

GROUND INVESTIGATION REPORT

Proposed Footbridge

Havant Railway Station, Havant

Prepared for: Hampshire County Council

Date: November 2024

Report No: TF-24-356



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Site Location : **Havant Railway Station, Havant**

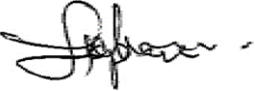
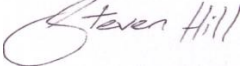
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00	21/11/2024	Draft Issue	MB	Jl	SH
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02	19/08/2025	FINAL Issue	PG	PG	

EXECUTIVE SUMMARY

Proposals	Hampshire County Council is proposing the construction of a new infrastructure development within land at Havant Railway Station, Havant. The proposed development will consist of a new footbridge replacement and associated infrastructure.																																	
Geology	<p>The 1:50,000-scale Geological Map of the area shows the site to be underlain by the London Clay to the north and south of the site, and the Bognor Sand Member along the central areas from east to west.</p> <p>The BGS described the London Clay Formation of the Ypresian Age as mainly comprised of bioturbated or poorly laminated, blue-grey or grey-brown, slightly calcareous, silty to very silty clay, clayey silt and sometimes silt, with some layers of sandy clay. While the Bognor Sand Member of the Eocene Epoch Age is described as glauconitic bioturbated or cross-bedded fine- and medium-grained sands, partially cemented.</p> <p>Superficial deposits in the form of River Terrace Deposits and Head Deposits are shown to overlie the bedrock geology to the west and east of the site respectively.</p> <p>The River Terrace deposits typically comprises sand and gravel, locally with lenses of silt, clay or peat. While the Head Deposits typically comprises poorly sorted and poorly stratified, angular rock debris and/or clayey hillwash and soil creep, mantling a hillslope and deposited by solifluction and gelifluction processes.</p>																																	
Field Investigation	<p>The site works were scoped by Hampshire County Council and comprised the following:</p> <p>2no. cable percussive boreholes (BH01 and BH02), and 5no. mini percussive boreholes (WS01-WS05), and</p> <p>The site works were carried out at the site from the 30th of September to the 4th of October 2024.</p> <p>Additional site works were undertaken on the 27th and 28th January 2025, which include the following:</p> <ul style="list-style-type: none">3no. hand excavated service inspection pits (IP01-IP03) <table><tr><td>0.00</td><td>0.30 / 0.80</td><td>0.30</td><td>0.80</td><td>Concrete over/or Dark brown slightly gravelly sandy CLAY</td><td colspan="2">Made Ground</td></tr><tr><td>0.30/ 0.50</td><td>2.00 / 2.30</td><td>1.50</td><td>2.00</td><td>Medium dense light brown slightly silty / clayey GRAVEL</td><td>Head (South of Railway)</td><td rowspan="3">Superficial</td></tr><tr><td>0.30/ 0.80</td><td>3.00 / 4.00</td><td>2.20</td><td>3.70</td><td>Very stiff light/dark brown slightly silty / sandy gravelly CLAY with occasional cobbles Light brown slightly gravelly clayey SAND Dark brown clayey GRAVEL</td><td>River Terrace Deposits</td></tr><tr><td>3.50</td><td>>10.0</td><td colspan="2">Unproven</td><td>Very dense orangish brown becoming dark grey, slightly clayey to slightly silty SAND</td><td>Bognor Sand Member (North of Railway)</td><td rowspan="2">Bedrock</td></tr><tr><td>2.00/ 4.00</td><td>>10.0</td><td colspan="2">Unproven</td><td>Stiff / very stiff light grey silty (sandy) CLAY</td><td>London Clay Formation (South of Railway)</td></tr></table> <p>In addition, the service inspection pits (IP0-IP03) terminated within the Made Ground, which was encountered to depths of between 1.33m and 1.70m bgl.</p> <p>During site works, groundwater was encountered within BH01 at a depth of 2.50m and BH02 at a depth of 3.10m, although depths of up to around 2.00m were inferred due to localised softening.</p>	0.00	0.30 / 0.80	0.30	0.80	Concrete over/or Dark brown slightly gravelly sandy CLAY	Made Ground		0.30/ 0.50	2.00 / 2.30	1.50	2.00	Medium dense light brown slightly silty / clayey GRAVEL	Head (South of Railway)	Superficial	0.30/ 0.80	3.00 / 4.00	2.20	3.70	Very stiff light/dark brown slightly silty / sandy gravelly CLAY with occasional cobbles Light brown slightly gravelly clayey SAND Dark brown clayey GRAVEL	River Terrace Deposits	3.50	>10.0	Unproven		Very dense orangish brown becoming dark grey, slightly clayey to slightly silty SAND	Bognor Sand Member (North of Railway)	Bedrock	2.00/ 4.00	>10.0	Unproven		Stiff / very stiff light grey silty (sandy) CLAY	London Clay Formation (South of Railway)
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Chemical Evaluation		None of the contaminants tested were above the SGV for their respective zone screening criteria, and therefore no contaminants of concern have been identified. Error! Reference source not found.
Engineering Recommendations	Footbridge Foundation Solution	<p>Abutment/Pad foundations should be extended into the underlying Superficial Deposits comprising either the River Terrace or Head Deposits at an embedded minimum founding depth of 1.00m with a presumed bearing resistance of 100kN/m² used for shallow foundation design purposes across the site.</p> <p>Depending on final proposals the above site wide shallow solution can be refined if necessary. Allowances should also be made due to the proximity of near-by trees where deepening may be required due to the effect of shrink-swell and desiccation.</p> <p>Pile foundations can alternatively be adopted. A specialist piling contractor would need to be consulted to confirm access and capabilities of working close to the existing railway line. However, it should be noted that deep ground conditions vary considerably either side of the railway with the London Clay Formation to the south being more conservative.</p>
	Buried Concrete	Based on the above and using guidance within BRE Special Digest 1 (2005) it is recommended that any buried concrete within the Superficial Deposits (Head and River Terrace Deposits) conform to class DS-1 and ACEC Class AC-1. While buried concrete within the Bognor Sand Member and London Clay should conform to class DS-2 and ACEC Class AC-2, and DS-4 and ACEC Class AC-4 respectively.

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Annex B: Chemical Test Results

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Drawing 2.1: Site Location Plan

Drawing 3.1: Exploratory Hole Location Plan

Drawing 3.2: SPT vs Depth

SECTION 1 Introduction and Proposed Development

Hampshire County Council is proposing the construction of a new infrastructure development within land at Havant Railway Station, Havant. The proposed development will consist of a new footbridge replacement and associated infrastructure.

Hampshire County Council are the Consulting Engineers for the proposed development.

Terra Firma have been commissioned as Geotechnical and Geo-Environmental Engineers to carry out a Ground Investigation of the site.

The main objectives of the ground investigation were to:

- Determine the type, strength and bearing characteristics of the near surface soils and underlying bedrock geology.
- Provide recommendations for a suitable and economic foundation/floor slab solution for the development.
- Provide recommendations regarding any other geo-technical aspects pertaining to the development.
- Collect representative samples for laboratory testing, and provide an evaluation of the results.

The Ground Investigation has been undertaken in accordance with the following advisory guidance:

- Code of Practice for Site Investigations - (BS 5930): 2015 + A1:2020
- Investigation of Potentially Contaminated Sites - CoP (BS 10175): 2011 + A2:2017
- Methods of test for soils for civil engineering purposes - In-situ tests (BS 1377-9):1999

In order to achieve the above objectives, Terra Firma carried out an assessment programme including a review of existing data, followed by a field investigation to determine the prevailing ground conditions and also to collect and analyse soil samples from selected locations around the site.

The scope of the works including the schedule for in-situ and laboratory testing was determined by Hampshire County Council.

A comprehensive desk study, other than an inspection of geological maps, has not been requested or undertaken as part of this investigation. Nor has a preliminary risk assessment been completed.

1.1 Limitations and Exceptions of Investigation

Hampshire County Council has requested that a Ground Investigation Report (GIR) be performed in order to establish the ground conditions at the site and collect representative samples for laboratory analysis.

The Ground Investigation was conducted and this report has been prepared for the sole internal reliance of Hampshire County Council and their design and construction team. This report shall not be relied upon or transferred to any other parties without the express written authorisation of Terra Firma. If an unauthorised third party comes into possession of this report, they rely on it at their peril and the authors owe them no duty of care and skill.

The report represents the findings and opinions of experienced geo-environmental and geo-technical consultants. Terra Firma does not provide legal advice and the advice of lawyers may also be required.

The subsurface geological profiles, any contamination and other plots are generalised by necessity and have been based on the information found at the locations of the exploratory holes and depths sampled and tested.

The ground investigation was limited by the following site constraints:

- The presence of access/constraint restrictions adjacent to a railway,
- The presence of underground services and utilities, and
- The presence of the existing footbridge structure.

SECTION 2 Site Setting

2.1 Physical Setting

The proposed development is to be located on land surrounding Havant Railway Station, Havant, Hampshire, PO9 2ES.

The site is centred approximately on National Grid Reference (NGR) SU 71703 06628. The site location is presented in **Drawing 2.1** below.



Drawing 2.1: Site Location Plan outlined in red

The site is irregular rectangle in shape with a plan area of approximately 0.3 hectares and sits at approximately 10m above ordnance datum (aod).

The topography of the site is typically flat. The topography of the surrounding area typically slopes towards the South.

The site is bound by residential houses with private gardens and Elmleigh Road Car Park to the north and Havant train station to the south. In addition open space of Havant Park is to the southeast of the site.

2.1.1 Current Use and Site Conditions

A walk-over survey was undertaken on the 21st of August 2024 by a Terra Firma Engineer. The site is accessed via either Mavis Crescent or off Market Road, Havant.

At the time of the walk-over survey the site currently comprises a public park and a public footbridge over Havant Railway Station.

Photographs taken during the walk-over survey are presented in Table 2.1 below:

Table 2.1: Walk-over Survey Photographs**Photo 1:** View of the Northern section of the site accessed off of Mavis Crescent**Photo 2:** View looking East onto Havant Train Station**Photo 3:** Scrubland directly East of the proposed footbridge.**Photo 4:** Location of the Southern end of the Footbridge accessed through Havant Park

2.2 Geological Setting

The 1:50,000-scale Geological Map of the area shows the site to be underlain by the London Clay to the north and south of the site, and the Bognor Sand Member along the central areas from east to west.

The BGS described the London Clay Formation of the Ypresian Age as mainly comprised of bioturbated or poorly laminated, blue-grey or grey-brown, slightly calcareous, silty to very silty clay, clayey silt and sometimes silt, with some layers of sandy clay. While the Bognor Sand Member of the Eocene Epoch Age is described as glauconitic bioturbated or cross-bedded fine- and medium-grained sands, partially cemented.

Superficial deposits in the form of River Terrace Deposits and Head Deposits are shown to overlie the bedrock geology to the west and east of the site respectively.

The River Terrace deposits typically comprises sand and gravel, locally with lenses of silt, clay or peat. While the Head Deposits typically comprises poorly sorted and poorly stratified, angular rock debris and/or clayey hillwash and soil creep, mantling a hillslope and deposited by solifluction and gelifluction processes.

Due to the nature and history of the site being associated with the railway station, the presence of made ground is expected.

2.3 Previous Investigation

There have been no previous investigations at the site made available to the author at the time of writing.

SECTION 3 Field Investigation

3.1 General

The site works were scoped by Hampshire County Council and comprised the following:

- 2no. cable percussive boreholes (BH01 and BH02), and
- 5no. mini percussive boreholes (WS01-WS05), and

The site works were carried out at the site from the 30th of September to the 4th of October 2024.

Additional site works were undertaken on the 27th and 28th January 2025, which include the following:

- 3no. hand excavated service inspection pits (IP01-IP03)

Prior to the site works, the following Health and Safety measures were undertaken:

- Risk Assessment & Method Statement (RAMS) was issued and approved beforehand,
- Underground Utility Plans were obtained from the relevant Statutory Undertakers,
- Site meetings were held with Hampshire County Council and Network Rail to outline the schedule of works and arrange the necessary safety measures to be implemented,
- Safety fencing was used to prevent unauthorised access into the site working area,
- Before any excavation, all exploratory hole locations were scanned using a Cable Avoidance Tool (CAT),
- Before any excavation, all exploratory holes were surveyed using Ground Penetrating Radar (GPR), and
- Before any drilling, a 1.20m deep inspection pit was excavated at each borehole location.

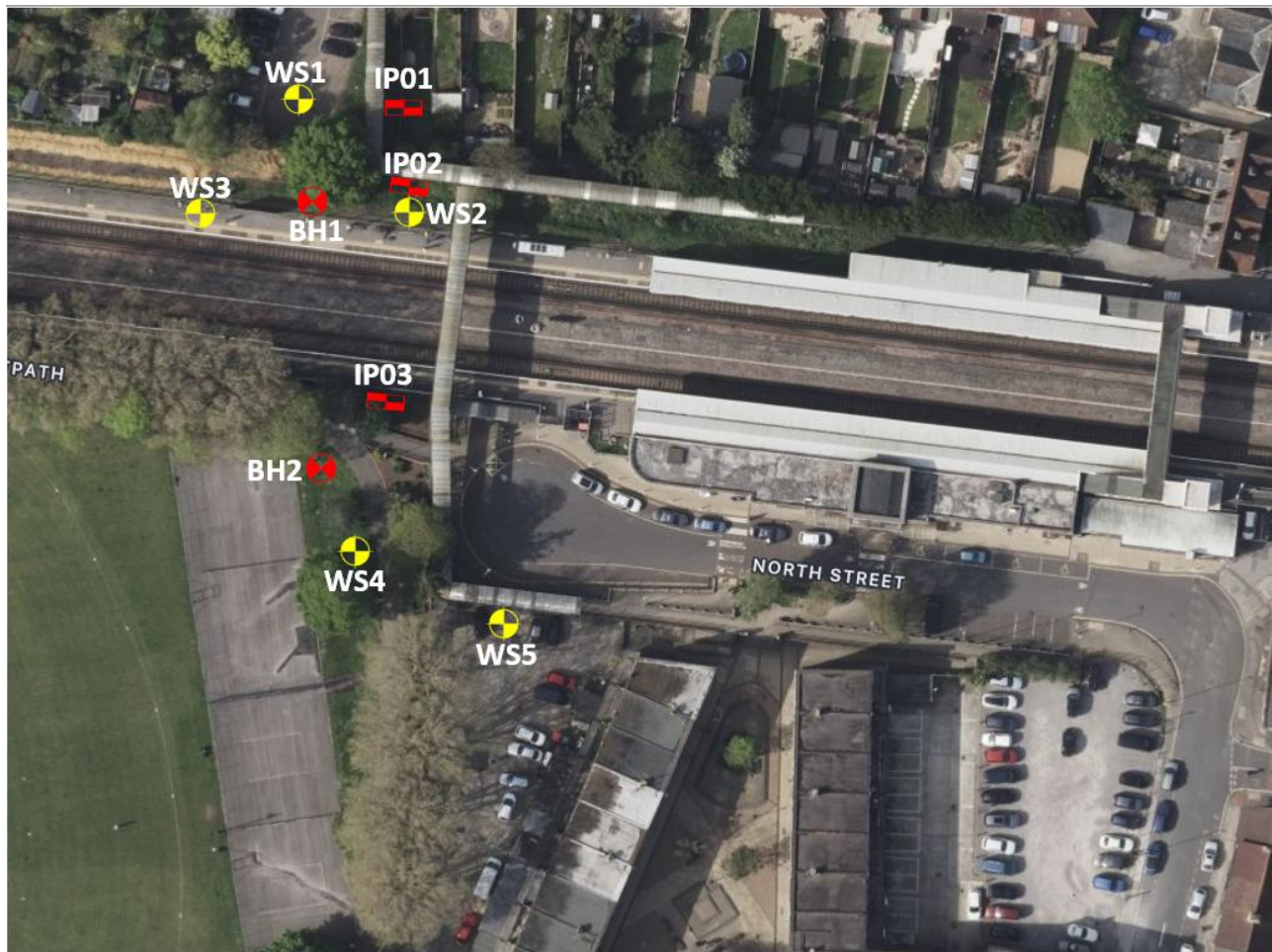
The exploratory holes were set out at locations provided by Hampshire County Council, and adjusted where necessary to take account of the site constraints detailed in Section 1.1.

Most exploratory hole co-ordinates and levels were picked up post-investigation by a qualified surveyor and presented in the table below:

Table 3.1: Exploratory Hole Co-ordinates				
Date of works	Exploratory Hole	Easting	Northing	Height AOD (m)
Initial works: 30th of September to the 4th of October 2024	BH01	471708.5	106623.0	9.923
	BH02	471702.4	106579.8	9.252
	WS01	471707.0	106623.6	9.941
	WS02	471723.9	106621.2	9.858
	WS03	471695.9	106624.7	10.310
	WS04	471706.5	106569.5	9.110
	WS05	471723.5	106562.2	9.254
Additional works: 27th and 28th January 2025	IP01	471714.0	106632.0	
	IP02	471713.0	106619.0	
	IP03	471710.0	106594.0	

The site works were supervised by Terra Firma, who also logged the exploratory holes to the requirements of BS5930:2015 + A1:2020.

The exploratory hole logs are presented in **Annex A**, and their locations shown on **Drawing 3.1** below.



Drawing 3.1: Exploratory Hole Location Plan

3.2 Exploratory Holes

3.2.1 Cable Percussive Boreholes

The cable percussive boreholes (150mm diameter) were sunk using a Dando 2000 tracked drilling rig as described in EN ISO 22475-1:2006.

Standard Penetration Tests using either a split spoon or solid cone (SPT(S/C)) were undertaken at regular depths during the drilling in accordance with BS EN ISO 22476-3. Typically, tests were undertaken at the base of an inspection pit and every metre for the first 5m, and then every 1.5m thereafter, a final test was undertaken at the base of each borehole.

Undisturbed (U100) and disturbed bulk/small soil samples were taken at regular depths during the drilling. Water samples were taken at each water strike.

All boreholes were backfilled using arisings and reinstated using arisings.

During drilling, standing time/day works were incurred due to the following reasons:

- Site Inductions / Briefings (1 Hour)
- Non-standard Set-up (4 Hours)
- Inspection Pits (2 Hours)

- Backfilling Holes / Clear-up (4 Hours)

3.2.2 Mini Percussive Boreholes

The windowless sampling boreholes were bored using an Archway Dart drilling rig.

Due to the presence of surface hard standing a concrete corer attachment or hydraulic breaker was used where necessary to progress drilling.

The windowless boreholes were used to recover soil samples. Standard Penetration Tests using either a split spoon or solid cone (SPT(S/C)) were undertaken at regular depths during the drilling in accordance with BS EN ISO 22476-3. Typically, tests were undertaken at the base of an inspection pit and every metre, a final test was undertaken at the base of each borehole.

All Boreholes were backfilled using arisings and reinstated using arisings except WS05, which was reinstated with Concrete.

3.2.3 Hand Excavated Service Inspection Pits

The hand excavated service inspection pits (IP01-IP03) were sunk using conventional digging tools, limited to a maximum investigated depth of 1.8m and used to obtain depth and location information regarding existing Openreach services, and the encasing concrete slab to inform pile location.

In IP01 the investigation found a line of 6 ducts. However, the historic plans show 18 ducts are possibly present, with the remaining 12 ducts likely located at depths below the 6 ducts encountered at 1.65m bgl. Due to the limited reach of hand digging tools, the pits could not be dug further.

Schematic drawings of these pits are shown in **Annex D**

Following completion of soil logging and photographing, the hand excavated inspection pits were backfilled using arisings and re-compacted as best as practicably possible using hand tools.

3.3 In-situ Testing

3.3.1 Strength Testing

Standard Penetration Tests (SPT)

Across the site two types of Superficial Deposits were encountered;

SPT N Values taken within the *Head Deposits* revealed an average N value of 14 (Range 10 to 17).

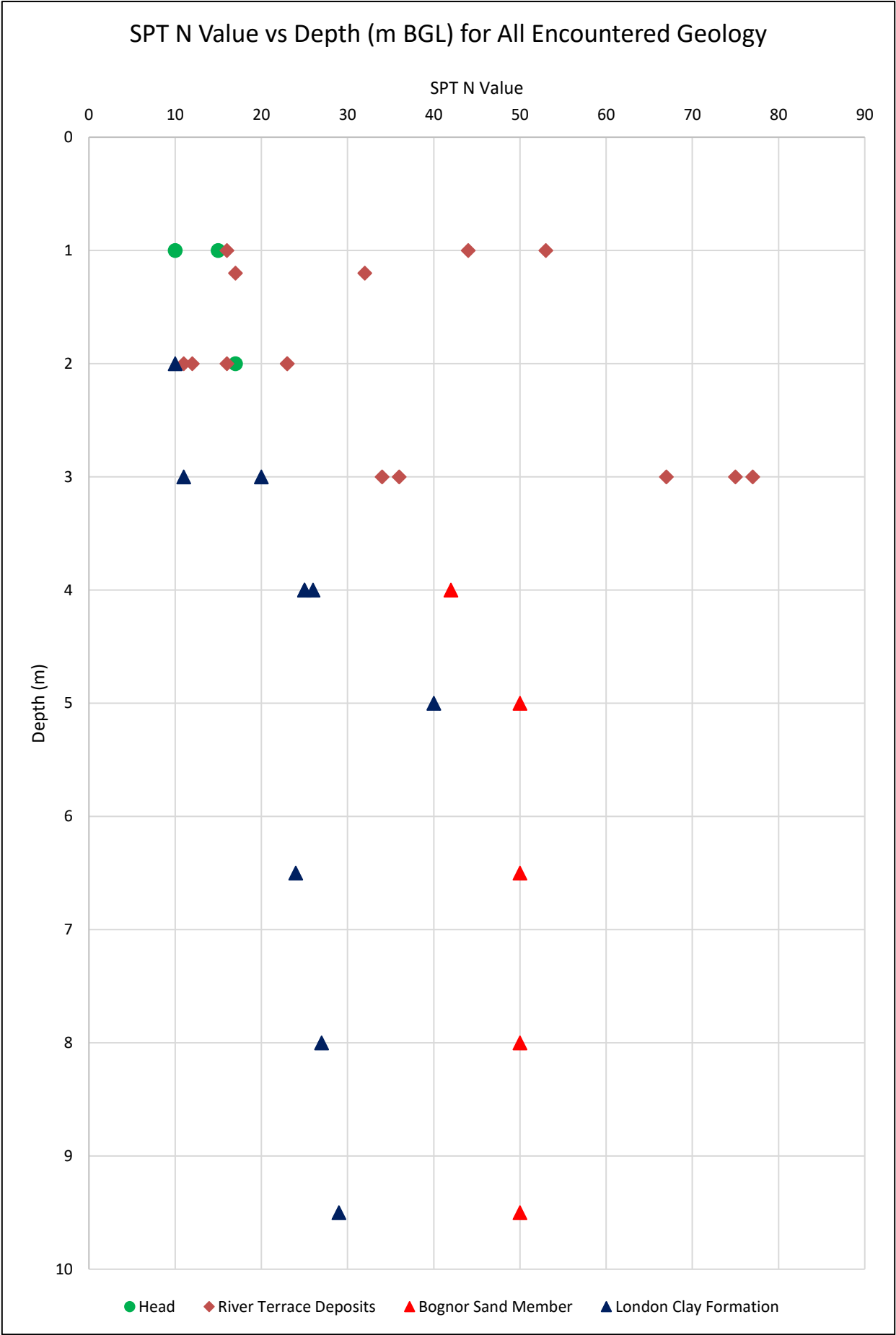
SPT N Values taken within the *River Terrace Deposits* revealed an average N value of 36 (Range 11 to 77).

Across the site two Bedrock strata were encountered;

SPT N Values taken within the *Bognor Sand Member* revealed an average N value of 48 (Range 42 to 50).

SPT N Values taken within the *London Clay Formation* revealed an average N value of 24 (Range 10 to 40).

Drawing 3.2 below presents the distribution of SPT N values against depth (mbgl).



Drawing 3.2: SPT vs Depth

3.4 Sampling

3.4.1 Sampling Quality Assurance

Care was taken to ensure that sampling quality assurance occurred during site works. This included the following measures:

- The use of nitrile gloves at each sampling point.
- Stainless steel shovels were used to collect soil samples. The tool was cleaned with distilled water between each sample point.
- Soil samples were stored at a temperature below 4 degrees.
- Soil samples were stored within sample containers according to the chemical testing required.
- No head space was left in sample containers.

3.4.2 Soil Chemical Test Sampling Regime

During the intrusive investigation small disturbed soil samples were collected for chemical testing.

The sample locations and depths are illustrated in the table below:

Table 3.2: Chemical Test Sample Descriptions		
Sample No./ Depth (m)		Sample Type
BH01	0.10	Made Ground
BH01	0.40	River Terrace Deposits
BH02	0.10	Made Ground
BH02	0.50	River Terrace Deposits
WS01	0.10	Made Ground
WS01	1.00	River Terrace Deposits
WS03	0.10	Made Ground
WS03	1.00	River Terrace Deposits
WS04	0.10	Made Ground
WS04	0.50	Head

3.4.3 Soil Property Test Sampling Regime

During the intrusive investigation bulk soil samples were collected for soil property testing.

The sample locations and depths are illustrated in the following table:

Table 3.3: Soil Property Test Sample Laboratory Descriptions			
Sample No./ Depth (m)		Sample Type	Description
BH01	0.40 - 0.60	RTD	Brown fine to coarse gravelly fine to coarse sandy SILT/CLAY
BH01	0.90 - 1.00	RTD	Brown fine to coarse sandy silty/clayey fine to coarse GRAVEL
BH01	2.00 - 2.45	RTD	Brown fine to coarse sandy fine to coarse gravelly SILT/CLAY (with cobbles)
BH01	3.00 - 3.45	RTD	Brown slightly gravelly silty/clayey fine to coarse SAND
BH01	4.00 - 4.45	BOSA	Brown silty/clayey fine to coarse gravelly fine to coarse SAND

BH01	6.50 - 6.95	BOSA	Brown silty/clayey fine to coarse SAND
BH01	9.50 - 9.95	BOSA	Brown grey silty/clayey fine to coarse SAND
BH02	0.50 - 0.90	RTD	Brown fine to coarse sandy fine to coarse gravelly SILT/CLAY
BH02	1.20 - 1.65	RTD	Brown silty/clayey fine to coarse sandy fine to coarse GRAVEL
BH02	2.00 - 2.45	RTD	Brown slightly gravelly silty/clayey fine to coarse SAND
BH02	3.00 - 3.45	RTD	Brown fine to coarse sandy SILT/CLAY
BH02	5.00 - 5.45	LC	Brown fine to coarse sandy fine to coarse gravelly SILT/CLAY
BH02	8.00 - 8.45	LC	Grey fine to coarse sandy SILT/CLAY
WS01	1.10 - 1.60	RTD	Brown fine to coarse sandy silty/clayey fine to coarse GRAVEL
WS02	1.30 - 1.80	RTD	Brown slightly gravelly clayey/silty fine to coarse SAND
WS03	1.30 - 1.80	RTD	Grey fine to coarse GRAVEL (Flint)
WS04	2.50 - 3.00	LC	Brown slightly fine to medium gravelly silty/clayey fine to coarse SAND
WS04	3.00 - 4.00	LC	Brown slightly gravelly fine to coarse sandy SILT/CLAY
WS05	1.10 - 1.40	HD	Brown silty/clayey fine to coarse sandy fine to coarse GRAVEL
WS05	2.20 - 2.70	LC	Grey fine to coarse sandy SILT/CLAY
WS05	3.20 - 3.70	LC	Grey fine to coarse sandy SILT/CLAY

Notes

- Sample Type: HD (Head), RTDU (River Terrace Deposits), BOSA (Bognor Sand Member), LC (London Clay Formation)

SECTION 4 Ground Conditions

4.1 Summary

The ground conditions encountered by the exploratory holes were variable across the site and but can in general be summarised as shown in the following table:

Table 4.1: Summary of Ground Conditions						
Depth (mbgl)		Thickness (m)		Stratum		
From	To	Min	Max			
0.00	0.30 / 0.80	0.30	0.80	Concrete over/ Dark brown slightly gravelly sandy CLAY And/or Light brown slightly gravelly SAND And/or Light grey/dark brown slightly sandy (clayey) GRAVEL	Made Ground (encountered to depths of 1.33/1.70m within service inspection pits)	
0.30 / 0.50	2.00 / 2.30	1.50	2.00	Medium dense light brown slightly silty / clayey GRAVEL	Head (Present within WS04 and WS05)	Superficial Deposits
0.30 / 0.80	3.00 / 4.00	2.20	3.70	Very stiff light/dark brown slightly silty / sandy gravelly CLAY with occasional cobbles and/ or Light brown slightly gravelly clayey SAND and/ or Dark brown clayey GRAVEL	River Terrace Deposits (Present within BH01, BH02, WS01, WS02 and WS03)	
3.50	>10.00	Unproven		Very dense orangish brown becoming dark grey, slightly clayey to slightly silty SAND	Bognor Sand Member (Present along the northern section of the site as recorded in BH01)	Bedrock Geology
2.00 / 4.00	>10.00	Unproven		Stiff / very stiff light grey silty (sandy) CLAY	London Clay Formation (Present along the southern section of the site as recorded in BH02, WS04 and WS05)	

4.2 Stability

The sides of the excavations were typically found to be unstable.

Due to the hole instability casing was needed to advance BH01 to a depth of 9.40m. While in BH2, casing was needed to advance the hole to a depth of 5.00m.

4.3 Strata Details

4.3.1 Made Ground

The Made Ground was encountered within all exploratory hole from ground level to a base depth of between 0.30m and 0.80m bgl within the cable percussive and window sample holes.

