY TEST CERTIFICATE

10 Queenslie Point
Queenslie Industrial Estate
120 Stepps Road
Glasgow
G33 3NQ

Tel: 0141 774 4032

email: info@mattest.org
Website: www.mattest.org

Certificate No : 20/968 - 01
To : Chris Bradley
Client : Geotechnics Limited
The Geotechnical Centre
Unit 1 Borders Industrial Park
River Lane, Saltney
Chester
CH4 8RJ

Dear Sirs,

LABORATORY TESTING OF ROCK

Introduction

We refer to samples taken from Stockport Bus Station and delivered to our laboratory on 15th October 2020.

Material & Source

Sample Reference : See Report Plates
Sampled By : Client
Sampling Certificate : Not Supplied
Location : See Report Plates
Description : Rock Cores
Date Sampled : Not Supplied
Date Tested : 15th October 2020 Onwards
Source : PN204140 - Stockport Bus Station

Test Results;

As Detailed On Page 2 to Page 13 inclusive

Comments;

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation
This report should not be reproduced except in full without the written approval of the laboratory
All remaining samples for this project will be disposed of 28 days after issue of this test certificate

Remarks;

Approved for Issue

T McLelland (Director)

Date 23/11/2020

| | | | |
|--|-------------------|--------------------|--|
| BOREHOLE | | BH401 | <p>SAMPLE FAILURE SHAPES</p> <p>External Internal</p> |
| SAMPLE | | C | |
| DEPTH | m | 11.00-11.12 | |
| SAMPLE DIAMETER | mm | 97.25 | |
| SAMPLE HEIGHT | mm | 82.39 | |
| TEST CONDITION | | As Received | |
| RATE OF LOADING | kN/s | 0.1 | |
| TEST DURATION | min.sec | 7.01 | |
| DATE OF TESTING | | 23/10/2020 | |
| LOAD FRAME USED | | 2000kN | |
| LOAD DIRECTION WITH RESPECT TO LITHOLOGY | | Unknown | |
| FAILURE LOAD | kN | 24.4 | |
| UNCONFINED COMPRESSIVE STRENGTH | MPa | 3.28 | |
| WATER CONTENT (ISRM Suggested Methods) | % | 14.9 | |
| BULK DENSITY (ISRM Suggested Methods) | Mg/m ³ | 2.11 | |
| DRY DENSITY (ISRM Suggested Methods) | Mg/m ³ | 1.84 | |

Test specimen does not meet specified length / diameter ratio requirements

| | | | |
|--|-------------------|--------------------|--|
| BOREHOLE | | BH401 | <p>SAMPLE FAILURE SHAPES</p> <p>External Internal</p> |
| SAMPLE | | C | |
| DEPTH | m | 16.45-16.62 | |
| SAMPLE DIAMETER | mm | 97.63 | |
| SAMPLE HEIGHT | mm | 157.08 | |
| TEST CONDITION | | As Received | |
| RATE OF LOADING | kN/s | 0.1 | |
| TEST DURATION | min.sec | 9.35 | |
| DATE OF TESTING | | 23/10/2020 | |
| LOAD FRAME USED | | 2000kN | |
| LOAD DIRECTION WITH RESPECT TO LITHOLOGY | | Unknown | |
| FAILURE LOAD | kN | 66.5 | |
| UNCONFINED COMPRESSIVE STRENGTH | MPa | 8.88 | |
| WATER CONTENT (ISRM Suggested Methods) | % | 13.1 | |
| BULK DENSITY (ISRM Suggested Methods) | Mg/m ³ | 2.24 | |
| DRY DENSITY (ISRM Suggested Methods) | Mg/m ³ | 1.98 | |

Test specimen does not meet specified length / diameter ratio requirements

| | | | |
|--|-------------------|--|--|
| BOREHOLE | | | <p>SAMPLE FAILURE SHAPES</p> <p>External Internal</p> |
| SAMPLE | | | |
| DEPTH | m | | |
| SAMPLE DIAMETER | mm | | |
| SAMPLE HEIGHT | mm | | |
| TEST CONDITION | | | |
| RATE OF LOADING | kN/s | | |
| TEST DURATION | min.sec | | |
| DATE OF TESTING | | | |
| LOAD FRAME USED | | | |
| LOAD DIRECTION WITH RESPECT TO LITHOLOGY | | | |
| FAILURE LOAD | kN | | |
| UNCONFINED COMPRESSIVE STRENGTH | MPa | | |
| WATER CONTENT (ISRM Suggested Methods) | % | | |
| BULK DENSITY (ISRM Suggested Methods) | Mg/m ³ | | |
| DRY DENSITY (ISRM Suggested Methods) | Mg/m ³ | | |

Tested in accordance with ASTM D7012 - 14

SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH

| | | | |
|--|-------------------|--------------------|--|
| BOREHOLE | | BH402 | |
| SAMPLE | | C | |
| DEPTH | m | 14.12-14.30 | |
| SAMPLE DIAMETER | mm | 96.79 | |
| SAMPLE HEIGHT | mm | 118.39 | |
| TEST CONDITION | | As Received | |
| RATE OF LOADING | kN/s | 0.04 | |
| TEST DURATION | min.sec | 7.34 | |
| DATE OF TESTING | | 23/10/2020 | |
| LOAD FRAME USED | | 2000kN | |
| LOAD DIRECTION WITH RESPECT TO LITHOLOGY | | Unknown | |
| FAILURE LOAD | kN | 18.2 | |
| UNCONFINED COMPRESSIVE STRENGTH | MPa | 2.47 | |
| WATER CONTENT (ISRM Suggested Methods) | % | 14.3 | |
| BULK DENSITY (ISRM Suggested Methods) | Mg/m ³ | 2.17 | |
| DRY DENSITY (ISRM Suggested Methods) | Mg/m ³ | 1.90 | |

Test specimen does not meet specified length / diameter ratio requirements

| | | | |
|--|-------------------|--------------------|--|
| BOREHOLE | | BH402 | |
| SAMPLE | | C | |
| DEPTH | m | 17.10-17.30 | |
| SAMPLE DIAMETER | mm | 98.42 | |
| SAMPLE HEIGHT | mm | 156.58 | |
| TEST CONDITION | | As Received | |
| RATE OF LOADING | kN/s | 0.1 | |
| TEST DURATION | min.sec | 8.33 | |
| DATE OF TESTING | | 23/10/2020 | |
| LOAD FRAME USED | | 2000kN | |
| LOAD DIRECTION WITH RESPECT TO LITHOLOGY | | Unknown | |
| FAILURE LOAD | kN | 34.8 | |
| UNCONFINED COMPRESSIVE STRENGTH | MPa | 4.57 | |
| WATER CONTENT (ISRM Suggested Methods) | % | 14.7 | |
| BULK DENSITY (ISRM Suggested Methods) | Mg/m ³ | 2.20 | |
| DRY DENSITY (ISRM Suggested Methods) | Mg/m ³ | 1.92 | |

Test specimen does not meet specified length / diameter ratio requirements

| | | | |
|--|-------------------|--|--|
| BOREHOLE | | | |
| SAMPLE | | | |
| DEPTH | m | | |
| SAMPLE DIAMETER | mm | | |
| SAMPLE HEIGHT | mm | | |
| TEST CONDITION | | | |
| RATE OF LOADING | kN/s | | |
| TEST DURATION | min.sec | | |
| DATE OF TESTING | | | |
| LOAD FRAME USED | | | |
| LOAD DIRECTION WITH RESPECT TO LITHOLOGY | | | |
| FAILURE LOAD | kN | | |
| UNCONFINED COMPRESSIVE STRENGTH | MPa | | |
| WATER CONTENT (ISRM Suggested Methods) | % | | |
| BULK DENSITY (ISRM Suggested Methods) | Mg/m ³ | | |
| DRY DENSITY (ISRM Suggested Methods) | Mg/m ³ | | |

Tested in accordance with ASTM D7012 - 14

SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH

| | | | |
|--|-------------------|--------------------|--|
| BOREHOLE | | BH403 | |
| SAMPLE | | C | |
| DEPTH | m | 10.00-10.30 | |
| SAMPLE DIAMETER | mm | 98.92 | |
| SAMPLE HEIGHT | mm | 202.81 | |
| TEST CONDITION | | As Received | |
| RATE OF LOADING | kN/s | 0.1 | |
| TEST DURATION | min.sec | 9.20 | |
| DATE OF TESTING | | 23/10/2020 | |
| LOAD FRAME USED | | 2000kN | |
| LOAD DIRECTION WITH RESPECT TO LITHOLOGY | | Unknown | |
| FAILURE LOAD | kN | 44.1 | |
| UNCONFINED COMPRESSIVE STRENGTH | MPa | 5.74 | |
| WATER CONTENT (ISRM Suggested Methods) | % | 14.7 | |
| BULK DENSITY (ISRM Suggested Methods) | Mg/m ³ | 2.16 | |
| DRY DENSITY (ISRM Suggested Methods) | Mg/m ³ | 1.89 | |

| | | | |
|--|-------------------|--------------------|--|
| BOREHOLE | | BH403 | |
| SAMPLE | | C | |
| DEPTH | m | 15.25-15.42 | |
| SAMPLE DIAMETER | mm | 98.60 | |
| SAMPLE HEIGHT | mm | 125.92 | |
| TEST CONDITION | | As Received | |
| RATE OF LOADING | kN/s | 0.1 | |
| TEST DURATION | min.sec | 3.05 | |
| DATE OF TESTING | | 23/10/2020 | |
| LOAD FRAME USED | | 2000kN | |
| LOAD DIRECTION WITH RESPECT TO LITHOLOGY | | Unknown | |
| FAILURE LOAD | kN | 10.8 | |
| UNCONFINED COMPRESSIVE STRENGTH | MPa | 1.41 | |
| WATER CONTENT (ISRM Suggested Methods) | % | 13.8 | |
| BULK DENSITY (ISRM Suggested Methods) | Mg/m ³ | 2.17 | |
| DRY DENSITY (ISRM Suggested Methods) | Mg/m ³ | 1.90 | |

Test specimen does not meet specified length / diameter ratio requirements

| | | | |
|--|-------------------|--|--|
| BOREHOLE | | | |
| SAMPLE | | | |
| DEPTH | m | | |
| SAMPLE DIAMETER | mm | | |
| SAMPLE HEIGHT | mm | | |
| TEST CONDITION | | | |
| RATE OF LOADING | kN/s | | |
| TEST DURATION | min.sec | | |
| DATE OF TESTING | | | |
| LOAD FRAME USED | | | |
| LOAD DIRECTION WITH RESPECT TO LITHOLOGY | | | |
| FAILURE LOAD | kN | | |
| UNCONFINED COMPRESSIVE STRENGTH | MPa | | |
| WATER CONTENT (ISRM Suggested Methods) | % | | |
| BULK DENSITY (ISRM Suggested Methods) | Mg/m ³ | | |
| DRY DENSITY (ISRM Suggested Methods) | Mg/m ³ | | |

Tested in accordance with ASTM D7012 - 14

SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH

| | | | |
|--|-------------------|--------------------|------------------------------|
| BOREHOLE | | BH404 | SAMPLE FAILURE SHAPES |
| SAMPLE | | C | |
| DEPTH | m | 10.58-10.71 | |
| SAMPLE DIAMETER | mm | 98.68 | |
| SAMPLE HEIGHT | mm | 112.61 | |
| TEST CONDITION | | As Received | |
| RATE OF LOADING | kN/s | 0.1 | |
| TEST DURATION | min.sec | 6.47 | |
| DATE OF TESTING | | 23/10/2020 | |
| LOAD FRAME USED | | 2000kN | |
| LOAD DIRECTION WITH RESPECT TO LITHOLOGY | | Unknown | |
| FAILURE LOAD | kN | 40.7 | |
| UNCONFINED COMPRESSIVE STRENGTH | MPa | 5.32 | |
| WATER CONTENT (ISRM Suggested Methods) | % | 14.7 | |
| BULK DENSITY (ISRM Suggested Methods) | Mg/m ³ | 2.17 | |
| DRY DENSITY (ISRM Suggested Methods) | Mg/m ³ | 1.90 | |

Test specimen does not meet specified length / diameter ratio requirements

| | | | |
|--|-------------------|--------------------|------------------------------|
| BOREHOLE | | BH404 | SAMPLE FAILURE SHAPES |
| SAMPLE | | C | |
| DEPTH | m | 15.03-15.21 | |
| SAMPLE DIAMETER | mm | 98.24 | |
| SAMPLE HEIGHT | mm | 163.88 | |
| TEST CONDITION | | As Received | |
| RATE OF LOADING | kN/s | 0.1 | |
| TEST DURATION | min.sec | 6.08 | |
| DATE OF TESTING | | 23/10/2020 | |
| LOAD FRAME USED | | 2000kN | |
| LOAD DIRECTION WITH RESPECT TO LITHOLOGY | | Unknown | |
| FAILURE LOAD | kN | 28.2 | |
| UNCONFINED COMPRESSIVE STRENGTH | MPa | 3.72 | |
| WATER CONTENT (ISRM Suggested Methods) | % | 14.2 | |
| BULK DENSITY (ISRM Suggested Methods) | Mg/m ³ | 2.16 | |
| DRY DENSITY (ISRM Suggested Methods) | Mg/m ³ | 1.89 | |

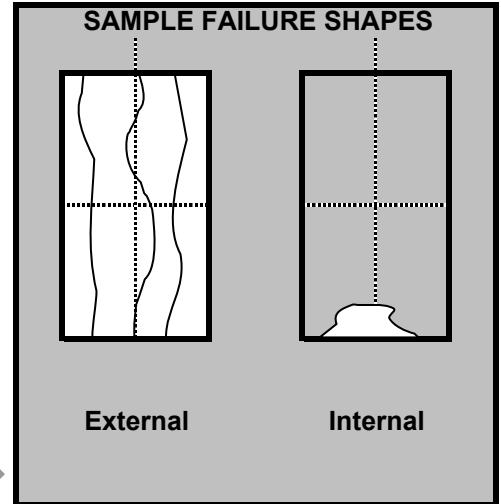
Test specimen does not meet specified length / diameter ratio requirements

| | | | | |
|--|-------------------|--|------------------------------|--|
| BOREHOLE | | | SAMPLE FAILURE SHAPES | |
| SAMPLE | | | | |
| DEPTH | m | | | |
| SAMPLE DIAMETER | mm | | | |
| SAMPLE HEIGHT | mm | | | |
| TEST CONDITION | | | | |
| RATE OF LOADING | kN/s | | | |
| TEST DURATION | min.sec | | | |
| DATE OF TESTING | | | | |
| LOAD FRAME USED | | | | |
| LOAD DIRECTION WITH RESPECT TO LITHOLOGY | | | | |
| FAILURE LOAD | kN | | | |
| UNCONFINED COMPRESSIVE STRENGTH | MPa | | | |
| WATER CONTENT (ISRM Suggested Methods) | % | | | |
| BULK DENSITY (ISRM Suggested Methods) | Mg/m ³ | | | |
| DRY DENSITY (ISRM Suggested Methods) | Mg/m ³ | | | |

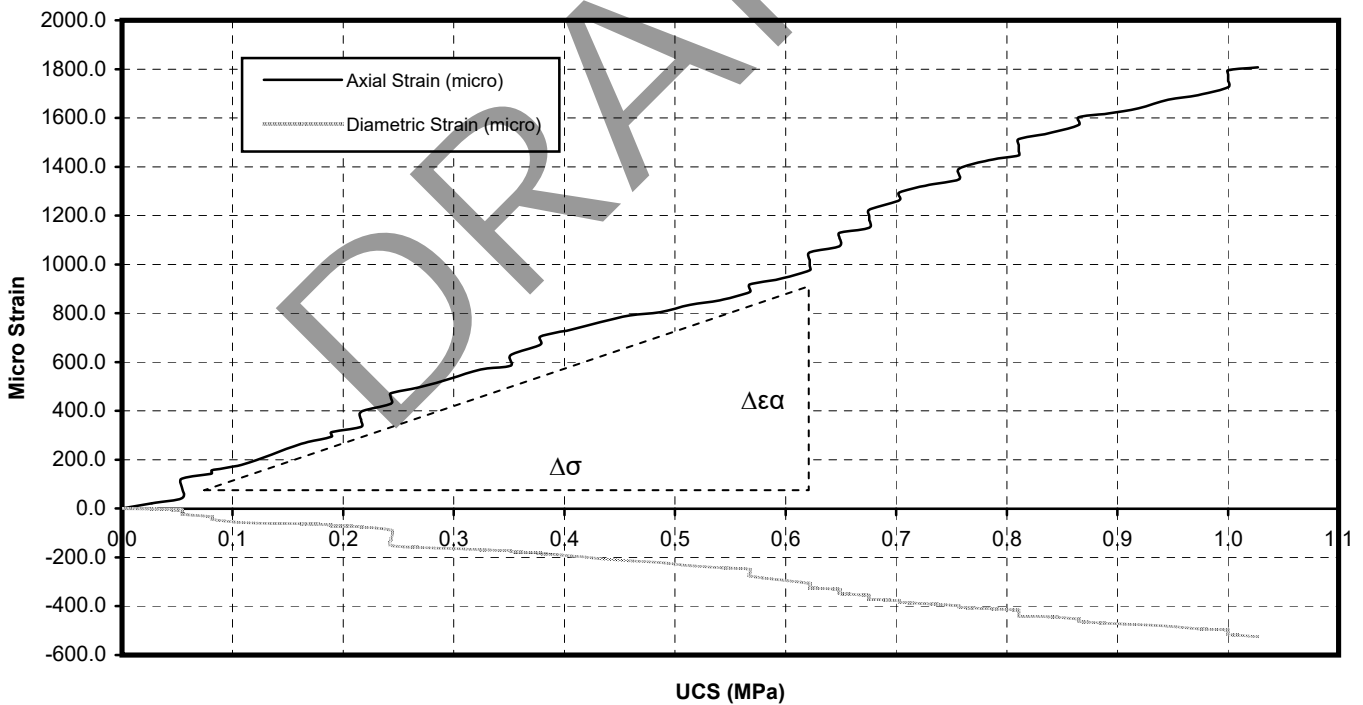
Tested in accordance with ASTM D7012 - 14

SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH

| | | |
|--|-------------------|-------------|
| BOREHOLE | | BH401 |
| SAMPLE | | C |
| DEPTH | m | 3.75-3.85 |
| SAMPLE DIAMETER | mm | 68.64 |
| SAMPLE HEIGHT | mm | 75.24 |
| TEST CONDITION | | As Received |
| RATE OF LOADING | kN/s | 0.03 |
| TEST DURATION | mm.sec | 2.10 |
| DATE OF TESTING | | 19/11/2020 |
| LOAD FRAME USED | | 2000kN |
| LOAD DIRECTION WITH RESPECT TO LITHOLOGY | | Unknown |
| FAILURE LOAD | kN | 3.8 |
| YOUNG'S MODULUS E (AVERAGE) | GPa | 0.63 |
| POISSON'S RATIO ν | | 0.32 |
| UNCONFINED COMPRESSIVE STRENGTH | MPa | 1.0 |
| WATER CONTENT (ISRM Suggested Methods) | % | 9.8 |
| BULK DENSITY (ISRM Suggested Methods) | Mg/m ³ | 2.00 |
| DRY DENSITY (ISRM Suggested Methods) | Mg/m ³ | 1.82 |