The service inspection pits (IP0-IP03) terminated within the Made Ground, which was encountered to depths of between 1.33m and 1.70m bgl.

The Made Ground is variable in composition but generally comprised of:

- Dark brown slightly gravelly sandy CLAY.
- Light brown slightly gravelly SAND
- Light grey/dark brown slightly sandy (clayey) GRAVEL

A concrete hand standing was recorded between ground level and 0.20m bgl in WS05.

4.3.2 Superficial - Head Deposits

Superficial deposits in the form of Head were encountered underlying the Made Ground only within WS04 and WS05 located south of the railway and was absent within all other exploratory holes.

The Head deposits were encountered from a top depth of between 0.30m and 0.50m bgl to a base depth of 2.30m bgl and 2.00m bgl in WS04 and WS05 respectively, where the stratum was fully penetrated.

The Head generally comprised of medium dense light brown slightly silty / clayey GRAVEL.

4.3.3 Superficial - River Terrace Deposits

Superficial deposits in the form of River Terrace Deposits were encountered underlying the Made Ground only within BH01, BH02, WS01, WS02 and WS03 but was typically absent within WS04 and WS05 where Head deposits were encountered.

The River Terrace Deposits were encountered from a top depth of between 0.30m and 0.80m bgl to a base depth of between 3.00m bgl and 4.00m bgl.

The River Terrace Deposits generally comprised of:

- Very stiff light/dark brown slightly silty / sandy gravelly CLAY, with occasional cobbles, and/ or
- Light brown slightly gravelly clayey SAND, and/ or
- Dark brown clayey GRAVEL.

4.3.4 Bedrock - Bognor Sand Member

The Bedrock Bognor Sand Member was only encountered within BH01 and was typically absent within all other exploratory holes.

BH01 is located to the north of the site (north of the railway line) and correlates with areas where the Bognor Sand Member is shown to be present according to the BGS online geology viewer.

The Bognor Sand Member was encountered from a top depth of 3.50m bgl to the maximum depth of investigation of 10.00m bgl in BH01.

The Bognor Sand Member was typically described as very dense orangish brown becoming dark grey, slightly clayey to slightly silty SAND.

4.3.5 Bedrock - London Clay Formation

The bedrock London Clay Formation was encountered within BH02, WS04 and WS05, and was typically absent within all other exploratory hole.

BH02, WS04 and WS05 are located to the south of the site (south of the railway line) and correlates with areas where the London Clay Formation is expected to be present according to the BGS online geology viewer.

The London Clay Formation was encountered from a top depth of between 2.00m and 4.00m bgl to the maximum depth of investigation of 10.00m bgl in BH02.

The London Clay Formation was typically described as stiff / very stiff light grey silty (sandy) CLAY.

4.4 Water Strikes

During site works, groundwater was encountered within BH01 at a depth of 3.10m rising to a depth of 2.50m after 20 minutes.

Groundwater encountered by the exploratory holes can in general be summarised as shown in the following table:

Table 4.2: Summary of Groundwater				
Hole Location	Groundwater Strike Depth (mbgl)	Groundwater Depth (mbgl) after 20 mins	Comments	Water Bearing Strata
BH01	3.10	2.50	Medium	River Terrace Deposits
BH02	3.10	3.10	No rise	River Terrace Deposits

SECTION 5 Laboratory Chemical Testing

5.1 General

During the recent site works, 10no. soil samples were taken and dispatched to the laboratories of Chemtest for laboratory chemical testing.

The following chemical testing was undertaken:

Table 5.1: Summary of Chemical Testing Suites		
Inorganics	Metals	Arsenic (As), Cadmium (Cd), Chromium (Cr), Hexavalent Chromium (CrVI), Copper (Cu), Lead (Pb), Mercury (Hg), Nickel (Ni), Selenium (Se), Zinc (Zn)
	General	pH (acidity), Cyanide (CN ⁻), Thiocyanate (SCN ⁻), Ammoniacal Nitrogen (NH ₄ -N), Sulphide (S ²⁻), Sulphur (S), Sulphate (SO ₄ ²⁻), Organic Matter (OM)
Organics		Phenol, Poly-Aromatic Hydrocarbons (PAH), Petroleum Hydrocarbons (PH): EPH
Miscellaneous		Asbestos ID

The results of the above chemical tests are presented in **Annex B** and evaluated below.

5.2 Evaluation of Analytical Results

5.2.1 Soils

A summary of the Inorganic (Metals) soil chemical test results are shown in the table below.

Table 5.2: Soil Chemical Test Results – Inorganics (Metals)					
Substance	Land Use / Guideline Values (mg/kg)	Measured Levels of Substances (mg/kg)		Number of exceedances	95% UCL
	POS-P	Min	Max		
Arsenic	170	< 0.5	11	0	-
Cadmium	880	< 0.1	0.48	0	-
Chromium	33000	< 0.5	19	0	-
Chromium VI	250	< 0.5	< 0.5	0	-
Copper	44000	< 0.5	42	0	-
Lead	1300	< 0.5	120	0	-
Mercury (Total)	240	< 0.05	0.71	0	-
Nickel	3400	< 0.5	17	0	-
Selenium	1800	0.26	0.77	0	-
Zinc	170000	< 0.5	120	0	-

Notes

- C4SL - Provisional Category 4 Screening Levels
- S4UL - Suitable for Use Levels
- POS-P (Public Open Space- Park)
- A total of 10no. representative soil samples were tested for these substances

A summary of the Inorganic (General) soil chemical test results are shown in the table below.

Table 5.3: Soil Chemical Test Results – Inorganics (General)

Substance	Land Use / Guideline Values (mg/kg)	Measured Levels of Substances (mg/kg)		Number of exceedances	95% UCL
	POS-P	Min	Max		
pH (pH Units)	Considered in BRE SD1, BS3882, BS8601 and/or UKWIR	6.8	8.4	0	-
Cyanide (Total)	-	< 0.5	1.0	0	-
Cyanide (Free)	-	< 0.5	0.7	0	-
Thiocyanate	5.0 (LoD)	< 5.0	< 5.0	0	-
Organic Matter	Considered in Organic Contaminant Guideline Value Assessment, BS3882 and/or BS8601	0.4	8.3	0	-
Ammoniacal Nitrogen	-	1.1	29	0	-
Sulphide	Considered in BRE SD1	2.8	6.2	0	-
Sulphur (%)	Considered in BRE SD1	0.01	0.09	0	-
Sulphate (Total) (%)	Considered in BRE SD1	< 0.01	0.21	0	-

Notes

- BRE SD1: 2005 - Concrete in Aggressive Ground
- BS 3882: 2015 - Specification for Topsoil
- BS 8601: 2013 - Specification for Subsoil and requirements for use
- UKWIR – Guidance for the Selection of Water Supply Pipe to be used in Brownfield Sites: 2010
- POS-P (Public Open Space- Park)
- LoD - Limit of Detection
- - No comparable Guideline Value
- A total of 10no. representative soil samples were tested for these substances

A summary of the Organic (General) soil chemical test results are shown in the table below.

Table 5.4: Soil Chemical Test Results – Organics (General)

Substance		Land Use / Guideline Values (mg/kg)	Measured Levels of Substances (mg/kg)		Number of exceedances	95% UCL
		POS-P	Min	Max		
Total Phenol	SOM					
	1	440	< 0.1	< 0.1	0	-
	2.5	690			0	
	6	1300			0	
Total PAH*		-	< 2.0	37	-	-
Total EPH (C10-C40) **	1	7600+	< 10	190	0	-
	2.5	7700+			0	
	6	7800+			0	

Notes

- **S4UL** - Suitable for Use Levels
- POS-P (Public Open Space- Park)
- SOM - Soil Organic Matter
- * Total PAH - Poly-Aromatic Hydrocarbons, EPA 16 (See Speciated PAH Results Table)
- ** Total EPH – Extractable Petroleum Hydrocarbons, Ali/Aro
- + Based on worse-case Aromatic C₁₆-C₂₁ fraction
- - No comparable Guideline Value
- A total of 10no. representative soil samples were tested for these substances

In order to accurately assess the risk from Total PAH, speciation was undertaken, which splits the total PAH concentration into its sixteen components.

A summary of the Organic (Speciated PAH) soil chemical test results are shown in the table below.

Table 5.5: Soil Chemical Test Results – Organics (Speciated PAH)						
Substance	SOM	Land Use / Guideline Values (mg/kg)	Measured Levels of Substances (mg/kg)		Number of exceedances	95% UCL
		POS-P	Min	Max		
Naphthalene	1	1200	< 0.1	0.32	0	-
	2.5	1900			0	
	6	3000			0	
Acenaphthylene	1	29000	< 0.1	0.43	0	-
	2.5	30000			0	
	6	30000			0	
Acenaphthene	1	29000	< 0.1	< 0.1	0	-
	2.5	30000			0	
	6	30000			0	
Fluorene	1	20000	< 0.1	0.12	0	-
	2.5	20000			0	
	6	20000			0	
Phenanthrene	1	6200	< 0.1	3.3	0	-
	2.5	6200			0	
	6	6300			0	
Anthracene	1	150000	< 0.1	0.45	0	-
	2.5	150000			0	
	6	150000			0	
Fluoranthene	1	6300	< 0.1	7.3	0	-
	2.5	6300			0	
	6	6400			0	
Pyrene	1	15000	< 0.1	5.6	0	-
	2.5	15000			0	
	6	15000			0	
Benzo(a)anthracene	1	49	< 0.1	2.5	0	-
	2.5	56			0	
	6	62			0	
Chrysene	1	370	< 0.1	3.5	0	-
	2.5	410			0	
	6	440			0	
Benzo(b)fluoranthene	1	13	< 0.1	4.3	0	-
	2.5	15			0	
	6	16			0	
Benzo(k)fluoranthene	1	370	< 0.1	1.7	0	-
	2.5	410			0	
	6	440			0	
Benzo(a)pyrene		21	< 0.1	3.1	0	-
Indeno(1,2,3-cd)pyrene		150	< 0.1	2.1	0	-

	2.5	170			0	
	6	180			0	
Dibenzo(a,h)anthracene	1	1.1	< 0.1	0.43	0	-
	2.5	1.3			0	
	6	1.4			0	
Benzo(g,h,i)perylene	1	1400	< 0.1	1.8	0	-
	2.5	1500			0	
	6	1600			0	

Notes

- C4SL - Provisional Category 4 Screening Levels
- S4UL - Suitable for Use Levels
- POS-P (Public Open Space- Park)
- SOM - Soil Organic Matter
- A total of 10no. representative soil samples were tested for these substances

A summary of the Miscellaneous (Asbestos) soil chemical test results are shown in the table below.

Table 5.6: Soil Chemical Test Results – Miscellaneous (Asbestos)		
Sample No. & Depth (m)		ID Result
BH01	0.10	No Asbestos Detected
BH01	0.40	No Asbestos Detected
BH02	0.10	No Asbestos Detected
BH02	0.50	No Asbestos Detected
WS01	0.10	No Asbestos Detected
WS01	1.00	No Asbestos Detected
WS03	0.10	No Asbestos Detected
WS03	1.00	No Asbestos Detected
WS04	0.10	No Asbestos Detected
WS04	0.50	No Asbestos Detected

5.3 Contaminants of Concern in Soils

5.3.1 Soils

Contaminants of concern are those where the measured concentrations and 95% Upper Confidence Limit exceeds the relevant Tier 1 CLEA Soil Guideline Value or CIEH Generic Assessment Criteria.

It can be seen from Tables 5.2 to 5.6 that none of the contaminants tested were above the SGV for their respective screening criteria, and therefore no contaminants of concern have been identified.

SECTION 6 Geotechnical Laboratory Testing Results

6.1 General

A number of bulk, undisturbed and solid core samples were collected, and dispatched to the UKAS accredited laboratories of GSTL for soil property testing, in accordance with the following:

- Methods of test for soils for civil engineering purposes – Parts 1 to 8 (BS 1377): 1999.

The results of the below property tests are presented in **Annex C** and discussed below.

6.1.1 Classification Testing

In order to assess the classification characteristics underlying the site, bulk samples were collected, and dispatched to the laboratory for the following soil property tests:

- 21no. Moisture Content (MC)
- 21no. Plasticity Index (P.I)
- 20no. Particle Size Distribution (PSD)

In addition, in order to assess the aggressiveness of the underlying the site, bulk samples were collected and dispatched to the laboratory for the following soil chemical tests:

- 21no. BRE SD1 Suite B

A summary of the soil classification test results are shown in the table below.

Table 6.1: Summary of Soil Classification Test Results									
Test		Location	BH01	BH01	BH01	BH01	BH01	BH01	BH01
		Depth (m)	0.40-0.60	0.90-1.00	2.00-2.45	3.00-3.45	4.00-4.45	6.50-6.95	9.50-9.95
		Unit	RTD	RTD	RTD	RTD	BOSA	BOSA	BOSA
Moisture Content		%	16	11	15	24	26	27	30
Plasticity	Liquid Limit	%	36	34	44	46	43	56	52
	Plastic Limit	%	17	13	18	18	17	23	22
	Plasticity Index	%	19	21	26	28	26	33	30
	% <425µm	%	70	29	33	93	87	100	100
	Modified PI	%	13	6	7	26	23	33	30
PSD	Cobbles	%	0	0	35	0	0	0	0
	Gravels	%	22	68	27	4	12	0	0
	Sands	%	23	8	10	79	82	92	88
	Silt & Clay	%	55	24	28	17	6	8	12
BRE	Total Sulphate	%	0.06	0.04	0.05	< 0.01	< 0.01	0.02	0.04
	2:1 Sulphate	g/l	0.046	0.022	0.043	0.026	< 0.010	0.067	0.12
	pH	-	8.1	8.0	8.0	8.3	8.6	8.9	8.6
	Total Sulphur	%	0.04	0.03	0.04	0.02	0.01	0.06	0.14

Notes

- Unit: RTD (River Terrace Deposits), BOSA (Bognor Sand Member)

Table 6.1a: Summary of Soil Classification Test Results Continued

Test	Location		BH02	BH02	BH02	BH02	BH02	BH02	WS01
	Depth (m)		0.50-0.90	1.20-1.65	2.00-2.45	3.00-3.45	5.00-5.45	8.00-8.45	1.10-1.60
	Unit		RTD	RTD	RTD	RTD	LC	LC	RTD
Moisture Content		%	22	13	28	26	27	32	15
Plasticity	Liquid Limit	%	49	38	52	63	48	57	45
	Plastic Limit	%	21	12	22	27	21	25	14
	Plasticity Index	%	28	26	30	36	27	32	31
	% <425µm	%	58	30	96	98	64	99	31
	Modified PI	%	16	8	29	35	17	32	10
PSD	Gravels	%	33	62	2	0	34	0	57
	Sands	%	32	19	82	57	30	19	21
	Silt & Clay	%	35	19	16	43	36	81	22
BRE	Total Sulphate	%	0.04	0.02	< 0.01	0.02	0.12	0.11	0.05
	2:1 Sulphate	g/l	< 0.010	0.018	0.027	0.059	0.41	0.35	0.024
	pH	-	7.4	8.2	8.5	8.4	8.1	8.2	8.4
	Total Sulphur	%	0.04	0.02	< 0.01	0.06	0.78	0.57	0.02

Notes

- Unit: RTD (River Terrace Deposits), LC (London Clay Formation)

Table 6.1b: Summary of Soil Classification Test Results Continued

Test	Location		WS02	WS03	WS04	WS04	WS05	WS05	WS05
	Depth (m)		1.30-1.80	1.30-1.80	2.50-3.00	3.00-4.00	1.10-1.40	2.20-2.70	3.20-3.70
	Unit		RTD	RTD	LC	LC	HD	LC	LC
Moisture Content		%	28	7.7	25	23	19	22	21
Plasticity	Liquid Limit	%	48		47	44	39	41	48
	Plastic Limit	%	19	NP	18	19	16	17	19
	Plasticity Index	%	29	-	29	25	23	24	29
	% <425µm	%	96	12	95	99	7	100	100
	Modified PI	%	28	-	28	25	2	24	29
PSD	Gravels	%	3	-	4	1	89	0	0
	Sands	%	88	-	69	54	6	42	31
	Silt & Clay	%	9	-	27	45	5	58	69
BRE	Total Sulphate	%	0.05	0.03	0.08	0.09	0.04	0.10	0.09
	2:1 Sulphate	g/l	< 0.010	0.017	0.25	0.29	0.082	0.38	0.28
	pH	-	8.5	8.8	8.5	8.4	8.4	8.0	8.1
	Total Sulphur	%	0.02	0.01	0.23	0.53	0.04	0.38	0.58

Notes

- Unit: HD (Head), RTD (River Terrace Deposits), LC (London Clay Formation)
- NP – Nonplastic

6.1.2 Shear Strength Testing

In order to assess the shear strength characteristics underlying the site, undisturbed samples were collected and dispatched to the laboratory for the following soil property tests:

- 4no. Shear box (60mm)

A summary of the shearbox test results are shown in the table below.

Table 6.2: Summary of Shearbox Test Results

Shearboxes		Location	BH01			BH01		
		Depth (m)	2.00 – 2.45			4.00 – 4.45		
		Unit	River Terrace Deposits			Bognor Sand Member		
Confining Stresses (kPa)			20	40	80	40	80	160
Angle of Resistance	Peak	Φ	29.0			37.0		
Cohesion	Peak	kPa	3.3			7.0		

Table 6.2a: Summary of Shearbox Test Results Continued

Shearboxes		Location	BH02			BH02		
		Depth (m)	3.00 – 3.45			5.00 – 5.45		
		Unit	River Terrace Deposits			London Clay Formation		
Confining Stresses (kPa)			30	60	120	50	100	200
Angle of Resistance	Peak	Φ	35.0			17.0		
Cohesion	Peak	kPa	4.0			20.0		

SECTION 7 Engineering Recommendations

7.1 Preparation of Site

Prior to the main site works, any buildings to be demolished should be subject to a full asbestos survey.

A structural survey should be undertaken of the adjacent buildings and structures (road and pavement structures) including pictorial records. This should be updated throughout the site development phases.

Any existing structures, foundations, floor slabs, concrete/tarmac hard standings beneath the proposed buildings should be broken up and removed from site and disposed of at a suitable landfill facility.

Alternatively, the crushed site won materials may be re-used as structural fill, subject to laboratory chemical testing and compliance with site soil guidance values.

Significant allowances should be made for dealing with the historic foundations, floor slabs, basement structures and other buried obstructions.

The existing grass and scrub vegetation, including all roots and any trees to be removed (and not subject to preservation orders) should be grubbed up and removed from beneath the proposed buildings and roadways.

The reduced levels should be brought up to the required levels with well, compacted imported granular materials. Department of Transport (DoT) Type 2 sub-base or similar may be used and should be compacted in layers, in accordance with the Specification for Highway Works. Alternatively, appropriate selected inert imported fill could be used.

Allowances should be made for removing any 'soft spots/area' and their replacement with well compacted granular materials as previously described. The excavated materials will be unacceptable as structural fill and should be removed from site and taken to an appropriately licensed tip.

All materials to be removed from site should be subject to the appropriate Waste Acceptance Protocol (WAP) and taken to an appropriately licensed tip.

Contingencies should be made for the protection/diversion of any underground services present beneath the site, brought about as a result of the proposed works.

Contingencies should also be made for the protection and any necessary temporary/permanent support of nearby walls.

7.2 Foundation Solution

The ground conditions from the site investigation can be summarised as follows:

Table 7.1 Summary of Ground Conditions				
Stratum	Depth From (m)	Depth to (m)	Minimum Thickness (m)	Maximum Thickness (m)
Made Ground	0.00	0.30 / 0.80	0.30	0.80
Head	0.30 / 0.50	2.00 / 2.30	1.50	2.00
River Terrace Deposits	0.30 / 0.80	3.00 / 4.00	2.20	3.70
Bognor Sand Member (Northern section)	3.50	> 10.00	Unproven	
London Clay Formation (Southern section)	2.00 / 4.00	> 10.00	Unproven	

During site works, groundwater was encountered within BH01 at a depth of 3.10m rising to a depth of 2.50m after 20 minutes and BH02 at a depth of 3.10m with no rise. Based on a general softening of deposits across the site at approximately 2.00m, it is assumed groundwater may rise to this depth.

Based on the encountered ground conditions and the proposed development for a new footbridge, the following foundation solutions are recommended.

Abutment/Pad

Based on the design proposals, it is likely that an abutment /pad foundation solution may prove the most economical.

In order to avoid unacceptable levels of differential settlement we recommend that the abutment /pad foundations should be extended into the underlying Superficial Deposits comprising either the River Terrace or Head Deposits at an embedded minimum founding depth of 1.00m.

For the above foundation solution and conservative in-situ material it is recommended that a presumed bearing resistance of 100kN/m² is used for shallow foundation design purposes across the site.

For the above given foundation solutions and bearing pressures, maximum total settlements of 25mm should result, with differential movements (δ/l) of the superstructure not exceeding 1:750 where δ is the differential settlement between two points of a foundation and l is the distance between these points.

Depending on final proposals the above site wide shallow solution can be refined if necessary. Allowances should also be made due to the proximity of near-by trees where deepening may be required due to the effect of shrink-swell and desiccation.

All foundation formations should be inspected by a suitably qualified Engineer before being concreted.

Piles

Alternatively, a piled foundation solution can be used. A specialist piling contractor would need to be consulted to confirm access and capabilities of working close to the existing railway line.

Due to the nature of the ground, the piles are likely to be a combination of skin friction (friction piles) and end-bearing piles.

Due to the variation in the bedrock geology between the northern and southern sections of the site, two foundation designs have been proposed. The most conservative approach will then be recommended for design.

Table 7.2 Pile Design for Granular Bedrock – BH01 (Northern Section)		
Pile Depth	Ultimate Pile Capacity (kN)	
	0.30, m Ø	0.45, m Ø
5.00	650	1279
7.50	974	1887
10.00	1353	2576

Note:

- The Made ground deposits have been ignored in the design
- A factor of safety of 3.0 has been used for design purposes

Table 7.3 Pile Design for Cohesive Bedrock – BH02 (Southern Section)

Pile Depth	Ultimate Pile Capacity (kN)	
	0.30, m Ø	0.45, m Ø
5.00	94	181
7.50	234	406
10.00	409	682

Note:

- The Made ground have been ignored in the design
- A factor of safety of 3.0 has been used for design purposes

Based on the above tables, it is recommended that the conservative cohesive pile design is used for the calculation of the bridge loadings.

Allowances should also be made for negative skin friction that could develop in the cohesive deposits.

For the size and type of pile recommended founded within the granular Bognor Sand Member or cohesive London Clay Formation, the total settlements should not exceed 10mm, with differential movements between adjacent piles being less than half this value.

The above estimated working loads, type and length of piles should be confirmed by the specialist piling contractor. It may also be prudent to drive a number of test piles at selected locations to confirm their drivability, anticipated lengths and safe working loads.

Allowances should be made for an element of pre-excavation and/or re drilling of piles where obstructions are encountered in the made ground.

All foundation formations should be inspected by a suitably qualified Engineer before being concreted.

7.2.1 Infrastructure

Appropriate measures should be taken in order to prevent misalignment issues due to disproportionate settlement between the proposed footbridge and associated infrastructure, which will not be piled.

In addition, it is recommended that for any hard standing or service entry points adjacent the proposed footbridge that the prepared surface should be covered by a geo-grid and 'terram' prior to further infilling, in accordance with Section 8.4, in order to reinforce the formation.

7.3 Excavations and Formations

Most shallow excavations should be possible with normal soil excavating machinery, although significant allowances should be made for a hydraulic breaker when excavating out any historic foundations, concrete floor slabs and other buried obstructions.

During site works, groundwater was encountered within BH01 at a depth of 2.50m and BH02 at a depth of 3.10m, although depths of up to around 2.00m were inferred due to localised softening. Therefore, shallow excavations are unlikely to encounter significant groundwater inflows.

However, it should be noted that during times of high rainfall a higher groundwater table may be encountered.

Therefore, any inflows should be dealt with by conventional pumping techniques. Heavy pumping should be avoided where possible as this will remove the fines from the soil and possibly cause localised settlement.

The sides of any excavations deeper than 1.00m, especially within the granular deposits, should be supported by planking and strutting or other proprietary means.

The sub-formations/formations will be susceptible to loosening, softening and deterioration by exposure to weather (rain, frost and drying conditions), the action of water (flood water or removal of groundwater) and site traffic.

Formations should never be left unprotected and continuously exposed to rain causing degradation, or left exposed/uncovered overnight, unless permitted by a qualified engineer.

Construction plant and other vehicular traffic should not be operated on unprotected formations. As a minimum the formation/excavation surfaces must be protected by a minimum thickness of 200mm of hard cover immediately after exposure.

Allowances should be made for trimming, re-trimming and re-compaction if necessary and for the removal of soft spots and their replacement with well compacted granular materials.

It is also recommended that if concerns still remain then a number of plate loading tests are carried out at formation level to confirm the suitability of the formations.

Allowances should be made for special precautions to prevent formation deterioration in addition to the above.

It is recommended that approval be gained from a qualified engineer of the formation condition before covering them with any subsequent construction.

7.4 Protection of Buried Concrete

The results of the BRE testing are given in Table 6.1 and the concrete design class is summarised in the table below:

Table 7.4: Summary of Concrete Design Class								
	Stratum	HD	RTD		BOSA		LC	
	Unit	-	Min	Max	Min	Max	Min	Max
Total Sulphate	%	0.04	< 0.01	0.06	< 0.01	0.04	0.08	0.12
2:1 Sulphate	g/l	0.082	< 0.01	0.059	< 0.01	0.12	0.25	0.41
pH	-	8.4	7.4	8.8	8.6	8.9	8.0	8.5
Total Sulphur	%	0.04	< 0.01	0.06	0.01	0.14	0.23	0.78
Total Potential Sulphate	%	0.12	0.18		0.03	0.42	0.69	2.34
Oxidisable Sulphates >0.3%?		No	No		Yes		Yes	
Design Sulphate Class		DS-1	DS-1		DS-2		DS-4	
ACEC Class		AC-1	AC-1		AC-2		AC-4	

Notes

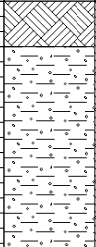
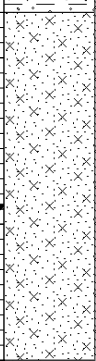
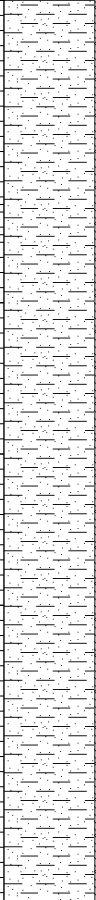
- Unit: HD (Head), RTD (River Terrace Deposits), BOSA (Bognor Sand Member), LC (London Clay Formation)

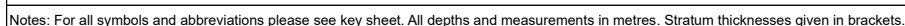
Groundwater was encountered at the site, and it is conservatively deemed to be mobile.

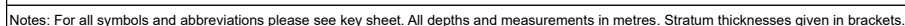
Based on the above and using guidance within BRE Special Digest 1 (2005) it is recommended that any buried concrete within the Superficial Deposits (Head and River Terrace Deposits) conform to class DS-1 and ACEC Class AC-1. While buried concrete within the Bognor Sand Member and London Clay should conform to class DS-2 and ACEC Class AC-2, and DS-4 and ACEC Class AC-4 respectively.

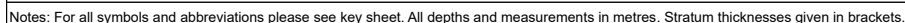
Annex A: Exploratory Hole Logs

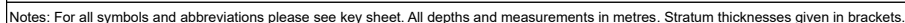
		Consulting Geotechnical, Geo-Environmental Engineers & Site Investigation Contractors			Cardiff Office 5 Deryn Court Wharfedale Road Pentwyn Cardiff CF23 7HA	Exeter Office The Slate Barn Lower Lowley Dunsford Exeter EX6 7BP	Portsmouth Office Technopole Kingston Crescent North End Portsmouth PO2 8FA	Borehole No. BH01 Sheet 1 of 1						
Project Name Havant Railway Station Footbridge					Project No. TF-24-356	Date 30/09/2024 to 01/10/2024			Hole Type CP					
Client Hampshire County Council					Co-ords E: 471708.48 N: 106622.95 L: 9.92	Water Strike Details			Logged By MB					
Contractor BH Drilling				Plant Used Dando 2000 Tracked		Depth Strike 3.10	After 20 mins 2.50	Remarks	Approved By JI					
									Scale 1:50					
Samples and Results				Depth, (Thickness)	Level	Stratum Description			Legend	Well				
Results	Type	Depth	Casing Water											
N=32 (3,6/6,8,9,9)	B	0.10				Dark brown slightly gravelly sandy CLAY with frequent rootlets. Sand is fine to medium. Gravel is angular to subangular, fine to coarse of flint, mudstone, glass. (Made Ground) Light brown slightly gravelly clayey SAND. Sand is fine to coarse. Gravel is angular to subangular, fine to coarse of flint, mudstone, quartzite. (River Terrace Deposits) Very stiff light brown slightly silty gravelly CLAY with medium cobble content. Gravel is angular to subrounded fine to coarse of flint. (River Terrace Deposits)								
	D	0.10 - 2.00		(0.30)	9.62									
	ES	0.10 - 3.00		0.30										
	B	0.40		(0.40)										
	D	0.40 - 0.60			9.22									
	ES	0.40 - 5.00		0.70										
N=12 (1,2/2,3,3,4)	B	0.90 - 1.00		1	Very dense orangish brown slightly clayey SAND. Sand is fine to coarse. (Bognor Sand Member)									
	D	0.90 - 1.20												
	B	1.20 - 1.65												
	D	1.20 - 1.65												
SPT(S)		1.20												
N=34 (2,3/5,8,9,12)	B	2.00 - 2.45		2										
	D	2.00 - 2.45		(2.80)										
	SPT(S)	2.00												
	B	2.60 - 2.95												
N=42 (3,8/9,10,10,13)	B	3.00 - 3.45		3										
	D	3.00 - 3.45												
	SPT(S)	3.00												
	B	4.00 - 4.45		3.50						6.42				
49 (3,7/49 for 195mm)	D	4.00 - 4.45		4										
	D	4.00 - 4.45												
	SPT(S)	4.00												
	B	5.00 - 5.27		5										
D	5.00 - 5.27													
SPT(S)	5.00		(3.50)											
50 (3,8/50 for 160mm)	D	6.00 - 6.20		6										
	B	6.50 - 6.81												
	D	6.50 - 6.95												
	SPT(S)	6.50												
50 (1,15/50 for 225mm)	B	7.00 - 7.45		7										
	D	7.80 - 7.90		7.00						2.92				
	D	8.00 - 8.38		8						Very dense dark grey slightly silty SAND. Sand is fine to coarse. (Bognor Sand Member)				
	D	8.00 - 8.45												
SPT(S)	8.00		(3.00)											
50 (6,18/50 for 175mm)	D	9.00 - 9.10		9										
	B	9.50 - 9.75												
	D	9.50 - 9.95												
	SPT(S)	9.50												
					10.00	-0.08	End of Borehole at 10.00m							
Chiselling Details			Remarks					Borehole Diameter						
Depth From	Depth To	Time						Base Depth	Diameter					
								10.00	150					
					Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.									

		Consulting Geotechnical, Geo-Environmental Engineers & Site Investigation Contractors		Cardiff Office 5 Deryn Court Wharfedale Road Pentwyn Cardiff CF23 7HA		Exeter Office The Slate Barn Lower Lowley Dunsford Exeter EX6 7BP		Portsmouth Office Technopole Kingston Crescent North End Portsmouth PO2 8FA		Borehole No. BH02 Sheet 1 of 1	
Project Name Havant Railway Station Footbridge				Project No. TF-24-356		Date 01/10/2024 to 02/10/2024				Hole Type CP	
Client Hampshire County Council				Co-ords E: 471702.43 N: 106579.79 L: 9.25		Water Strike Details Depth Strike After 20 mins Remarks 3.10 3.10				Logged By MB	
Contractor BH Drilling			Plant Used Dando 2000 Tracked							Approved By JI	
										Scale 1:50	
Samples and Results				Depth, (Thickness)		Level		Stratum Description		Legend Well	
Results	Type	Depth	Casing Water								
N=17 (3,3/4,4,4,5)	B	0.10						Dark brown slightly gravelly sandy CLAY with frequent rootlets. Sand is fine to medium, gravel is angular to subangular, fine to coarse of flint, mudstone, glass. (Made Ground) Very stiff dark brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular to subrounded, fine to coarse of flint, sandstone. (River Terrace Deposits)			
	D	0.10 - 0.20									
	ES	0.10 - 0.30									
	B	0.50									
	D	0.50 - 0.60									
N=11 (1,2/2,3,3,3)	ES	0.50 - 0.90						Medium dense turning dense dull white silty SAND. Sand is fine to coarse (River Terrace Deposits)			
	B	1.20 - 1.65									
	D	1.20 - 1.65									
N=36 (3,4/6,8,10,12)	SPT(S)	1.20						Very stiff light grey silty sandy CLAY. Sand is fine to medium (London Clay Formation)			
	B	1.70 - 2.00									
	D	2.00 - 2.45									
N=26 (2,3/4,5,8,9)	SPT(S)	2.00						5.35 to 5.55m - Band of weak Mudstone			
	B	3.00 - 3.45									
	D	3.00 - 3.45									
N=40 (2,4/4,6,15,15)	SPT(S)	3.00									
	B	4.00 - 4.45									
	D	4.00 - 4.45									
N=24 (2,4/4,5,6,9)	SPT(S)	4.00									
	B	5.00 - 5.45									
	D	5.00 - 5.45									
N=27 (3,4/5,6,8,8)	SPT(S)	5.00									
	B	6.50 - 6.95									
	D	6.50 - 6.95									
N=29 (3,4/6,7,7,9)	SPT(S)	6.50									
	B	7.00 - 7.10									
	D	8.00 - 8.45									
N=29 (3,4/6,7,7,9)	SPT(S)	8.00									
	B	8.00 - 8.45									
	D	8.00 - 8.45									
N=29 (3,4/6,7,7,9)	SPT(S)	8.00									
	B	9.00 - 9.10									
	D	9.50 - 9.95									
N=29 (3,4/6,7,7,9)	SPT(S)	9.50									
	B	9.50 - 9.95									
	D	9.50 - 9.95									
				10.00	-0.75	End of Borehole at 10.00m					
Chiselling Details			Remarks					Borehole Diameter			
Depth From	Depth To	Time						Base Depth		Diameter	
								10.00		150	
			Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.								

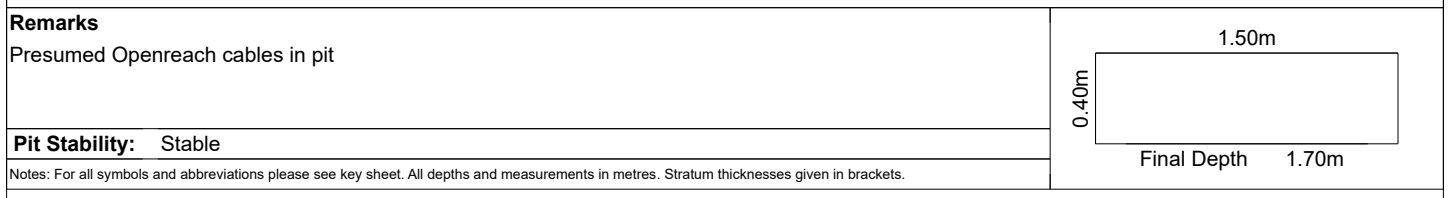


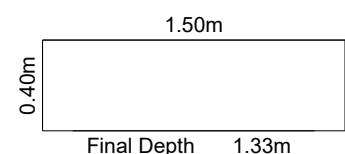


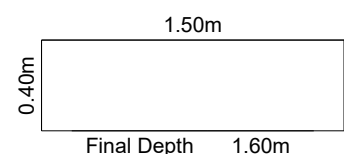




Remarks	Borehole Diameter	
	Base Depth	Diameter
No SPT at base of hole due to hole collapse.		
Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.		







Annex B: Chemical Test Results



Final Report

Report No.: 24-33044-1

Initial Date of Issue: 21-Oct-2024

Re-Issue Details:

Client Terra Firma

Client Address: 5 Deryn Court
Wharfedale Road
Pentwyn
Cardiff
CF23 7HA

Contact(s): Exeter Group

Project TF-24-356 Havant Railway Station
Footbridge

Quotation No.: Q24-33609

Date Received: 11-Oct-2024

Order No.: TF-24-356

Date Instructed: 11-Oct-2024

No. of Samples: 10

Turnaround (Wkdays): 5

Results Due: 17-Oct-2024

Date Approved: 21-Oct-2024

Approved By:

Details: David Smith, Technical Director

For details about application of accreditation to specific matrix types, please refer to the Table at the back of this report

Results - Soil

Project: TF-24-356 Havant Railway Station Footbridge

Client: Terra Firma		Chemtest Job No.:					24-33044	24-33044	24-33044	24-33044	24-33044	24-33044	24-33044
Quotation No.: Q24-33609		Chemtest Sample ID.:					1879619	1879620	1879621	1879622	1879623	1879624	1879628
Order No.: TF-24-356		Client Sample Ref.:					1	2	1	2	3	1	3
		Sample Location:					BH01	BH01	BH02	BH02	WS01	WS01	WS03
		Sample Type:					SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):					0.10	0.40	0.10	0.50	1.00	0.10	1.00
		Date Sampled:					01-Oct-2024	01-Oct-2024	02-Oct-2024	02-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024
		Asbestos Lab:					DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	HWOL Code	Accred.	SOP	Units	LOD								
ACM Type		U	2192		N/A	-	-	-	-	-	-	-	-
Asbestos Identification		U	2192		N/A	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture		N	2030	%	0.020	19	11	16	5.6	4.7	20	24	16
Soil Colour		N	2040		N/A	Brown	Brown	Brown	Brown	Brown	Brown	Beige	Brown
Other Material		N	2040		N/A	Stones and Roots	Stones and Roots	Stones and Roots	Stones	Stones	Stones, Roots and plastic	Stones	Stones and Roots
Soil Texture		N	2040		N/A	Loam	Loam	Loam	Gravel	Gravel	Loam	Sand	Loam
pH at 20C		M	2010		4.0	7.3	7.4	7.3	7.7	7.8	7.4	7.3	7.3
Total Sulphur		U	2175	%	0.010	0.070	0.040	0.040	0.030	0.020	0.090	0.010	0.040
Cyanide (Free)		M	2300	mg/kg	0.50	0.50	< 0.50	0.70	< 0.50	< 0.50	0.60	< 0.50	0.50
Cyanide (Total)		M	2300	mg/kg	0.50	2.1	< 0.50	0.80	< 0.50	< 0.50	1.0	< 0.50	0.50
Thiocyanate		M	2300	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Sulphide (Easily Liberatable)		N	2325	mg/kg	0.50	4.6	6.2	3.6	3.3	3.6	4.2	3.5	4.6
Ammoniacal Nitrogen		M	2425	mg/kg	0.50	19	3.1	3.3	1.6	1.3	29	1.1	3.7
Sulphate (Total)		U	2430	%	0.010	0.17	0.062	0.10	0.049	0.038	0.21	0.044	0.13
Arsenic		M	2455	mg/kg	0.5	11	11	8.2	4.7	3.8	< 0.5	< 0.5	< 0.5
Cadmium		M	2455	mg/kg	0.10	0.36	0.48	0.25	0.18	0.39	< 0.10	< 0.10	< 0.10
Chromium		M	2455	mg/kg	0.5	18	19	18	17	16	< 0.5	< 0.5	< 0.5
Copper		M	2455	mg/kg	0.50	41	42	29	17	10	< 0.50	< 0.50	< 0.50
Mercury		M	2455	mg/kg	0.05	0.36	0.34	0.71	0.23	< 0.05	< 0.05	< 0.05	< 0.05
Nickel		M	2455	mg/kg	0.50	16	17	11	9.8	7.8	< 0.50	< 0.50	< 0.50
Lead		M	2455	mg/kg	0.50	130	120	100	46	33	< 0.50	< 0.50	< 0.50
Selenium		M	2455	mg/kg	0.25	0.85	0.77	0.65	0.44	0.28	0.47	0.26	0.55
Zinc		M	2455	mg/kg	0.50	96	100	72	45	120	< 0.50	< 0.50	< 0.50
Chromium (Hexavalent)		N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter		M	2625	%	0.40	13	2.6	4.1	4.1	0.74	8.3	< 0.40	3.5
Total TPH >C6-C40	EH_1D_Total	U	2670	mg/kg	10	120	53	110	< 10	< 10	170	< 10	190
Naphthalene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.18	< 0.10	0.32
Acenaphthylene		N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.15	< 0.10	0.43
Acenaphthene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.12
Phenanthrene		M	2800	mg/kg	0.10	0.29	0.28	0.20	< 0.10	0.21	0.91	0.42	3.3
Anthracene		M	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.23	0.13	0.45
Fluoranthene		M	2800	mg/kg	0.10	0.80	0.86	0.63	< 0.10	0.14	2.6	0.27	7.3
Pyrene		M	2800	mg/kg	0.10	0.73	0.79	0.51	< 0.10	0.13	2.1	0.25	5.6
Benzo[a]anthracene		M	2800	mg/kg	0.10	0.39	0.48	0.26	< 0.10	< 0.10	1.2	< 0.10	2.5
Chrysene		M	2800	mg/kg	0.10	0.39	0.48	0.30	< 0.10	< 0.10	1.4	< 0.10	3.5

Results - Soil

Project: TF-24-356 Havant Railway Station Footbridge

Client: Terra Firma		Chemtest Job No.:				24-33044	24-33044	24-33044	24-33044	24-33044	24-33044	24-33044	24-33044
Quotation No.: Q24-33609		Chemtest Sample ID.:				1879619	1879620	1879621	1879622	1879623	1879624	1879627	1879628
Order No.: TF-24-356		Client Sample Ref.:				1	2	1	2	3	1	3	1
		Sample Location:				BH01	BH01	BH02	BH02	WS01	WS01	WS03	WS03
		Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):				0.10	0.40	0.10	0.50	1.00	0.10	1.00	0.10
		Date Sampled:				01-Oct-2024	01-Oct-2024	02-Oct-2024	02-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024	03-Oct-2024
		Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	HWOL Code	Accred.	SOP	Units	LOD								
Benzo[b]fluoranthene		M	2800	mg/kg	0.10	0.80	0.65	< 0.10	< 0.10	< 0.10	1.9	< 0.10	4.3
Benzo[k]fluoranthene		M	2800	mg/kg	0.10	0.22	0.26	< 0.10	< 0.10	< 0.10	0.71	< 0.10	1.7
Benzo[a]pyrene		M	2800	mg/kg	0.10	0.57	0.46	< 0.10	< 0.10	< 0.10	1.4	< 0.10	3.1
Indeno(1,2,3-c,d)Pyrene		M	2800	mg/kg	0.10	0.45	0.38	< 0.10	< 0.10	< 0.10	1.0	< 0.10	2.1
Dibenz(a,h)Anthracene		N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.20	< 0.10	0.43
Benzo[g,h,i]perylene		M	2800	mg/kg	0.10	0.48	0.39	< 0.10	< 0.10	< 0.10	0.94	< 0.10	1.8
Total Of 16 PAH's		N	2800	mg/kg	2.0	5.1	5.0	< 2.0	< 2.0	< 2.0	15	< 2.0	37
Total Phenols		M	2920	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Results - Soil

Project: TF-24-356 Havant Railway Station Footbridge

Client: Terra Firma		Chemtest Job No.:				24-33044	24-33044
Quotation No.: Q24-33609		Chemtest Sample ID.:				1879629	1879630
Order No.: TF-24-356		Client Sample Ref.:				1	3
		Sample Location:				WS04	WS04
		Sample Type:				SOIL	SOIL
		Top Depth (m):				0.10	0.50
		Date Sampled:				04-Oct-2024	04-Oct-2024
		Asbestos Lab:				DURHAM	DURHAM
Determinand	HWOL Code	Accred.	SOP	Units	LOD		
ACM Type		U	2192		N/A	-	-
Asbestos Identification		U	2192		N/A	No Asbestos Detected	No Asbestos Detected
Moisture		N	2030	%	0.020	17	4.4
Soil Colour		N	2040		N/A	Brown	Brown
Other Material		N	2040		N/A	Stones and Roots	Stones
Soil Texture		N	2040		N/A	Loam	Gravel
pH at 20C		M	2010		4.0	6.8	8.4
Total Sulphur		U	2175	%	0.010	0.050	0.010
Cyanide (Free)		M	2300	mg/kg	0.50	0.70	< 0.50
Cyanide (Total)		M	2300	mg/kg	0.50	0.90	< 0.50
Thiocyanate		M	2300	mg/kg	5.0	< 5.0	< 5.0
Sulphide (Easily Liberatable)		N	2325	mg/kg	0.50	3.6	2.8
Ammoniacal Nitrogen		M	2425	mg/kg	0.50	3.6	2.2
Sulphate (Total)		U	2430	%	0.010	0.11	< 0.010
Arsenic		M	2455	mg/kg	0.5	< 0.5	< 0.5
Cadmium		M	2455	mg/kg	0.10	< 0.10	< 0.10
Chromium		M	2455	mg/kg	0.5	< 0.5	< 0.5
Copper		M	2455	mg/kg	0.50	< 0.50	< 0.50
Mercury		M	2455	mg/kg	0.05	< 0.05	< 0.05
Nickel		M	2455	mg/kg	0.50	< 0.50	< 0.50
Lead		M	2455	mg/kg	0.50	< 0.50	< 0.50
Selenium		M	2455	mg/kg	0.25	0.55	0.28
Zinc		M	2455	mg/kg	0.50	< 0.50	< 0.50
Chromium (Hexavalent)		N	2490	mg/kg	0.50	< 0.50	< 0.50
Organic Matter		M	2625	%	0.40	4.7	0.74
Total TPH >C6-C40	EH_1D_Total	U	2670	mg/kg	10	< 10	< 10
Naphthalene		M	2800	mg/kg	0.10	< 0.10	< 0.10
Acenaphthylene		N	2800	mg/kg	0.10	< 0.10	< 0.10
Acenaphthene		M	2800	mg/kg	0.10	< 0.10	< 0.10
Fluorene		M	2800	mg/kg	0.10	< 0.10	< 0.10
Phenanthrene		M	2800	mg/kg	0.10	0.21	< 0.10
Anthracene		M	2800	mg/kg	0.10	< 0.10	< 0.10
Fluoranthene		M	2800	mg/kg	0.10	0.46	< 0.10
Pyrene		M	2800	mg/kg	0.10	0.38	< 0.10
Benzo[a]anthracene		M	2800	mg/kg	0.10	0.21	< 0.10
Chrysene		M	2800	mg/kg	0.10	0.22	< 0.10

Results - Soil

Project: TF-24-356 Havant Railway Station Footbridge

Client: Terra Firma		Chemtest Job No.:				24-33044	24-33044
Quotation No.: Q24-33609		Chemtest Sample ID.:				1879629	1879630
Order No.: TF-24-356		Client Sample Ref.:				1	3
		Sample Location:				WS04	WS04
		Sample Type:				SOIL	SOIL
		Top Depth (m):				0.10	0.50
		Date Sampled:				04-Oct-2024	04-Oct-2024
		Asbestos Lab:				DURHAM	DURHAM
Determinand	HWOL Code	Accred.	SOP	Units	LOD		
Benzo[b]fluoranthene		M	2800	mg/kg	0.10	0.34	< 0.10
Benzo[k]fluoranthene		M	2800	mg/kg	0.10	0.12	< 0.10
Benzo[a]pyrene		M	2800	mg/kg	0.10	0.18	< 0.10
Indeno(1,2,3-c,d)Pyrene		M	2800	mg/kg	0.10	0.23	< 0.10
Dibenz(a,h)Anthracene		N	2800	mg/kg	0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene		M	2800	mg/kg	0.10	0.17	< 0.10
Total Of 16 PAH's		N	2800	mg/kg	2.0	2.5	< 2.0
Total Phenols		M	2920	mg/kg	0.10	< 0.10	< 0.10

Test Methods

SOP	Title	Parameters included	Method summary	Water Accred.
2010	pH Value of Soils	pH at 20°C	pH Meter	
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <30°C.	
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930	
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES	
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.	
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry	
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.	
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N-dimethyl-p-phenylenediamine.	
2425	Extractable Ammonium in soils	Ammonium	Extraction with potassium chloride solution / analysis by 'Aquakem 600' Discrete Analyser using sodium salicylate and sodium dichloroisocyanurate.	
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.	
2455	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.	
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazine.	
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.	
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID	
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenz[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS	
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.	

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"
SOP	Standard operating procedure
LOD	Limit of detection

This report shall not be reproduced except in full, and only with the prior approval of the laboratory.

Any comments or interpretations are outside the scope of UKAS accreditation.

The Laboratory is not accredited for any sampling activities and reported results relate to the samples 'as received' at the laboratory.

Uncertainty of measurement for the determinands tested are available upon request .

None of the results in this report have been recovery corrected.

All results are expressed on a dry weight basis.

The following tests were analysed on samples 'as received' and the results subsequently corrected to a dry weight basis EPH, VPH, TPH, BTEX, VOCs, SVOCs, PCBs, Phenols.

For all other tests the samples were dried at $\leq 30^{\circ}\text{C}$ prior to analysis.

All Asbestos testing is performed at the indicated laboratory .

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1.

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt.

All water samples will be retained for 14 days from the date of receipt.

Charges may apply to extended sample storage.

Water Sample Category Key for Accreditation

- DW - Drinking Water
- GW - Ground Water
- LE - Land Leachate
- NA - Not Applicable

Report Information

PL - Prepared Leachate
PW - Processed Water
RE - Recreational Water
SA - Saline Water
SW - Surface Water
TE - Treated Effluent
TS - Treated Sewage
UL - Unspecified Liquid

Clean Up Codes

NC - No Clean Up
MC - Mathematical Clean Up
FC - Florisil Clean Up

HWOL Acronym System

HS - Headspace analysis
EH - Extractable hydrocarbons – i.e. everything extracted by the solvent
CU - Clean-up – e.g. by Florisil, silica gel
1D - GC – Single coil gas chromatography
Total - Aliphatics & Aromatics
AL - Aliphatics only
AR - Aromatic only
2D - GC-GC – Double coil gas chromatography
#1 - EH_2D_Total but with humics mathematically subtracted
#2 - EH_2D_Total but with fatty acids mathematically subtracted
+ - Operator to indicate cumulative e.g. EH+EH_Total or EH_CU+HS_Total

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

Annex C: Soil Property Test Results

Contract Number: 75204

Client Ref: **TF-24-356**

Client PO: **TF-24-356**

Date Received: **14-10-2024**

Date Completed: **30-10-2024**

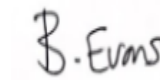
Report Date: **30-10-2024**

Client: **Terrafirma South**

This report has been checked and approved by:

Contract Title: **Havant Railway Station Footbridge**

For the attention of: **Labs**



Brendan Evans
Office Administrator

Description	Qty
Moisture Content BS 1377:1990 - Part 2 : 3.2 - * UKAS	21
4 Point Liquid & Plastic Limit BS 1377:1990 - Part 2 : 4.3 & 5.3 - * UKAS	21
Particle Size Distribution BS EN ISO 17892-4 : 5.1 - * UKAS	20
BRE Suite B Greenfield Site (pyrite present) includes pH, water & acid soluble sulphate and total sulphur Sub-contracted Test	21
Direct Shearbox - set of 3 - 60 x 60mm (3 days) BS 1377:1990 - Part 7 : 4 - * UKAS	4
Disposal of samples for job	1

Notes: Observations and Interpretations are outside the UKAS Accreditation

* - denotes test included in laboratory scope of accreditation

- denotes test carried out by approved contractor

@ - denotes non accredited tests

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 test report/certificate shall not be reproduced except in full, without the approval of GEO Site & Testing Services Ltd. Any opinions or interpretations stated - within this report/certificate are excluded from the laboratories UKAS accreditation.

Approved Signatories:

Brendan Evans (Office Administrator) - Darren Bourne (Quality Senior Technician) - Paul Evans (Director)

Richard John (Quality/Technical Manager) - Shaun Jones (Laboratory manager) - Shaun Thomas (Site Manager)

Wayne Honey (HR & HSE Manager)

**NATURAL MOISTURE, LIQUID LIMIT, PLASTIC LIMIT AND
PLASTICITY INDEX
(BS 1377:1990 - Part 2 : 4.3 & 5.3)**

Contract Number	75204	
Project Name	Havant Railway Station Footbridge	
Date Tested	22/10/2024	
	DESCRIPTIONS	

Sample/Hole Reference	Sample Number	Sample Type	Depth (m)			Descriptions
BH01	4	B	0.40	-	0.60	Brown fine to coarse gravelly fine to coarse sandy SILT/CLAY
BH01	5	D	0.90	-	1.00	Brown fine to coarse sandy silty/clayey fine to coarse GRAVEL
BH01	10	B	2.00	-	2.45	Brown fine to coarse sandy fine to coarse gravelly SILT/CLAY (with cobbles)
BH01	13	B	3.00	-	3.45	Brown slightly gravelly silty/clayey fine to coarse SAND
BH01	15	B	4.00	-	4.45	Brown silty/clayey fine to coarse gravelly fine to coarse SAND
BH01	20	B	6.50	-	6.95	Brown silty/clayey fine to coarse SAND
BH01	27	B	9.50	-	9.95	Brown grey silty/clayey fine to coarse SAND
BH02	4	B	0.50	-	0.90	Brown fine to coarse sandy fine to coarse gravelly SILT/CLAY
BH02	5	B	1.20	-	1.65	Brown silty/clayey fine to coarse sandy fine to coarse GRAVEL
BH02	9	B	2.00	-	2.45	Brown slightly gravelly silty/clayey fine to coarse SAND
BH02	11	B	3.00	-	3.45	Brown fine to coarse sandy SILT/CLAY
BH02	14	B	5.00	-	5.45	Brown fine to coarse sandy fine to coarse gravelly SILT/CLAY
BH02	19	B	8.00	-	8.45	Grey fine to coarse sandy SILT/CLAY
WS01	4	B	1.10	-	1.60	Brown fine to coarse sandy silty/clayey fine to coarse GRAVEL
WS02	5	B	1.30	-	1.80	Brown slightly gravelly clayey/silty fine to coarse SAND
WS03	4	D	1.30	-	1.80	Grey fine to coarse GRAVEL (Flint)
WS04	6	B	2.50	-	3.00	Brown slightly fine to medium gravelly silty/clayey fine to coarse SAND
WS04	7	B	3.00	-	4.00	Brown slightly gravelly fine to coarse sandy SILT/CLAY
WS05	3	B	1.10	-	1.40	Brown silty/clayey fine to coarse sandy fine to coarse GRAVEL
WS05	6	B	2.20	-	2.70	Grey fine to coarse sandy SILT/CLAY
WS05	7	B	3.20	-	3.70	Grey fine to coarse sandy SILT/CLAY
				-		
				-		
				-		

Operator
Aaron Hodge

NATURAL MOISTURE, LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX

(BS 1377:1990 - Part 2 : 4.3 & 5.3)

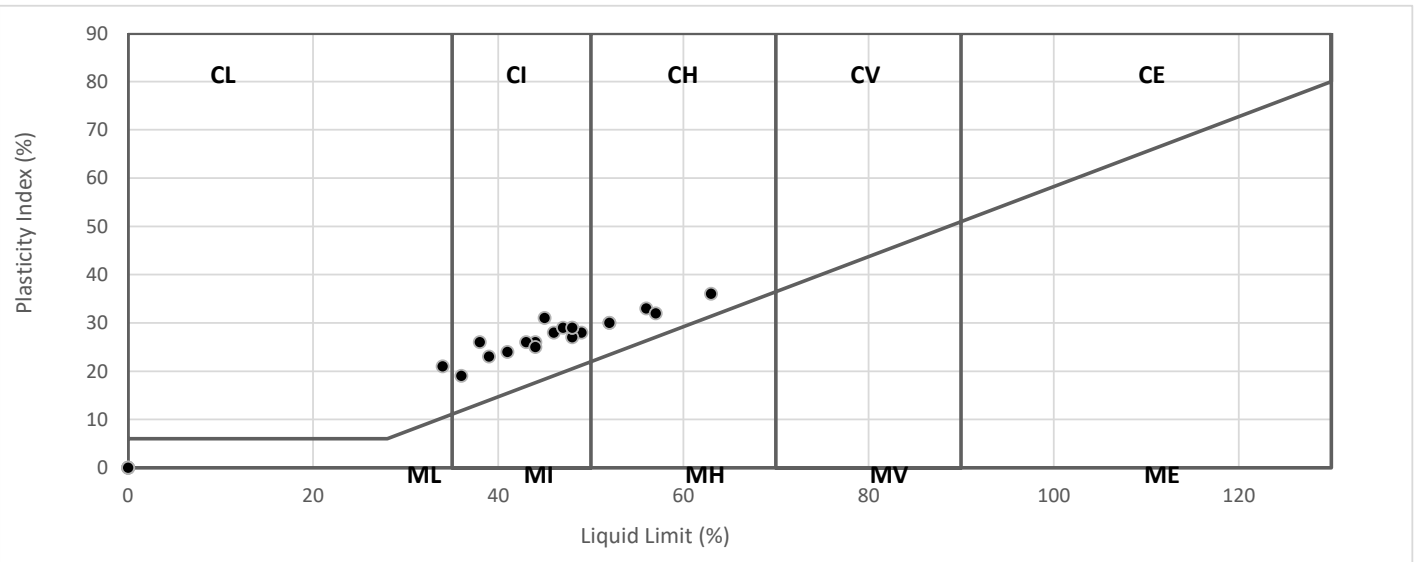
Contract Number	75204	
Project Name	Havant Railway Station Footbridge	
Date Tested	22/10/2024	

Sample/Hole Reference	Sample Number	Sample Type	Depth (m)			Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity index %	Passing 0.425mm %	Remarks
BH01	4	B	0.40	-	0.60	16	36	17	19	70	CI Intermediate Plasticity
BH01	5	D	0.90	-	1.00	11	34	13	21	29	CL Low Plasticity
BH01	10	B	2.00	-	2.45	15	44	18	26	33	CI Intermediate Plasticity
BH01	13	B	3.00	-	3.45	24	46	18	28	93	CI Intermediate Plasticity
BH01	15	B	4.00	-	4.45	26	43	17	26	87	CI Intermediate Plasticity
BH01	20	B	6.50	-	6.95	27	56	23	33	100	CH High Plasticity
BH01	27	B	9.50	-	9.95	30	52	22	30	100	CH High Plasticity
BH02	4	B	0.50	-	0.90	22	49	21	28	58	CI Intermediate Plasticity
BH02	5	B	1.20	-	1.65	13	38	12	26	30	CI Intermediate Plasticity
BH02	9	B	2.00	-	2.45	28	52	22	30	96	CH High Plasticity
BH02	11	B	3.00	-	3.45	26	63	27	36	98	CH High Plasticity
BH02	14	B	5.00	-	5.45	27	48	21	27	64	CI Intermediate Plasticity
BH02	19	B	8.00	-	8.45	32	57	25	32	99	CH High Plasticity
WS01	4	B	1.10	-	1.60	15	45	14	31	31	CI Intermediate Plasticity
WS02	5	B	1.30	-	1.80	28	48	19	29	96	CI Intermediate Plasticity
WS03	4	D	1.30	-	1.80	7.7		NP		12	
WS04	6	B	2.50	-	3.00	25	47	18	29	95	CI Intermediate Plasticity
WS04	7	B	3.00	-	4.00	23	44	19	25	99	CI Intermediate Plasticity
WS05	3	B	1.10	-	1.40	19	39	16	23	7	CI Intermediate Plasticity
WS05	6	B	2.20	-	2.70	22	41	17	24	100	CI Intermediate Plasticity
WS05	7	B	3.20	-	3.70	21	48	19	29	100	CI Intermediate Plasticity
				-							
				-							
				-							