Axial & Diametric Stress / Strain Curves



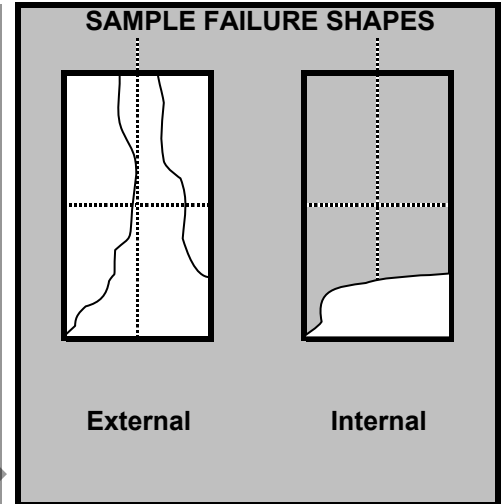
Test Notes:

Method of Young's modulus determination - Average Modulus of Linear Portion of Axial Stress-Strain Curve
 Method of Poisson's ratio determination - slope of axial curve / slope of lateral curve
 Young's modulus and poisson's ratio calculated between stress levels of 0.1MPa and 0.6MPa
 Test specimen does not meet specified length / diameter ratio requirements

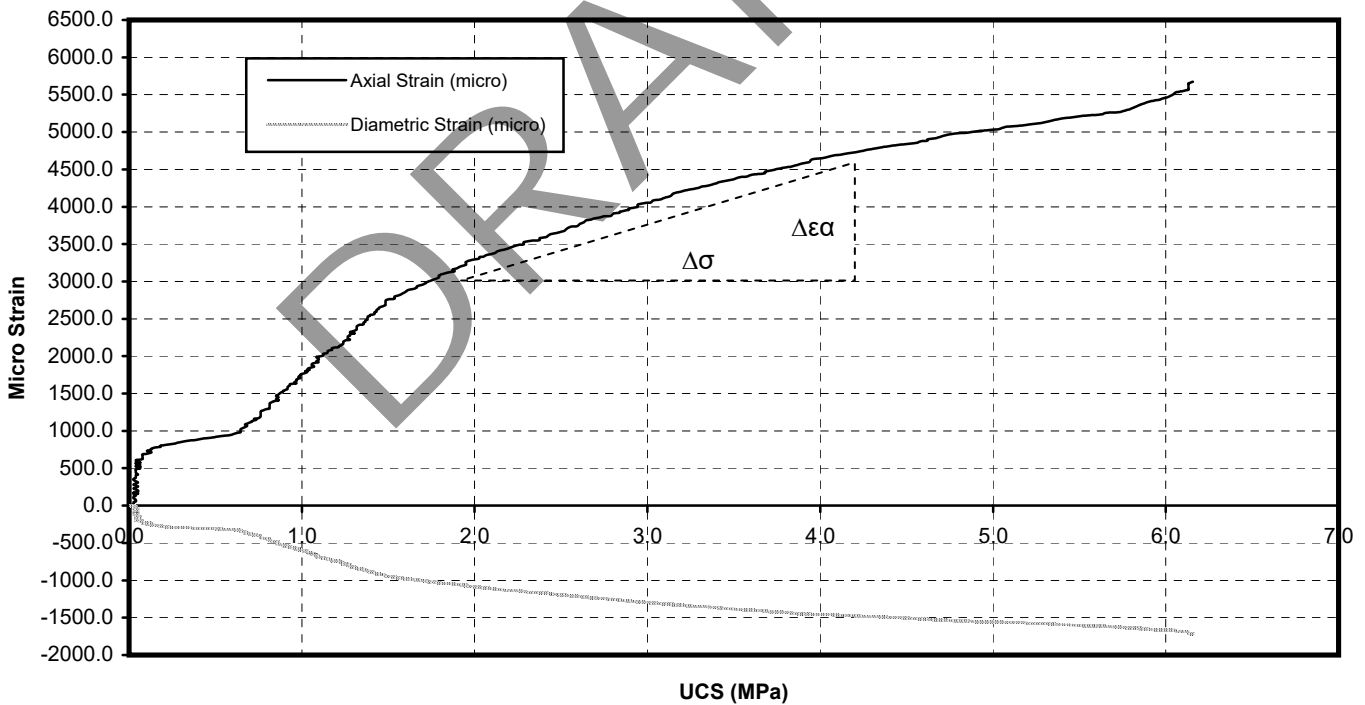
Tested in accordance with ASTM D7012 - 14

SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH AND ELASTIC MODULI

| | | |
|--|-------------------|-------------|
| BOREHOLE | | BH401 |
| SAMPLE | | C |
| DEPTH | m | 7.62-7.70 |
| SAMPLE DIAMETER | mm | 99.32 |
| SAMPLE HEIGHT | mm | 57.81 |
| TEST CONDITION | | As Received |
| RATE OF LOADING | kN/s | 0.1 |
| TEST DURATION | mm.sec | 6.06 |
| DATE OF TESTING | | 19/11/2020 |
| LOAD FRAME USED | | 2000kN |
| LOAD DIRECTION WITH RESPECT TO LITHOLOGY | | Unknown |
| FAILURE LOAD | kN | 47.9 |
| YOUNG'S MODULUS E (AVERAGE) | GPa | 1.46 |
| POISSON'S RATIO ν | | 0.27 |
| UNCONFINED COMPRESSIVE STRENGTH | MPa | 6.2 |
| WATER CONTENT (ISRM Suggested Methods) | % | 7.6 |
| BULK DENSITY (ISRM Suggested Methods) | Mg/m ³ | 1.91 |
| DRY DENSITY (ISRM Suggested Methods) | Mg/m ³ | 1.78 |



Axial & Diametric Stress / Strain Curves



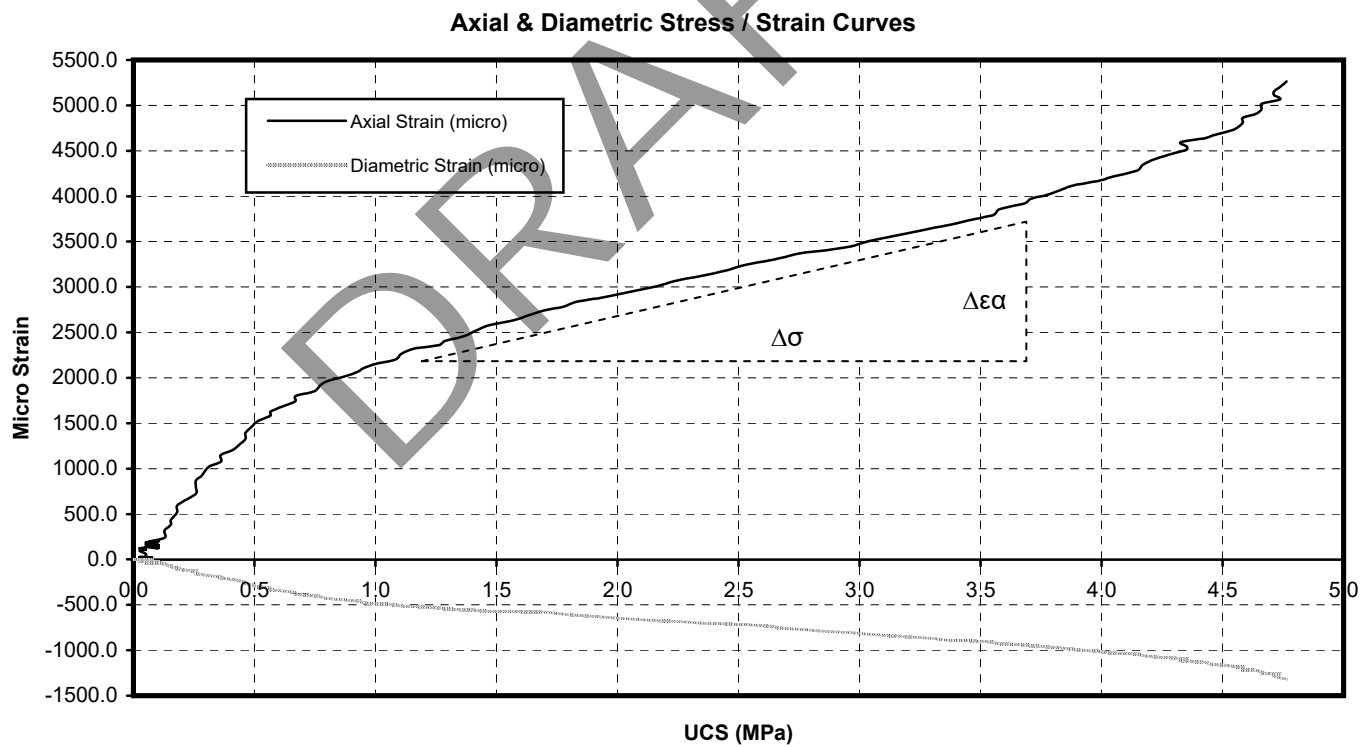
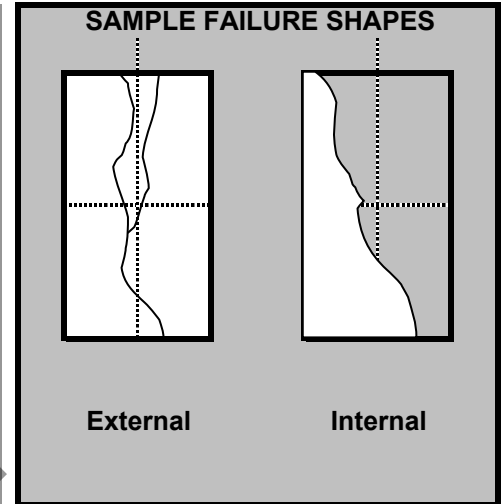
Test Notes:

Method of Young's modulus determination - Average Modulus of Linear Portion of Axial Stress-Strain Curve
 Method of Poisson's ratio determination - slope of axial curve / slope of lateral curve
 Young's modulus and poisson's ratio calculated between stress levels of 1.8MPa and 4.2MPa
 Test specimen does not meet specified length / diameter ratio requirements

Tested in accordance with ASTM D7012 - 14

SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH AND ELASTIC MODULI

| | | |
|--|-------------------|-------------|
| BOREHOLE | | BH402 |
| SAMPLE | | C |
| DEPTH | m | 3.65-3.80 |
| SAMPLE DIAMETER | mm | 70.32 |
| SAMPLE HEIGHT | mm | 116.26 |
| TEST CONDITION | | As Received |
| RATE OF LOADING | kN/s | 0.1 |
| TEST DURATION | mm.sec | 2.45 |
| DATE OF TESTING | | 19/11/2020 |
| LOAD FRAME USED | | 2000kN |
| LOAD DIRECTION WITH RESPECT TO LITHOLOGY | | Unknown |
| FAILURE LOAD | kN | 18.5 |
| YOUNG'S MODULUS E (AVERAGE) | GPa | 1.52 |
| POISSON'S RATIO ν | | 0.27 |
| UNCONFINED COMPRESSIVE STRENGTH | MPa | 4.8 |
| WATER CONTENT (ISRM Suggested Methods) | % | 10.1 |
| BULK DENSITY (ISRM Suggested Methods) | Mg/m ³ | 2.05 |
| DRY DENSITY (ISRM Suggested Methods) | Mg/m ³ | 1.86 |



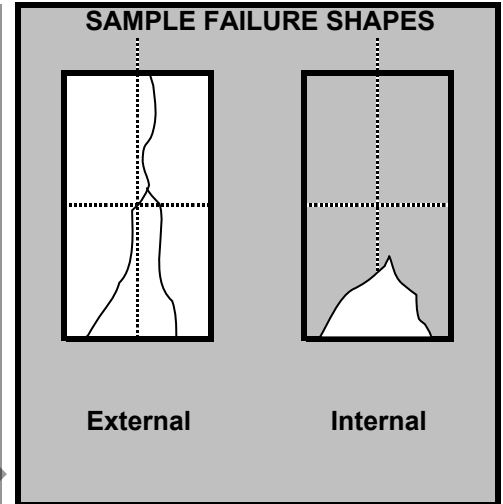
Test Notes:

Method of Young's modulus determination - Average Modulus of Linear Portion of Axial Stress-Strain Curve
 Method of Poisson's ratio determination - slope of axial curve / slope of lateral curve
 Young's modulus and poisson's ratio calculated between stress levels of 1.1MPa and 3.7MPa
 Test specimen does not meet specified length / diameter ratio requirements

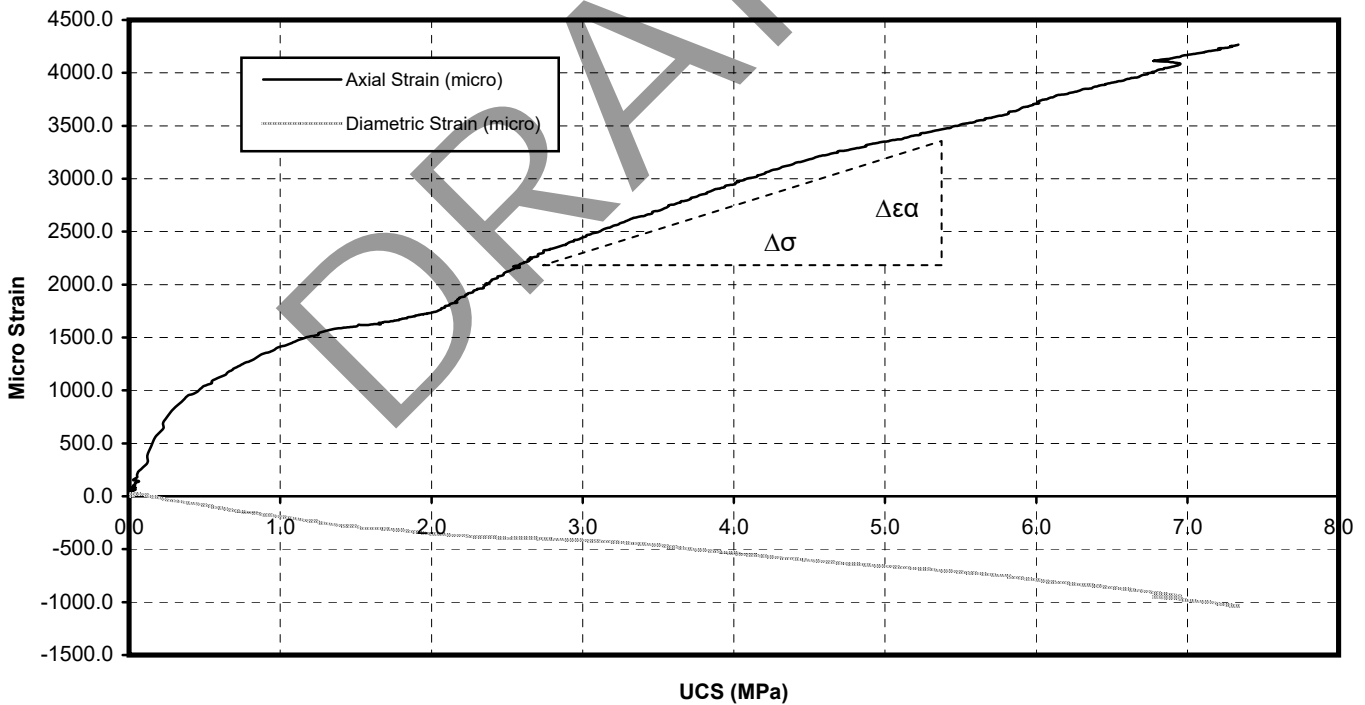
Tested in accordance with ASTM D7012 - 14

SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH AND ELASTIC MODULI

| | | |
|--|-------------------|-------------|
| BOREHOLE | | BH402 |
| SAMPLE | | C |
| DEPTH | m | 9.56-9.70 |
| SAMPLE DIAMETER | mm | 97.78 |
| SAMPLE HEIGHT | mm | 95.72 |
| TEST CONDITION | | As Received |
| RATE OF LOADING | kN/s | 0.1 |
| TEST DURATION | mm.sec | 7.44 |
| DATE OF TESTING | | 19/11/2020 |
| LOAD FRAME USED | | 2000kN |
| LOAD DIRECTION WITH RESPECT TO LITHOLOGY | | Unknown |
| FAILURE LOAD | kN | 55.2 |
| YOUNG'S MODULUS E (AVERAGE) | GPa | 2.24 |
| POISSON'S RATIO ν | | 0.27 |
| UNCONFINED COMPRESSIVE STRENGTH | MPa | 7.4 |
| WATER CONTENT (ISRM Suggested Methods) | % | 9.4 |
| BULK DENSITY (ISRM Suggested Methods) | Mg/m ³ | 2.07 |
| DRY DENSITY (ISRM Suggested Methods) | Mg/m ³ | 1.89 |



Axial & Diametric Stress / Strain Curves



Test Notes:

Method of Young's modulus determination - Average Modulus of Linear Portion of Axial Stress-Strain Curve
 Method of Poisson's ratio determination - slope of axial curve / slope of lateral curve
 Young's modulus and poisson's ratio calculated between stress levels of 2.7MPa and 5.4MPa
 Test specimen does not meet specified length / diameter ratio requirements

Tested in accordance with ASTM D7012 - 14

SUMMARY OF UNCONFINED COMPRESSIVE STRENGTH AND ELASTIC MODULI

| BOREHOLE | SAMPLE | DEPTH (m) | MOISTURE CONTENT (%) | TYPE OF TEST * (see below) | CORE DIAMETER (mm) | EQUIVALENT DIAMETER (mm) | PLATEN SEPARATION (mm) | FAILURE LOAD (kN) | Is (MPa) | Is(50) (MPa) |
|----------|--------|--------------|----------------------------|----------------------------------|--------------------------|--------------------------------|------------------------------|-------------------------|-------------|-----------------|
| BH401 | C | 3.75-3.85 | As Received | I | 35.11 | 33.50 | 25.10 | 0.05 | 0.05 | 0.04 |
| | | | | I | 37.05 | 38.19 | 30.91 | 0.05 | 0.03 | 0.03 |
| | | | | I | 42.12 | 46.92 | 41.05 | 0.03 | 0.01 | 0.01 |
| | C | 7.62-7.70 | As Received | I | 72.10 | 72.50 | 57.25 | 0.03 | 0.00 | 0.01 |
| | | | | I | 59.05 | 51.39 | 35.12 | 0.03 | 0.01 | 0.01 |
| | | | | I | 45.00 | 42.02 | 30.81 | 0.04 | 0.02 | 0.02 |
| | C | 11.00-11.12 | As Received | D | 97.04 | 97.04 | 97.04 | 0.02 | 0.00 | 0.00 |
| | | | | A | 87.88 | 69.93 | 43.70 | 0.05 | 0.01 | 0.01 |
| | | | | A | 87.86 | 72.67 | 47.21 | 0.04 | 0.01 | 0.01 |
| | C | 16.45-16.62 | As Received | D | 100.09 | 100.09 | 100.09 | 0.03 | 0.00 | 0.00 |
| | | | | A | 100.09 | 75.20 | 44.37 | 0.06 | 0.01 | 0.01 |
| | | | | A | 100.05 | 76.79 | 46.29 | 0.06 | 0.01 | 0.01 |