Symbols: NP : Non Plastic # : Liquid Limit and Plastic Limit Wet Sieved

PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION

BS 5930:2015+A1:2020



Operator
Aaron Hodge

PARTICLE SIZE DISTRIBUTION
BS EN ISO 17892-4:2016
Wet Sieve, Clause 5.2

 Contract Number **75204**

 Borehole/Pit No. **BH01**

 Project Name **Havant Railway Station Footbridge**

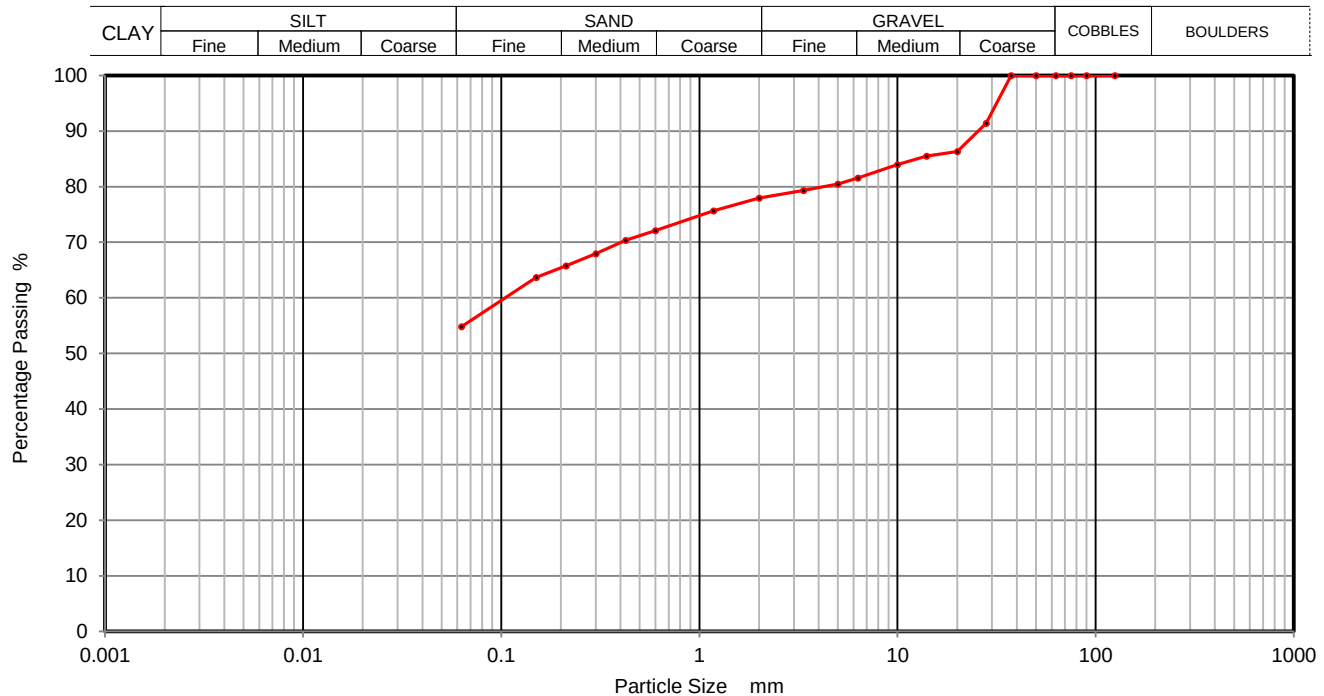
 Sample No. **4**

 Sample Description **Brown fine to coarse gravelly fine to coarse sandy SILT/CLAY**

 Depth Top **0.40**

 Depth Base **0.60**

 Date Tested **18/10/2024**

 Sample Type **B**


Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	91		
20	86		
14	86		
10	84		
6.3	82		
5	80		
3.35	79		
2	78		
1.18	76		
0.63	72		
0.425	70		
0.30	68		
0.20	66		
0.15	64		
0.063	55		

Sample Proportions	% dry mass
Cobbles	0
Gravel	22
Sand	23
Silt and Clay	55

Remarks
 Preparation and testing in accordance with BS17892 unless noted below

Operator

Jordan Williams

PARTICLE SIZE DISTRIBUTION
BS EN ISO 17892-4:2016
Wet Sieve, Clause 5.2

Contract Number **75204**

Borehole/Pit No. **BH01**

Project Name **Havant Railway Station Footbridge**

Sample No. **5**

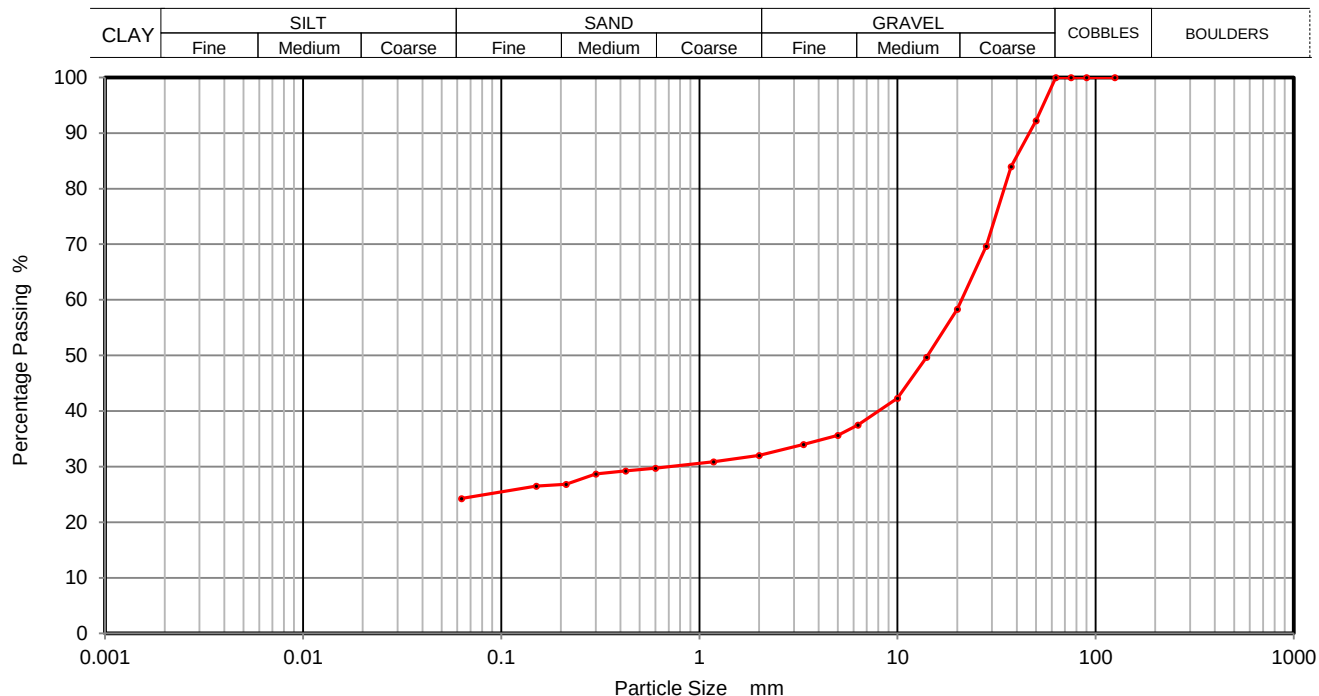
Sample Description **Brown fine to coarse sandy silty/clayey fine to coarse GRAVEL**

Depth Top **0.90**

Depth Base **1.00**

Date Tested **18/10/2024**

Sample Type **D**



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	92		
37.5	84		
28	70		
20	58		
14	50		
10	42		
6.3	37		
5	36		
3.35	34		
2	32		
1.18	31		
0.63	30		
0.425	29		
0.30	29		
0.20	27		
0.15	26		
0.063	24		

Sample Proportions	% dry mass
Cobbles	0
Gravel	68
Sand	8
Silt and Clay	24

Remarks
Preparation and testing in accordance with BS17892 unless noted below

Operator

Jordan Williams

PARTICLE SIZE DISTRIBUTION
BS EN ISO 17892-4:2016
Wet Sieve, Clause 5.2

Contract Number **75204**

Borehole/Pit No. **BH01**

Project Name **Havant Railway Station Footbridge**

Sample No. **10**

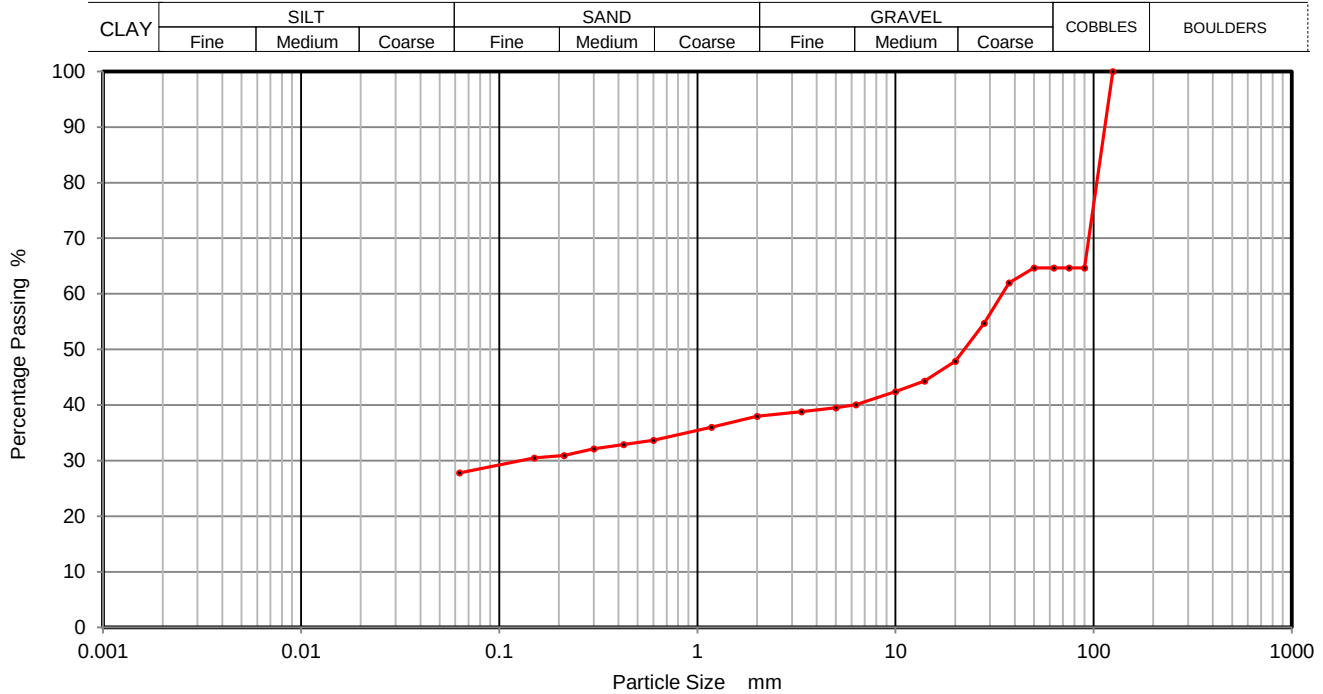
Sample Description **Brown fine to coarse sandy fine to coarse gravelly SILT/CLAY (with cobbles)**

Depth Top **2.00**

Depth Base **2.45**

Date Tested **18/10/2024**

Sample Type **B**



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	65		
75	65		
63	65		
50	65		
37.5	62		
28	55		
20	48		
14	44		
10	42		
6.3	40		
5	40		
3.35	39		
2	38		
1.18	36		
0.63	34		
0.425	33		
0.30	32		
0.20	31		
0.15	30		
0.063	28		

Sample Proportions	% dry mass
Cobbles	35
Gravel	27
Sand	10
Silt and Clay	28

Remarks
Preparation and testing in accordance with BS17892 unless noted below

Operator

Jordan Williams

PARTICLE SIZE DISTRIBUTION
BS EN ISO 17892-4:2016
Wet Sieve, Clause 5.2

 Contract Number **75204**

 Borehole/Pit No. **BH01**

 Project Name **Havant Railway Station Footbridge**

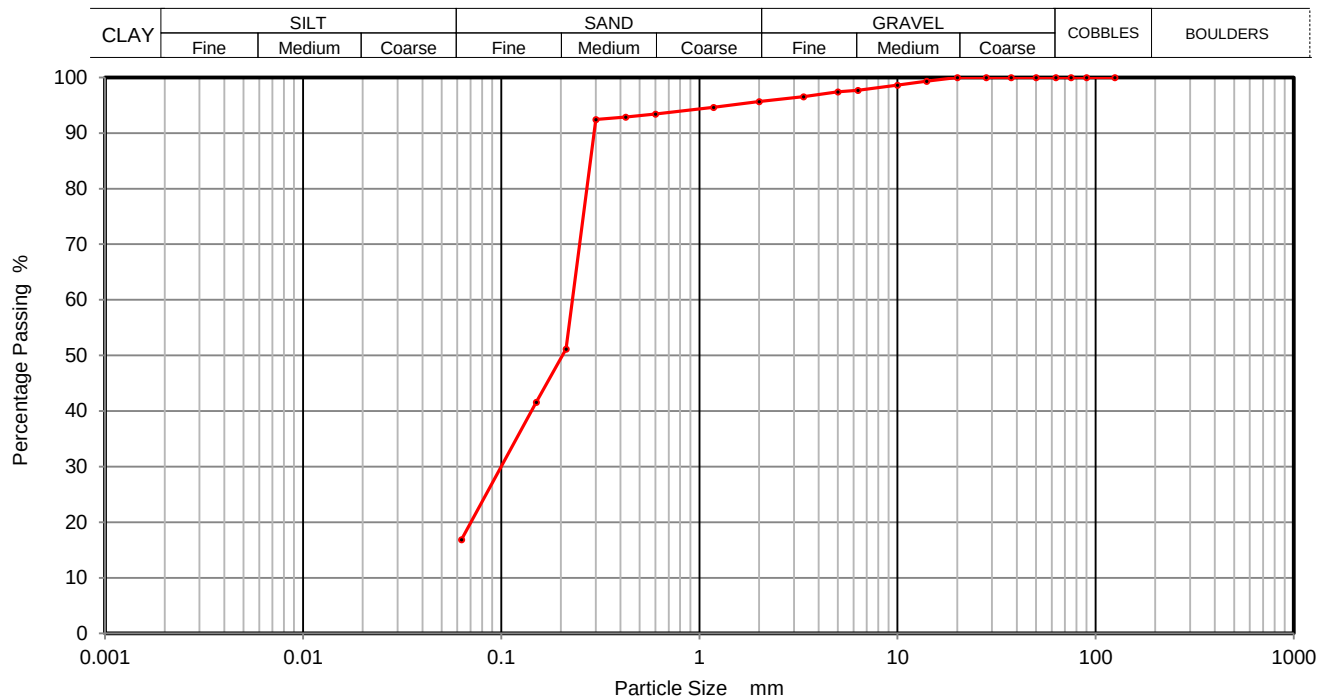
 Sample No. **13**

 Sample Description **Brown slightly gravelly silty/clayey fine to coarse SAND**

 Depth Top **3.00**

 Depth Base **3.45**

 Date Tested **18/10/2024**

 Sample Type **B**


Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	99		
10	99		
6.3	98		
5	97		
3.35	97		
2	96		
1.18	95		
0.63	93		
0.425	93		
0.30	92		
0.20	51		
0.15	42		
0.063	17		

Sample Proportions	% dry mass
Cobbles	0
Gravel	4
Sand	79
Silt and Clay	17

 Remarks
 Preparation and testing in accordance with BS17892 unless noted below

Operator

Jordan Williams

PARTICLE SIZE DISTRIBUTION
BS EN ISO 17892-4:2016
Wet Sieve, Clause 5.2

 Contract Number **75204**

 Borehole/Pit No. **BH01**

 Project Name **Havant Railway Station Footbridge**

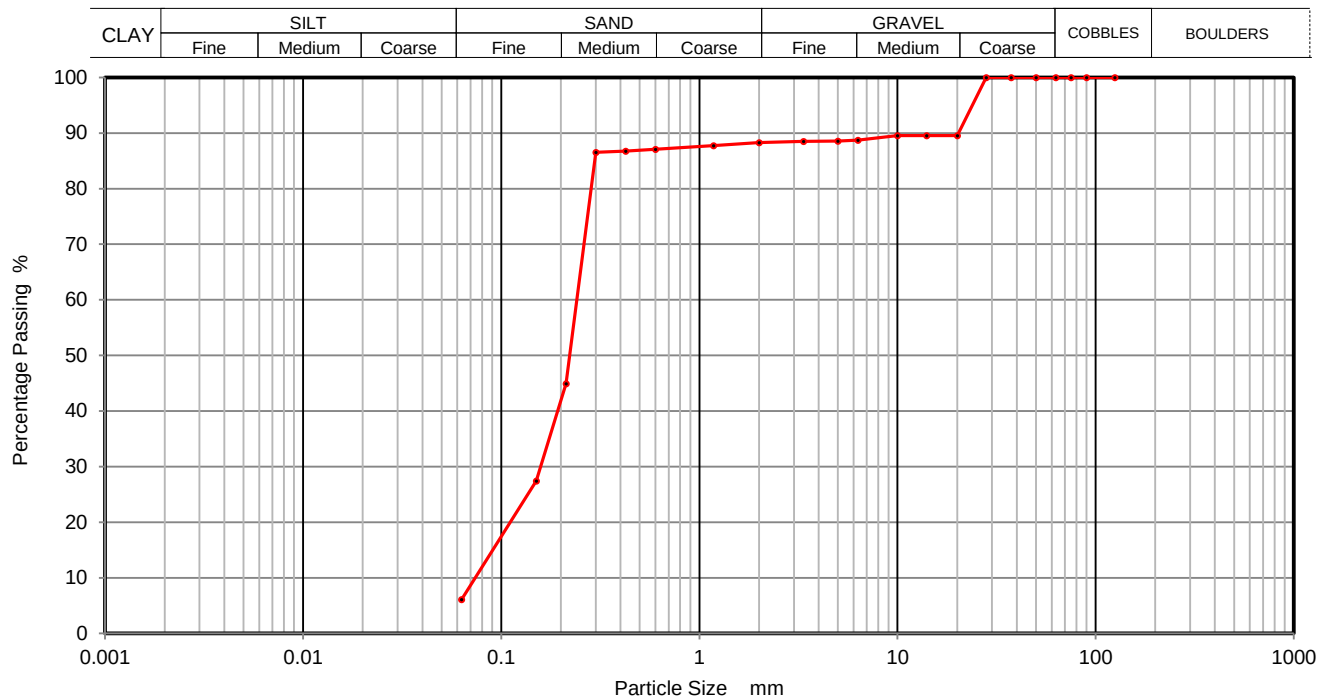
 Sample No. **15**

 Sample Description **Brown silty/clayey fine to coarse gravelly fine to coarse SAND**

 Depth Top **4.00**

 Depth Base **4.45**

 Date Tested **18/10/2024**

 Sample Type **B**


Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	90		
14	90		
10	90		
6.3	89		
5	89		
3.35	89		
2	88		
1.18	88		
0.63	87		
0.425	87		
0.30	87		
0.20	45		
0.15	27		
0.063	6		

Sample Proportions	% dry mass
Cobbles	0
Gravel	12
Sand	82
Silt and Clay	6

Remarks
 Preparation and testing in accordance with BS17892 unless noted below

Operator

Jordan Williams

PARTICLE SIZE DISTRIBUTION
BS EN ISO 17892-4:2016
Wet Sieve, Clause 5.2

Contract Number **75204**

Borehole/Pit No. **BH01**

Project Name **Havant Railway Station Footbridge**

Sample No. **20**

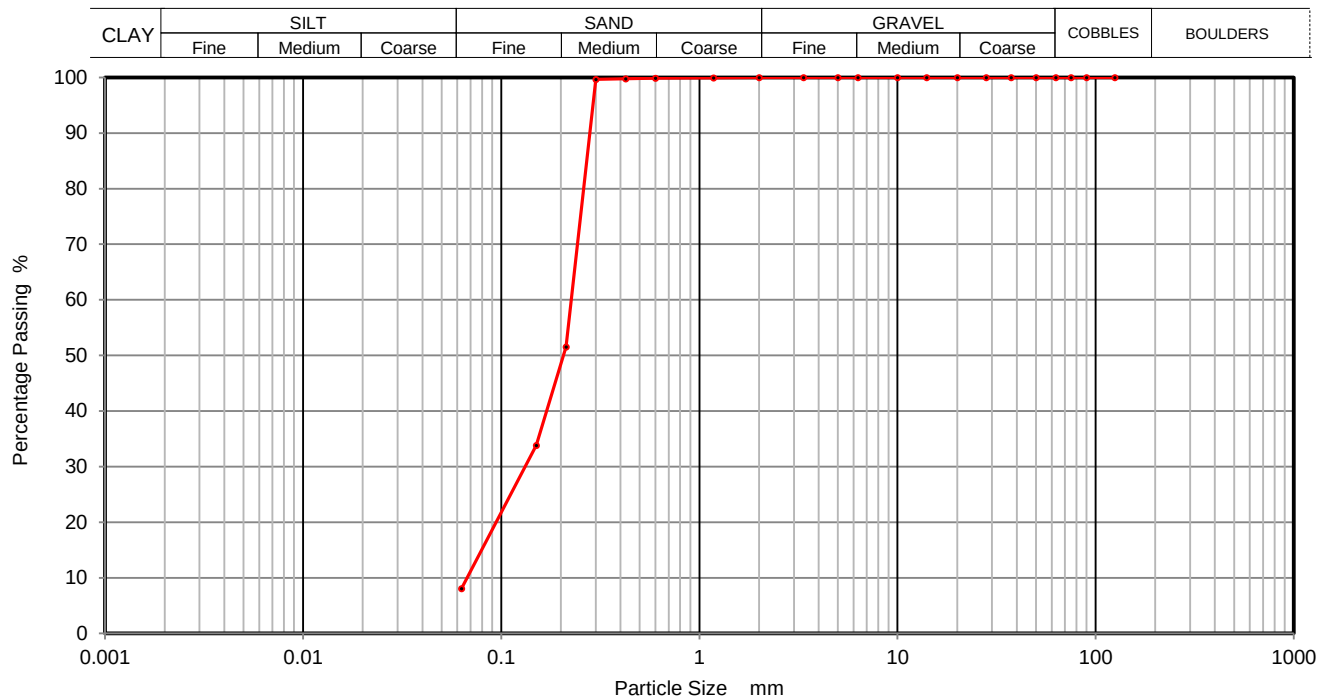
Sample Description **Brown silty/clayey fine to coarse SAND**

Depth Top **6.50**

Depth Base **6.95**

Date Tested **18/10/2024**

Sample Type **B**



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.63	100		
0.425	100		
0.30	100		
0.20	52		
0.15	34		
0.063	8		

Sample Proportions	% dry mass
Cobbles	0
Gravel	0
Sand	92
Silt and Clay	8

Remarks
Preparation and testing in accordance with BS17892 unless noted below

Operator

Jordan Williams

PARTICLE SIZE DISTRIBUTION
BS EN ISO 17892-4:2016
Wet Sieve, Clause 5.2

 Contract Number **75204**

 Borehole/Pit No. **BH01**

 Project Name **Havant Railway Station Footbridge**

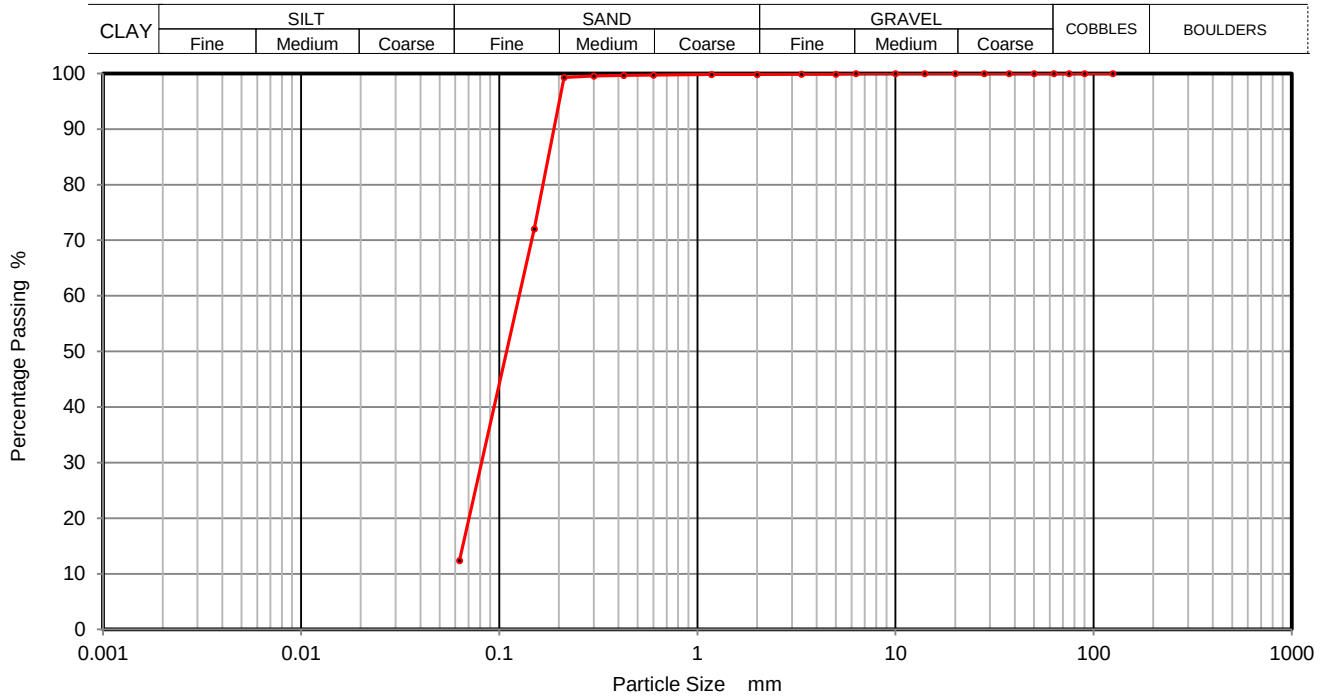
 Sample No. **27**

 Sample Description **Brown grey silty/clayey fine to coarse SAND**

 Depth Top **9.50**

 Depth Base **9.95**

 Date Tested **18/10/2024**

 Sample Type **B**


Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.63	100		
0.425	100		
0.30	100		
0.20	99		
0.15	72		
0.063	12		

Sample Proportions	% dry mass
Cobbles	0
Gravel	0
Sand	88
Silt and Clay	12

Remarks
 Preparation and testing in accordance with BS17892 unless noted below

Operator

Jordan Williams

PARTICLE SIZE DISTRIBUTION
BS EN ISO 17892-4:2016
Wet Sieve, Clause 5.2

Contract Number **75204**

Borehole/Pit No. **BH02**

Project Name **Havant Railway Station Footbridge**

Sample No. **4**

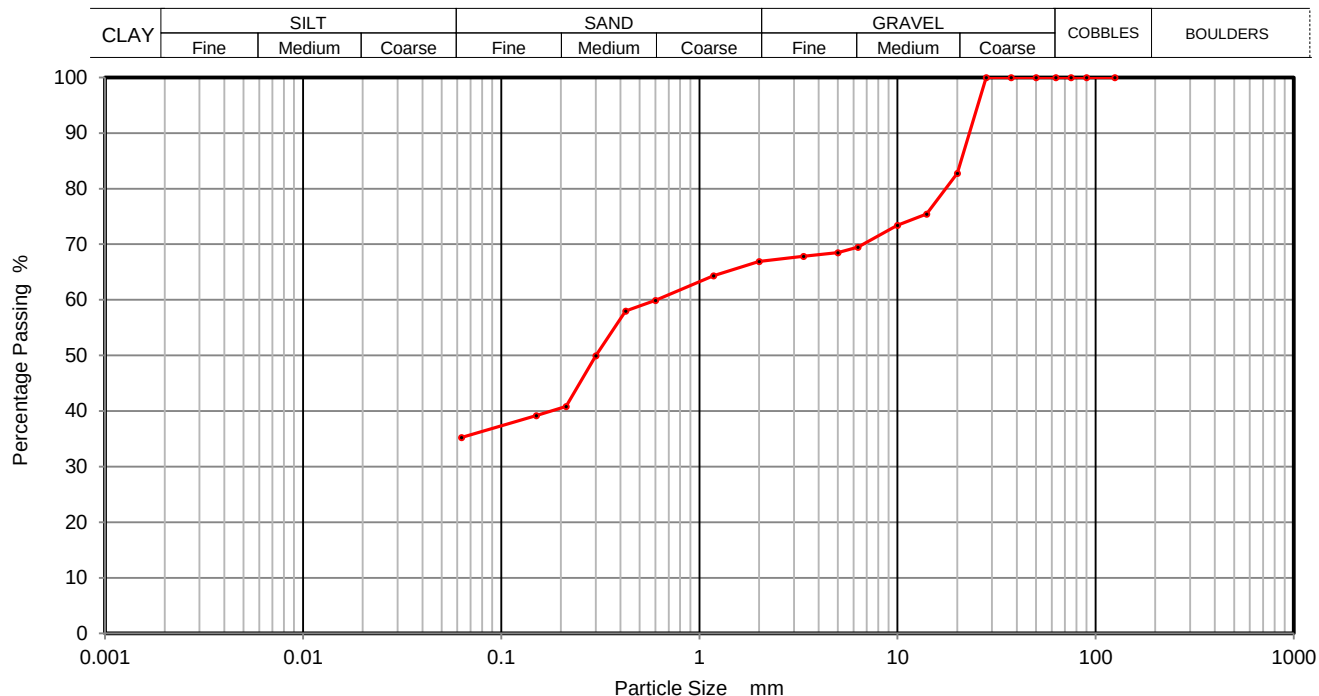
Sample Description **Brown fine to coarse sandy fine to coarse gravelly SILT/CLAY**