NOTE: N/M - Not measured
NOTE: A dash (-) signifies that scale did not register a reading

* I = IRREGULAR TEST
D = DIAMETRICAL TEST
A = AXIAL TEST

| | |
|---------------------------------|------|
| Mean Is(50) - Axial tests | 0.01 |
| Mean Is(50) - Diametrical tests | 0.00 |
| la(50) | 3.24 |

Tested in accordance with ISRM (2007)

SUMMARY OF POINT LOAD TEST RESULTS

| BOREHOLE | SAMPLE | DEPTH (m) | MOISTURE CONTENT (%) | TYPE OF TEST * (see below) | CORE DIAMETER (mm) | EQUIVALENT DIAMETER (mm) | PLATEN SEPARATION (mm) | FAILURE LOAD (kN) | Is (MPa) | Is(50) (MPa) |
|----------|--------|--------------|----------------------------|----------------------------------|--------------------------|--------------------------------|------------------------------|-------------------------|-------------|-----------------|
| BH402 | C | 3.65-3.80 | As Received | I | 62.18 | 50.50 | 32.21 | 0.01 | 0.01 | 0.01 |
| | | | | I | 65.72 | 64.61 | 49.88 | 0.04 | 0.01 | 0.01 |
| | | | | I | 62.11 | 52.67 | 35.08 | 0.04 | 0.01 | 0.01 |
| | C | 9.56-9.70 | As Received | I | 58.66 | 62.39 | 52.12 | 0.09 | 0.02 | 0.03 |
| | | | | I | 52.84 | 58.01 | 50.02 | 0.11 | 0.03 | 0.03 |
| | | | | I | 39.67 | 42.30 | 35.42 | 0.08 | 0.05 | 0.04 |
| | C | 14.12-14.30 | As Received | I | 44.57 | 64.96 | 74.36 | 0.02 | 0.00 | 0.00 |
| | | | | I | 48.78 | 68.55 | 75.65 | 0.03 | 0.01 | 0.01 |
| | | | | I | 48.58 | 69.27 | 77.57 | 0.03 | 0.01 | 0.01 |
| | C | 17.10-17.30 | As Received | D | 101.18 | 101.18 | 101.18 | 0.01 | 0.00 | 0.00 |
| | | | | A | 101.04 | 66.86 | 34.75 | 0.21 | 0.05 | 0.05 |
| | | | | A | 101.07 | 74.18 | 42.76 | 0.15 | 0.03 | 0.03 |

DRAFT

NOTE: N/M - Not measured
NOTE: A dash (-) signifies that scale did not register a reading

* I = IRREGULAR TEST
D = DIAMETRICAL TEST
A = AXIAL TEST

| | |
|---------------------------------|-------|
| Mean Is(50) - Axial tests | 0.04 |
| Mean Is(50) - Diametrical tests | 0.00 |
| la(50) | 23.30 |

Tested in accordance with ISRM (2007)

SUMMARY OF POINT LOAD TEST RESULTS

| BOREHOLE | SAMPLE | DEPTH (m) | MOISTURE CONTENT (%) | TYPE OF TEST * (see below) | CORE DIAMETER (mm) | EQUIVALENT DIAMETER (mm) | PLATEN SEPARATION (mm) | FAILURE LOAD (kN) | Is (MPa) | Is(50) (MPa) |
|----------|-------------|--------------|----------------------------|----------------------------------|--------------------------|--------------------------------|------------------------------|-------------------------|-------------|-----------------|
| BH403 | C | 4.70-4.83 | As Received | I | 39.82 | 42.23 | 35.18 | 0.04 | 0.02 | 0.02 |
| | | | | I | 45.05 | 49.23 | 42.25 | 0.03 | 0.01 | 0.01 |
| | | | | I | 55.05 | 58.25 | 48.40 | 0.11 | 0.03 | 0.03 |
| | C | 4.70-4.83 | As Received | I | 30.55 | 31.69 | 25.82 | 0.03 | 0.03 | 0.02 |
| | | | | I | 35.11 | 36.71 | 30.15 | 0.09 | 0.07 | 0.06 |
| | | | | I | 40.67 | 42.88 | 35.51 | 0.11 | 0.06 | 0.05 |
| | C | 10.00-10.30 | As Received | D | 99.05 | 99.05 | 99.05 | 0.03 | 0.00 | 0.00 |
| | | | | A | 99.16 | 77.68 | 47.79 | 0.76 | 0.13 | 0.15 |
| | | | | A | 99.01 | 79.91 | 50.65 | 0.39 | 0.06 | 0.08 |
| C | 15.25-15.42 | As Received | D | 100.26 | 100.26 | 100.26 | 0.05 | 0.00 | 0.01 | |
| | | | A | 93.20 | 58.41 | 28.75 | 0.02 | 0.01 | 0.01 | |
| | | | A | 94.18 | 51.46 | 22.08 | 0.03 | 0.01 | 0.01 | |

DRAFT

NOTE: N/M - Not measured
NOTE: A dash (-) signifies that scale did not register a reading

* I = IRREGULAR TEST
D = DIAMETRICAL TEST
A = AXIAL TEST

| | |
|---------------------------------|-------|
| Mean Is(50) - Axial tests | 0.06 |
| Mean Is(50) - Diametrical tests | 0.01 |
| la(50) | 11.24 |

Tested in accordance with ISRM (2007)

SUMMARY OF POINT LOAD TEST RESULTS

| BOREHOLE | SAMPLE | DEPTH (m) | MOISTURE CONTENT (%) | TYPE OF TEST * (see below) | CORE DIAMETER (mm) | EQUIVALENT DIAMETER (mm) | PLATEN SEPARATION (mm) | FAILURE LOAD (kN) | Is (MPa) | Is(50) (MPa) |
|----------|-------------|--------------|----------------------------|----------------------------------|--------------------------|--------------------------------|------------------------------|-------------------------|-------------|-----------------|
| BH404 | C | 3.41-3.48 | As Received | I | 45.11 | 47.96 | 40.05 | 0.05 | 0.02 | 0.02 |
| | | | | I | 40.23 | 39.85 | 31.00 | 0.07 | 0.04 | 0.04 |
| | | | | I | 32.32 | 32.53 | 25.71 | 0.10 | 0.09 | 0.08 |
| | C | 3.41-3.48 | As Received | I | 25.76 | 24.45 | 18.22 | 0.05 | 0.08 | 0.06 |
| | | | | I | 30.99 | 31.46 | 25.09 | 0.02 | 0.02 | 0.02 |
| | | | | I | 40.01 | 39.86 | 31.19 | 0.04 | 0.02 | 0.02 |
| | C | 10.58-10.71 | As Received | I | 73.10 | 63.34 | 43.10 | 0.05 | 0.01 | 0.01 |
| | | | | I | 71.81 | 58.94 | 38.00 | 0.07 | 0.02 | 0.02 |
| | | | | I | 44.79 | 47.82 | 40.09 | 0.00 | 0.00 | 0.00 |
| C | 15.03-15.21 | As Received | D | 98.25 | 98.25 | 98.25 | 0.05 | 0.01 | 0.01 | |
| | | | A | 98.25 | 85.62 | 58.60 | 0.10 | 0.01 | 0.02 | |
| | | | A | 96.46 | 87.13 | 61.81 | 0.02 | 0.00 | 0.00 | |

NOTE: N/M - Not measured
NOTE: A dash (-) signifies that scale did not register a reading

* I = IRREGULAR TEST
D = DIAMETRICAL TEST
A = AXIAL TEST

| | |
|---------------------------------|------|
| Mean Is(50) - Axial tests | 0.01 |
| Mean Is(50) - Diametrical tests | 0.01 |
| la(50) | 1.45 |

Tested in accordance with ISRM (2007)

SUMMARY OF POINT LOAD TEST RESULTS

DRAFT

APPENDIX 12

Laboratory Test Results - Contamination (Soil)



Certificate of Analysis

Certificate Number 20-17533-1

30-Sep-20

Client Geotechnics LTD
The Geotechnical Centre
Unit 1B Borders Ind. Park
River Lane
Saltney
Chester
CH4 8RJ

Our Reference 20-17533-1

Client Reference PN204140

Order No ON26500

Contract Title Stockport Bus Station

Description 3 Soil samples.

Date Received 11-Sep-20

Date Started 11-Sep-20

Date Completed 30-Sep-20

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

Notes **This report supersedes 20-17533, extra testing added**

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

Approved By

A handwritten signature in black ink, appearing to read "Adam Fenwick".

Adam Fenwick
Contracts Manager



2139

Summary of Chemical Analysis

Soil Samples

Our Ref 20-17533-1

Client Ref PN204140

Contract Title Stockport Bus Station

| Lab No | 1725464 | 1725465 | 1725466 |
|---------------|------------|------------|------------|
| Sample ID | WS400 | WS401 | WS402 |
| Depth | 1.20-1.60 | 1.20-1.40 | 1.20-1.50 |
| Other ID | | | |
| Sample Type | SOIL | SOIL | SOIL |
| Sampling Date | 01/09/2020 | 01/09/2020 | 01/09/2020 |
| Sampling Time | n/s | n/s | n/s |

| Test | Method | LOD | Units | | | |
|---------------------------------|-------------|------|-------|--------|--------|--------|
| Metals | | | | | | |
| Arsenic | DETSC 2301# | 0.2 | mg/kg | 6.4 | 4.4 | 2.6 |
| Beryllium | DETSC 2301# | 0.2 | mg/kg | 0.6 | 0.4 | < 0.2 |
| Boron, Water Soluble | DETSC 2311# | 0.2 | mg/kg | 2.1 | 0.3 | 0.2 |
| Cadmium | DETSC 2301# | 0.1 | mg/kg | 0.4 | 0.7 | < 0.1 |
| Chromium | DETSC 2301# | 0.15 | mg/kg | 14 | 14 | 7.6 |
| Chromium III | DETSC 2301* | 0.15 | mg/kg | 14 | 14 | 7.6 |
| Chromium, Hexavalent | DETSC 2204* | 1 | mg/kg | < 1.0 | < 1.0 | < 1.0 |
| Copper | DETSC 2301# | 0.2 | mg/kg | 23 | 20 | 34 |
| Lead | DETSC 2301# | 0.3 | mg/kg | 17 | 22 | 9.3 |
| Mercury | DETSC 2325# | 0.05 | mg/kg | 0.11 | 0.09 | < 0.05 |
| Nickel | DETSC 2301# | 1 | mg/kg | 15 | 13 | 6.5 |
| Selenium | DETSC 2301# | 0.5 | mg/kg | 0.5 | < 0.5 | < 0.5 |
| Vanadium | DETSC 2301# | 0.8 | mg/kg | 18 | 20 | 9.9 |
| Zinc | DETSC 2301# | 1 | mg/kg | 45 | 68 | 39 |
| Inorganics | | | | | | |
| pH | DETSC 2008# | | pH | 6.5 | 7.9 | 7.5 |
| Cyanide, Total | DETSC 2130# | 0.1 | mg/kg | 0.9 | 0.2 | 0.1 |
| PID Reading | * | 0.1 | ppm | < 0.10 | < 0.10 | < 0.10 |
| Total Organic Carbon | DETSC 2084# | 0.5 | % | | 1.1 | |
| Organic matter | DETSC 2002# | 0.1 | % | | 1.4 | |
| Sulphate Aqueous Extract as SO4 | DETSC 2076# | 10 | mg/l | 33 | 35 | 18 |
| Petroleum Hydrocarbons | | | | | | |
| Aliphatic C5-C6 | DETSC 3321* | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| Aliphatic C6-C8 | DETSC 3321* | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| Aliphatic C8-C10 | DETSC 3321* | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| Aliphatic C10-C12 | DETSC 3072# | 1.5 | mg/kg | < 1.5 | < 1.5 | < 1.5 |
| Aliphatic C12-C16 | DETSC 3072# | 1.2 | mg/kg | < 1.2 | < 1.2 | < 1.2 |
| Aliphatic C16-C21 | DETSC 3072# | 1.5 | mg/kg | < 1.5 | < 1.5 | < 1.5 |
| Aliphatic C21-C35 | DETSC 3072# | 3.4 | mg/kg | < 3.4 | < 3.4 | < 3.4 |
| Aliphatic C35-C44 | DETSC 3072* | 3.4 | mg/kg | < 3.4 | < 3.4 | < 3.4 |
| Aliphatic C5-C35 | DETSC 3072* | 10 | mg/kg | < 10 | < 10 | < 10 |
| Aromatic C5-C7 | DETSC 3321* | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| Aromatic C7-C8 | DETSC 3321* | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| Aromatic C8-C10 | DETSC 3321* | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| Aromatic C10-C12 | DETSC 3072# | 0.9 | mg/kg | < 0.9 | < 0.9 | < 0.9 |
| Aromatic C12-C16 | DETSC 3072# | 0.5 | mg/kg | < 0.5 | < 0.5 | < 0.5 |
| Aromatic C16-C21 | DETSC 3072# | 0.6 | mg/kg | < 0.6 | < 0.6 | < 0.6 |
| Aromatic C21-C35 | DETSC 3072# | 1.4 | mg/kg | < 1.4 | < 1.4 | < 1.4 |
| Aromatic C35-C44 | DETSC 3072* | 1.4 | mg/kg | < 1.4 | < 1.4 | < 1.4 |
| Aromatic C5-C35 | DETSC 3072* | 10 | mg/kg | < 10 | < 10 | < 10 |
| TPH Ali/Aro Total | DETSC 3072* | 10 | mg/kg | < 10 | < 10 | < 10 |
| Benzene | DETSC 3321# | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |

Summary of Chemical Analysis Soil Samples

Our Ref 20-17533-1

Client Ref PN204140

Contract Title Stockport Bus Station

| | | | |
|---------------|------------|------------|------------|
| Lab No | 1725464 | 1725465 | 1725466 |
| Sample ID | WS400 | WS401 | WS402 |
| Depth | 1.20-1.60 | 1.20-1.40 | 1.20-1.50 |
| Other ID | | | |
| Sample Type | SOIL | SOIL | SOIL |
| Sampling Date | 01/09/2020 | 01/09/2020 | 01/09/2020 |
| Sampling Time | n/s | n/s | n/s |

| Test | Method | LOD | Units | | | |
|-------------------------|-------------|------|-------|--------|--------|--------|
| Ethylbenzene | DETSC 3321# | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| Toluene | DETSC 3321# | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| Xylene | DETSC 3321# | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| MTBE | DETSC 3321 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| PAHs | | | | | | |
| Naphthalene | DETSC 3303# | 0.03 | mg/kg | < 0.03 | < 0.03 | < 0.03 |
| Acenaphthylene | DETSC 3303# | 0.03 | mg/kg | < 0.03 | < 0.03 | < 0.03 |
| Acenaphthene | DETSC 3303# | 0.03 | mg/kg | < 0.03 | < 0.03 | < 0.03 |
| Fluorene | DETSC 3303 | 0.03 | mg/kg | < 0.03 | < 0.03 | < 0.03 |
| Phenanthrene | DETSC 3303# | 0.03 | mg/kg | < 0.03 | 0.16 | < 0.03 |
| Anthracene | DETSC 3303 | 0.03 | mg/kg | < 0.03 | 0.04 | < 0.03 |
| Fluoranthene | DETSC 3303# | 0.03 | mg/kg | < 0.03 | 0.24 | < 0.03 |
| Pyrene | DETSC 3303# | 0.03 | mg/kg | < 0.03 | 0.20 | < 0.03 |
| Benzo(a)anthracene | DETSC 3303# | 0.03 | mg/kg | < 0.03 | 0.08 | < 0.03 |
| Chrysene | DETSC 3303 | 0.03 | mg/kg | < 0.03 | 0.08 | < 0.03 |
| Benzo(b)fluoranthene | DETSC 3303# | 0.03 | mg/kg | < 0.03 | 0.05 | < 0.03 |
| Benzo(k)fluoranthene | DETSC 3303# | 0.03 | mg/kg | < 0.03 | < 0.03 | < 0.03 |
| Benzo(a)pyrene | DETSC 3303# | 0.03 | mg/kg | < 0.03 | 0.05 | < 0.03 |
| Indeno(1,2,3-c,d)pyrene | DETSC 3303# | 0.03 | mg/kg | < 0.03 | < 0.03 | < 0.03 |
| Dibenzo(a,h)anthracene | DETSC 3303# | 0.03 | mg/kg | < 0.03 | < 0.03 | < 0.03 |
| Benzo(g,h,i)perylene | DETSC 3303# | 0.03 | mg/kg | < 0.03 | < 0.03 | < 0.03 |
| PAH - USEPA 16, Total | DETSC 3303 | 0.1 | mg/kg | < 0.10 | 0.89 | < 0.10 |
| Phenols | | | | | | |
| Phenol - Monohydric | DETSC 2130# | 0.3 | mg/kg | 0.4 | < 0.3 | < 0.3 |

Summary of Chemical Analysis

Soil VOC/SVOC Samples

Our Ref 20-17533-1

Client Ref PN204140

Contract Title Stockport Bus Station

| | |
|---------------|------------|
| Lab No | 1725465 |
| Sample ID | WS401 |
| Depth | 1.20-1.40 |
| Other ID | |
| Sample Type | SOIL |
| Sampling Date | 01/09/2020 |
| Sampling Time | n/s |

| Test | Method | LOD | Units | |
|----------------------------|-------------|------|-------|--------|
| VOCs | | | | |
| Vinyl Chloride | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| 1,1 Dichloroethylene | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| Trans-1,2-dichloroethylene | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| 1,1-dichloroethane | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| Cis-1,2-dichloroethylene | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| 2,2-dichloropropane | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| Bromochloromethane | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| Chloroform | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| 1,1,1-trichloroethane | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| 1,1-dichloropropene | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| Carbon tetrachloride | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| Benzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| 1,2-dichloroethane | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| Trichloroethylene | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| 1,2-dichloropropane | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| Dibromomethane | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| Bromodichloromethane | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| cis-1,3-dichloropropene | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| Toluene | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| trans-1,3-dichloropropene | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| 1,1,2-trichloroethane | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| Tetrachloroethylene | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| 1,3-dichloropropane | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| Dibromochloromethane | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| 1,2-dibromoethane | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| Chlorobenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| 1,1,1,2-tetrachloroethane | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| Ethylbenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| m+p-Xylene | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| o-Xylene | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| Styrene | DETSC 3431* | 0.01 | mg/kg | < 0.01 |
| Bromoform | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| Isopropylbenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| Bromobenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| 1,2,3-trichloropropane | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| n-propylbenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| 2-chlorotoluene | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| 1,3,5-trimethylbenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| 4-chlorotoluene | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| Tert-butylbenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| 1,2,4-trimethylbenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| sec-butylbenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 |

Summary of Chemical Analysis

Soil VOC/SVOC Samples

Our Ref 20-17533-1

Client Ref PN204140

Contract Title Stockport Bus Station

| | |
|---------------|------------|
| Lab No | 1725465 |
| Sample ID | WS401 |
| Depth | 1.20-1.40 |
| Other ID | |
| Sample Type | SOIL |
| Sampling Date | 01/09/2020 |
| Sampling Time | n/s |

| Test | Method | LOD | Units | |
|-----------------------------|-------------|------|-------|--------|
| p-isopropyltoluene | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| 1,3-dichlorobenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| 1,4-dichlorobenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| n-butylbenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| 1,2-dichlorobenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| 1,2-dibromo-3-chloropropane | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| 1,2,4-trichlorobenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| Hexachlorobutadiene | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| 1,2,3-trichlorobenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 |
| MTBE | DETSC 3431* | 0.01 | mg/kg | < 0.01 |
| SVOCs | | | | |
| Phenol | DETSC 3433 | 0.1 | mg/kg | < 0.1 |
| Aniline | DETSC 3433* | 0.1 | mg/kg | < 0.1 |
| 2-Chlorophenol | DETSC 3433 | 0.1 | mg/kg | < 0.1 |
| Benzyl Alcohol | DETSC 3433 | 0.1 | mg/kg | < 0.1 |
| 2-Methylphenol | DETSC 3433 | 0.1 | mg/kg | < 0.1 |
| Bis(2-chloroisopropyl)ether | DETSC 3433 | 0.1 | mg/kg | < 0.1 |
| 3&4-Methylphenol | DETSC 3433 | 0.1 | mg/kg | < 0.1 |
| 2,4-Dimethylphenol | DETSC 3433 | 0.1 | mg/kg | < 0.1 |
| Bis-(dichloroethoxy)methane | DETSC 3433 | 0.1 | mg/kg | < 0.1 |
| 2,4-Dichlorophenol | DETSC 3433 | 0.1 | mg/kg | < 0.1 |
| 1,2,4-Trichlorobenzene | DETSC 3433 | 0.1 | mg/kg | < 0.1 |
| 4-Chloro-3-methylphenol | DETSC 3433 | 0.1 | mg/kg | < 0.1 |
| 2-Methylnaphthalene | DETSC 3433 | 0.1 | mg/kg | < 0.1 |
| Hexachlorocyclopentadiene | DETSC 3433* | 0.1 | mg/kg | < 0.1 |
| 2,4,6-Trichlorophenol | DETSC 3433 | 0.1 | mg/kg | < 0.1 |
| 2,4,5-Trichlorophenol | DETSC 3433* | 0.1 | mg/kg | < 0.1 |
| 2-Chloronaphthalene | DETSC 3433 | 0.1 | mg/kg | < 0.1 |
| 2-Nitroaniline | DETSC 3433* | 0.1 | mg/kg | < 0.1 |
| 2,4-Dinitrotoluene | DETSC 3433* | 0.1 | mg/kg | < 0.1 |
| 3-Nitroaniline | DETSC 3433* | 0.1 | mg/kg | < 0.1 |
| 4-Nitrophenol | DETSC 3433* | 0.1 | mg/kg | < 0.1 |
| Dibenzofuran | DETSC 3433 | 0.1 | mg/kg | 0.2 |
| 2,6-Dinitrotoluene | DETSC 3433 | 0.1 | mg/kg | < 0.1 |
| 2,3,4,6-Tetrachlorophenol | DETSC 3433* | 0.1 | mg/kg | < 0.1 |
| Diethylphthalate | DETSC 3433 | 0.1 | mg/kg | < 0.1 |
| 4-Chlorophenylphenylether | DETSC 3433* | 0.1 | mg/kg | < 0.1 |
| 4-Nitroaniline | DETSC 3433* | 0.1 | mg/kg | < 0.1 |
| 2-Methyl-4,6-Dinitrophenol | DETSC 3433* | 0.1 | mg/kg | < 0.1 |
| Diphenylamine | DETSC 3433 | 0.1 | mg/kg | < 0.1 |
| 4-Bromophenylphenylether | DETSC 3433 | 0.1 | mg/kg | < 0.1 |

Summary of Chemical Analysis Soil VOC/SVOC Samples

Our Ref 20-17533-1

Client Ref PN204140

Contract Title Stockport Bus Station

| | |
|---------------|------------|
| Lab No | 1725465 |
| Sample ID | WS401 |
| Depth | 1.20-1.40 |
| Other ID | |
| Sample Type | SOIL |
| Sampling Date | 01/09/2020 |
| Sampling Time | n/s |

| Test | Method | LOD | Units | |
|----------------------------|-------------|-----|-------|-------|
| Hexachlorobenzene | DETSC 3433 | 0.1 | mg/kg | < 0.1 |
| Pentachlorophenol | DETSC 3433* | 0.1 | mg/kg | < 0.1 |
| Di-n-butylphthalate | DETSC 3433 | 0.1 | mg/kg | < 0.1 |
| Butylbenzylphthalate | DETSC 3433* | 0.1 | mg/kg | < 0.1 |
| Bis(2-ethylhexyl)phthalate | DETSC 3433 | 0.1 | mg/kg | < 0.1 |
| Di-n-octylphthalate | DETSC 3433 | 0.1 | mg/kg | < 0.1 |
| 1,4-Dinitrobenzene | DETSC 3433* | 0.1 | mg/kg | < 0.1 |
| Dimethylphthalate | DETSC 3433 | 0.1 | mg/kg | < 0.1 |
| 1,3-Dinitrobenzene | DETSC 3433* | 0.1 | mg/kg | < 0.1 |
| 1,2-Dinitrobenzene | DETSC 3433* | 0.1 | mg/kg | < 0.1 |
| 2,3,5,6-Tetrachlorophenol | DETSC 3433* | 0.1 | mg/kg | < 0.1 |
| Azobenzene | DETSC 3433 | 0.1 | mg/kg | < 0.1 |
| Carbazole | DETSC 3433* | 0.1 | mg/kg | < 0.1 |

Summary of Asbestos Analysis Soil Samples

Our Ref 20-17533-1

Client Ref PN204140

Contract Title Stockport Bus Station

| Lab No | Sample ID | Material Type | Result | Comment* | Analyst |
|---------|-----------------|---------------|--------|----------|---------------|
| 1725464 | WS400 1.20-1.60 | SOIL | NAD | none | Colin Patrick |
| 1725465 | WS401 1.20-1.40 | SOIL | NAD | none | Colin Patrick |
| 1725466 | WS402 1.20-1.50 | SOIL | NAD | none | Colin Patrick |

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

DRAFT

Information in Support of the Analytical Results

Our Ref 20-17533-1
 Client Ref PN204140
 Contract Stockport Bus Station

Containers Received & Deviating Samples

| Lab No | Sample ID | Date Sampled | Containers Received | Holding time exceeded for tests | Inappropriate container for tests |
|---------|----------------------|--------------|----------------------|--|-----------------------------------|
| | | | | | |
| 1725464 | WS400 1.20-1.60 SOIL | 01/09/20 | GJ 250ml x2, GJ 60ml | pH + Conductivity (7 days) | |
| 1725465 | WS401 1.20-1.40 SOIL | 01/09/20 | GJ 250ml x2, GJ 60ml | pH + Conductivity (7 days), VOC (7 days) | |
| 1725466 | WS402 1.20-1.50 SOIL | 01/09/20 | GJ 250ml x2, GJ 60ml | pH + Conductivity (7 days) | |

Key: G-Glass J-Jar

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

Soil Analysis Notes

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

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

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

Disposal

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

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

End of Report



DETS

Certificate of Analysis

Certificate Number 20-18308

08-Oct-20

Client Geotechnics LTD
The Geotechnical Centre
Unit 1B Borders Ind. Park
River Lane
Saltney
Chester
CH4 8RJ

Our Reference 20-18308

Client Reference PN204140

Order No ON26500

Contract Title Stockport Bus Station

Description 7 Soil samples.

Date Received 21-Sep-20

Date Started 21-Sep-20

Date Completed 08-Oct-20

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

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

Approved By



Adam Fenwick
Contracts Manager



Summary of Chemical Analysis

Soil Samples

Our Ref 20-18308

Client Ref PN204140

Contract Title Stockport Bus Station

| Lab No | 1730315 | 1730316 | 1730317 | 1730318 | 1730319 | 1730320 |
|---------------|------------|------------|------------|------------|------------|------------|
| Sample ID | BH400 | WS401 | BH401 | BH402 | BH402 | BH403 |
| Depth | 1.50 | 0.30-0.80 | 0.90 | 0.50 | 2.00 | 0.80 |
| Other ID | | | | | | |
| Sample Type | ES | ES | ES | ES | ES | ES |
| Sampling Date | 10/09/2020 | 09/09/2020 | 10/09/2020 | 10/09/2020 | 10/09/2020 | 09/09/2020 |
| Sampling Time | n/s | n/s | n/s | n/s | n/s | n/s |

| Test | Method | LOD | Units | | | | | | |
|---------------------------------|-------------|------|-------|--------|--------|--------|--------|--------|--------|
| Metals | | | | | | | | | |
| Arsenic | DETSC 2301# | 0.2 | mg/kg | 5.7 | 1.2 | 5.1 | 1.9 | 5.0 | 3.7 |
| Beryllium | DETSC 2301# | 0.2 | mg/kg | 0.3 | < 0.2 | 0.2 | < 0.2 | < 0.2 | < 0.2 |
| Boron, Water Soluble | DETSC 2311# | 0.2 | mg/kg | 0.6 | < 0.2 | 0.2 | 0.3 | < 0.2 | < 0.2 |
| Cadmium | DETSC 2301# | 0.1 | mg/kg | 5.2 | 5.7 | 1.3 | 4.5 | 1.8 | 0.3 |
| Chromium | DETSC 2301# | 0.15 | mg/kg | 8.2 | 4.8 | 12 | 5.2 | 6.8 | 7.0 |
| Chromium III | DETSC 2301* | 0.15 | mg/kg | 8.2 | 4.8 | 12 | 5.2 | 6.8 | 7.0 |
| Chromium, Hexavalent | DETSC 2204* | 1 | mg/kg | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Copper | DETSC 2301# | 0.2 | mg/kg | 28 | 15 | 21 | 15 | 21 | 18 |
| Lead | DETSC 2301# | 0.3 | mg/kg | 53 | 32 | 24 | 26 | 35 | 20 |
| Mercury | DETSC 2325# | 0.05 | mg/kg | 0.13 | < 0.05 | 0.09 | < 0.05 | 0.06 | 0.07 |
| Nickel | DETSC 2301# | 1 | mg/kg | 8.4 | 2.7 | 13 | 3.4 | 6.2 | 6.0 |
| Selenium | DETSC 2301# | 0.5 | mg/kg | < 0.5 | < 0.5 | < 0.5 | 0.5 | < 0.5 | < 0.5 |
| Vanadium | DETSC 2301# | 0.8 | mg/kg | 12 | 4.1 | 15 | 5.9 | 7.6 | 8.9 |
| Zinc | DETSC 2301# | 1 | mg/kg | 67 | 42 | 44 | 42 | 63 | 56 |
| Inorganics | | | | | | | | | |
| pH | DETSC 2008# | | pH | 9.2 | 9.6 | 8.9 | 10.6 | 9.1 | 9.2 |
| Cyanide, Total | DETSC 2130# | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 | < 0.1 | 0.2 | < 0.1 |
| PID Reading | * | 0.1 | ppm | 0.10 | < 0.10 | 0.10 | 0.10 | 0.10 | 0.10 |
| Total Organic Carbon | DETSC 2084# | 0.5 | % | | | | | | 1.7 |
| Organic matter | DETSC 2002# | 0.1 | % | | | | | | 1.2 |
| Sulphate Aqueous Extract as SO4 | DETSC 2076# | 10 | mg/l | 110 | 24 | 29 | 190 | 59 | 52 |
| Petroleum Hydrocarbons | | | | | | | | | |
| Aliphatic C5-C6 | DETSC 3321* | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Aliphatic C6-C8 | DETSC 3321* | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Aliphatic C8-C10 | DETSC 3321* | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Aliphatic C10-C12 | DETSC 3072# | 1.5 | mg/kg | < 1.5 | < 1.5 | < 1.5 | < 1.5 | < 1.5 | < 1.5 |
| Aliphatic C12-C16 | DETSC 3072# | 1.2 | mg/kg | < 1.2 | < 1.2 | < 1.2 | < 1.2 | < 1.2 | < 1.2 |
| Aliphatic C16-C21 | DETSC 3072# | 1.5 | mg/kg | < 1.5 | < 1.5 | < 1.5 | < 1.5 | < 1.5 | < 1.5 |
| Aliphatic C21-C35 | DETSC 3072# | 3.4 | mg/kg | < 3.4 | < 3.4 | < 3.4 | < 3.4 | < 3.4 | < 3.4 |
| Aliphatic C35-C44 | DETSC 3072* | 3.4 | mg/kg | < 3.4 | < 3.4 | < 3.4 | < 3.4 | < 3.4 | < 3.4 |
| Aliphatic C5-C35 | DETSC 3072* | 10 | mg/kg | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| Aromatic C5-C7 | DETSC 3321* | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Aromatic C7-C8 | DETSC 3321* | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Aromatic C8-C10 | DETSC 3321* | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Aromatic C10-C12 | DETSC 3072# | 0.9 | mg/kg | < 0.9 | < 0.9 | < 0.9 | < 0.9 | < 0.9 | < 0.9 |
| Aromatic C12-C16 | DETSC 3072# | 0.5 | mg/kg | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 |
| Aromatic C16-C21 | DETSC 3072# | 0.6 | mg/kg | < 0.6 | < 0.6 | < 0.6 | < 0.6 | < 0.6 | < 0.6 |
| Aromatic C21-C35 | DETSC 3072# | 1.4 | mg/kg | < 1.4 | < 1.4 | < 1.4 | < 1.4 | < 1.4 | < 1.4 |
| Aromatic C35-C44 | DETSC 3072* | 1.4 | mg/kg | < 1.4 | < 1.4 | < 1.4 | < 1.4 | < 1.4 | < 1.4 |
| Aromatic C5-C35 | DETSC 3072* | 10 | mg/kg | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |

Summary of Chemical Analysis

Soil Samples

Our Ref 20-18308

Client Ref PN204140

Contract Title Stockport Bus Station

| Lab No | 1730315 | 1730316 | 1730317 | 1730318 | 1730319 | 1730320 |
|---------------|------------|------------|------------|------------|------------|------------|
| Sample ID | BH400 | WS401 | BH401 | BH402 | BH402 | BH403 |
| Depth | 1.50 | 0.30-0.80 | 0.90 | 0.50 | 2.00 | 0.80 |
| Other ID | | | | | | |
| Sample Type | ES | ES | ES | ES | ES | ES |
| Sampling Date | 10/09/2020 | 09/09/2020 | 10/09/2020 | 10/09/2020 | 10/09/2020 | 09/09/2020 |
| Sampling Time | n/s | n/s | n/s | n/s | n/s | n/s |

| Test | Method | LOD | Units | | | | | | |
|-------------------------|------------|------|-------|--------|--------|--------|--------|--------|--------|
| TPH Ali/Aro Total | DETS 3072* | 10 | mg/kg | < 10 | < 10 | < 10 | < 10 | < 10 | < 10 |
| Benzene | DETS 3321# | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Ethylbenzene | DETS 3321# | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Toluene | DETS 3321# | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Xylene | DETS 3321# | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| MTBE | DETS 3321 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| PAHs | | | | | | | | | |
| Naphthalene | DETS 3303# | 0.03 | mg/kg | < 0.03 | < 0.03 | < 0.03 | < 0.03 | < 0.03 | 0.08 |
| Acenaphthylene | DETS 3303# | 0.03 | mg/kg | < 0.03 | < 0.03 | < 0.03 | < 0.03 | < 0.03 | < 0.03 |
| Acenaphthene | DETS 3303# | 0.03 | mg/kg | < 0.03 | < 0.03 | < 0.03 | < 0.03 | < 0.03 | 0.42 |
| Fluorene | DETS 3303 | 0.03 | mg/kg | < 0.03 | < 0.03 | < 0.03 | < 0.03 | < 0.03 | < 0.03 |
| Phenanthrene | DETS 3303# | 0.03 | mg/kg | 0.08 | < 0.03 | < 0.03 | 0.11 | 0.11 | 1.8 |
| Anthracene | DETS 3303 | 0.03 | mg/kg | < 0.03 | < 0.03 | < 0.03 | < 0.03 | < 0.03 | < 0.03 |
| Fluoranthene | DETS 3303# | 0.03 | mg/kg | 0.10 | 0.05 | < 0.03 | 0.11 | 0.09 | 3.4 |
| Pyrene | DETS 3303# | 0.03 | mg/kg | 0.10 | 0.04 | < 0.03 | 0.11 | 0.09 | 3.4 |
| Benzo(a)anthracene | DETS 3303# | 0.03 | mg/kg | 0.05 | < 0.03 | < 0.03 | 0.05 | 0.04 | 1.1 |
| Chrysene | DETS 3303 | 0.03 | mg/kg | 0.06 | < 0.03 | < 0.03 | 0.05 | 0.04 | < 0.03 |
| Benzo(b)fluoranthene | DETS 3303# | 0.03 | mg/kg | 0.05 | 0.03 | < 0.03 | 0.04 | 0.03 | 1.0 |
| Benzo(k)fluoranthene | DETS 3303# | 0.03 | mg/kg | < 0.03 | < 0.03 | < 0.03 | < 0.03 | < 0.03 | 0.41 |
| Benzo(a)pyrene | DETS 3303# | 0.03 | mg/kg | 0.05 | < 0.03 | < 0.03 | 0.04 | < 0.03 | 0.90 |
| Indeno(1,2,3-c,d)pyrene | DETS 3303# | 0.03 | mg/kg | < 0.03 | < 0.03 | < 0.03 | < 0.03 | < 0.03 | 0.29 |
| Dibenzo(a,h)anthracene | DETS 3303# | 0.03 | mg/kg | < 0.03 | < 0.03 | < 0.03 | < 0.03 | < 0.03 | 0.07 |
| Benzo(g,h,i)perylene | DETS 3303# | 0.03 | mg/kg | < 0.03 | < 0.03 | < 0.03 | < 0.03 | < 0.03 | 0.36 |
| PAH - USEPA 16, Total | DETS 3303 | 0.1 | mg/kg | 0.49 | 0.12 | < 0.10 | 0.53 | 0.36 | 13 |
| PCBs | | | | | | | | | |
| PCB 28 + PCB 31 | DETS 3401# | 0.01 | mg/kg | | | | | | < 0.01 |
| PCB 52 | DETS 3401# | 0.01 | mg/kg | | | | | | < 0.01 |
| PCB 101 | DETS 3401# | 0.01 | mg/kg | | | | | | < 0.01 |
| PCB 118 | DETS 3401# | 0.01 | mg/kg | | | | | | < 0.01 |
| PCB 153 | DETS 3401# | 0.01 | mg/kg | | | | | | < 0.01 |
| PCB 138 | DETS 3401# | 0.01 | mg/kg | | | | | | < 0.01 |
| PCB 180 | DETS 3401# | 0.01 | mg/kg | | | | | | < 0.01 |
| PCB 7 Total | DETS 3401# | 0.01 | mg/kg | | | | | | < 0.01 |
| Phenols | | | | | | | | | |
| Phenol - Monohydric | DETS 2130# | 0.3 | mg/kg | < 0.3 | < 0.3 | < 0.3 | < 0.3 | < 0.3 | < 0.3 |