Depth Top **0.50**

Depth Base **0.90**

Date Tested **18/10/2024**

Sample Type **B**



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	83		
14	75		
10	73		
6.3	69		
5	69		
3.35	68		
2	67		
1.18	64		
0.63	60		
0.425	58		
0.30	50		
0.20	41		
0.15	39		
0.063	35		

Sample Proportions	% dry mass
Cobbles	0
Gravel	33
Sand	32
Silt and Clay	35

Remarks
Preparation and testing in accordance with BS17892 unless noted below

Operator

Jordan Williams

PARTICLE SIZE DISTRIBUTION
BS EN ISO 17892-4:2016
Wet Sieve, Clause 5.2

 Contract Number **75204**

 Borehole/Pit No. **BH02**

 Project Name **Havant Railway Station Footbridge**

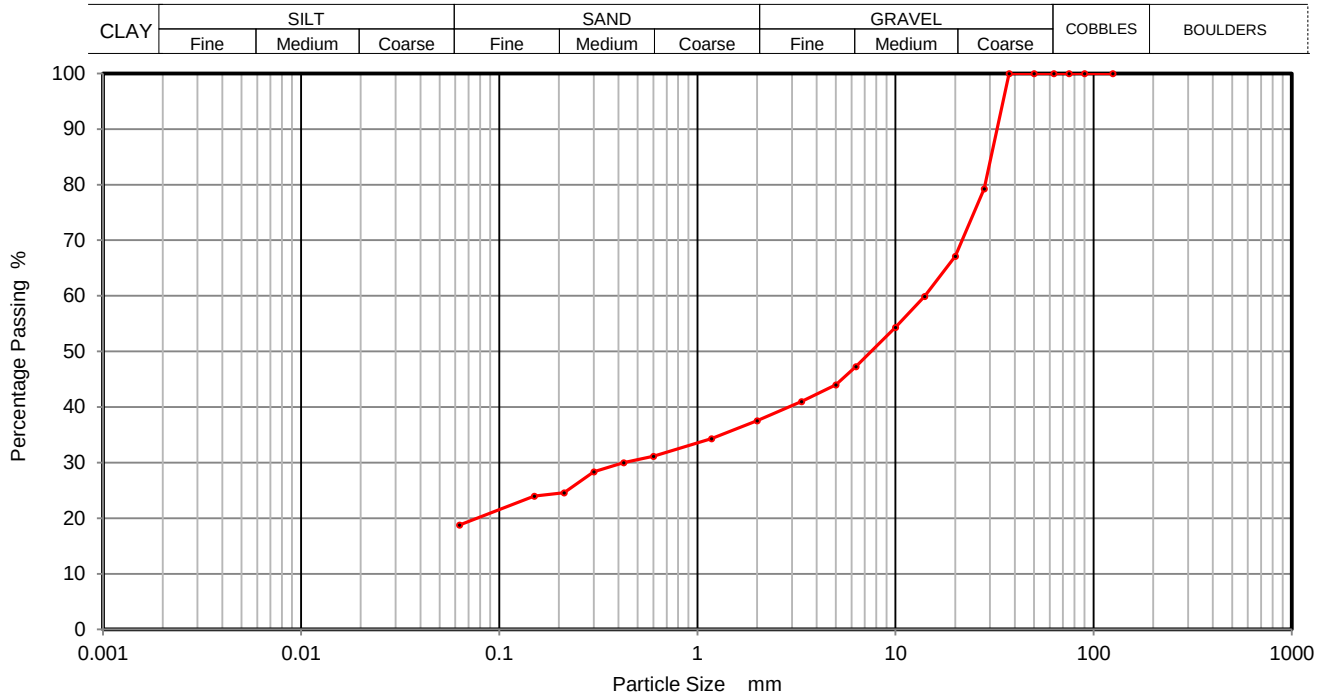
 Sample No. **5**

 Sample Description **Brown silty/clayey fine to coarse sandy fine to coarse GRAVEL**

 Depth Top **1.20**

 Depth Base **1.65**

 Date Tested **18/10/2024**

 Sample Type **B**


Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	79		
20	67		
14	60		
10	54		
6.3	47		
5	44		
3.35	41		
2	38		
1.18	34		
0.63	31		
0.425	30		
0.30	28		
0.20	25		
0.15	24		
0.063	19		

Sample Proportions	% dry mass
Cobbles	0
Gravel	62
Sand	19
Silt and Clay	19

Remarks
 Preparation and testing in accordance with BS17892 unless noted below

Operator

Jordan Williams

PARTICLE SIZE DISTRIBUTION
BS EN ISO 17892-4:2016
Wet Sieve, Clause 5.2

Contract Number **75204**

Borehole/Pit No. **BH02**

Project Name **Havant Railway Station Footbridge**

Sample No. **9**

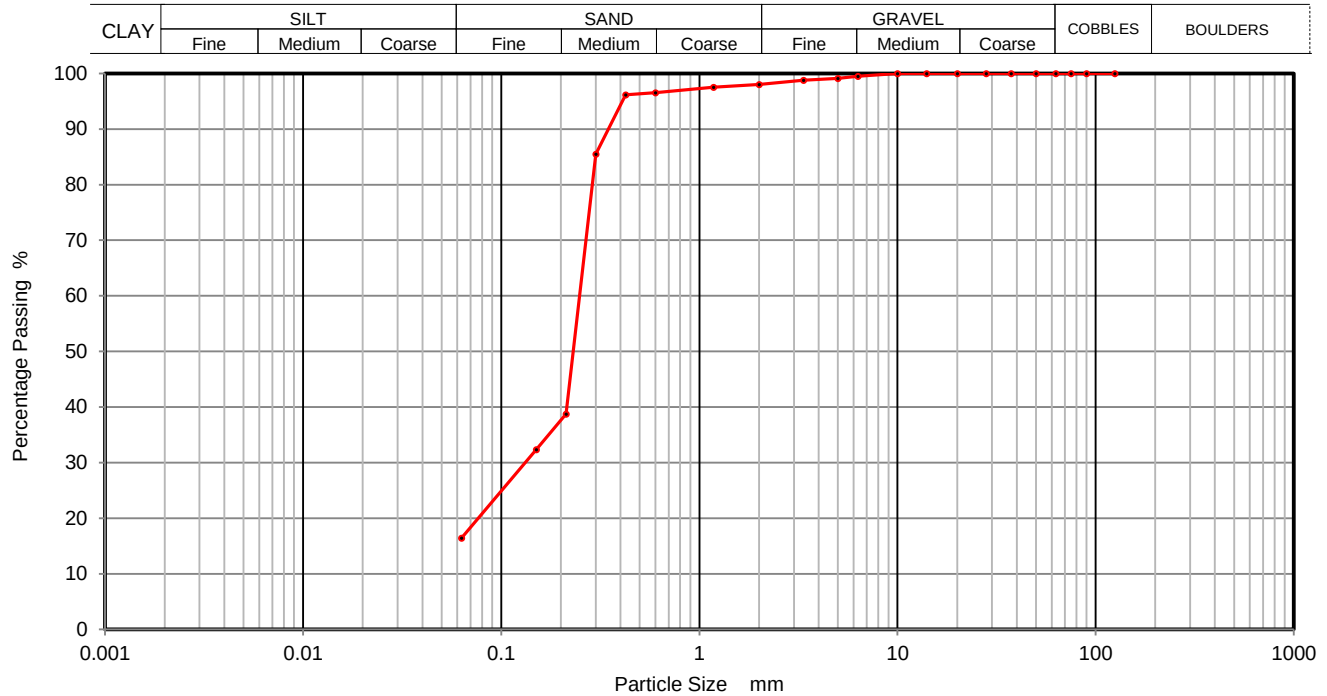
Sample Description **Brown slightly gravelly silty/clayey fine to coarse SAND**

Depth Top **2.00**

Depth Base **2.45**

Date Tested **18/10/2024**

Sample Type **B**



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	99		
5	99		
3.35	99		
2	98		
1.18	98		
0.63	97		
0.425	96		
0.30	86		
0.20	39		
0.15	32		
0.063	16		

Sample Proportions	% dry mass
Cobbles	0
Gravel	2
Sand	82
Silt and Clay	16

Remarks
Preparation and testing in accordance with BS17892 unless noted below

Operator

Jordan Williams

PARTICLE SIZE DISTRIBUTION
BS EN ISO 17892-4:2016
Wet Sieve, Clause 5.2

Contract Number **75204**

Borehole/Pit No. **BH02**

Project Name **Havant Railway Station Footbridge**

Sample No. **11**

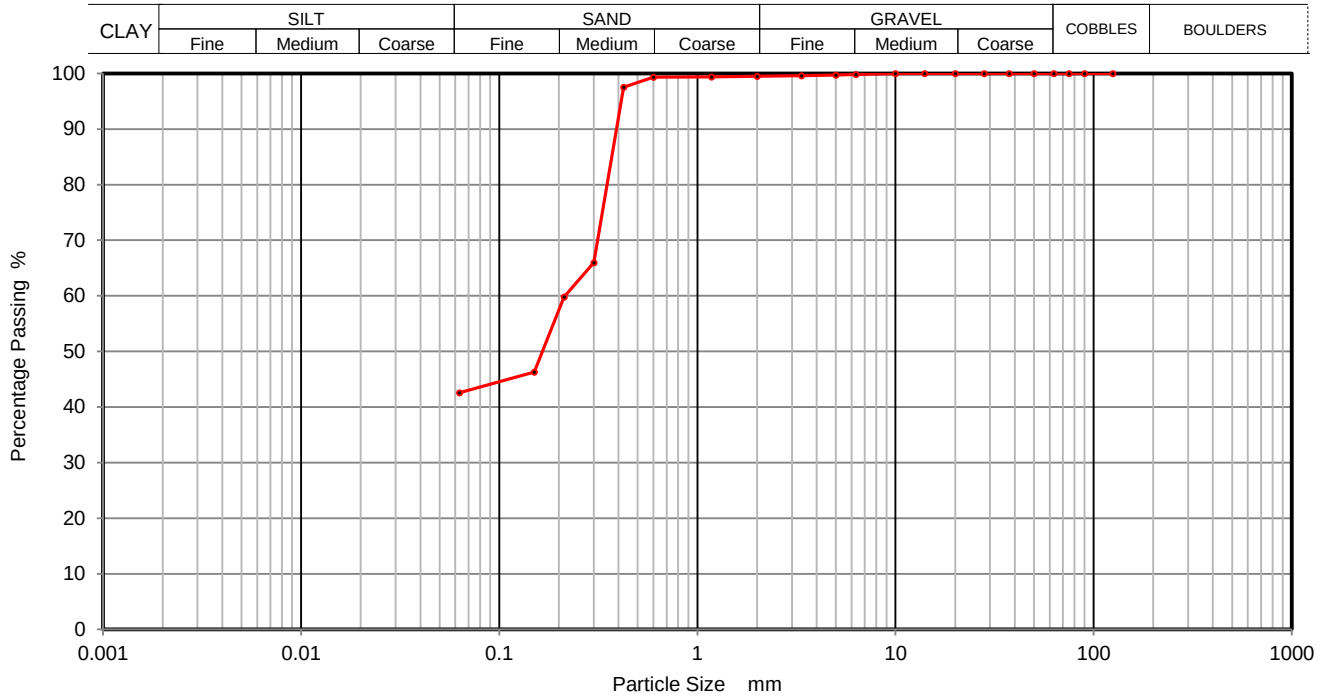
Sample Description **Brown fine to coarse sandy SILT/CLAY**

Depth Top **3.00**

Depth Base **3.45**

Date Tested **18/10/2024**

Sample Type **B**



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	99		
0.63	99		
0.425	98		
0.30	66		
0.20	60		
0.15	46		
0.063	43		

Sample Proportions	% dry mass
Cobbles	0
Gravel	0
Sand	57
Silt and Clay	43

Remarks
Preparation and testing in accordance with BS17892 unless noted below

Operator

Jordan Williams

PARTICLE SIZE DISTRIBUTION
BS EN ISO 17892-4:2016
Wet Sieve, Clause 5.2

 Contract Number **75204**

 Borehole/Pit No. **BH02**

 Project Name **Havant Railway Station Footbridge**

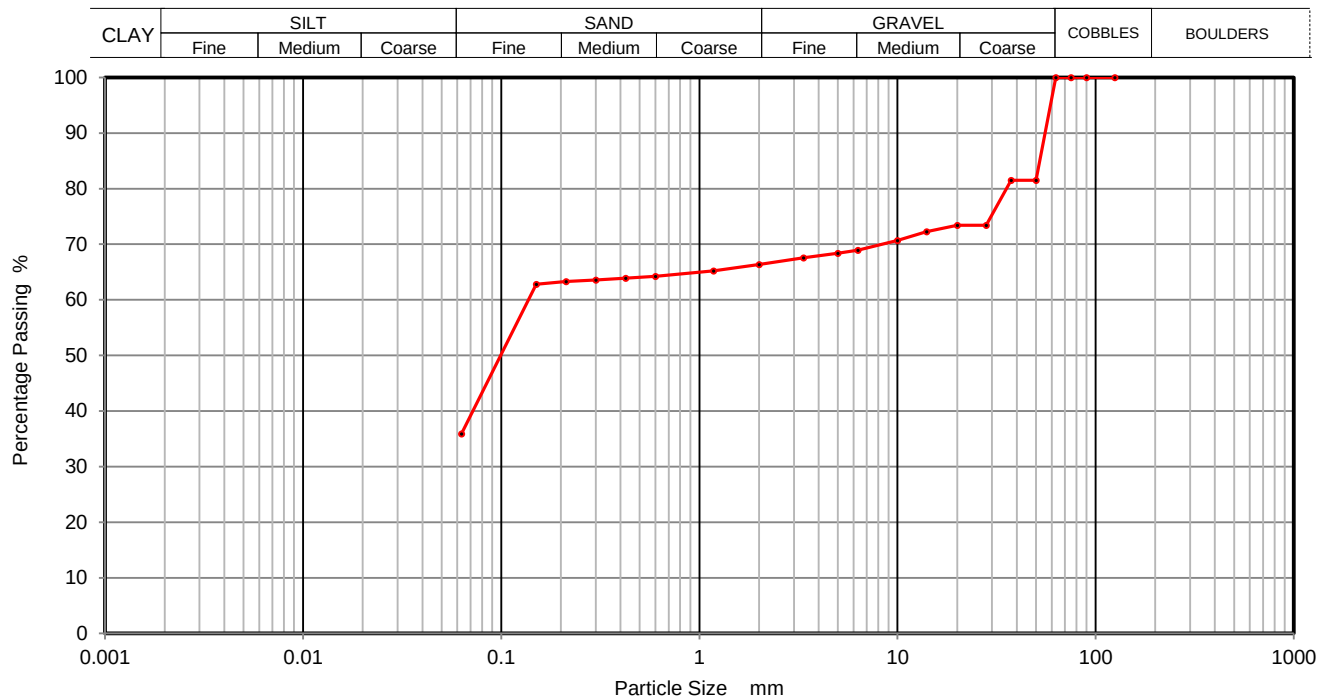
 Sample No. **14**

 Sample Description **Brown fine to coarse sandy fine to coarse gravelly SILT/CLAY**

 Depth Top **5.00**

 Depth Base **5.45**

 Date Tested **18/10/2024**

 Sample Type **B**


Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	82		
37.5	82		
28	73		
20	73		
14	72		
10	71		
6.3	69		
5	68		
3.35	68		
2	66		
1.18	65		
0.63	64		
0.425	64		
0.30	64		
0.20	63		
0.15	63		
0.063	36		

Sample Proportions	% dry mass
Cobbles	0
Gravel	34
Sand	30
Silt and Clay	36

 Remarks
 Preparation and testing in accordance with BS17892 unless noted below

Operator

Jordan Williams

PARTICLE SIZE DISTRIBUTION
BS EN ISO 17892-4:2016
Wet Sieve, Clause 5.2

Contract Number **75204**

Borehole/Pit No. **BH02**

Project Name **Havant Railway Station Footbridge**

Sample No. **19**

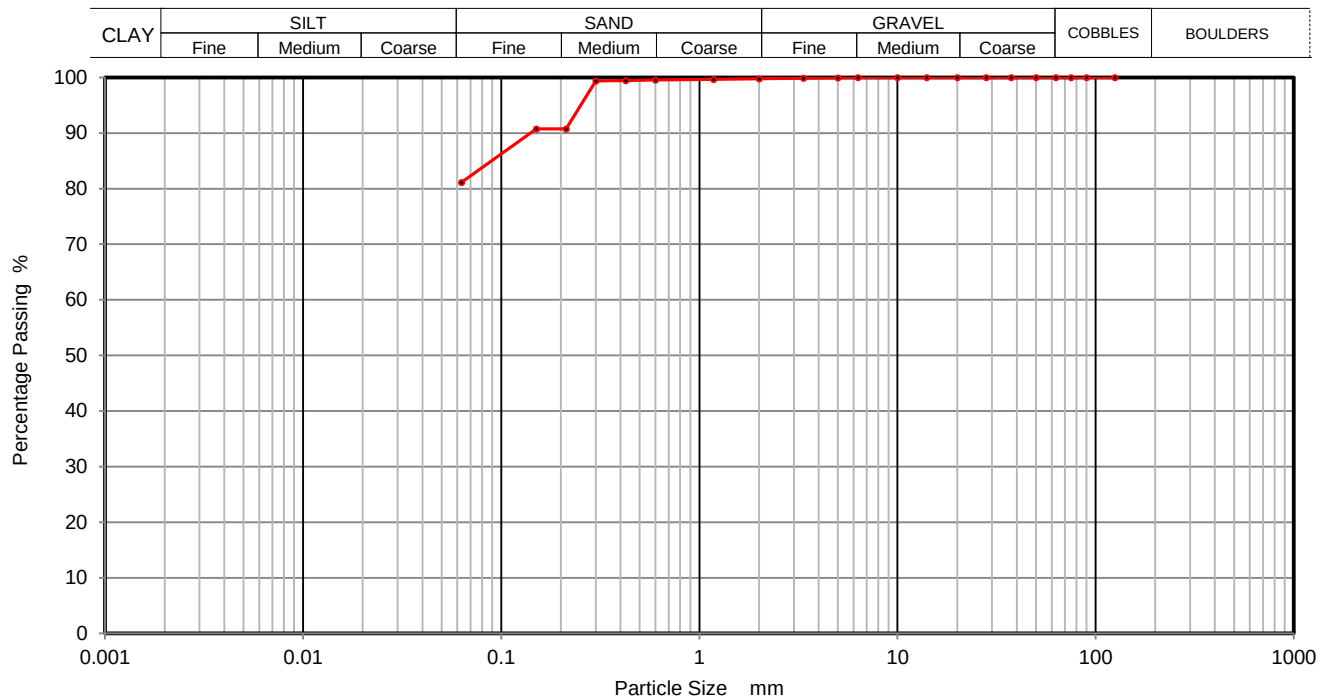
Sample Description **Grey fine to coarse sandy SILT/CLAY**

Depth Top **8.00**

Depth Base **8.45**

Date Tested **18/10/2024**

Sample Type **B**



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.63	100		
0.425	99		
0.30	99		
0.20	91		
0.15	91		
0.063	81		

Sample Proportions	% dry mass
Cobbles	0
Gravel	0
Sand	19
Silt and Clay	81

Remarks
Preparation and testing in accordance with BS17892 unless noted below

Operator

Jordan Williams

PARTICLE SIZE DISTRIBUTION
BS EN ISO 17892-4:2016
Wet Sieve, Clause 5.2

Contract Number **75204**

Borehole/Pit No. **WS01**

Project Name **Havant Railway Station Footbridge**

Sample No. **4**

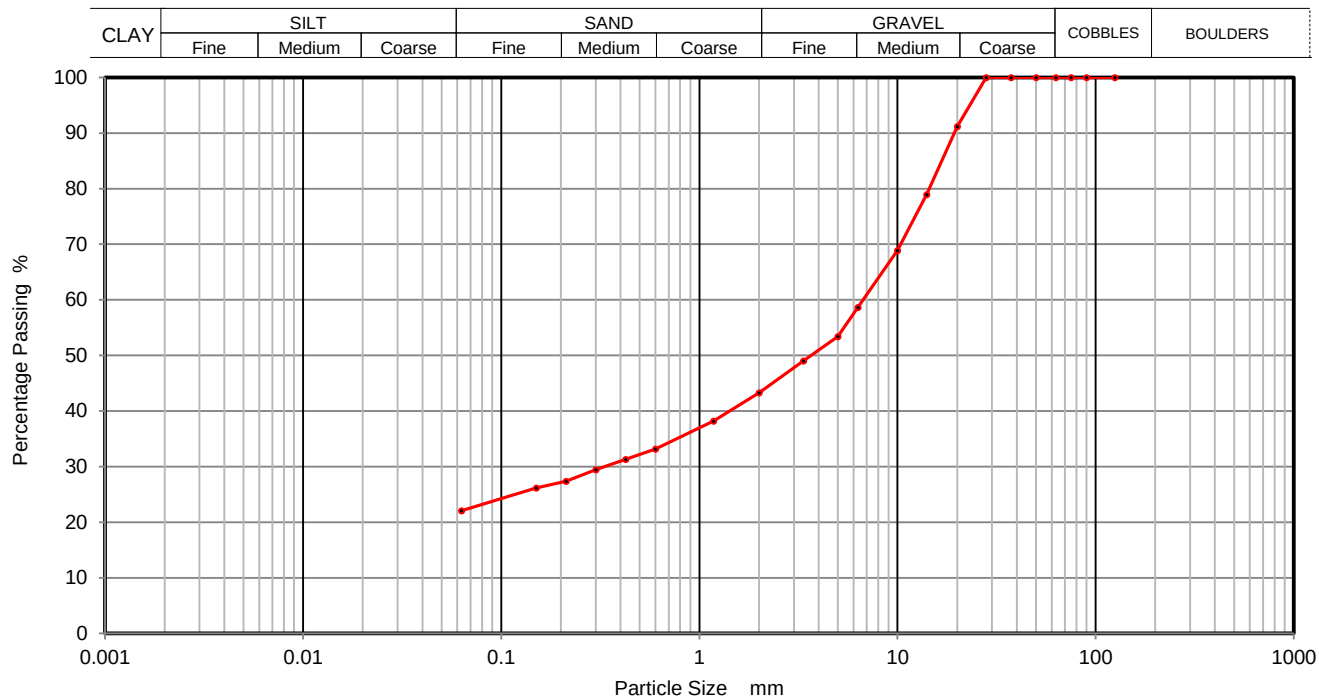
Sample Description **Brown fine to coarse sandy silty/clayey fine to coarse GRAVEL**

Depth Top **1.10**

Depth Base **1.60**

Date Tested **18/10/2024**

Sample Type **B**



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	91		
14	79		
10	69		
6.3	59		
5	53		
3.35	49		
2	43		
1.18	38		
0.63	33		
0.425	31		
0.30	29		
0.20	27		
0.15	26		
0.063	22		

Sample Proportions	% dry mass
Cobbles	0
Gravel	57
Sand	21
Silt and Clay	22

Remarks
Preparation and testing in accordance with BS17892 unless noted below

Operator

Jordan Williams

PARTICLE SIZE DISTRIBUTION
BS EN ISO 17892-4:2016
Wet Sieve, Clause 5.2

Contract Number **75204**

Borehole/Pit No. **WS02**

Project Name **Havant Railway Station Footbridge**

Sample No. **5**

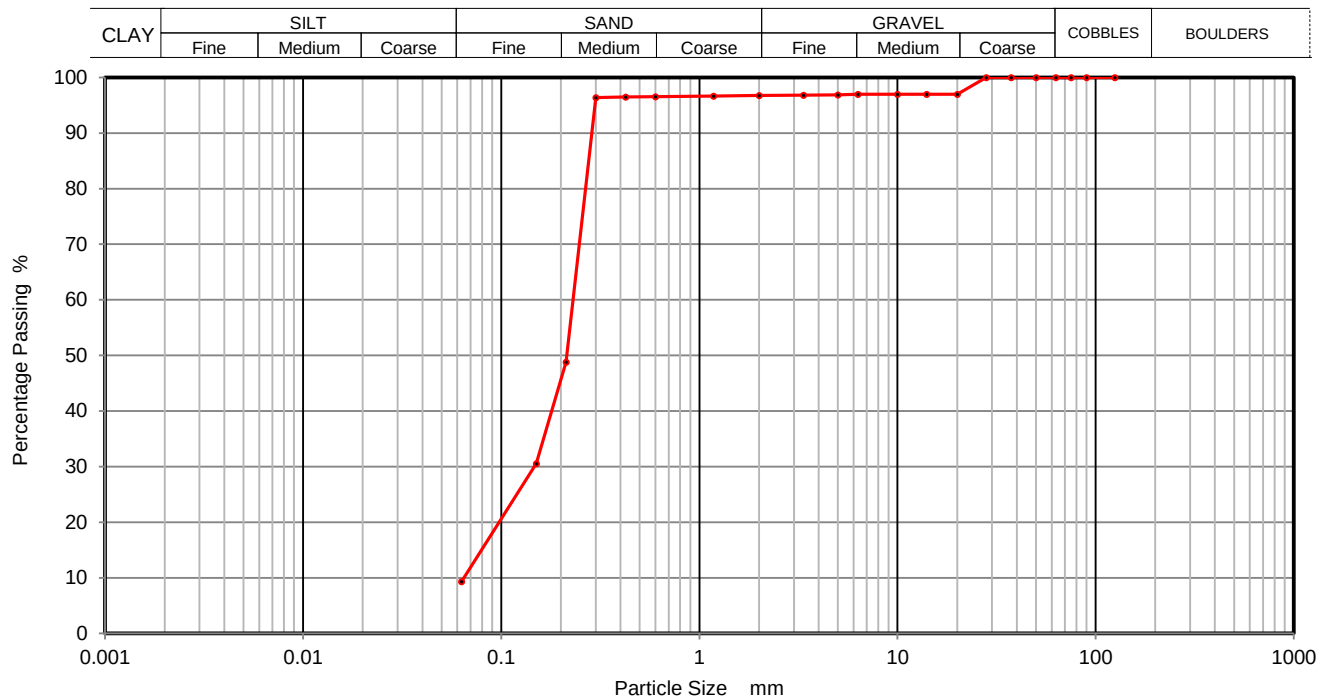
Sample Description **Brown slightly gravelly clayey/silty fine to coarse SAND**

Depth Top **1.30**

Depth Base **1.80**

Date Tested **18/10/2024**

Sample Type **B**



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	97		
14	97		
10	97		
6.3	97		
5	97		
3.35	97		
2	97		
1.18	97		
0.63	97		
0.425	96		
0.30	96		
0.20	49		
0.15	31		
0.063	9		

Sample Proportions	% dry mass
Cobbles	0
Gravel	3
Sand	88
Silt and Clay	9

Remarks
Preparation and testing in accordance with BS17892 unless noted below

Operator

Jordan Williams

PARTICLE SIZE DISTRIBUTION
BS EN ISO 17892-4:2016
Wet Sieve, Clause 5.2

Contract Number **75204**

Borehole/Pit No. **WS04**

Project Name **Havant Railway Station Footbridge**

Sample No. **6**

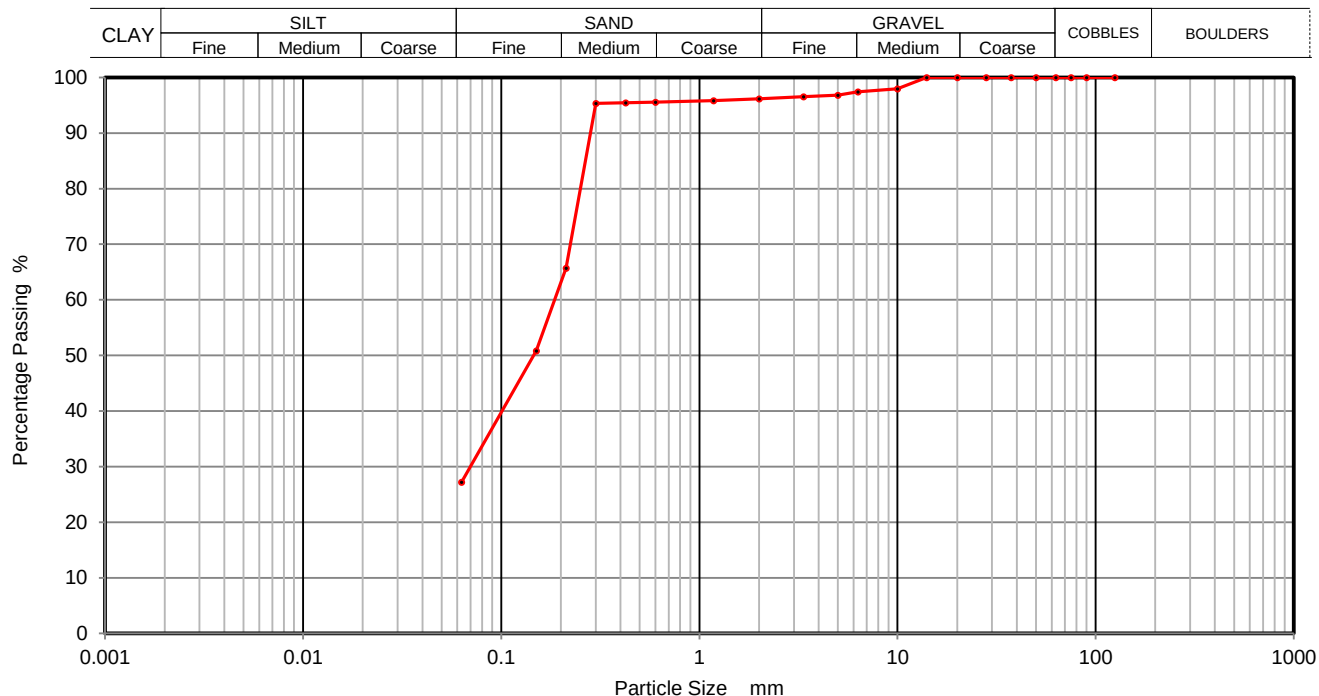
Sample Description **Brown slightly fine to medium gravelly silty/clayey fine to coarse SAND**