Summary of Chemical Analysis

Soil Samples

Our Ref 20-18308

Client Ref PN204140

Contract Title Stockport Bus Station

| | |
|---------------|------------|
| Lab No | 1730321 |
| Sample ID | BH404 |
| Depth | 0.30 |
| Other ID | |
| Sample Type | ES |
| Sampling Date | 09/09/2020 |
| Sampling Time | n/s |

| Test | Method | LOD | Units | |
|---------------------------------|-------------|------|-------|--------|
| Metals | | | | |
| Arsenic | DETSC 2301# | 0.2 | mg/kg | 11 |
| Beryllium | DETSC 2301# | 0.2 | mg/kg | 0.3 |
| Boron, Water Soluble | DETSC 2311# | 0.2 | mg/kg | 0.3 |
| Cadmium | DETSC 2301# | 0.1 | mg/kg | 0.3 |
| Chromium | DETSC 2301# | 0.15 | mg/kg | 7.8 |
| Chromium III | DETSC 2301* | 0.15 | mg/kg | 7.8 |
| Chromium, Hexavalent | DETSC 2204* | 1 | mg/kg | < 1.0 |
| Copper | DETSC 2301# | 0.2 | mg/kg | 27 |
| Lead | DETSC 2301# | 0.3 | mg/kg | 20 |
| Mercury | DETSC 2325# | 0.05 | mg/kg | < 0.05 |
| Nickel | DETSC 2301# | 1 | mg/kg | 10 |
| Selenium | DETSC 2301# | 0.5 | mg/kg | < 0.5 |
| Vanadium | DETSC 2301# | 0.8 | mg/kg | 12 |
| Zinc | DETSC 2301# | 1 | mg/kg | 42 |
| Inorganics | | | | |
| pH | DETSC 2008# | | pH | 10.3 |
| Cyanide, Total | DETSC 2130# | 0.1 | mg/kg | < 0.1 |
| PID Reading | * | 0.1 | ppm | 0.10 |
| Total Organic Carbon | DETSC 2084# | 0.5 | % | |
| Organic matter | DETSC 2002# | 0.1 | % | |
| Sulphate Aqueous Extract as SO4 | DETSC 2076# | 10 | mg/l | 30 |
| Petroleum Hydrocarbons | | | | |
| Aliphatic C5-C6 | DETSC 3321* | 0.01 | mg/kg | < 0.01 |
| Aliphatic C6-C8 | DETSC 3321* | 0.01 | mg/kg | < 0.01 |
| Aliphatic C8-C10 | DETSC 3321* | 0.01 | mg/kg | < 0.01 |
| Aliphatic C10-C12 | DETSC 3072# | 1.5 | mg/kg | < 1.5 |
| Aliphatic C12-C16 | DETSC 3072# | 1.2 | mg/kg | < 1.2 |
| Aliphatic C16-C21 | DETSC 3072# | 1.5 | mg/kg | < 1.5 |
| Aliphatic C21-C35 | DETSC 3072# | 3.4 | mg/kg | < 3.4 |
| Aliphatic C35-C44 | DETSC 3072* | 3.4 | mg/kg | < 3.4 |
| Aliphatic C5-C35 | DETSC 3072* | 10 | mg/kg | < 10 |
| Aromatic C5-C7 | DETSC 3321* | 0.01 | mg/kg | < 0.01 |
| Aromatic C7-C8 | DETSC 3321* | 0.01 | mg/kg | < 0.01 |
| Aromatic C8-C10 | DETSC 3321* | 0.01 | mg/kg | < 0.01 |
| Aromatic C10-C12 | DETSC 3072# | 0.9 | mg/kg | < 0.9 |
| Aromatic C12-C16 | DETSC 3072# | 0.5 | mg/kg | < 0.5 |
| Aromatic C16-C21 | DETSC 3072# | 0.6 | mg/kg | < 0.6 |
| Aromatic C21-C35 | DETSC 3072# | 1.4 | mg/kg | < 1.4 |
| Aromatic C35-C44 | DETSC 3072* | 1.4 | mg/kg | < 1.4 |
| Aromatic C5-C35 | DETSC 3072* | 10 | mg/kg | < 10 |

Summary of Chemical Analysis

Soil Samples

Our Ref 20-18308

Client Ref PN204140

Contract Title Stockport Bus Station

| | |
|---------------|------------|
| Lab No | 1730321 |
| Sample ID | BH404 |
| Depth | 0.30 |
| Other ID | |
| Sample Type | ES |
| Sampling Date | 09/09/2020 |
| Sampling Time | n/s |

| Test | Method | LOD | Units | |
|-------------------------|-------------|------|-------|--------|
| TPH Ali/Aro Total | DETSC 3072* | 10 | mg/kg | < 10 |
| Benzene | DETSC 3321# | 0.01 | mg/kg | < 0.01 |
| Ethylbenzene | DETSC 3321# | 0.01 | mg/kg | < 0.01 |
| Toluene | DETSC 3321# | 0.01 | mg/kg | < 0.01 |
| Xylene | DETSC 3321# | 0.01 | mg/kg | < 0.01 |
| MTBE | DETSC 3321 | 0.01 | mg/kg | < 0.01 |
| PAHs | | | | |
| Naphthalene | DETSC 3303# | 0.03 | mg/kg | < 0.03 |
| Acenaphthylene | DETSC 3303# | 0.03 | mg/kg | < 0.03 |
| Acenaphthene | DETSC 3303# | 0.03 | mg/kg | < 0.03 |
| Fluorene | DETSC 3303 | 0.03 | mg/kg | < 0.03 |
| Phenanthrene | DETSC 3303# | 0.03 | mg/kg | 0.49 |
| Anthracene | DETSC 3303 | 0.03 | mg/kg | < 0.03 |
| Fluoranthene | DETSC 3303# | 0.03 | mg/kg | 0.83 |
| Pyrene | DETSC 3303# | 0.03 | mg/kg | 0.84 |
| Benzo(a)anthracene | DETSC 3303# | 0.03 | mg/kg | 0.33 |
| Chrysene | DETSC 3303 | 0.03 | mg/kg | < 0.03 |
| Benzo(b)fluoranthene | DETSC 3303# | 0.03 | mg/kg | 0.34 |
| Benzo(k)fluoranthene | DETSC 3303# | 0.03 | mg/kg | 0.14 |
| Benzo(a)pyrene | DETSC 3303# | 0.03 | mg/kg | 0.29 |
| Indeno(1,2,3-c,d)pyrene | DETSC 3303# | 0.03 | mg/kg | 0.13 |
| Dibenzo(a,h)anthracene | DETSC 3303# | 0.03 | mg/kg | 0.04 |
| Benzo(g,h,i)perylene | DETSC 3303# | 0.03 | mg/kg | 0.16 |
| PAH - USEPA 16, Total | DETSC 3303 | 0.1 | mg/kg | 3.6 |
| PCBs | | | | |
| PCB 28 + PCB 31 | DETSC 3401# | 0.01 | mg/kg | < 0.01 |
| PCB 52 | DETSC 3401# | 0.01 | mg/kg | < 0.01 |
| PCB 101 | DETSC 3401# | 0.01 | mg/kg | < 0.01 |
| PCB 118 | DETSC 3401# | 0.01 | mg/kg | < 0.01 |
| PCB 153 | DETSC 3401# | 0.01 | mg/kg | < 0.01 |
| PCB 138 | DETSC 3401# | 0.01 | mg/kg | < 0.01 |
| PCB 180 | DETSC 3401# | 0.01 | mg/kg | < 0.01 |
| PCB 7 Total | DETSC 3401# | 0.01 | mg/kg | < 0.01 |
| Phenols | | | | |
| Phenol - Monohydric | DETSC 2130# | 0.3 | mg/kg | < 0.3 |

Summary of Chemical Analysis

Soil VOC/SVOC Samples

Our Ref 20-18308

Client Ref PN204140

Contract Title Stockport Bus Station

| | | | |
|----------------------|------------|------------|------------|
| Lab No | 1730317 | 1730320 | 1730321 |
| Sample ID | BH401 | BH403 | BH404 |
| Depth | 0.90 | 0.80 | 0.30 |
| Other ID | | | |
| Sample Type | ES | ES | ES |
| Sampling Date | 10/09/2020 | 09/09/2020 | 09/09/2020 |
| Sampling Time | n/s | n/s | n/s |

| Test | Method | LOD | Units | | | |
|----------------------------|-------------|------|-------|--------|--------|--------|
| VOCs | | | | | | |
| Vinyl Chloride | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| 1,1 Dichloroethylene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| Trans-1,2-dichloroethylene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| 1,1-dichloroethane | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| Cis-1,2-dichloroethylene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| 2,2-dichloropropane | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| Bromochloromethane | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| Chloroform | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| 1,1,1-trichloroethane | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| 1,1-dichloropropene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| Carbon tetrachloride | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| Benzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| 1,2-dichloroethane | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| Trichloroethylene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| 1,2-dichloropropane | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| Dibromomethane | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| Bromodichloromethane | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| cis-1,3-dichloropropene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| Toluene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| trans-1,3-dichloropropene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| 1,1,2-trichloroethane | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| Tetrachloroethylene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| 1,3-dichloropropane | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| Dibromochloromethane | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| 1,2-dibromoethane | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| Chlorobenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| 1,1,1,2-tetrachloroethane | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| Ethylbenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| m+p-Xylene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| o-Xylene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| Styrene | DETSC 3431* | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| Bromoform | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| Isopropylbenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| Bromobenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| 1,2,3-trichloropropane | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| n-propylbenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| 2-chlorotoluene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| 1,3,5-trimethylbenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| 4-chlorotoluene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| Tert-butylbenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |

Summary of Chemical Analysis

Soil VOC/SVOC Samples

Our Ref 20-18308

Client Ref PN204140

Contract Title Stockport Bus Station

| Lab No | 1730317 | 1730320 | 1730321 |
|---------------|------------|------------|------------|
| Sample ID | BH401 | BH403 | BH404 |
| Depth | 0.90 | 0.80 | 0.30 |
| Other ID | | | |
| Sample Type | ES | ES | ES |
| Sampling Date | 10/09/2020 | 09/09/2020 | 09/09/2020 |
| Sampling Time | n/s | n/s | n/s |

| Test | Method | LOD | Units | | | |
|-----------------------------|-------------|------|-------|--------|--------|--------|
| 1,2,4-trimethylbenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| sec-butylbenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| p-isopropyltoluene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| 1,3-dichlorobenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| 1,4-dichlorobenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| n-butylbenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| 1,2-dichlorobenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| 1,2-dibromo-3-chloropropane | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| 1,2,4-trichlorobenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| Hexachlorobutadiene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| 1,2,3-trichlorobenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| MTBE | DETSC 3431* | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| SVOCs | | | | | | |
| Phenol | DETSC 3433 | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 |
| Aniline | DETSC 3433* | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 |
| 2-Chlorophenol | DETSC 3433 | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 |
| Benzyl Alcohol | DETSC 3433 | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 |
| 2-Methylphenol | DETSC 3433 | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 |
| Bis(2-chloroisopropyl)ether | DETSC 3433 | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 |
| 3&4-Methylphenol | DETSC 3433 | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 |
| 2,4-Dimethylphenol | DETSC 3433 | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 |
| Bis-(dichloroethoxy)methane | DETSC 3433 | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 |
| 2,4-Dichlorophenol | DETSC 3433 | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 |
| 1,2,4-Trichlorobenzene | DETSC 3433 | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 |
| 4-Chloro-3-methylphenol | DETSC 3433 | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 |
| 2-Methylnaphthalene | DETSC 3433 | 0.1 | mg/kg | < 0.1 | 0.2 | < 0.1 |
| Hexachlorocyclopentadiene | DETSC 3433* | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 |
| 2,4,6-Trichlorophenol | DETSC 3433 | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 |
| 2,4,5-Trichlorophenol | DETSC 3433* | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 |
| 2-Chloronaphthalene | DETSC 3433 | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 |
| 2-Nitroaniline | DETSC 3433* | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 |
| 2,4-Dinitrotoluene | DETSC 3433* | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 |
| 3-Nitroaniline | DETSC 3433* | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 |
| 4-Nitrophenol | DETSC 3433* | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 |
| Dibenzofuran | DETSC 3433 | 0.1 | mg/kg | < 0.1 | 0.3 | < 0.1 |
| 2,6-Dinitrotoluene | DETSC 3433 | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 |
| 2,3,4,6-Tetrachlorophenol | DETSC 3433* | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 |
| Diethylphthalate | DETSC 3433 | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 |
| 4-Chlorophenylphenylether | DETSC 3433* | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 |
| 4-Nitroaniline | DETSC 3433* | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 |

Summary of Chemical Analysis

Soil VOC/SVOC Samples

Our Ref 20-18308

Client Ref PN204140

Contract Title Stockport Bus Station

| | | | |
|----------------------|------------|------------|------------|
| Lab No | 1730317 | 1730320 | 1730321 |
| Sample ID | BH401 | BH403 | BH404 |
| Depth | 0.90 | 0.80 | 0.30 |
| Other ID | | | |
| Sample Type | ES | ES | ES |
| Sampling Date | 10/09/2020 | 09/09/2020 | 09/09/2020 |
| Sampling Time | n/s | n/s | n/s |

| Test | Method | LOD | Units | | | |
|----------------------------|-------------|-----|-------|-------|-------|-------|
| 2-Methyl-4,6-Dinitrophenol | DETSC 3433* | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 |
| Diphenylamine | DETSC 3433 | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 |
| 4-Bromophenylphenylether | DETSC 3433 | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 |
| Hexachlorobenzene | DETSC 3433 | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 |
| Pentachlorophenol | DETSC 3433* | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 |
| Di-n-butylphthalate | DETSC 3433 | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 |
| Butylbenzylphthalate | DETSC 3433* | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 |
| Bis(2-ethylhexyl)phthalate | DETSC 3433 | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 |
| Di-n-octylphthalate | DETSC 3433 | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 |
| 1,4-Dinitrobenzene | DETSC 3433* | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 |
| Dimethylphthalate | DETSC 3433 | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 |
| 1,3-Dinitrobenzene | DETSC 3433* | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 |
| 1,2-Dinitrobenzene | DETSC 3433* | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 |
| 2,3,5,6-Tetrachlorophenol | DETSC 3433* | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 |
| Azobenzene | DETSC 3433 | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 |
| Carbazole | DETSC 3433* | 0.1 | mg/kg | < 0.1 | 0.2 | < 0.1 |

Summary of Asbestos Analysis

Soil Samples

Our Ref 20-18308

Client Ref PN204140

Contract Title Stockport Bus Station

| Lab No | Sample ID | Material Type | Result | Comment* | Analyst |
|---------|-----------------|---------------|--------|----------|-----------------|
| 1730315 | BH400 1.50 | SOIL | NAD | none | Joanne Luscombe |
| 1730316 | WS401 0.30-0.80 | SOIL | NAD | none | Joanne Luscombe |
| 1730317 | BH401 0.90 | SOIL | NAD | none | Joanne Luscombe |
| 1730318 | BH402 0.50 | SOIL | NAD | none | Joanne Luscombe |
| 1730319 | BH402 2.00 | SOIL | NAD | none | Joanne Luscombe |
| 1730320 | BH403 0.80 | SOIL | NAD | none | Joanne Luscombe |
| 1730321 | BH404 0.30 | SOIL | NAD | none | Joanne Luscombe |

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

DRAFT

Information in Support of the Analytical Results

Our Ref 20-18308

Client Ref PN204140

Contract Stockport Bus Station

Containers Received & Deviating Samples

| Lab No | Sample ID | Date Sampled | Containers Received | Holding time exceeded for tests | Inappropriate container for tests |
|---------|----------------------|--------------|----------------------|--|-----------------------------------|
| 1730315 | BH400 1.50 SOIL | 10/09/20 | GJ 250ml x2, GJ 60ml | pH + Conductivity (7 days) | |
| 1730316 | WS401 0.30-0.80 SOIL | 09/09/20 | GJ 250ml x2, GJ 60ml | pH + Conductivity (7 days) | |
| 1730317 | BH401 0.90 SOIL | 10/09/20 | GJ 250ml x2, GJ 60ml | pH + Conductivity (7 days), VOC (7 days) | |
| 1730318 | BH402 0.50 SOIL | 10/09/20 | GJ 250ml x2, GJ 60ml | pH + Conductivity (7 days) | |
| 1730319 | BH402 2.00 SOIL | 10/09/20 | GJ 250ml x2, GJ 60ml | pH + Conductivity (7 days) | |
| 1730320 | BH403 0.80 SOIL | 09/09/20 | GJ 250ml x2, GJ 60ml | pH + Conductivity (7 days), VOC (7 days) | |
| 1730321 | BH404 0.30 SOIL | 09/09/20 | GJ 250ml x2, GJ 60ml | pH + Conductivity (7 days), VOC (7 days) | |

Key: G-Glass J-Jar

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

Soil Analysis Notes

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

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

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

Disposal

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

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

End of Report



DETS

Certificate of Analysis

Certificate Number 20-18748

24-Nov-20

Client Geotechnics LTD
The Geotechnical Centre
Unit 1B Borders Ind. Park
River Lane
Saltney
Chester
CH4 8RJ

Our Reference 20-18748

Client Reference PN204140

Order No ON26500

Contract Title Stockport Bus Station

Description 6 Soil samples.