Depth Top **2.50**

Depth Base **3.00**

Date Tested **18/10/2024**

Sample Type **B**



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	98		
6.3	97		
5	97		
3.35	97		
2	96		
1.18	96		
0.63	96		
0.425	95		
0.30	95		
0.20	66		
0.15	51		
0.063	27		

Sample Proportions	% dry mass
Cobbles	0
Gravel	4
Sand	69
Silt and Clay	27

Remarks
Preparation and testing in accordance with BS17892 unless noted below

Operator

Jordan Williams

PARTICLE SIZE DISTRIBUTION
BS EN ISO 17892-4:2016
Wet Sieve, Clause 5.2

Contract Number **75204**

Borehole/Pit No. **WS04**

Project Name **Havant Railway Station Footbridge**

Sample No. **7**

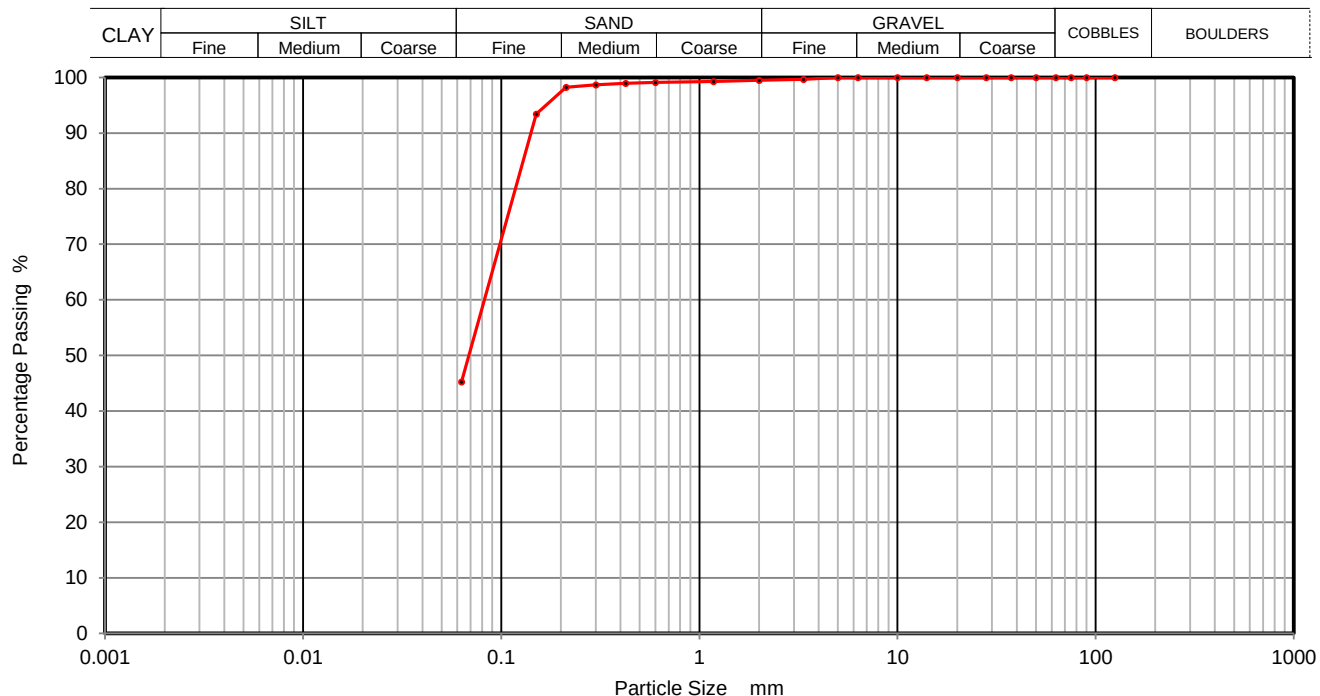
Sample Description **Brown slightly gravelly fine to coarse sandy SILT/CLAY**

Depth Top **3.00**

Depth Base **4.00**

Date Tested **18/10/2024**

Sample Type **B**



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	99		
1.18	99		
0.63	99		
0.425	99		
0.30	99		
0.20	98		
0.15	93		
0.063	45		

Sample Proportions	% dry mass
Cobbles	0
Gravel	1
Sand	54
Silt and Clay	45

Remarks
Preparation and testing in accordance with BS17892 unless noted below

Operator

Jordan Williams

PARTICLE SIZE DISTRIBUTION
BS EN ISO 17892-4:2016
Wet Sieve, Clause 5.2

 Contract Number **75204**

 Borehole/Pit No. **WS05**

 Project Name **Havant Railway Station Footbridge**

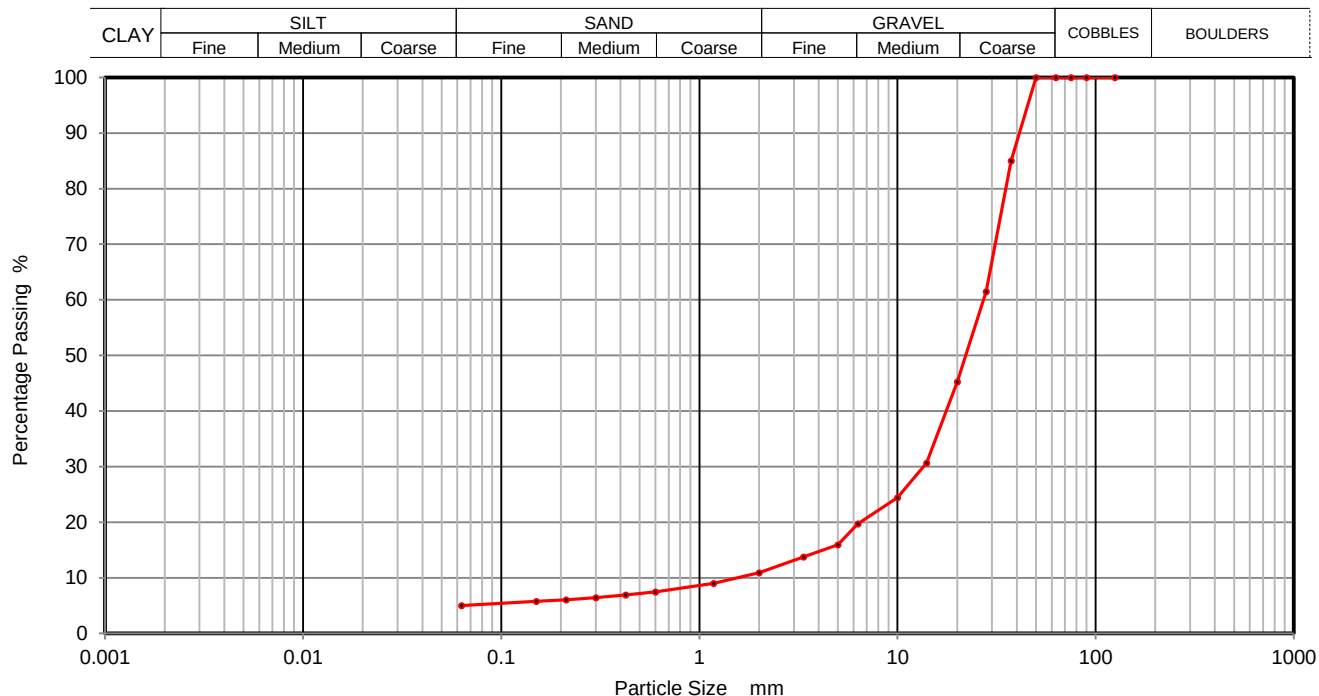
 Sample No. **3**

 Sample Description **Brown silty/clayey fine to coarse sandy fine to coarse GRAVEL**

 Depth Top **1.10**

 Depth Base **1.40**

 Date Tested **18/10/2024**

 Sample Type **B**


Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	85		
28	61		
20	45		
14	31		
10	24		
6.3	20		
5	16		
3.35	14		
2	11		
1.18	9		
0.63	7		
0.425	7		
0.30	6		
0.20	6		
0.15	6		
0.063	5		

Sample Proportions	% dry mass
Cobbles	0
Gravel	89
Sand	6
Silt and Clay	5

Remarks
 Preparation and testing in accordance with BS17892 unless noted below

Operator

Jordan Williams

PARTICLE SIZE DISTRIBUTION
BS EN ISO 17892-4:2016
Wet Sieve, Clause 5.2

Contract Number **75204**

Borehole/Pit No. **WS05**

Project Name **Havant Railway Station Footbridge**

Sample No. **6**

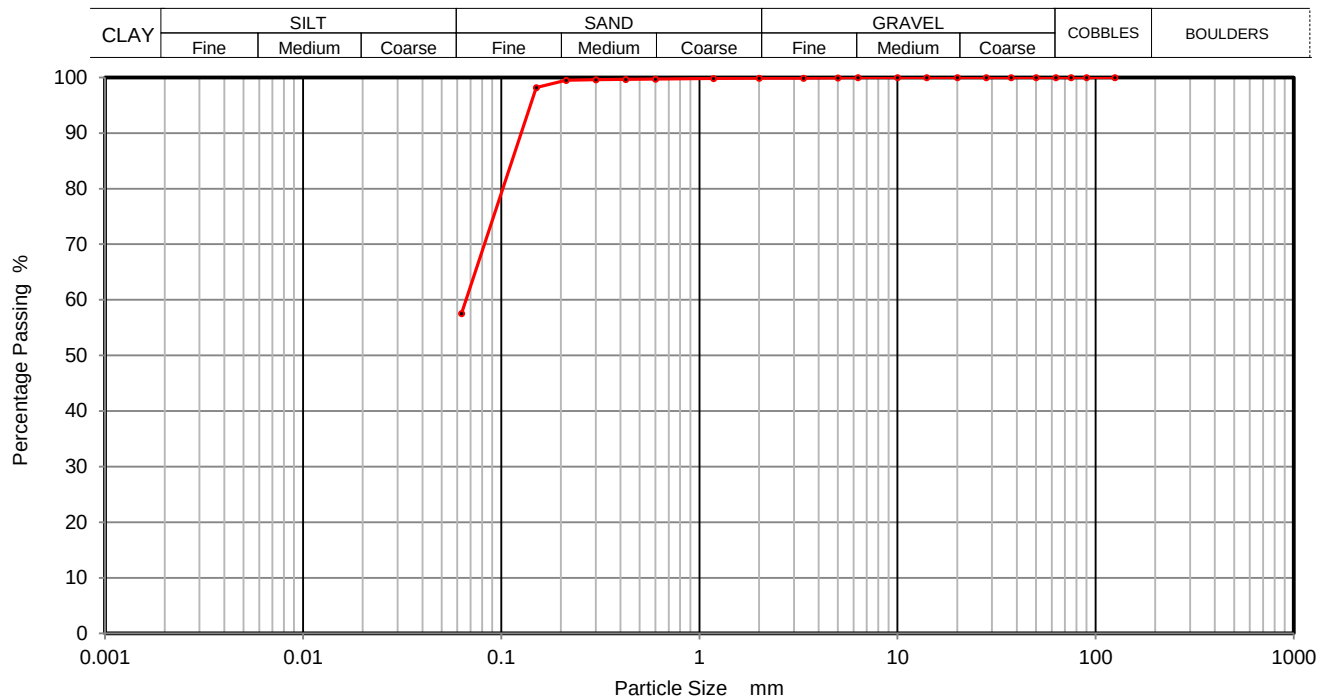
Sample Description **Grey fine to coarse sandy SILT/CLAY**

Depth Top **2.20**

Depth Base **2.70**

Date Tested **18/10/2024**

Sample Type **B**



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.63	100		
0.425	100		
0.30	100		
0.20	100		
0.15	98		
0.063	58		

Sample Proportions	% dry mass
Cobbles	0
Gravel	0
Sand	42
Silt and Clay	58

Remarks
Preparation and testing in accordance with BS17892 unless noted below

Operator

Jordan Williams

PARTICLE SIZE DISTRIBUTION
BS EN ISO 17892-4:2016
Wet Sieve, Clause 5.2

Contract Number **75204**

Borehole/Pit No. **WS05**

Project Name **Havant Railway Station Footbridge**

Sample No. **7**

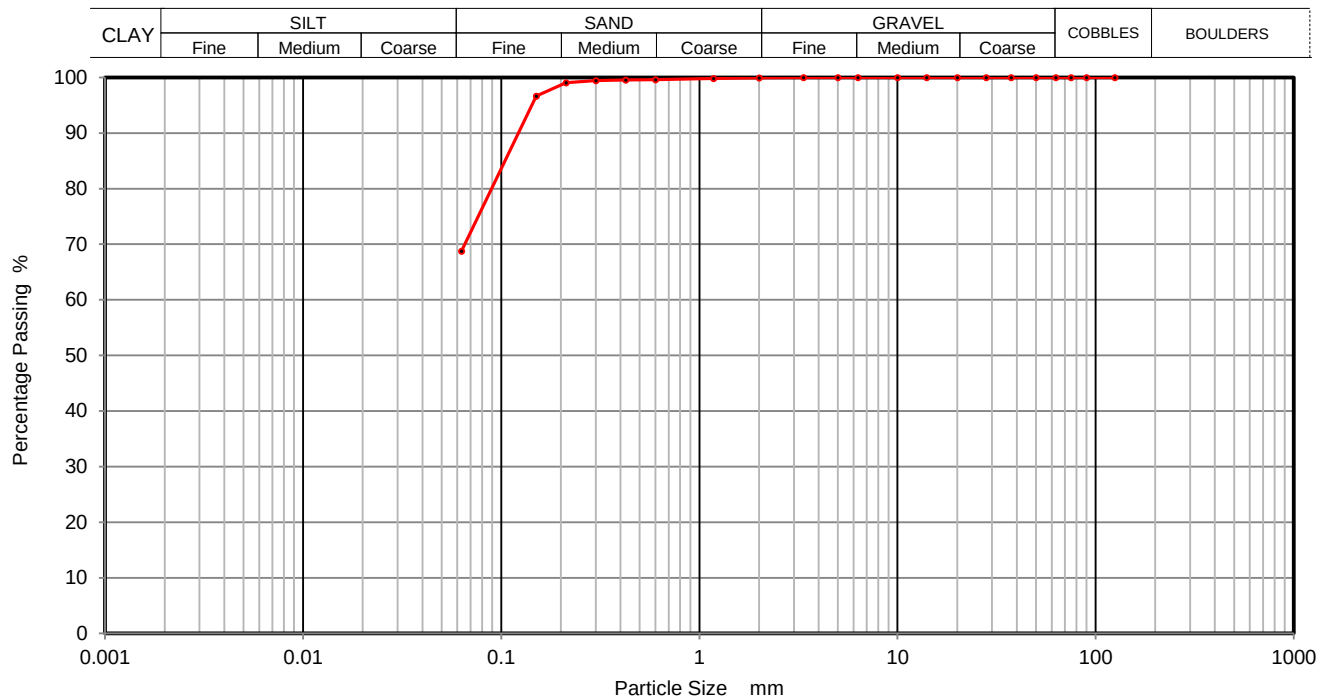
Sample Description **Grey fine to coarse sandy SILT/CLAY**

Depth Top **3.20**

Depth Base **3.70**

Date Tested **18/10/2024**

Sample Type **B**



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.63	100		
0.425	100		
0.30	99		
0.20	99		
0.15	97		
0.063	69		

Sample Proportions	% dry mass
Cobbles	0
Gravel	0
Sand	31
Silt and Clay	69

Remarks
Preparation and testing in accordance with BS17892 unless noted below

Operator

Jordan Williams

Test Report: MS DIRECT SHEARBOX TEST.BS1377:Part 7:4.5 :1990.

Borehole Number: BH01 Depth from (m): 2.00
 Sample Number : 10 Depth to (m): 2.45

Sample Type: B
 Particle Density - Mg/m³: 2.65 (Assumed)
 Specimen Tested: Submerged, Remoulded (Light Tamping) Material above 2mm removed.

Sample Description:

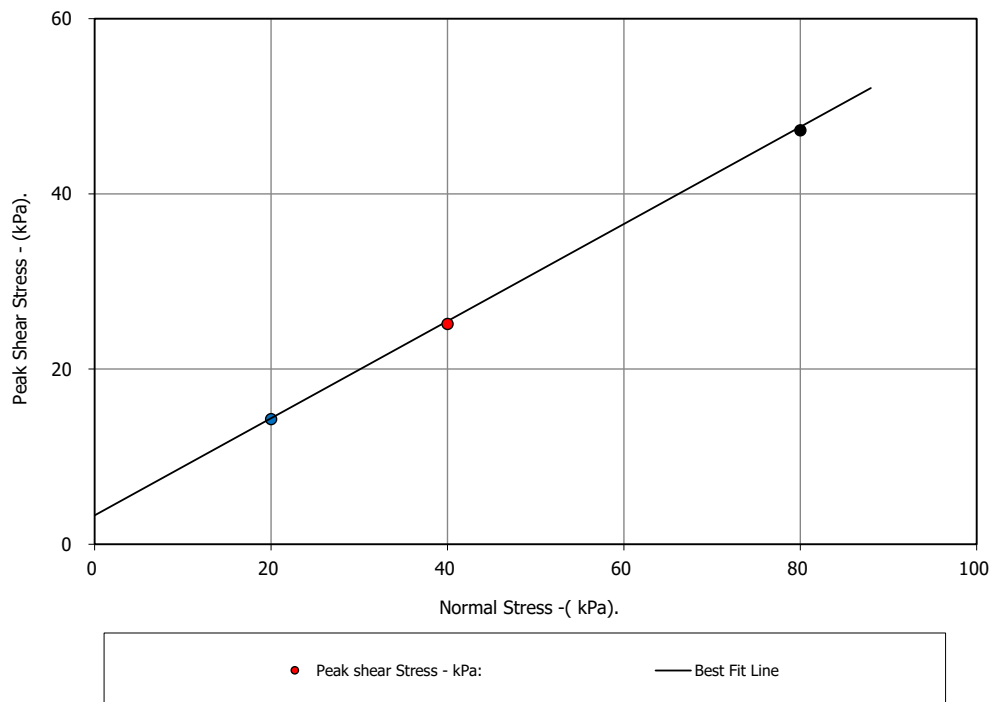
Brown fine to medium gravel silty CLAY

STAGE	1	2	3
Initial Conditions			
Height - mm:	24.80	24.80	24.80
Length - mm:	60.00	60.00	60.00
Moisture Content - %:	24	24	24
Bulk Density - Mg/m ³ :	1.98	1.97	1.97
Dry Density - Mg/m ³ :	1.60	1.59	1.59
Voids Ratio:	0.6611	0.6669	0.6648
Degree of Saturation - %:	96.14	95.31	95.61
Normal Pressure- kPa	20	40	80
Consolidation			
Consolidated Height - mm:	22.84	21.55	21.31
Shear			
Rate of Horizontal Displacement (mm/min)	0.200	0.200	0.200
Horizontal Displacement at Peak Shear Stress (mm)	12.78	12.60	13.23
Peak shear Stress - kPa:	14	25	47

PEAK

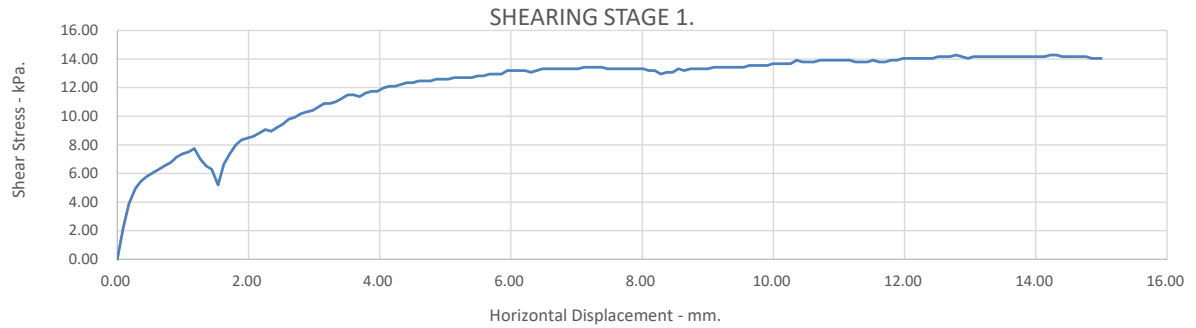
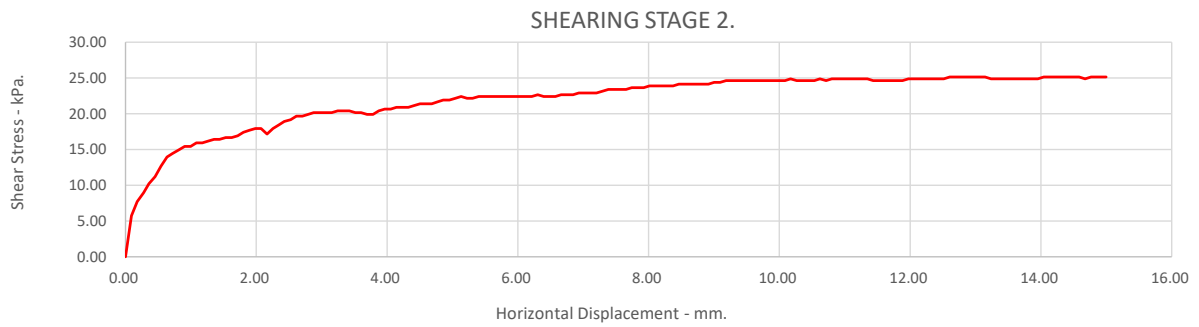
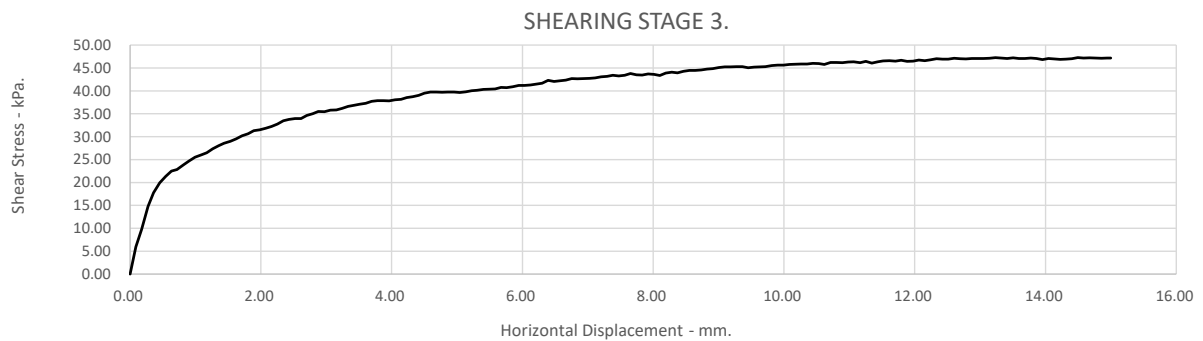
Angle of Shearing Resistance:(θ) **29.0**
 Effective Cohesion - kPa: **3.3**

FAILURE CONDITIONS



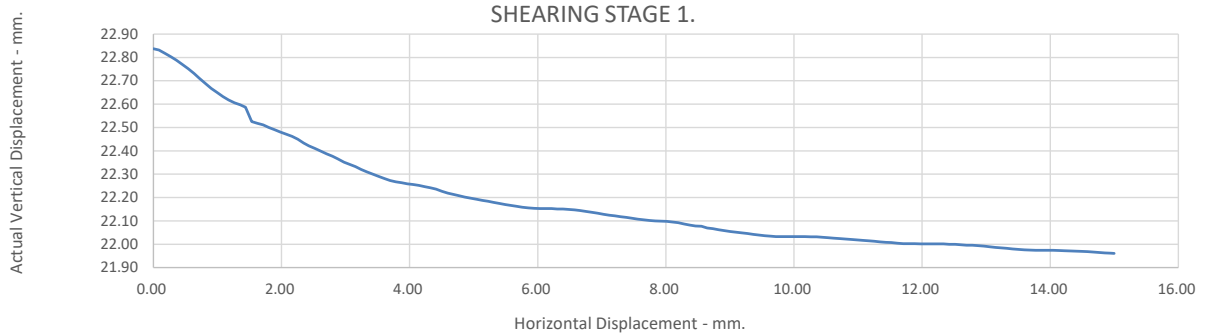
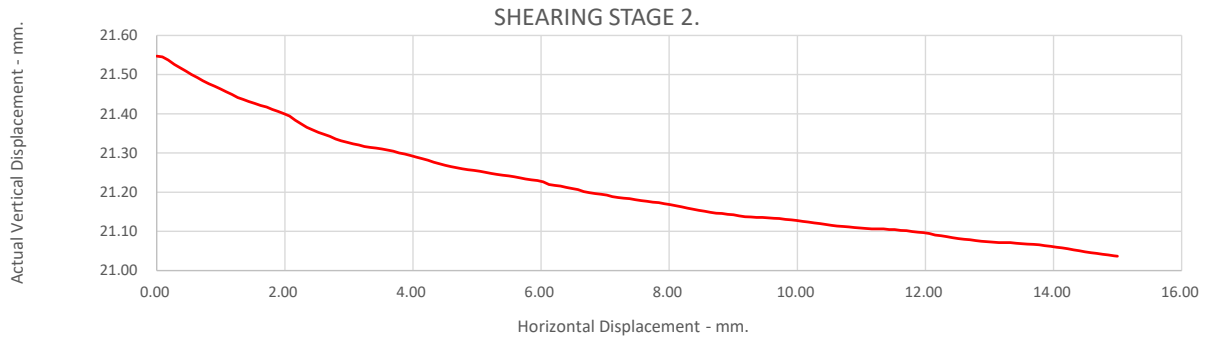
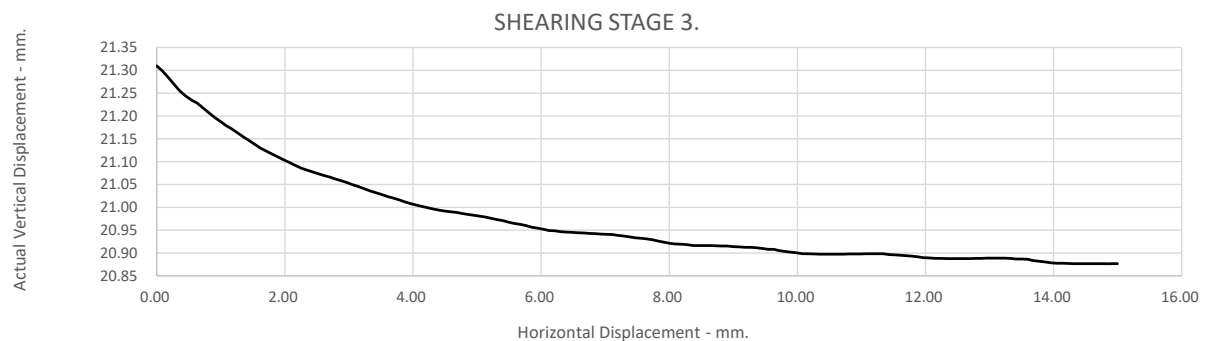
Borehole Number: BH01
Sample Number : 10

Depth from (m): 2.00
Depth to (m): 2.45



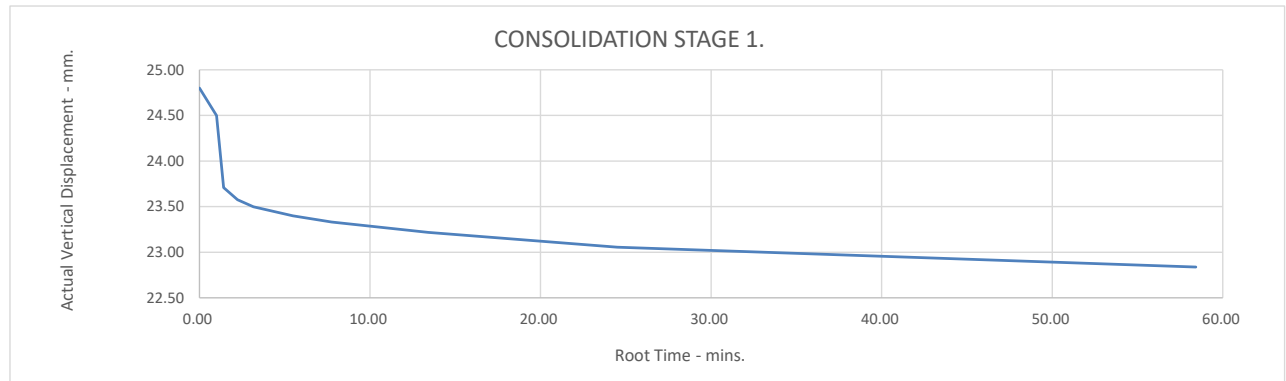
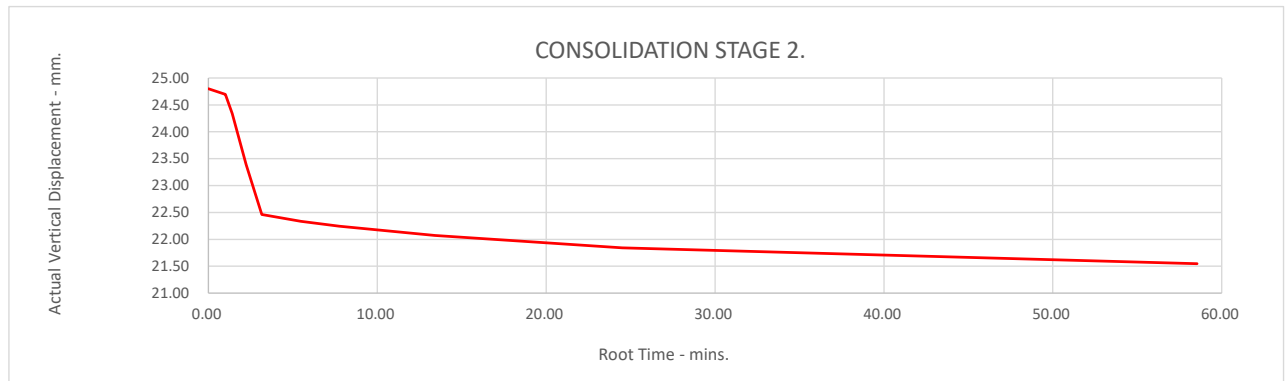
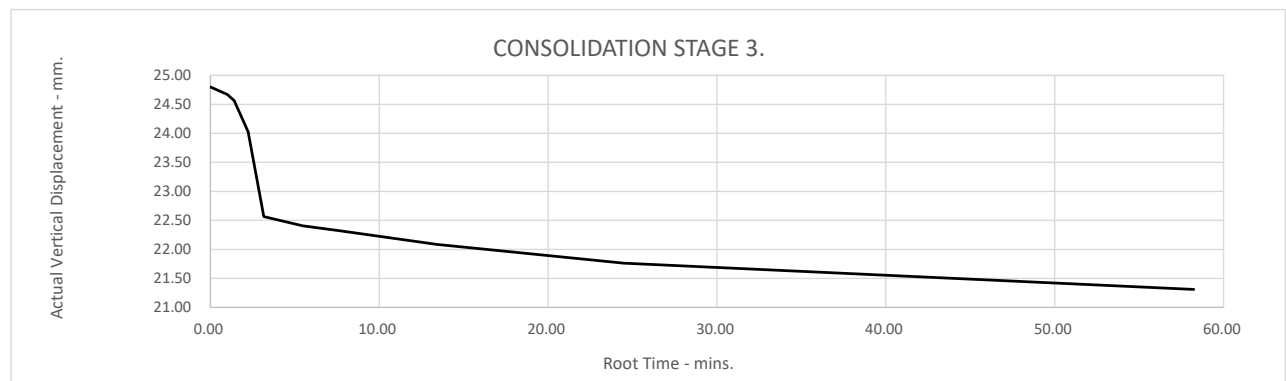
Borehole Number: BH01
Sample Number : 10

Depth from (m): 2.00
Depth to (m): 2.45



Borehole Number: BH01
Sample Number : 10

Depth from (m): 2.00
Depth to (m): 2.45



Test Report: MS DIRECT SHEARBOX TEST.BS1377:Part 7:4.5 :1990.

Borehole Number: BH01 Depth from (m): 4.00
 Sample Number : 15 Depth to (m): 4.45

Sample Type: B
 Particle Density - Mg/m³: 2.65 (Assumed)
 Specimen Tested: Submerged, Remoulded (Light Tamping) Material above 2mm removed.

Sample Description:

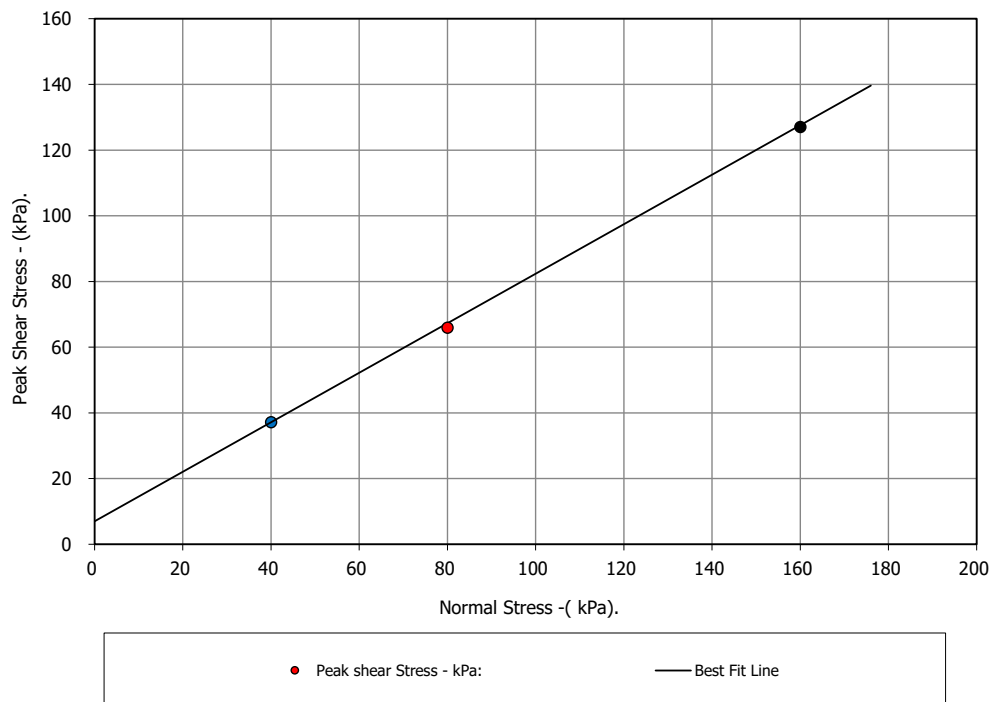
Brown silty/clayey fine to coarse gravelly fine to coarse SAND

STAGE	1	2	3
Initial Conditions			
Height - mm:	24.80	24.80	24.80
Length - mm:	60.00	60.00	60.00
Moisture Content - %:	25	25	25
Bulk Density - Mg/m ³ :	1.72	1.72	1.71
Dry Density - Mg/m ³ :	1.38	1.38	1.38
Voids Ratio:	0.9157	0.9154	0.9247
Degree of Saturation - %:	70.93	70.96	70.24
Normal Pressure- kPa	40	80	160
Consolidation			
Consolidated Height - mm:	23.95	23.34	22.58
Shear			
Rate of Horizontal Displacement (mm/min)	0.200	0.200	0.200
Horizontal Displacement at Peak Shear Stress (mm)	3.79	4.42	3.43
Peak shear Stress - kPa:	37	66	127

PEAK

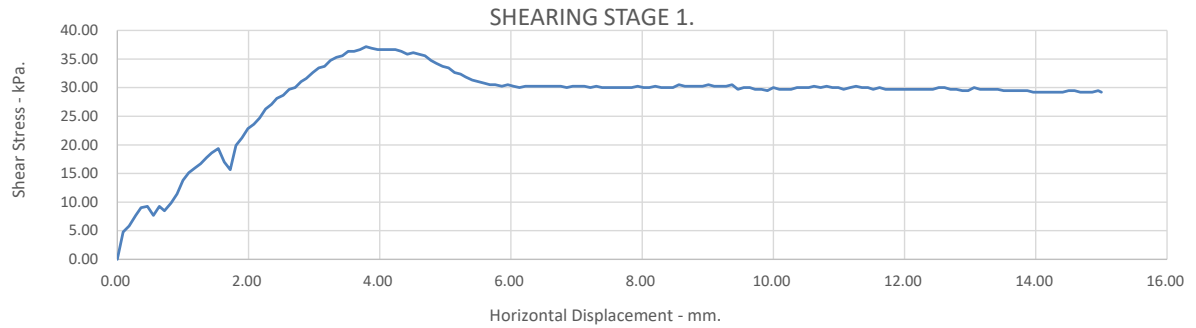
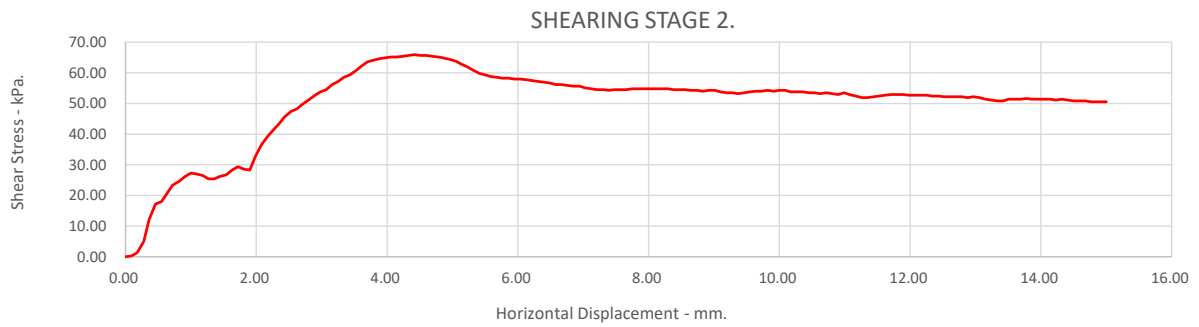
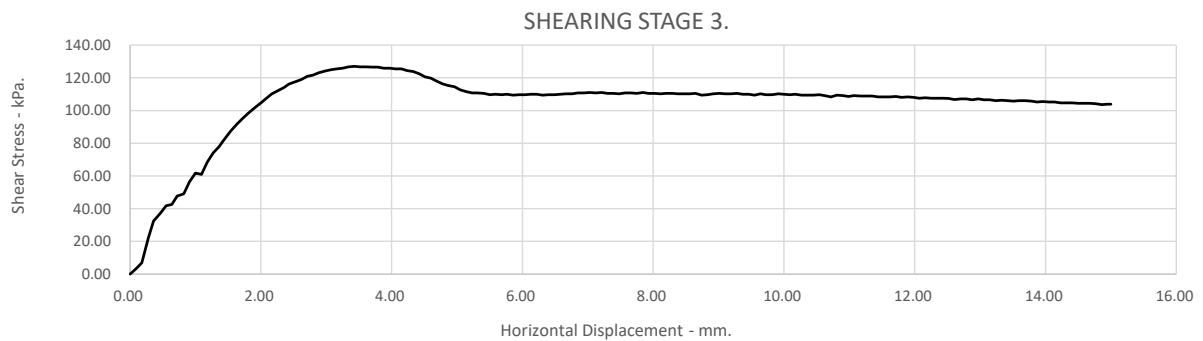
Angle of Shearing Resistance:(θ) **37.0**
 Effective Cohesion - kPa: **7.0**

FAILURE CONDITIONS



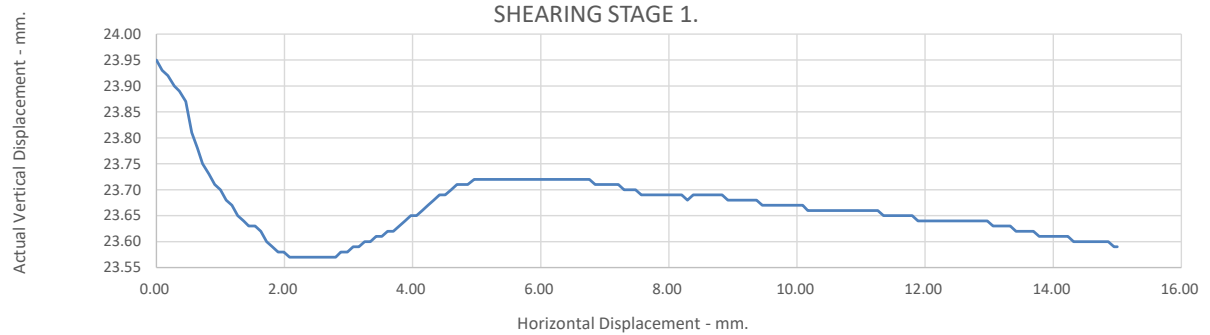
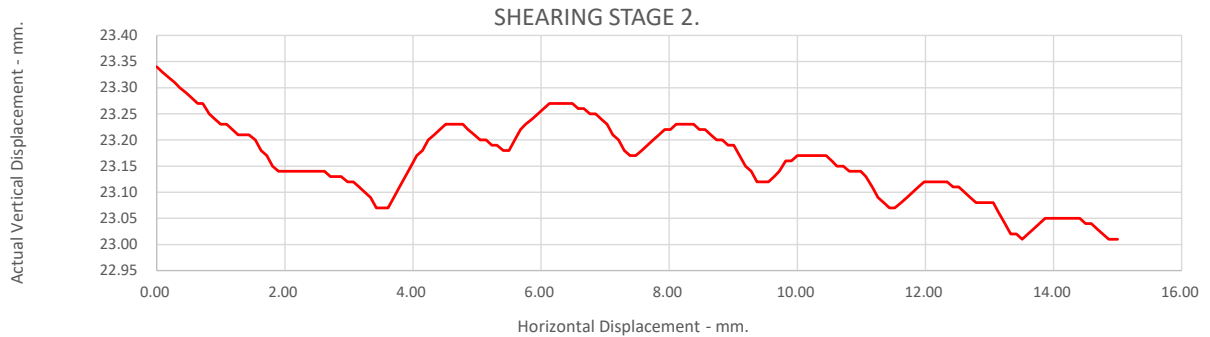
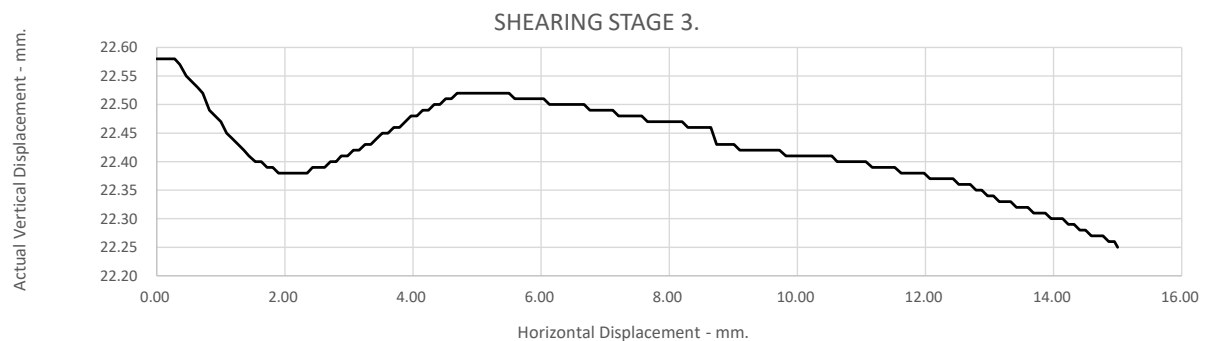
Borehole Number: BH01
Sample Number : 15

Depth from (m): 4.00
Depth to (m): 4.45



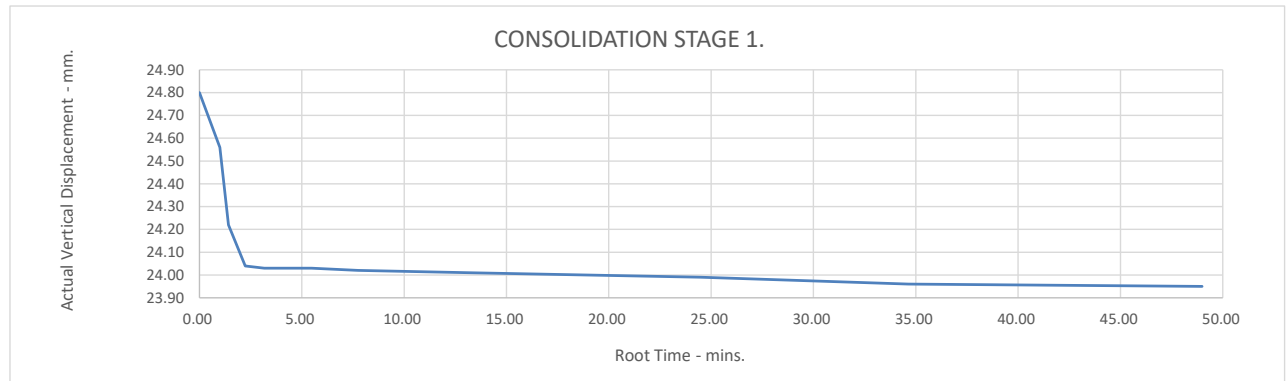
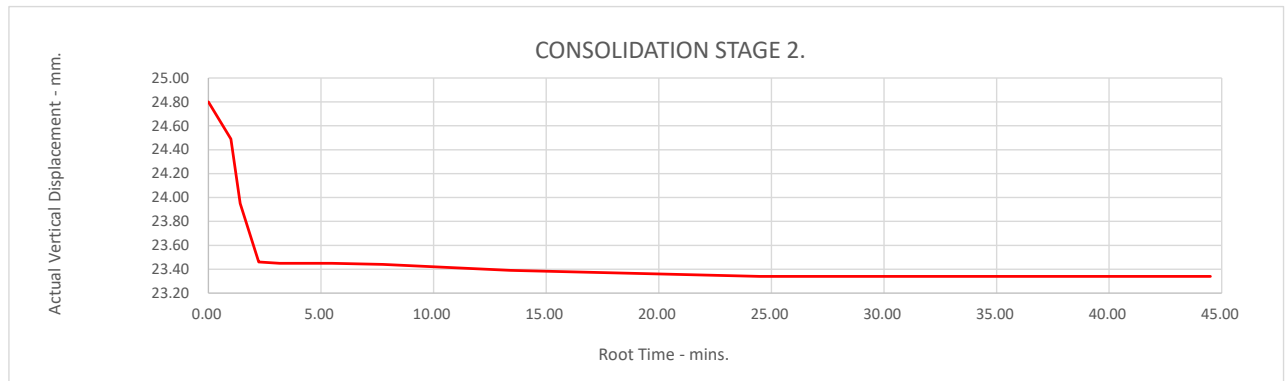
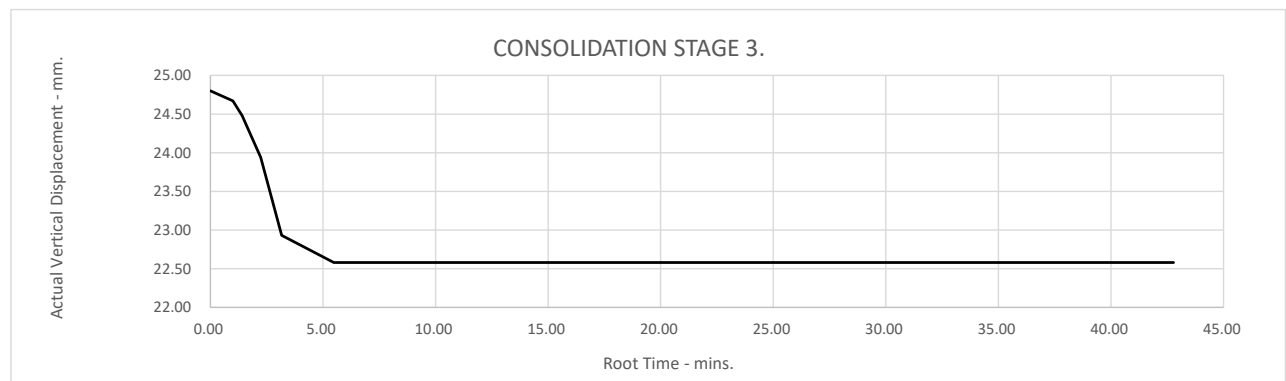
Borehole Number: BH01
Sample Number : 15

Depth from (m): 4.00
Depth to (m): 4.45



Borehole Number: BH01
Sample Number : 15

Depth from (m): 4.00
Depth to (m): 4.45



Test Report: MS DIRECT SHEARBOX TEST.BS1377:Part 7:4.5 :1990.

Borehole Number: BH02 Depth from (m): 3.00
 Sample Number : 11 Depth to (m): 3.45

Sample Type: B
 Particle Density - Mg/m³: 2.65 (Assumed)
 Specimen Tested: Submerged, Remoulded (Light Tamping) Material above 2mm removed.

Sample Description:

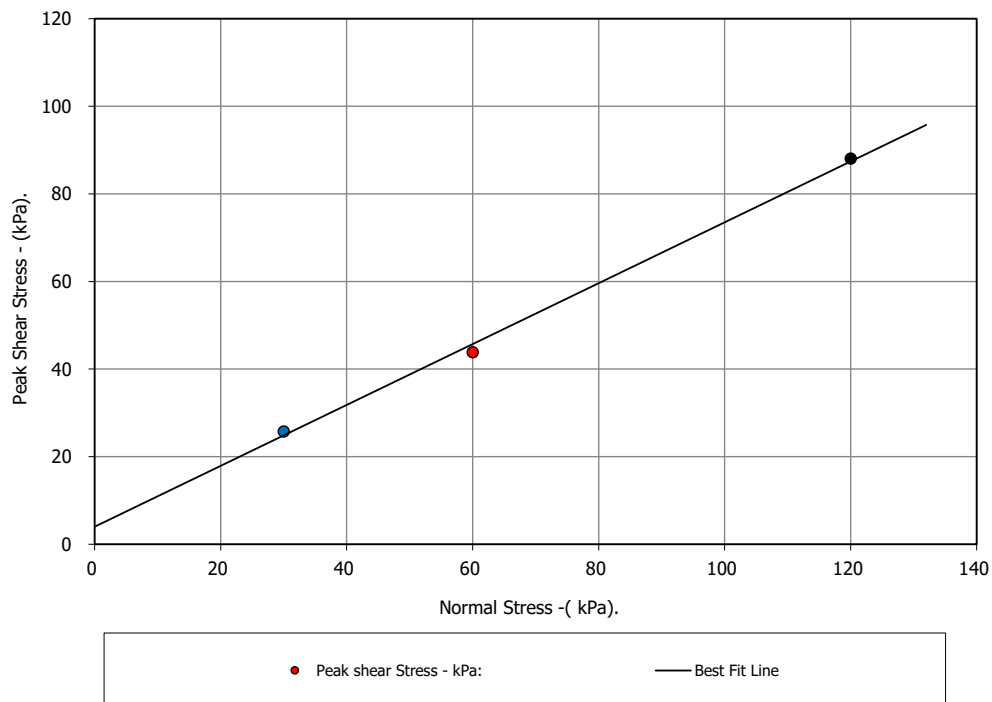
Brown fine to coarse sandy SILT/CLAY

STAGE	1	2	3
Initial Conditions			
Height - mm:	24.80	24.80	24.80
Length - mm:	60.00	60.00	60.00
Moisture Content - %:	30	30	30
Bulk Density - Mg/m ³ :	1.92	1.92	1.91
Dry Density - Mg/m ³ :	1.47	1.47	1.47
Voids Ratio:	0.8034	0.8006	0.8076
Degree of Saturation - %:	100.59	100.95	100.06
Normal Pressure- kPa	30	60	120
Consolidation			
Consolidated Height - mm:	22.92	23.16	22.32
Shear			
Rate of Horizontal Displacement (mm/min)	0.200	0.200	0.200
Horizontal Displacement at Peak Shear Stress (mm)	4.86	6.67	5.76
Peak shear Stress - kPa:	26	44	88

PEAK

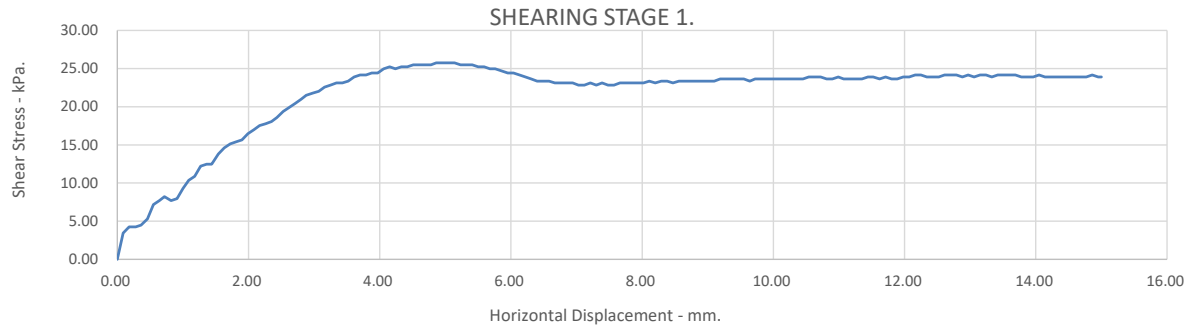
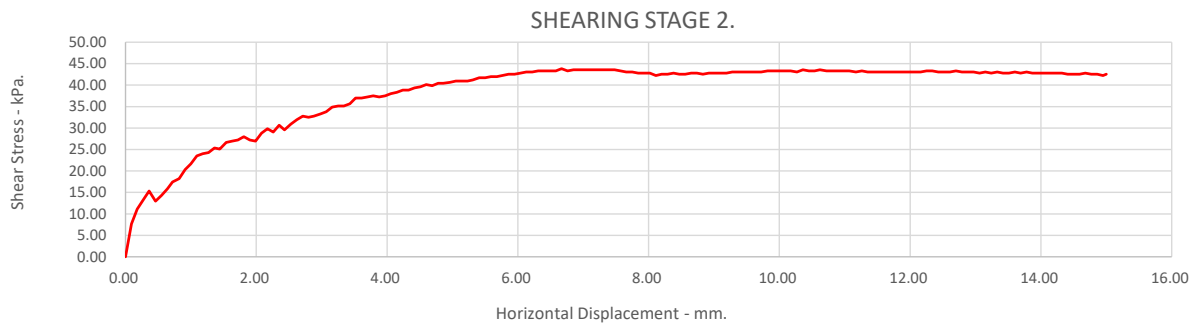
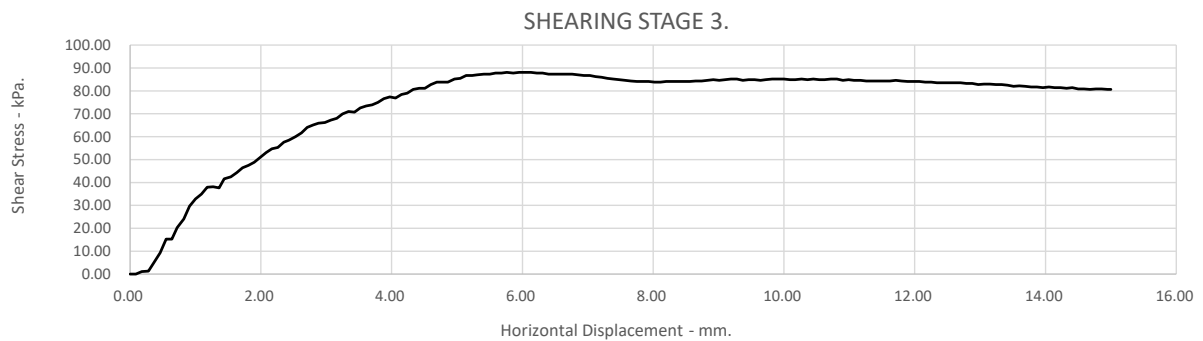
Angle of Shearing Resistance:(θ) **35.0**
 Effective Cohesion - kPa: **4.0**

FAILURE CONDITIONS



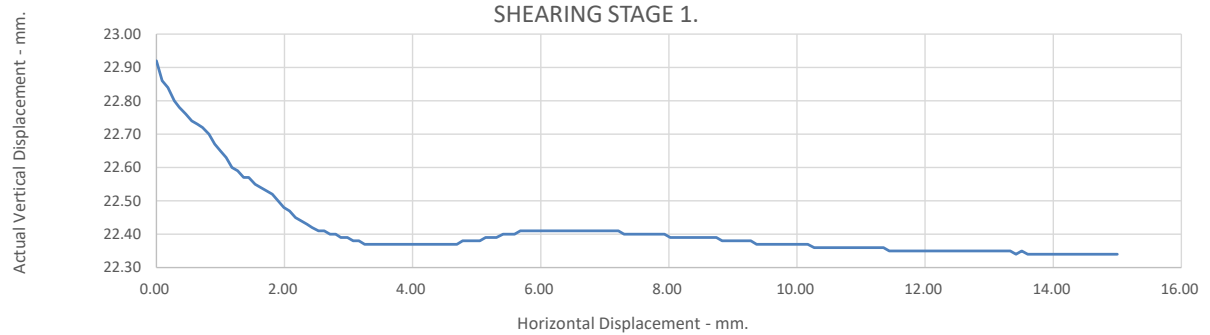
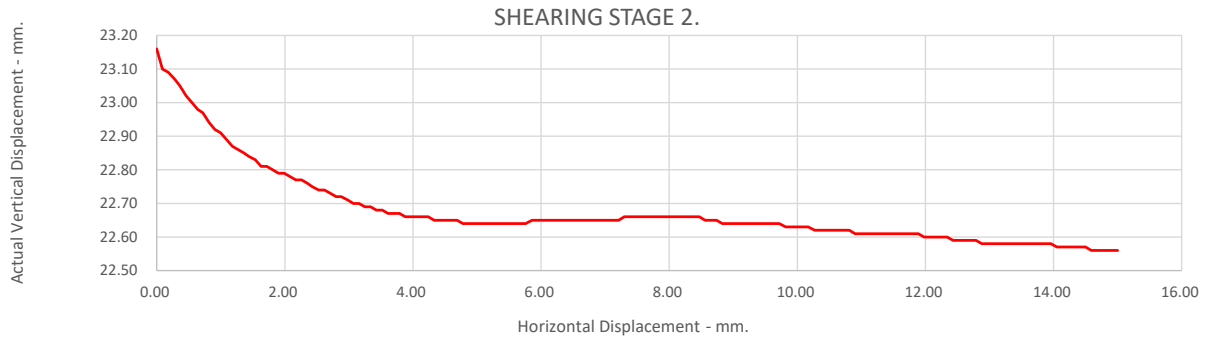
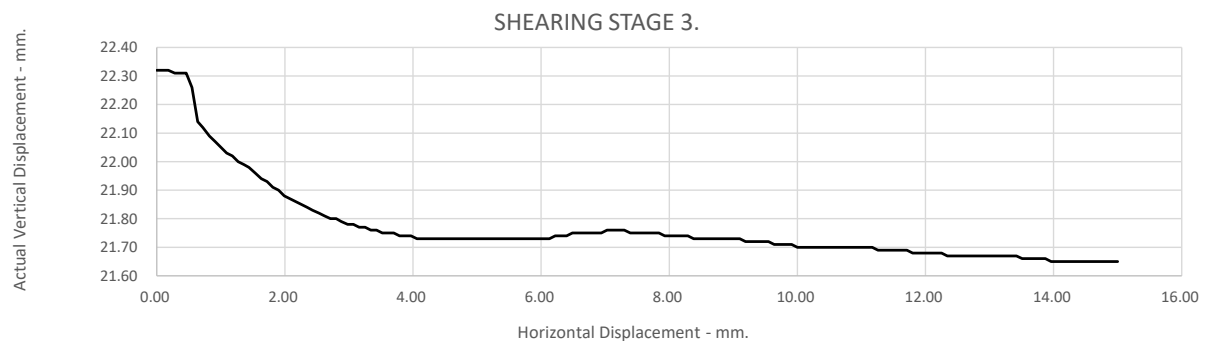
Borehole Number: BH02
Sample Number : 11