Date Received 25-Sep-20

Date Started 25-Sep-20

Date Completed 24-Nov-20

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

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

Approved By



Adam Fenwick
Contracts Manager



Summary of Chemical Analysis

Soil Samples

Our Ref 20-18748

Client Ref PN204140

Contract Title Stockport Bus Station

| Lab No | 1733354 | 1733355 | 1733356 |
|---------------|------------|------------|------------|
| Sample ID | OP400 | OP400 | OP401 |
| Depth | 0.25 | 0.50 | 0.25 |
| Other ID | | | |
| Sample Type | SOIL | SOIL | SOIL |
| Sampling Date | 21/09/2020 | 21/09/2020 | 21/09/2020 |
| Sampling Time | n/s | n/s | n/s |

| Test | Method | LOD | Units | | | |
|---------------------------------|-------------|------|-------|--------|--------|------|
| Metals | | | | | | |
| Arsenic | DETSC 2301# | 0.2 | mg/kg | | 4.9 | |
| Beryllium | DETSC 2301# | 0.2 | mg/kg | | < 0.2 | |
| Boron, Water Soluble | DETSC 2311# | 0.2 | mg/kg | | < 0.2 | |
| Cadmium | DETSC 2301# | 0.1 | mg/kg | | 4.2 | |
| Chromium | DETSC 2301# | 0.15 | mg/kg | | 2.1 | |
| Chromium III | DETSC 2301* | 0.15 | mg/kg | | 2.1 | |
| Chromium, Hexavalent | DETSC 2204* | 1 | mg/kg | | < 1.0 | |
| Copper | DETSC 2301# | 0.2 | mg/kg | | 40 | |
| Lead | DETSC 2301# | 0.3 | mg/kg | | 85 | |
| Mercury | DETSC 2325# | 0.05 | mg/kg | | 0.11 | |
| Nickel | DETSC 2301# | 1 | mg/kg | | 4.0 | |
| Selenium | DETSC 2301# | 0.5 | mg/kg | | < 0.5 | |
| Vanadium | DETSC 2301# | 0.8 | mg/kg | | 10 | |
| Zinc | DETSC 2301# | 1 | mg/kg | | 50 | |
| Inorganics | | | | | | |
| pH | DETSC 2008# | | pH | | 8.1 | |
| Cyanide, Total | DETSC 2130# | 0.1 | mg/kg | | < 0.1 | |
| PID Reading | * | 0.1 | ppm | < 0.10 | < 0.10 | 0.10 |
| Sulphate Aqueous Extract as SO4 | DETSC 2076# | 10 | mg/l | | 17 | |

Summary of Chemical Analysis

Soil Samples

Our Ref 20-18748

Client Ref PN204140

Contract Title Stockport Bus Station

| Lab No | 1733354 | 1733355 | 1733356 |
|---------------|------------|------------|------------|
| Sample ID | OP400 | OP400 | OP401 |
| Depth | 0.25 | 0.50 | 0.25 |
| Other ID | | | |
| Sample Type | SOIL | SOIL | SOIL |
| Sampling Date | 21/09/2020 | 21/09/2020 | 21/09/2020 |
| Sampling Time | n/s | n/s | n/s |

| Test | Method | LOD | Units | | |
|-------------------------------|-------------|------|-------|--|--------|
| Petroleum Hydrocarbons | | | | | |
| Aliphatic C5-C6 | DETSC 3321* | 0.01 | mg/kg | | < 0.01 |
| Aliphatic C6-C8 | DETSC 3321* | 0.01 | mg/kg | | < 0.01 |
| Aliphatic C8-C10 | DETSC 3321* | 0.01 | mg/kg | | < 0.01 |
| Aliphatic C10-C12 | DETSC 3072# | 1.5 | mg/kg | | < 1.5 |
| Aliphatic C12-C16 | DETSC 3072# | 1.2 | mg/kg | | < 1.2 |
| Aliphatic C16-C21 | DETSC 3072# | 1.5 | mg/kg | | < 1.5 |
| Aliphatic C21-C35 | DETSC 3072# | 3.4 | mg/kg | | < 3.4 |
| Aliphatic C35-C44 | DETSC 3072* | 3.4 | mg/kg | | < 3.4 |
| Aliphatic C5-C35 | DETSC 3072* | 10 | mg/kg | | < 10 |
| Aromatic C5-C7 | DETSC 3321* | 0.01 | mg/kg | | < 0.01 |
| Aromatic C7-C8 | DETSC 3321* | 0.01 | mg/kg | | < 0.01 |
| Aromatic C8-C10 | DETSC 3321* | 0.01 | mg/kg | | < 0.01 |
| Aromatic C10-C12 | DETSC 3072# | 0.9 | mg/kg | | < 0.9 |
| Aromatic C12-C16 | DETSC 3072# | 0.5 | mg/kg | | < 0.5 |
| Aromatic C16-C21 | DETSC 3072# | 0.6 | mg/kg | | < 0.6 |
| Aromatic C21-C35 | DETSC 3072# | 1.4 | mg/kg | | < 1.4 |
| Aromatic C35-C44 | DETSC 3072* | 1.4 | mg/kg | | < 1.4 |
| Aromatic C5-C35 | DETSC 3072* | 10 | mg/kg | | < 10 |
| TPH Ali/Aro Total C5-C35 | DETSC 3072* | 10 | mg/kg | | < 10 |
| Benzene | DETSC 3321# | 0.01 | mg/kg | | < 0.01 |
| Ethylbenzene | DETSC 3321# | 0.01 | mg/kg | | < 0.01 |
| Toluene | DETSC 3321# | 0.01 | mg/kg | | < 0.01 |
| Xylene | DETSC 3321# | 0.01 | mg/kg | | < 0.01 |
| MTBE | DETSC 3321 | 0.01 | mg/kg | | < 0.01 |

Summary of Chemical Analysis

Soil Samples

Our Ref 20-18748

Client Ref PN204140

Contract Title Stockport Bus Station

| Lab No | 1733354 | 1733355 | 1733356 |
|---------------|------------|------------|------------|
| Sample ID | OP400 | OP400 | OP401 |
| Depth | 0.25 | 0.50 | 0.25 |
| Other ID | | | |
| Sample Type | SOIL | SOIL | SOIL |
| Sampling Date | 21/09/2020 | 21/09/2020 | 21/09/2020 |
| Sampling Time | n/s | n/s | n/s |

| Test | Method | LOD | Units | | |
|-------------------------|-------------|------|-------|--|--------|
| PAHs | | | | | |
| Naphthalene | DETSC 3303# | 0.03 | mg/kg | | < 0.03 |
| Acenaphthylene | DETSC 3303# | 0.03 | mg/kg | | < 0.03 |
| Acenaphthene | DETSC 3303# | 0.03 | mg/kg | | 0.05 |
| Fluorene | DETSC 3303 | 0.03 | mg/kg | | 0.04 |
| Phenanthrene | DETSC 3303# | 0.03 | mg/kg | | 0.53 |
| Anthracene | DETSC 3303 | 0.03 | mg/kg | | 0.09 |
| Fluoranthene | DETSC 3303# | 0.03 | mg/kg | | 1.1 |
| Pyrene | DETSC 3303# | 0.03 | mg/kg | | 1.2 |
| Benzo(a)anthracene | DETSC 3303# | 0.03 | mg/kg | | 0.65 |
| Chrysene | DETSC 3303 | 0.03 | mg/kg | | 0.70 |
| Benzo(b)fluoranthene | DETSC 3303# | 0.03 | mg/kg | | 0.71 |
| Benzo(k)fluoranthene | DETSC 3303# | 0.03 | mg/kg | | 0.28 |
| Benzo(a)pyrene | DETSC 3303# | 0.03 | mg/kg | | 0.70 |
| Indeno(1,2,3-c,d)pyrene | DETSC 3303# | 0.03 | mg/kg | | 0.23 |
| Dibenzo(a,h)anthracene | DETSC 3303# | 0.03 | mg/kg | | 0.07 |
| Benzo(g,h,i)perylene | DETSC 3303# | 0.03 | mg/kg | | 0.28 |
| PAH - USEPA 16, Total | DETSC 3303 | 0.1 | mg/kg | | 6.7 |
| Phenols | | | | | |
| Phenol - Monohydric | DETSC 2130# | 0.3 | mg/kg | | < 0.3 |

Summary of Chemical Analysis

Soil Samples

Our Ref 20-18748

Client Ref PN204140

Contract Title Stockport Bus Station

| Lab No | 1733357 | 1733358 | 1733359 |
|---------------|------------|------------|------------|
| Sample ID | OP401 | OP403 | OP403 |
| Depth | 0.60 | 0.30-0.60 | 1.00 |
| Other ID | | | |
| Sample Type | SOIL | SOIL | SOIL |
| Sampling Date | 21/09/2020 | 21/09/2020 | 21/09/2020 |
| Sampling Time | n/s | n/s | n/s |

| Test | Method | LOD | Units | | | |
|---------------------------------|-------------|------|-------|--------|--------|--------|
| Metals | | | | | | |
| Arsenic | DETSC 2301# | 0.2 | mg/kg | 1.7 | 3.7 | 3.6 |
| Beryllium | DETSC 2301# | 0.2 | mg/kg | < 0.2 | < 0.2 | < 0.2 |
| Boron, Water Soluble | DETSC 2311# | 0.2 | mg/kg | < 0.2 | < 0.2 | < 0.2 |
| Cadmium | DETSC 2301# | 0.1 | mg/kg | 7.7 | 1.0 | 10 |
| Chromium | DETSC 2301# | 0.15 | mg/kg | 0.27 | 0.38 | < 0.15 |
| Chromium III | DETSC 2301* | 0.15 | mg/kg | 0.27 | 0.38 | < 0.15 |
| Chromium, Hexavalent | DETSC 2204* | 1 | mg/kg | < 1.0 | < 1.0 | < 1.0 |
| Copper | DETSC 2301# | 0.2 | mg/kg | 14 | 19 | 24 |
| Lead | DETSC 2301# | 0.3 | mg/kg | 28 | 23 | 58 |
| Mercury | DETSC 2325# | 0.05 | mg/kg | < 0.05 | 0.05 | < 0.05 |
| Nickel | DETSC 2301# | 1 | mg/kg | 1.7 | 3.8 | 3.7 |
| Selenium | DETSC 2301# | 0.5 | mg/kg | < 0.5 | < 0.5 | < 0.5 |
| Vanadium | DETSC 2301# | 0.8 | mg/kg | 5.3 | 8.9 | 6.3 |
| Zinc | DETSC 2301# | 1 | mg/kg | 30 | 37 | 66 |
| Inorganics | | | | | | |
| pH | DETSC 2008# | | pH | 8.1 | 8.4 | 8.6 |
| Cyanide, Total | DETSC 2130# | 0.1 | mg/kg | < 0.1 | < 0.1 | < 0.1 |
| PID Reading | * | 0.1 | ppm | < 0.10 | < 0.10 | 0.10 |
| Sulphate Aqueous Extract as SO4 | DETSC 2076# | 10 | mg/l | 26 | 20 | 19 |

Summary of Chemical Analysis

Soil Samples

Our Ref 20-18748

Client Ref PN204140

Contract Title Stockport Bus Station

| Lab No | 1733357 | 1733358 | 1733359 |
|---------------|------------|------------|------------|
| Sample ID | OP401 | OP403 | OP403 |
| Depth | 0.60 | 0.30-0.60 | 1.00 |
| Other ID | | | |
| Sample Type | SOIL | SOIL | SOIL |
| Sampling Date | 21/09/2020 | 21/09/2020 | 21/09/2020 |
| Sampling Time | n/s | n/s | n/s |

| Test | Method | LOD | Units | | | |
|-------------------------------|-------------|------|-------|--------|--------|--------|
| Petroleum Hydrocarbons | | | | | | |
| Aliphatic C5-C6 | DETSC 3321* | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| Aliphatic C6-C8 | DETSC 3321* | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| Aliphatic C8-C10 | DETSC 3321* | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| Aliphatic C10-C12 | DETSC 3072# | 1.5 | mg/kg | < 1.5 | < 1.5 | < 1.5 |
| Aliphatic C12-C16 | DETSC 3072# | 1.2 | mg/kg | < 1.2 | < 1.2 | < 1.2 |
| Aliphatic C16-C21 | DETSC 3072# | 1.5 | mg/kg | < 1.5 | < 1.5 | < 1.5 |
| Aliphatic C21-C35 | DETSC 3072# | 3.4 | mg/kg | 20 | 48 | < 3.4 |
| Aliphatic C35-C44 | DETSC 3072* | 3.4 | mg/kg | < 3.4 | < 3.4 | < 3.4 |
| Aliphatic C5-C35 | DETSC 3072* | 10 | mg/kg | 20 | 49 | < 10 |
| Aromatic C5-C7 | DETSC 3321* | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| Aromatic C7-C8 | DETSC 3321* | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| Aromatic C8-C10 | DETSC 3321* | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| Aromatic C10-C12 | DETSC 3072# | 0.9 | mg/kg | < 0.9 | < 0.9 | < 0.9 |
| Aromatic C12-C16 | DETSC 3072# | 0.5 | mg/kg | < 0.5 | 1.4 | < 0.5 |
| Aromatic C16-C21 | DETSC 3072# | 0.6 | mg/kg | < 0.6 | 14 | < 0.6 |
| Aromatic C21-C35 | DETSC 3072# | 1.4 | mg/kg | < 1.4 | 110 | < 1.4 |
| Aromatic C35-C44 | DETSC 3072* | 1.4 | mg/kg | < 1.4 | < 1.4 | < 1.4 |
| Aromatic C5-C35 | DETSC 3072* | 10 | mg/kg | < 10 | 120 | < 10 |
| TPH Ali/Aro Total C5-C35 | DETSC 3072* | 10 | mg/kg | 20 | 170 | < 10 |
| Benzene | DETSC 3321# | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| Ethylbenzene | DETSC 3321# | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| Toluene | DETSC 3321# | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| Xylene | DETSC 3321# | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |
| MTBE | DETSC 3321 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 |

Summary of Chemical Analysis

Soil Samples

Our Ref 20-18748

Client Ref PN204140

Contract Title Stockport Bus Station

| Lab No | 1733357 | 1733358 | 1733359 |
|---------------|------------|------------|------------|
| Sample ID | OP401 | OP403 | OP403 |
| Depth | 0.60 | 0.30-0.60 | 1.00 |
| Other ID | | | |
| Sample Type | SOIL | SOIL | SOIL |
| Sampling Date | 21/09/2020 | 21/09/2020 | 21/09/2020 |
| Sampling Time | n/s | n/s | n/s |

| Test | Method | LOD | Units | | | |
|-------------------------|-------------|------|-------|--------|-------|--------|
| PAHs | | | | | | |
| Naphthalene | DETSC 3303# | 0.03 | mg/kg | 0.04 | 0.23 | < 0.03 |
| Acenaphthylene | DETSC 3303# | 0.03 | mg/kg | < 0.03 | 0.06 | < 0.03 |
| Acenaphthene | DETSC 3303# | 0.03 | mg/kg | 0.05 | 0.43 | < 0.03 |
| Fluorene | DETSC 3303 | 0.03 | mg/kg | 0.05 | 0.32 | < 0.03 |
| Phenanthrene | DETSC 3303# | 0.03 | mg/kg | 0.52 | 3.0 | < 0.03 |
| Anthracene | DETSC 3303 | 0.03 | mg/kg | 0.13 | 0.73 | < 0.03 |
| Fluoranthene | DETSC 3303# | 0.03 | mg/kg | 0.71 | 4.4 | 0.05 |
| Pyrene | DETSC 3303# | 0.03 | mg/kg | 0.74 | 4.4 | 0.05 |
| Benzo(a)anthracene | DETSC 3303# | 0.03 | mg/kg | 0.34 | 2.0 | 0.04 |
| Chrysene | DETSC 3303 | 0.03 | mg/kg | 0.38 | 1.9 | 0.04 |
| Benzo(b)fluoranthene | DETSC 3303# | 0.03 | mg/kg | 0.42 | 2.1 | 0.04 |
| Benzo(k)fluoranthene | DETSC 3303# | 0.03 | mg/kg | 0.17 | 0.85 | < 0.03 |
| Benzo(a)pyrene | DETSC 3303# | 0.03 | mg/kg | 0.36 | 2.2 | 0.04 |
| Indeno(1,2,3-c,d)pyrene | DETSC 3303# | 0.03 | mg/kg | 0.14 | 0.55 | < 0.03 |
| Dibenzo(a,h)anthracene | DETSC 3303# | 0.03 | mg/kg | 0.04 | 0.17 | < 0.03 |
| Benzo(g,h,i)perylene | DETSC 3303# | 0.03 | mg/kg | 0.17 | 0.81 | < 0.03 |
| PAH - USEPA 16, Total | DETSC 3303 | 0.1 | mg/kg | 4.3 | 24 | 0.26 |
| Phenols | | | | | | |
| Phenol - Monohydric | DETSC 2130# | 0.3 | mg/kg | < 0.3 | < 0.3 | < 0.3 |

Summary of Asbestos Analysis

Soil Samples

Our Ref 20-18748

Client Ref PN204140

Contract Title Stockport Bus Station

| Lab No | Sample ID | Material Type | Result | Comment* | Analyst |
|---------|-----------------|---------------|--------|----------|-----------------|
| 1733355 | OP400 0.50 | SOIL | NAD | none | Joanne Luscombe |
| 1733357 | OP401 0.60 | SOIL | NAD | none | Joanne Luscombe |
| 1733358 | OP403 0.30-0.60 | SOIL | NAD | none | Joanne Luscombe |
| 1733359 | OP403 1.00 | SOIL | NAD | none | Joanne Luscombe |

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

DRAFT

Information in Support of the Analytical Results

Our Ref 20-18748

Client Ref PN204140

Contract Stockport Bus Station

Containers Received & Deviating Samples

| Lab No | Sample ID | Date Sampled | Containers Received | Holding time exceeded for tests | Inappropriate container for tests |
|---------|----------------------|--------------|----------------------|---------------------------------|-----------------------------------|
| 1733354 | OP400 0.25 SOIL | 21/09/20 | GJ 250ml x2, GJ 60ml | | |
| 1733355 | OP400 0.50 SOIL | 21/09/20 | GJ 250ml x2, GJ 60ml | | |
| 1733356 | OP401 0.25 SOIL | 21/09/20 | GJ 250ml x2, GJ 60ml | | |
| 1733357 | OP401 0.60 SOIL | 21/09/20 | GJ 250ml x2, GJ 60ml | | |
| 1733358 | OP403 0.30-0.60 SOIL | 21/09/20 | GJ 250ml x2, GJ 60ml | | |
| 1733359 | OP403 1.00 SOIL | 21/09/20 | GJ 250ml x2, GJ 60ml | | |

Key: G-Glass J-Jar

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

Soil Analysis Notes

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

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

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

Disposal

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

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

End of Report



Certificate of Analysis

Certificate Number 20-19340

13-Oct-20

Client Geotechnics LTD
The Geotechnical Centre
Unit 1B Borders Ind. Park
River Lane
Saltney
Chester
CH4 8RJ

Our Reference 20-19340

Client Reference PN204140

Order No ON26500

Contract Title Stockport Bus Station

Description 5 Soil samples.

Date Received 02-Oct-20

Date Started 02-Oct-20

Date Completed 13-Oct-20

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

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

Approved By

A handwritten signature in black ink, appearing to read "A Fenwick".

Adam Fenwick
Contracts Manager



2139

Summary of Chemical Analysis

Soil Samples

Our Ref 20-19340

Client Ref PN204140

Contract Title Stockport Bus Station

| Lab No | 1737218 | 1737219 | 1737220 | 1737221 | 1737222 |
|---------------|------------|------------|------------|------------|------------|
| Sample ID | HP01 | HP03 | HP03 | HP02 | HP05 |
| Depth | 0.20-0.50 | 0.20-0.50 | 0.60-0.80 | 0.20-0.90 | 0.25-0.80 |
| Other ID | | | | | |
| Sample Type | SOIL | SOIL | SOIL | SOIL | SOIL |
| Sampling Date | 24/09/2020 | 24/09/2020 | 24/09/2020 | 25/09/2020 | 25/09/2020 |
| Sampling Time | n/s | n/s | n/s | n/s | n/s |

| Test | Method | LOD | Units | | | | | |
|---------------------------------|-------------|------|-------|--------|--------|--------|--------|--------|
| Metals | | | | | | | | |
| Arsenic | DETSC 2301# | 0.2 | mg/kg | 15 | 35 | 19 | 12 | 15 |
| Beryllium | DETSC 2301# | 0.2 | mg/kg | 0.9 | 1.7 | 0.3 | 1.9 | 0.9 |
| Boron, Water Soluble | DETSC 2311# | 0.2 | mg/kg | 0.4 | 0.7 | 1.0 | 0.5 | 0.5 |
| Cadmium | DETSC 2301# | 0.1 | mg/kg | 1.7 | 0.4 | < 0.1 | 0.6 | 3.1 |
| Chromium | DETSC 2301# | 0.15 | mg/kg | 14 | 32 | 35 | 23 | 13 |
| Chromium III | DETSC 2301* | 0.15 | mg/kg | 14 | 32 | 35 | 23 | 13 |
| Chromium, Hexavalent | DETSC 2204* | 1 | mg/kg | < 1.0 | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Copper | DETSC 2301# | 0.2 | mg/kg | 330 | 140 | 70 | 66 | 520 |
| Lead | DETSC 2301# | 0.3 | mg/kg | 300 | 95 | 80 | 82 | 420 |
| Mercury | DETSC 2325# | 0.05 | mg/kg | 0.43 | 0.85 | 0.10 | 0.24 | 0.33 |
| Nickel | DETSC 2301# | 1 | mg/kg | 24 | 47 | 46 | 33 | 17 |
| Selenium | DETSC 2301# | 0.5 | mg/kg | < 0.5 | < 0.5 | < 0.5 | < 0.5 | < 0.5 |
| Vanadium | DETSC 2301# | 0.8 | mg/kg | 30 | 120 | 88 | 52 | 25 |
| Zinc | DETSC 2301# | 1 | mg/kg | 180 | 120 | 46 | 110 | 690 |
| Inorganics | | | | | | | | |
| pH | DETSC 2008# | | pH | 8.6 | 7.5 | 7.0 | 10.6 | 8.8 |
| Cyanide, Total | DETSC 2130# | 0.1 | mg/kg | 0.1 | 0.1 | < 0.1 | < 0.1 | 1.4 |
| PID Reading | * | 0.1 | ppm | I/S | < 0.10 | I/S | < 0.10 | < 0.10 |
| Total Organic Carbon | DETSC 2084# | 0.5 | % | 6.8 | | 5.0 | | |
| Organic matter | DETSC 2002# | 0.1 | % | 4.2 | | 2.7 | | |
| Sulphate Aqueous Extract as SO4 | DETSC 2076# | 10 | mg/l | 32 | 420 | 610 | 87 | 57 |
| Petroleum Hydrocarbons | | | | | | | | |
| Aliphatic C5-C6 | DETSC 3321* | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Aliphatic C6-C8 | DETSC 3321* | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Aliphatic C8-C10 | DETSC 3321* | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Aliphatic C10-C12 | DETSC 3072# | 1.5 | mg/kg | < 1.5 | < 1.5 | < 1.5 | < 1.5 | < 1.5 |
| Aliphatic C12-C16 | DETSC 3072# | 1.2 | mg/kg | < 1.2 | < 1.2 | < 1.2 | 1.7 | < 1.2 |
| Aliphatic C16-C21 | DETSC 3072# | 1.5 | mg/kg | < 1.5 | < 1.5 | < 1.5 | 6.4 | < 1.5 |
| Aliphatic C21-C35 | DETSC 3072# | 3.4 | mg/kg | < 3.4 | < 3.4 | < 3.4 | 110 | < 3.4 |
| Aliphatic C35-C44 | DETSC 3072* | 3.4 | mg/kg | < 3.4 | < 3.4 | < 3.4 | 30 | < 3.4 |
| Aliphatic C5-C35 | DETSC 3072* | 10 | mg/kg | < 10 | < 10 | < 10 | 120 | < 10 |
| Aromatic C5-C7 | DETSC 3321* | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Aromatic C7-C8 | DETSC 3321* | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Aromatic C8-C10 | DETSC 3321* | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Aromatic C10-C12 | DETSC 3072# | 0.9 | mg/kg | < 0.9 | < 0.9 | < 0.9 | < 0.9 | < 0.9 |
| Aromatic C12-C16 | DETSC 3072# | 0.5 | mg/kg | 3.1 | < 0.5 | < 0.5 | 4.6 | 6.6 |
| Aromatic C16-C21 | DETSC 3072# | 0.6 | mg/kg | 27 | < 0.6 | < 0.6 | 35 | 46 |
| Aromatic C21-C35 | DETSC 3072# | 1.4 | mg/kg | 55 | < 1.4 | < 1.4 | 240 | 86 |
| Aromatic C35-C44 | DETSC 3072* | 1.4 | mg/kg | < 1.4 | < 1.4 | < 1.4 | 95 | 54 |
| Aromatic C5-C35 | DETSC 3072* | 10 | mg/kg | 86 | < 10 | < 10 | 280 | 140 |
| TPH Ali/Aro Total | DETSC 3072* | 10 | mg/kg | 86 | < 10 | < 10 | 400 | 140 |
| Benzene | DETSC 3321# | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |

Summary of Chemical Analysis

Soil Samples

Our Ref 20-19340

Client Ref PN204140

Contract Title Stockport Bus Station

| Lab No | 1737218 | 1737219 | 1737220 | 1737221 | 1737222 |
|---------------|------------|------------|------------|------------|------------|
| Sample ID | HP01 | HP03 | HP03 | HP02 | HP05 |
| Depth | 0.20-0.50 | 0.20-0.50 | 0.60-0.80 | 0.20-0.90 | 0.25-0.80 |
| Other ID | | | | | |
| Sample Type | SOIL | SOIL | SOIL | SOIL | SOIL |
| Sampling Date | 24/09/2020 | 24/09/2020 | 24/09/2020 | 25/09/2020 | 25/09/2020 |
| Sampling Time | n/s | n/s | n/s | n/s | n/s |

| Test | Method | LOD | Units | | | | | |
|-------------------------|------------|------|-------|--------|--------|--------|--------|--------|
| Ethylbenzene | DETS 3321# | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Toluene | DETS 3321# | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Xylene | DETS 3321# | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| MTBE | DETS 3321 | 0.01 | mg/kg | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| PAHs | | | | | | | | |
| Naphthalene | DETS 3303# | 0.03 | mg/kg | 0.89 | 0.18 | 0.03 | 0.13 | 4.7 |
| Acenaphthylene | DETS 3303# | 0.03 | mg/kg | 0.16 | 0.04 | < 0.03 | 0.05 | 0.23 |
| Acenaphthene | DETS 3303# | 0.03 | mg/kg | 1.7 | 0.57 | 0.13 | 0.86 | 5.8 |
| Fluorene | DETS 3303 | 0.03 | mg/kg | 1.1 | 0.30 | 0.06 | 0.53 | 3.8 |
| Phenanthrene | DETS 3303# | 0.03 | mg/kg | 10 | 2.7 | 0.67 | 5.2 | 31 |
| Anthracene | DETS 3303 | 0.03 | mg/kg | 2.5 | 0.52 | 0.12 | 1.3 | 7.0 |
| Fluoranthene | DETS 3303# | 0.03 | mg/kg | 11 | 3.5 | 0.82 | 8.1 | 29 |
| Pyrene | DETS 3303# | 0.03 | mg/kg | 10 | 3.5 | 0.82 | 7.9 | 26 |
| Benzo(a)anthracene | DETS 3303# | 0.03 | mg/kg | 3.7 | 0.98 | 0.29 | 3.4 | 8.4 |
| Chrysene | DETS 3303 | 0.03 | mg/kg | 3.6 | 1.0 | 0.32 | 3.4 | 8.0 |
| Benzo(b)fluoranthene | DETS 3303# | 0.03 | mg/kg | 3.3 | 0.83 | 0.24 | 3.5 | 6.3 |
| Benzo(k)fluoranthene | DETS 3303# | 0.03 | mg/kg | 1.2 | 0.27 | 0.10 | 1.3 | 2.1 |
| Benzo(a)pyrene | DETS 3303# | 0.03 | mg/kg | 2.9 | 0.69 | 0.22 | 3.0 | 5.5 |
| Indeno(1,2,3-c,d)pyrene | DETS 3303# | 0.03 | mg/kg | 0.87 | 0.21 | 0.09 | 0.91 | 1.6 |
| Dibenzo(a,h)anthracene | DETS 3303# | 0.03 | mg/kg | 0.27 | 0.07 | 0.03 | 0.27 | 0.54 |
| Benzo(g,h,i)perylene | DETS 3303# | 0.03 | mg/kg | 1.0 | 0.22 | 0.10 | 1.1 | 1.8 |
| PAH - USEPA 16, Total | DETS 3303 | 0.1 | mg/kg | 55 | 16 | 4.0 | 41 | 140 |
| PCBs | | | | | | | | |
| PCB 28 + PCB 31 | DETS 3401# | 0.01 | mg/kg | | | | | < 0.01 |
| PCB 52 | DETS 3401# | 0.01 | mg/kg | | | | | < 0.01 |
| PCB 101 | DETS 3401# | 0.01 | mg/kg | | | | | < 0.01 |
| PCB 118 | DETS 3401# | 0.01 | mg/kg | | | | | < 0.01 |
| PCB 153 | DETS 3401# | 0.01 | mg/kg | | | | | < 0.01 |
| PCB 138 | DETS 3401# | 0.01 | mg/kg | | | | | < 0.01 |
| PCB 180 | DETS 3401# | 0.01 | mg/kg | | | | | < 0.01 |
| PCB 7 Total | DETS 3401# | 0.01 | mg/kg | | | | | < 0.01 |
| Phenols | | | | | | | | |
| Phenol - Monohydric | DETS 2130# | 0.3 | mg/kg | < 0.3 | 0.6 | < 0.3 | < 0.3 | 0.5 |

Summary of Chemical Analysis

Soil VOC/SVOC Samples

Our Ref 20-19340
 Client Ref PN204140
 Contract Title Stockport Bus Station

| | | |
|---------------|------------|------------|
| Lab No | 1737218 | 1737220 |
| Sample ID | HP01 | HP03 |
| Depth | 0.20-0.50 | 0.60-0.80 |
| Other ID | | |
| Sample Type | SOIL | SOIL |
| Sampling Date | 24/09/2020 | 24/09/2020 |
| Sampling Time | n/s | n/s |

| Test | Method | LOD | Units | | |
|----------------------------|-------------|------|-------|--------|--------|
| VOCs | | | | | |
| Vinyl Chloride | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| 1,1 Dichloroethylene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| Trans-1,2-dichloroethylene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| 1,1-dichloroethane | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| Cis-1,2-dichloroethylene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| 2,2-dichloropropane | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| Bromochloromethane | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| Chloroform | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| 1,1,1-trichloroethane | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| 1,1-dichloropropene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| Carbon tetrachloride | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| Benzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| 1,2-dichloroethane | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| Trichloroethylene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| 1,2-dichloropropane | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| Dibromomethane | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| Bromodichloromethane | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| cis-1,3-dichloropropene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| Toluene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| trans-1,3-dichloropropene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| 1,1,2-trichloroethane | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| Tetrachloroethylene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| 1,3-dichloropropane | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| Dibromochloromethane | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| 1,2-dibromoethane | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| Chlorobenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| 1,1,1,2-tetrachloroethane | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| Ethylbenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| m+p-Xylene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| o-Xylene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| Styrene | DETSC 3431* | 0.01 | mg/kg | < 0.01 | < 0.01 |
| Bromoform | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| Isopropylbenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| Bromobenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| 1,2,3-trichloropropane | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| n-propylbenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| 2-chlorotoluene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| 1,3,5-trimethylbenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| 4-chlorotoluene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| Tert-butylbenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| 1,2,4-trimethylbenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| sec-butylbenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |

Summary of Chemical Analysis

Soil VOC/SVOC Samples

Our Ref 20-19340

Client Ref PN204140

Contract Title Stockport Bus Station

| | | |
|---------------|------------|------------|
| Lab No | 1737218 | 1737220 |
| Sample ID | HP01 | HP03 |
| Depth | 0.20-0.50 | 0.60-0.80 |
| Other ID | | |
| Sample Type | SOIL | SOIL |
| Sampling Date | 24/09/2020 | 24/09/2020 |
| Sampling Time | n/s | n/s |

| Test | Method | LOD | Units | | |
|-----------------------------|-------------|------|-------|--------|--------|
| p-isopropyltoluene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| 1,3-dichlorobenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| 1,4-dichlorobenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| n-butylbenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| 1,2-dichlorobenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| 1,2-dibromo-3-chloropropane | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| 1,2,4-trichlorobenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| Hexachlorobutadiene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| 1,2,3-trichlorobenzene | DETSC 3431 | 0.01 | mg/kg | < 0.01 | < 0.01 |
| MTBE | DETSC 3431* | 0.01 | mg/kg | < 0.01 | < 0.01 |
| SVOCs | | | | | |
| Phenol | DETSC 3433 | 0.1 | mg/kg | 0.2 | < 0.1 |
| Aniline | DETSC 3433* | 0.1 | mg/kg | < 0.1 | < 0.1 |
| 2-Chlorophenol | DETSC 3433 | 0.1 | mg/kg | < 0.1 | < 0.1 |
| Benzyl Alcohol | DETSC 3433 | 0.1 | mg/kg | < 0.1 | < 0.1 |
| 2-Methylphenol | DETSC 3433 | 0.1 | mg/kg | < 0.1 | < 0.1 |
| Bis(2-chloroisopropyl)ether | DETSC 3433 | 0.1 | mg/kg | < 0.1 | < 0.1 |
| 3&4-Methylphenol | DETSC 3433 | 0.1 | mg/kg | 0.4 | < 0.1 |
| 2,4-Dimethylphenol | DETSC 3433 | 0.1 | mg/kg | 0.2 | < 0.1 |
| Bis-(dichloroethoxy)methane | DETSC 3433 | 0.1 | mg/kg | < 0.1 | < 0.1 |
| 2,4-Dichlorophenol | DETSC 3433 | 0.1 | mg/kg | < 0.1 | < 0.1 |
| 1,2,4-Trichlorobenzene | DETSC 3433 | 0.1 | mg/kg | < 0.1 | < 0.1 |
| 4-Chloro-3-methylphenol | DETSC 3433 | 0.1 | mg/kg | < 0.1 | < 0.1 |
| 2-Methylnaphthalene | DETSC 3433 | 0.1 | mg/kg | 0.8 | < 0.1 |
| Hexachlorocyclopentadiene | DETSC 3433* | 0.1 | mg/kg | < 0.1 | < 0.1 |
| 2,4,6-Trichlorophenol | DETSC 3433 | 0.1 | mg/kg | < 0.1 | < 0.1 |
| 2,4,5-Trichlorophenol | DETSC 3433* | 0.1 | mg/kg | < 0.1 | < 0.1 |
| 2-Chloronaphthalene | DETSC 3433 | 0.1 | mg/kg | < 0.1 | < 0.1 |
| 2-Nitroaniline | DETSC 3433* | 0.1 | mg/kg | < 0.1 | < 0.1 |
| 2,4-Dinitrotoluene | DETSC 3433* | 0.1 | mg/kg | < 0.1 | < 0.1 |
| 3-Nitroaniline | DETSC 3433* | 0.1 | mg/kg | < 0.1 | < 0.1 |
| 4-Nitrophenol | DETSC 3433* | 0.1 | mg/kg | < 0.1 | < 0.1 |
| Dibenzofuran | DETSC 3433 | 0.1 | mg/kg | 1.4 | < 0.1 |
| 2,6-Dinitrotoluene | DETSC 3433 | 0.1 | mg/kg | < 0.1 | < 0.1 |
| 2,3,4,6-Tetrachlorophenol | DETSC 3433* | 0.1 | mg/kg | < 0.1 | < 0.1 |
| Diethylphthalate | DETSC 3433 | 0.1 | mg/kg | < 0.1 | < 0.1 |
| 4-Chlorophenylphenylether | DETSC 3433* | 0.1 | mg/kg | < 0.1 | < 0.1 |
| 4-Nitroaniline | DETSC 3433* | 0.1 | mg/kg | < 0.1 | < 0.1 |
| 2-Methyl-4,6-Dinitrophenol | DETSC 3433* | 0.1 | mg/kg | < 0.1 | < 0.1 |
| Diphenylamine | DETSC 3433 | 0.1 | mg/kg | < 0.1 | < 0.1 |
| 4-Bromophenylphenylether | DETSC 3433 | 0.1 | mg/kg | < 0.1 | < 0.1 |

Summary of Chemical Analysis Soil VOC/SVOC Samples

Our Ref 20-19340

Client Ref PN204140

Contract Title Stockport Bus Station

| | | |
|---------------|------------|------------|
| Lab No | 1737218 | 1737220 |
| Sample ID | HP01 | HP03 |
| Depth | 0.20-0.50 | 0.60-0.80 |
| Other ID | | |
| Sample Type | SOIL | SOIL |
| Sampling Date | 24/09/2020 | 24/09/2020 |
| Sampling Time | n/s | n/s |

| Test | Method | LOD | Units | | |
|----------------------------|-------------|-----|-------|-------|-------|
| Hexachlorobenzene | DETSC 3433 | 0.1 | mg/kg | < 0.1 | < 0.1 |
| Pentachlorophenol | DETSC 3433* | 0.1 | mg/kg | < 0.1 | < 0.1 |
| Di-n-butylphthalate | DETSC 3433 | 0.1 | mg/kg | 0.5 | < 0.1 |
| Butylbenzylphthalate | DETSC 3433* | 0.1 | mg/kg | < 0.1 | < 0.1 |
| Bis(2-ethylhexyl)phthalate | DETSC 3433 | 0.1 | mg/kg | 0.5 | < 0.1 |
| Di-n-octylphthalate | DETSC 3433 | 0.1 | mg/kg | < 0.1 | < 0.1 |
| 1,4-Dinitrobenzene | DETSC 3433* | 0.1 | mg/kg | < 0.1 | < 0.1 |
| Dimethylphthalate | DETSC 3433 | 0.1 | mg/kg | 5.3 | < 0.1 |
| 1,3-Dinitrobenzene | DETSC 3433* | 0.1 | mg/kg | < 0.1 | < 0.1 |
| 1,2-Dinitrobenzene | DETSC 3433* | 0.1 | mg/kg | < 0.1 | < 0.1 |
| 2,3,5,6-Tetrachlorophenol | DETSC 3433* | 0.1 | mg/kg | < 0.1 | < 0.1 |
| Azobenzene | DETSC 3433 | 0.1 | mg/kg | < 0.1 | < 0.1 |
| Carbazole | DETSC 3433* | 0.1 | mg/kg | 1.5 | < 0.1 |

Summary of Asbestos Analysis Soil Samples

Our Ref 20-19340

Client Ref PN204140

Contract Title Stockport Bus Station

| Lab No | Sample ID | Material Type | Result | Comment* | Analyst |
|---------|----------------|---------------|--------|----------|---------------|
| 1737218 | HP01 0.20-0.50 | SOIL | NAD | none | Colin Patrick |
| 1737219 | HP03 0.20-0.50 | SOIL | NAD | none | Colin Patrick |
| 1737220 | HP03 0.60-0.80 | SOIL | NAD | none | Colin Patrick |
| 1737221 | HP02 0.20-0.90 | SOIL | NAD | none | Colin Patrick |
| 1737222 | HP05 0.25-0.80 | SOIL | NAD | none | Colin Patrick |

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

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Information in Support of the Analytical Results

Our Ref 20-19340

Client Ref PN204140

Contract Stockport Bus Station

Containers Received & Deviating Samples

| Lab No | Sample ID | Date | | Holding time exceeded for tests | Inappropriate container for tests |
|---------|---------------------|----------|----------------------|--|-----------------------------------|
| | | Sampled | Containers Received | | |
| 1737218 | HP01 0.20-0.50 SOIL | 24/09/20 | GJ 250ml, GJ 60ml x2 | pH + Conductivity (7 days), VOC (7 days) | |
| 1737219 | HP03 0.20-0.50 SOIL | 24/09/20 | GJ 250ml, GJ 60ml x2 | pH + Conductivity (7 days) | |
| 1737220 | HP03 0.60-0.80 SOIL | 24/09/20 | GJ 250ml, GJ 60ml x2 | pH + Conductivity (7 days), VOC (7 days) | |
| 1737221 | HP02 0.20-0.90 SOIL | 25/09/20 | GJ 250ml x2, GJ 60ml | | |
| 1737222 | HP05 0.25-0.80 SOIL | 25/09/20 | GJ 250ml x2, GJ 60ml | | |

Key: G-Glass J-Jar

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

Soil Analysis Notes

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

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

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

Disposal

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

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

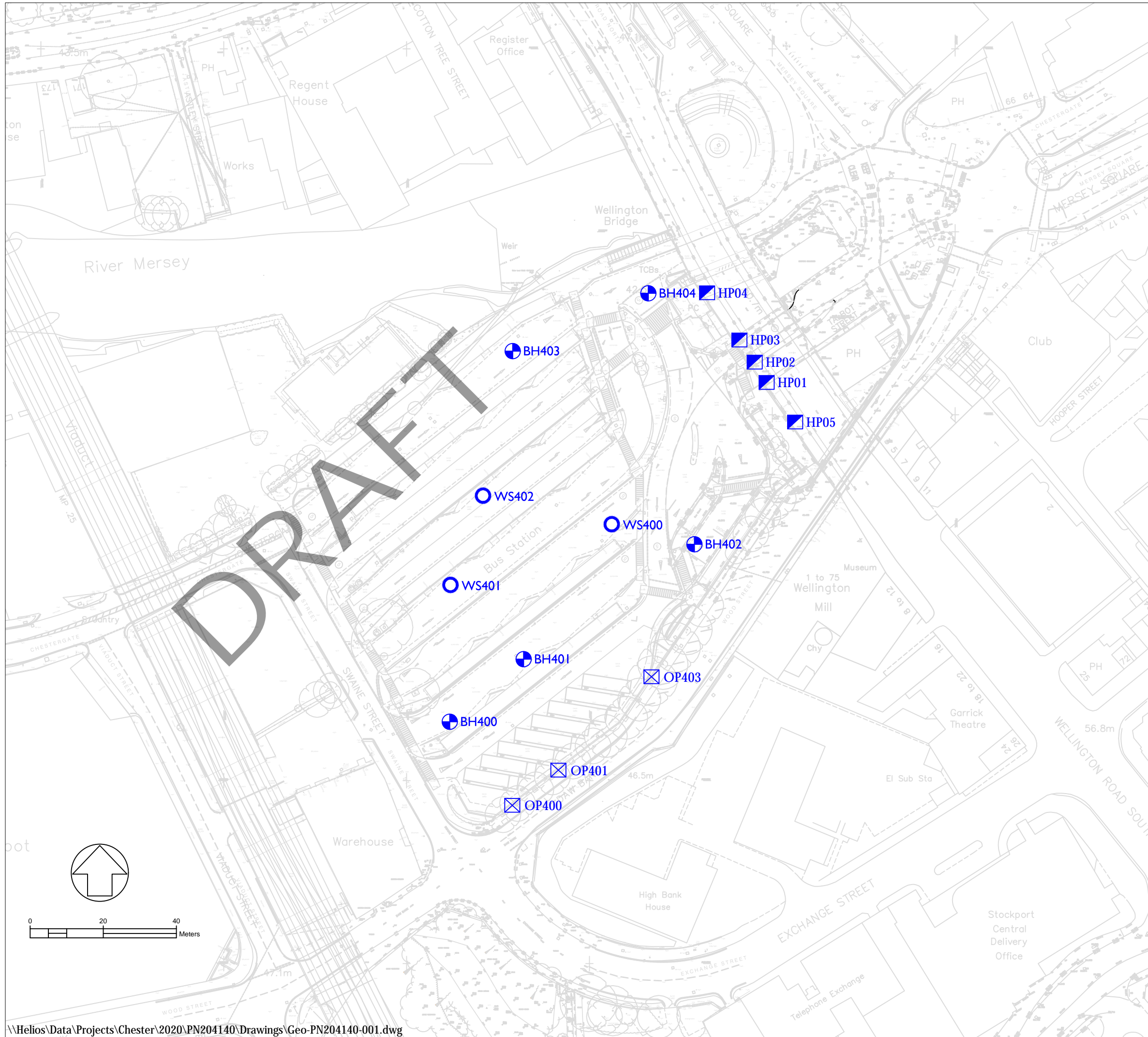
End of Report

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APPENDIX 13

Laboratory Test Results - Contamination (Groundwater)

APPENDIX 14
Exploratory Hole Location Plan



Key

-  Borehole
-  Dynamic Sample Borehole
-  Hand Dug Trial Pit
-  Machine Dug Trial Pit

| Bore ID | Griding (mE) | Northing (mN) | Level (mOD) |
|---------|--------------|---------------|-------------|
| BH400 | 990211.00 | 990309.00 | 44.40 |
| BH401 | 990322.00 | 990301.00 | 44.30 |
| BH402 | 990278.00 | 990214.00 | 44.04 |
| BH403 | 990229.00 | 990357.00 | 42.52 |
| BH404 | 990206.00 | 990393.00 | 42.50 |
| WS400 | 990204.00 | 990275.00 | 43.20 |
| WS401 | 990222.00 | 990303.00 | 42.80 |
| WS402 | 990200.00 | 990377.00 | 42.89 |
| HP001 | 990209.00 | 990344.00 | - |
| HP002 | 990411.00 | 990352.00 | - |
| HP003 | 990209.00 | 990378.00 | - |
| HP004 | 990209.00 | 990378.00 | - |
| HP005 | 990209.00 | 990378.00 | - |
| HP006 | 990209.00 | 990378.00 | - |
| HP007 | 990209.00 | 990378.00 | - |
| HP008 | 990209.00 | 990378.00 | - |
| HP009 | 990209.00 | 990378.00 | - |
| HP010 | 990209.00 | 990378.00 | - |
| HP011 | 990209.00 | 990378.00 | - |
| HP012 | 990209.00 | 990378.00 | - |
| HP013 | 990209.00 | 990378.00 | - |
| HP014 | 990209.00 | 990378.00 | - |
| HP015 | 990209.00 | 990378.00 | - |



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 www.geotechnics.co.uk

Client:
 Willmott Dixon Construction Limited

Project:
 Stockport Interchange - Supplementary
 Ground Investigation

Drawing Title:
 Exploratory Hole Location Plan

Scale: 1:1000@ A3

Date:
 November 2020

Project No:
 PN204140

File Name:
 Geo-PN204140-001(1)

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APPENDIX 15

Investigation Techniques and General Notes

INTRODUCTION

The following brief review of Ground Investigation techniques, generally used as part of most Site Investigations in the UK, summarises their methodology, advantages and limitations. Detailed descriptions of the techniques are available and can be provided on request. This review should be read in conjunction with the accompanying General Notes.

TRIAL PITS

The trial pit is amongst the simplest yet most effective means of identifying shallow ground conditions on a site. Its advantages include simplicity, speed, potential accuracy and cost-effectiveness. The trial pit is most commonly formed using a back-acting excavator which can typically determine ground conditions to some 4 metres below ground level. Hand excavation is often used to locate, expose and detail existing foundations, features or services. In general, it is difficult to extend pits significantly below the water table in predominantly granular soils, where flows can cause instability. Unless otherwise stated, the trial pits will not have been provided with temporary side support during their construction. Under such circumstances, entrance into the pit is not permitted and hence observations will have been made from the ground surface and samples taken from the excavator bucket.

Where access for personnel is required to allow close observation of the exposed strata, the taking of samples and the carrying out of in situ tests, the sides of the trial pits (Observation Pits in BS 5930:2015) will be made safe using temporary supports or the sides battered back to a stable angle. Some limited access to such Trial Pits (Observation Pits) at depths less than 1m may be allowed in stable conditions or where the sides are benched or battered back to a safe angle.

Trends in strata type, level and thickness can be determined, shear surfaces identified and the behaviour of plant, excavation sides and excavated materials can be related to the construction process. They are particularly valuable in land slip investigations. Some types of in situ test can be undertaken in such pits and large disturbed or block samples obtained.

CABLE PERCUSSION BORING

The light Cable Percussion technique of soft ground boring, typically at a diameter of 150mm, is a well-established simple and flexible method of boring vertical holes and generally allows data to be obtained in respect of strata conditions other than rock. A tubular cutter (for cohesive soils) or shell with a flap valve (for granular soils) is repeatedly lifted and dropped using a winch and rope operating from an "A" frame. Soil which enters these tools is regularly removed and either sampled for subsequent examination or test, or laid to one side for later removal off site and licensed disposal or, if permitted by the Client, use as backfill. Steel casing will have been used to prevent collapse of the borehole sides where necessary. A degree of disturbance of soil and mixing of layers is inevitable and the presence of very thin layers of different soils within a particular stratum may not be identified. Changes in strata type can only be detected on recognition of a change in soil samples at the surface, after the interface has been passed. For the foregoing reasons, depth measurements should not be considered to be more accurate than 0.10 metre. The technique can determine ground conditions to depths in excess of 30 metres under suitable circumstances and usually causes less surface disturbance than trial pitting.

In cohesive soils cylindrical samples are retrieved by driving or pushing in 100mm nominal diameter tubes. In soft soils, piston sampling or vane testing may be undertaken. In granular soils and often in cohesive materials, in situ Standard Penetration Tests (SPT's) are performed. The SPT records the number of standard blows required to drive a 50mm diameter open or cone ended probe for 300mm after an initial 150mm penetration. A modified method of recording is used in denser strata. Small disturbed samples are obtained throughout.

ROTARY DRILLING

Rotary Drilling to produce cores by rotating an annular diamond-impregnated tube or barrel into the ground is the technique most appropriate to the forming of site investigation boreholes through rock or other hard strata. It has the advantage of being able to be used vertically or at an angle. Core diameters of less than 100mm are most common for site investigation purposes. Core is normally retrieved in plastic lining tubes. A flushing fluid such as air, water or foam is used to cool the bit and carry cuttings to the surface. Depths in excess of 60 metres can be achieved under suitable circumstances using rotary techniques, with minimal surface disturbance.

Examination of cores allows detailed rock description and generally enables angled discontinuity surfaces to be observed. However, vertical holes do not necessarily reveal the presence of vertical or near-vertical fissures or joint discontinuities. The core type and/or techniques used will depend on the ground conditions. Where open hole rotary drilling is employed, descriptions of strata result from examination at the surface of small particles ejected from the borehole in the flushing medium. In consequence, no indication of fissuring, bedding, consistency or degree of weathering can be obtained.

DYNAMIC SAMPLING

This technique involves the driving of an open-ended tube into the ground and retrieval of the soil which enters the tube. It was previously called window or windowless sampling. The term "window sample" arose from the original device which had a "window" or slot cut into the side of the tube through which samples were taken. This was superseded by the use of a thin-walled plastic liner to retrieve the soil sample from within a sampler (windowless sampling) which has a solid wall. Line diameters range from 36 to 86mm. Such samples can be used for qualitative logging, selection of samples for classification and chemical analysis and for obtaining a rudimentary assessment of strength.

Driving devices can be hand-held or machine mounted and the drive tubes are typically in 1m lengths. Depending on the type of rig used, the hole formed can be cased to prevent collapse of the borehole sides. Where the type of rig does not allow the insertion of casing, the success of this technique can be limited when soils and groundwater conditions are such that the sides of the hole collapse on withdrawal of the sampler. Obstructions within the ground, the density of the material or its strength can also limit the depth and rate of penetration of this light-weight investigation technique. Nevertheless, it is a valuable tool where access is constrained such as within buildings or on embankments. Depths of up to 10m can be achieved in suitable circumstances depending on the rig type but depths of 5m to 6m are more common.

EXPLORATORY HOLE RECORDS

The data obtained by these techniques are generally presented on Trial Pit, Borehole, Drillhole or Dynamic Sample Records. The descriptions of strata result from information gathered from a number of sources which may include published geological data, preliminary field observations and descriptions, in situ test results, laboratory test results and specimen descriptions. A key to the symbols and abbreviations used accompanies the records. The descriptions on the exploratory hole records accommodate but may not necessarily be identical to those on any preliminary records or the laboratory summaries.

The records show ground conditions at the exploratory hole locations. The degree to which they can be used to represent conditions between or beyond such holes, however, is a matter for geological interpretation rather than factual reporting and the associated uncertainties must be recognised.

DYNAMIC PROBING

This technique typically measures the number of blows of a standard weight falling over a standard height to advance a cone-ended rod over sequential standard distances (typically 100mm). Some devices measure the penetration of the probe per standard blow. It is essentially a profiling tool and is best used in conjunction with other investigation techniques where site-specific correlation can be used to delineate the distribution of soft or loose soils or the upper horizon of a dense or strong layer such as rock.

Both machine-driven and hand-driven equipment is available, the selection depending upon access restrictions and the depth of penetration required. It is particularly useful where access for larger equipment is not available, disturbance is to be minimised or where there are cost constraints. No samples are recovered and some techniques leave a sacrificial cone head in the ground. As with other lightweight techniques, progress is limited in strong or dense soils. The results are presented both numerically and graphically. Depths of up to 10m are commonly achieved in suitable circumstances.

The hand-driven DCP probing device has been calibrated by the Highways Agency to provide a profile of CBR values over a range of depths.

INSTRUMENTATION

The most common form of instrument used in site investigation is either the standpipe or else the standpipe piezometer which can be installed in investigation holes. They are used to facilitate monitoring of groundwater levels and water sampling over a period of time following site work. Normally a standpipe would be formed using rigid plastic tubing which has been perforated or slotted over much of its length whilst a standpipe piezometer would have a filter tip which would be placed at a selected level and the hole sealed above and sometimes below to isolate the zone of interest. Groundwater levels are determined using an electronic "dip meter" to measure the depth to the water surface from ground level. Piezometers can also be used to measure permeability. They are simple and inexpensive instruments for long term monitoring but response times can limit their use in tidal areas and access to the ground surface at each instrument is necessary. Remote reading requires more sophisticated hydraulic, electronic or pneumatic equipment.

Settlement can be monitored using surface or buried target plates whilst lateral movement over a range of depths is monitored using slip indicator or inclinometer equipment.

1. The report is prepared for the exclusive use of the Client named in the document and copyright subsists with Geotechnics Limited. Prior written permission must be obtained to reproduce all or part of the report. It is prepared on the understanding that its contents are only disclosed to parties directly involved in the current investigation, preparation and development of the site.
2. Further copies may be obtained with the Client's written permission, from Geotechnics Limited with whom the master copy of the document will be retained.
3. The report and/or opinion is prepared for the specific purpose stated in the document and in relation to the nature and extent of proposals made available to Geotechnics Limited at that time. Re-consideration will be necessary should those details change. The recommendations should not be used for other schemes on or adjacent to the site without further reference to Geotechnics Limited.
4. The assessment of the significance of the factual data, where called for, is provided to assist the Client and their Engineer and/or Advisers in the preparation of their designs.
5. The report is based on the ground conditions encountered in the exploratory holes together with the results of field and laboratory testing in the context of the proposed development. The data from any commissioned desk study and site reconnaissance are also drawn upon. There may be special conditions appertaining to the site, however, which are not revealed by the investigation and which may not be taken into account in the report.
6. Methods of construction and/or design other than those proposed by the designers or referred to in the report may require consideration during the evolution of the proposals and further assessment of the geotechnical and any geoenvironmental data would be required to provide discussion and evaluations appropriate to these methods.
7. The accuracy of results reported depends upon the technique of measurement, investigation and test used and these values should not be regarded necessarily as characteristics of the strata as a whole (see accompanying notes on Investigation Techniques). Where such measurements are critical, the technique of investigation will need to be reviewed and supplementary investigation undertaken in accordance with the advice of the Company where necessary.
8. The samples selected for laboratory test are prepared and tested in accordance with the relevant Clauses and Parts of BS EN ISO 17892 and BS 1377 Parts 1 to 8, where appropriate, in Geotechnics Limited's UKAS accredited Laboratory, where possible. A list of tests is given.
9. Tests requiring the use of another laboratory having UKAS accreditation where possible are identified.
10. Any unavoidable variations from specified procedures are identified in the report.
11. Specimens are cut vertically, where this is relevant and can be identified, unless otherwise stated
12. All the data required by the test procedures are recorded on individual test sheets but the results in the report are presented in summary form to aid understanding and assimilation for design purposes. Where all details are required, these can be made available.
13. Whilst the report may express an opinion on possible configurations of strata between or beyond exploratory holes, or on the possible presence of features based on either visual, verbal, written, cartographical, photographic or published evidence, this is for guidance only and no liability can be accepted for its accuracy.
14. The Code of Practice for Ground Investigations – BS 5930:2015 calls for man-made soils to be described as Anthropogenic Ground with soils placed in an un-controlled manner classified as Made Ground and soils placed in a controlled manner as Fill. In view of the difficulty in always accurately determining the origin of man-made soils in exploratory holes, Geotechnics Limited classify such materials as Made Ground. Where soils can be clearly identified as being placed in a controlled manner then further classification of the soils as Fill has been added to the Exploratory Hole Records.
15. Classification of man-made soils is based on the inspection of retrieved samples or exposed excavations. Where it is obvious that foreign matter such as paper, plastic or metal is present, classification is clear. Frequently, however, for man-made soils that arise from the adjacent ground or from the backfilling of excavations, their visual characteristics can closely resemble those of undisturbed ground. Other evidence such as site history, exploratory hole location or other tests may need to be drawn upon to provide clarification. For these reasons, classification of soils on the exploratory hole records as either Made Ground or naturally occurring strata, the boundary between them and any interpretation that this gives rise to should be regarded as provisional and subject to re-evaluation in the light of further data.
16. The classification of materials as Topsoil is generally based on visual description and should not be interpreted to mean that the material so described complies with the criteria for Topsoil used in BS 3882:2015. Specific testing would be necessary where such a definition is a requirement.
17. Ground conditions should be monitored during the construction of the works and the report should be re-evaluated in the light of these data by the supervising geotechnical engineers.
18. Any comments on groundwater conditions are based on observations made at the time of the investigation, unless specifically stated otherwise. It should be noted, however, that the observations are subject to the method and speed of boring, drilling or excavation and that groundwater levels will vary due to seasonal or other effects.
19. Any bearing capacities for conventional spread foundations which are given in the report and interpreted from the investigation are for bases at a minimum depth of 1m below finished ground level in naturally occurring strata and at broadly similar levels throughout individual structures, unless otherwise stated. Typically they are based on serviceability criteria taking account of an assessment of the shear strength and/or density data obtained by the investigation. The foundations should be designed in accordance with the good practice embodied in BS 8004:2015 - Foundations, supplemented for housing by NHBC Standards. Foundation design is an iterative process and bearing pressures may need adjustment or other measures may need to be taken in the context of final layouts and levels prior to finalisation of proposals.
20. Unless specifically stated, the investigation does not take account of the possible effects of mineral extraction or of gases from fill or natural sources within, below or outside the site.
21. The costs or economic viability of the proposals referred to in the report, or of the solutions put forward to any problems encountered, will depend on very many factors in addition to geotechnical or geoenvironmental considerations and hence their evaluation is outside the scope of the report.