Depth from (m): 3.00
Depth to (m): 3.45



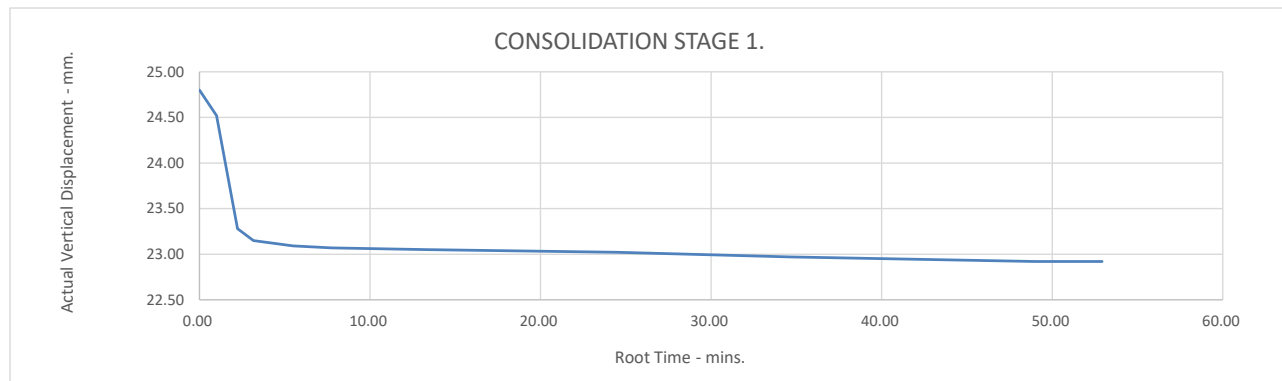
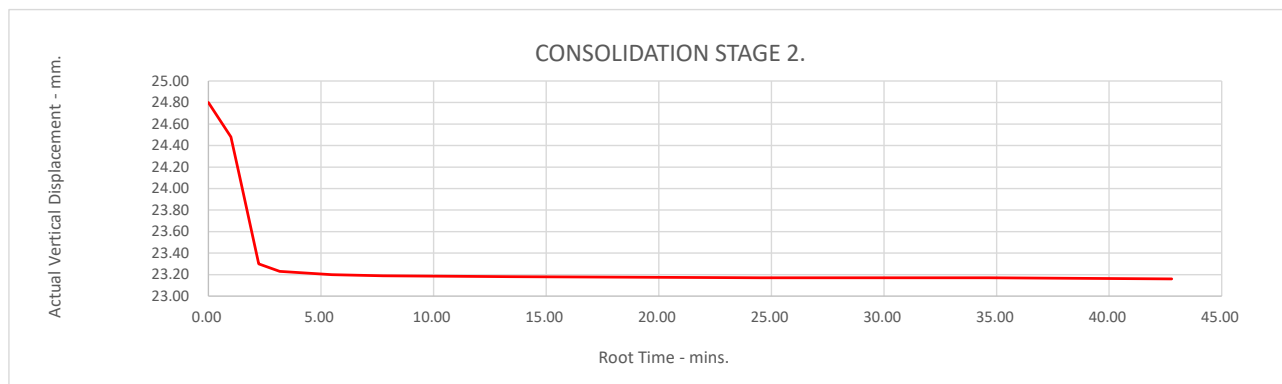
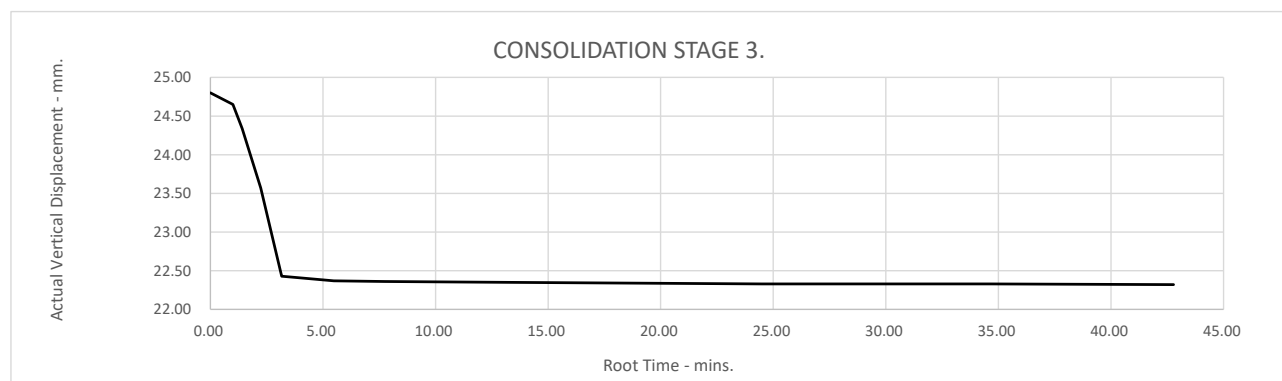
Borehole Number: BH02
Sample Number : 11

Depth from (m): 3.00
Depth to (m): 3.45



Borehole Number: BH02
Sample Number : 11

Depth from (m): 3.00
Depth to (m): 3.45



Test Report: MS DIRECT SHEARBOX TEST.BS1377:Part 7:4.5 :1990.

Borehole Number: BH02 Depth from (m): 5.00
 Sample Number : 14 Depth to (m): 5.45

Sample Type: B
 Particle Density - Mg/m³: 2.65 (Assumed)
 Specimen Tested: Submerged, Remoulded (Light Tamping) Material above 2mm removed.

Sample Description:

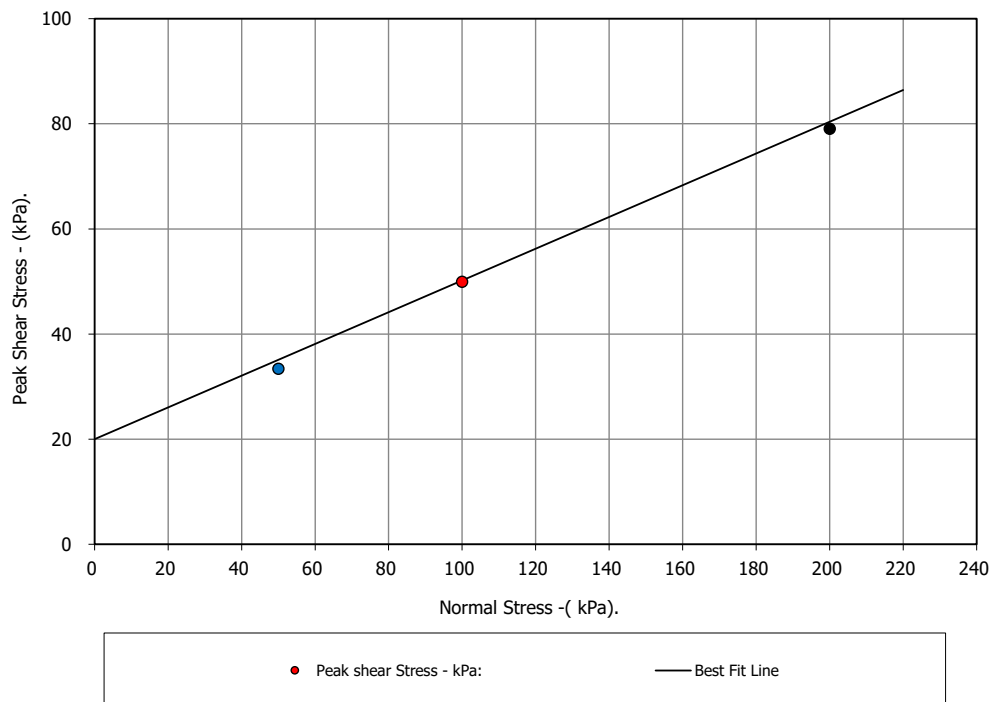
Brown fine to coarse sandy fine to coarse gravelly SILT/CLAY

STAGE	1	2	3
Initial Conditions			
Height - mm:	24.80	24.80	24.80
Length - mm:	60.00	60.00	60.00
Moisture Content - %:	29	29	29
Bulk Density - Mg/m ³ :	1.92	1.92	1.93
Dry Density - Mg/m ³ :	1.49	1.49	1.49
Voids Ratio:	0.7753	0.7770	0.7749
Degree of Saturation - %:	98.91	98.69	98.96
Normal Pressure- kPa	50	100	200
Consolidation			
Consolidated Height - mm:	20.78	20.69	19.70
Shear			
Rate of Horizontal Displacement (mm/min)	0.200	0.200	0.200
Horizontal Displacement at Peak Shear Stress (mm)	13.59	13.95	14.04
Peak shear Stress - kPa:	33	50	79

PEAK

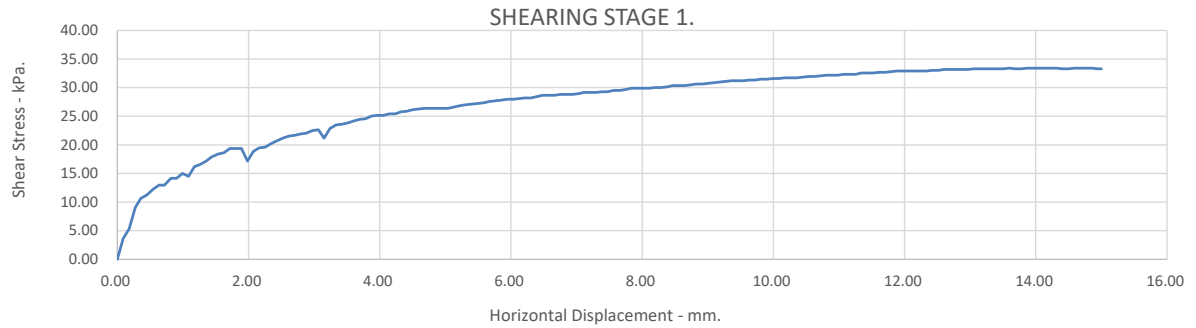
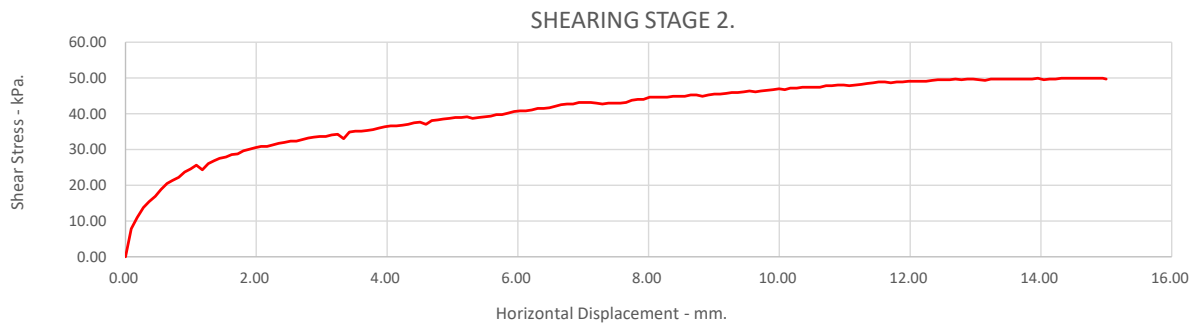
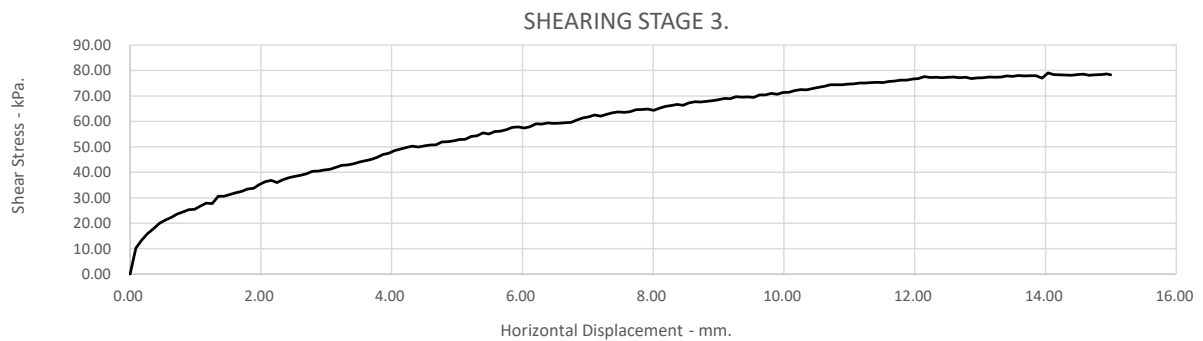
Angle of Shearing Resistance:(θ) **17.0**
 Effective Cohesion - kPa: **20**

FAILURE CONDITIONS



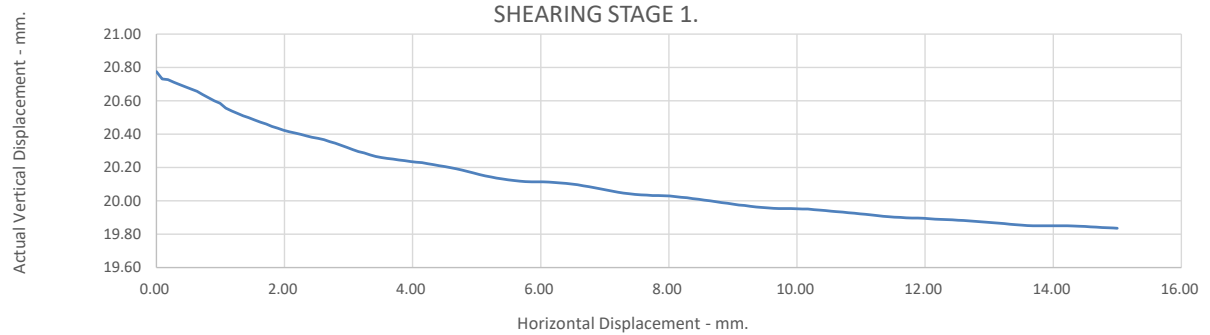
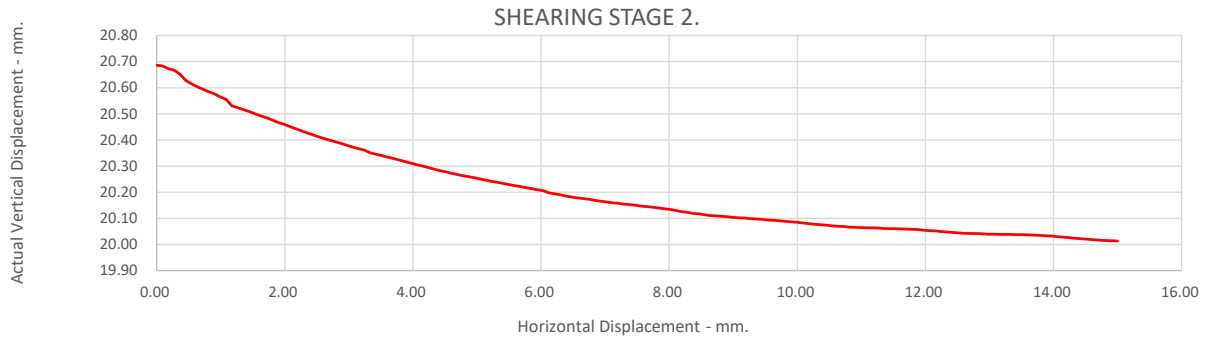
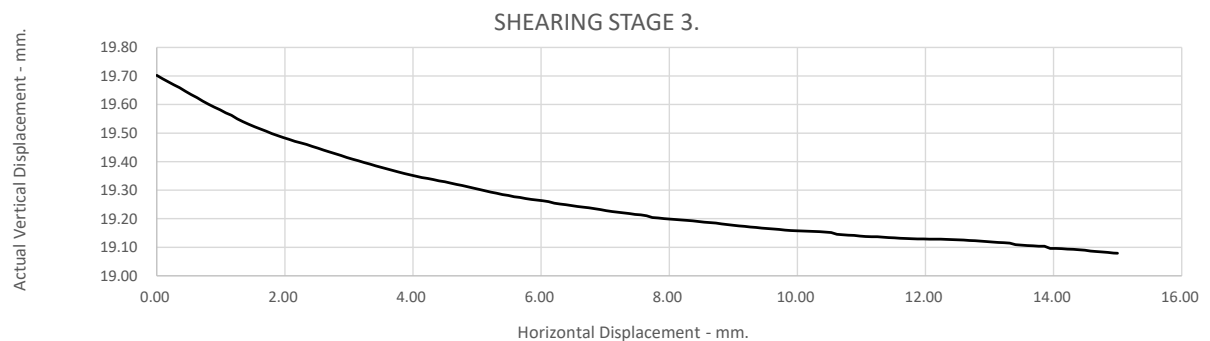
Borehole Number: BH02
Sample Number : 14

Depth from (m): 5.00
Depth to (m): 5.45



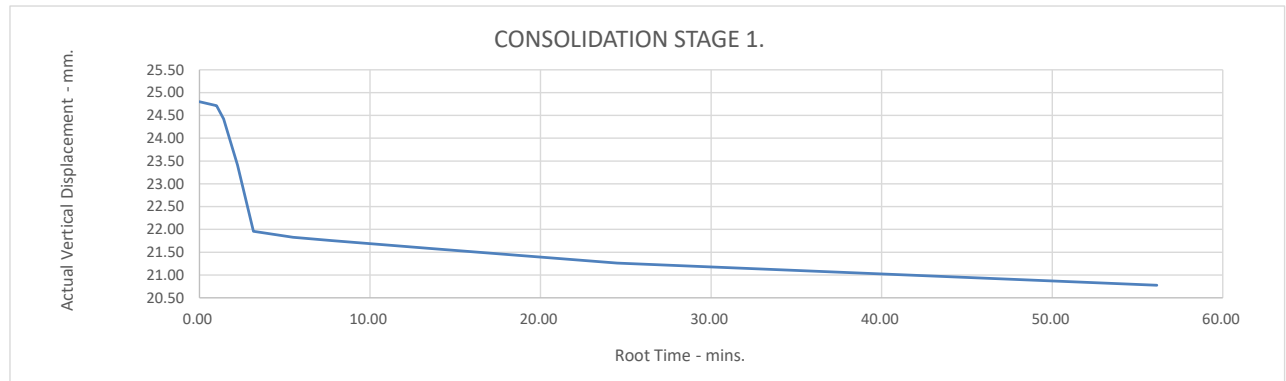
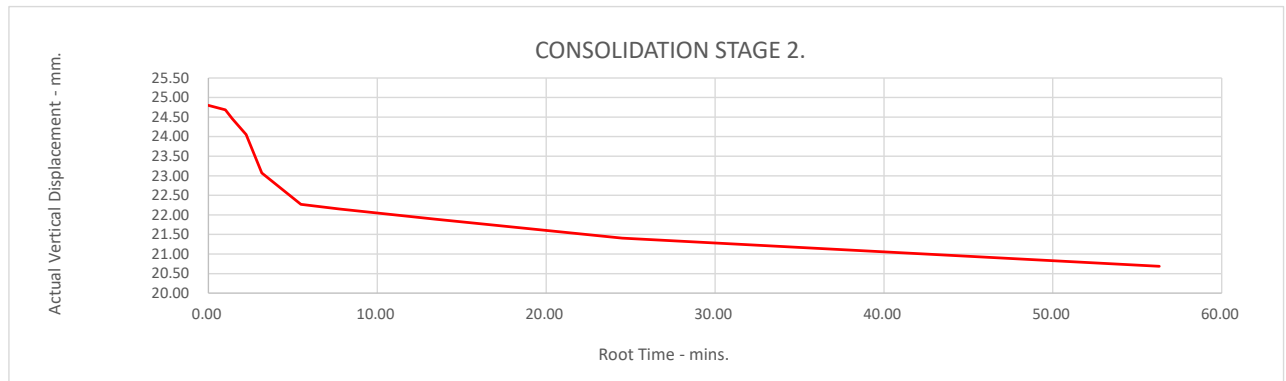
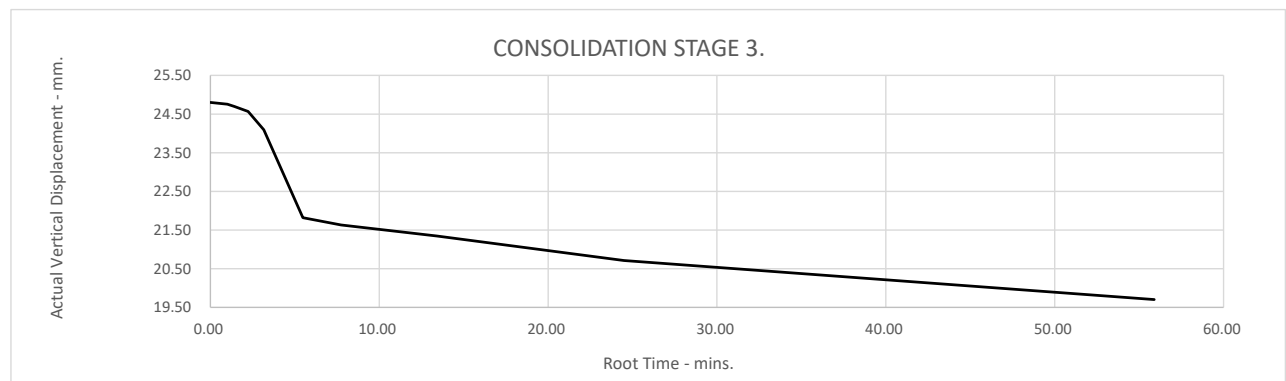
Borehole Number: BH02
Sample Number : 14

Depth from (m): 5.00
Depth to (m): 5.45



Borehole Number: BH02
Sample Number : 14

Depth from (m): 5.00
Depth to (m): 5.45





4161



7 - 11 Harding Street
Leicester
LE1 4DH

GSTL

Unit 3-4 Heol Aur
Dafen Ind Estate
Dafen
SA14 8QN

Analytical Test Report: L24/09833/GSL - 24-51276

Your Project Reference:	Havant Railway Station Footbridge TF-24-356		
Your Order Number:	75204	Samples Received / Instructed:	21/10/2024 / 21/10/2024
Report Issue Number:	1	Sample Tested:	21/10 to 29/10/2024
Samples Analysed:	21 sample(s)	Report issued:	29/10/2024

Signed

Emily Blissett
Report Manager
CTS Group

Notes:**General**

Please refer to Methodologies page for details pertaining to the analytical methods undertaken.

Samples will be retained for 14 days after issue of this report unless otherwise requested.

Moisture Content was determined in accordance with CTS method statement MS - CL - Sample Prep, oven dried at <30°C.

Moisture Content is reported as a percentage of the dry mass of soil, this calculation is in accordance with BS1377, Part 2, 1990, Clause 3.2

Where specification limits are included these are for guidance only. Where a measured value has been highlighted this is not implying acceptance or failure and certainty of measurement values have not been taken into account.

Uncertainty of measurement values are available on request.

Samples were supplied by customer, results apply to the samples as received.

Deviating Samples

On receipt samples are compared against our sample holding and handling protocols, where any deviations have been noted these are reported on our deviating sample page (if present)

Accreditation Key

UKAS = UKAS Accreditation, MCERTS = MCERTS Accreditation, u = Unaccredited, subUKAS - Subcontracted to a laboratory UKAS accredited for this test, subMCERTS - Subcontracted to a laboratory MCERTS accredited for this test

MCERTS Accreditation only covers the SAND, CLAY and LOAM matrices

UKAS accreditation on waters only covers the Ground water and Surface water matrices

Date of Issue: 23.10.2024

Issued by: J. Gane

Issue No: 4

Rev No: 17



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L24/09833/GSL - 24-51276

Project Reference - Havant Railway Station

Foortbridge TF-24-356

Analytical Test Results - Chemical Analysis

Lab Reference			409702	409703	409704	409705	409706	409707
Client Sample ID			BH01B4	BH01D5	BH01B10	BH01B13	BH01B15	BH01B20
Client Sample Location			BH01	BH01	BH01	BH01	BH01	BH01
Client Sample Type			B	D	B	B	B	B
Client Sample Number			-	-	-	-	-	-
Depth - Top (m)			0.40	0.90	2.00	3.00	4.00	6.50
Depth - Bottom (m)			0.60	1.00	2.45	3.45	4.45	6.95
Date of Sampling			-	-	-	-	-	-
Time of Sampling			-	-	-	-	-	-
Sample Matrix			Sand	Sand	Clay	Sand	Sand	Sand
Determinant	Units	Accreditation						
Water soluble sulphate (as SO ₄)	(mg/l)	u	46	22	43	26	< 10	67
Acid Soluble Sulphate	(%)	u	0.06	0.04	0.05	< 0.01	< 0.01	0.02
Total Sulphur	(%)	UKAS	0.04	0.03	0.04	0.02	0.01	0.06
pH Value	pH Units	MCERTS	8.1	8.0	8.0	8.3	8.6	8.9



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L24/09833/GSL - 24-51276

Project Reference - Havant Railway Station

Foortbridge TF-24-356

Analytical Test Results - Chemical Analysis

Lab Reference			409708	409709	409710	409711	409712	409713
Client Sample ID			BH01B27	BH02B4	BH02B5	BH02B9	BH02B11	BH02B14
Client Sample Location			BH01	BH02	BH02	BH02	BH02	BH02
Client Sample Type			B	B	B	B	B	B
Client Sample Number			-	-	-	-	-	-
Depth - Top (m)			9.50	0.50	1.20	2.00	3.00	5.00
Depth - Bottom (m)			9.95	0.90	1.65	2.45	3.45	5.45
Date of Sampling			-	-	-	-	-	-
Time of Sampling			-	-	-	-	-	-
Sample Matrix			Sand	Sand	Clay	Sand	Clay	Clay
Determinant	Units	Accreditation						
Water soluble sulphate (as SO ₄)	(mg/l)	u	120	< 10	18	27	59	410
Acid Soluble Sulphate	(%)	u	0.04	0.07	0.03	< 0.01	0.02	0.12
Total Sulphur	(%)	UKAS	0.14	0.04	0.02	< 0.01	0.06	0.78
pH Value	pH Units	MCERTS	8.6	7.4	8.2	8.5	8.4	8.1



L24/09833/GSL - 24-51276

Project Reference - Havant Railway Station

Foortbridge TF-24-356

Analytical Test Results - Chemical Analysis

Lab Reference			409714	409715	409716	409717	409718	409719
Client Sample ID			BH02B19	WS01B4	WS02B5	WS03D4	WS04B6	WS04B7
Client Sample Location			BH02	WS1	WS02	WS03	WS04	WS04
Client Sample Type			B	B	B	D	B	B
Client Sample Number			-	-	-	-	-	-
Depth - Top (m)			8.00	1.10	1.30	1.30	2.50	3.00
Depth - Bottom (m)			8.45	1.60	1.80	1.30	3.00	4.00
Date of Sampling			-	-	-	-	-	-
Time of Sampling			-	-	-	-	-	-
Sample Matrix			Clay	Clay	Clay	Other	Clay	Clay
Determinant	Units	Accreditation						
Water soluble sulphate (as SO ₄)	(mg/l)	u	350	24	< 10	17	250	290
Acid Soluble Sulphate	(%)	u	0.11	0.05	0.05	0.03	0.08	0.09
Total Sulphur	(%)	UKAS	0.57	0.02	0.02	0.01	0.23	0.53
pH Value	pH Units	MCERTS	8.2	8.4	8.5	8.8	8.5	8.4



L24/09833/GSL - 24-51276

Project Reference - Havant Railway Station

Footbridge TF-24-356

Analytical Test Results - Chemical Analysis

Lab Reference			409720	409721	409722
Client Sample ID			WS05B3	WS05B6	WS05B7
Client Sample Location			WS05	WS05	WS05
Client Sample Type			B	B	B
Client Sample Number			-	-	-
Depth - Top (m)			1.10	2.20	3.20
Depth - Bottom (m)			1.40	2.70	3.70
Date of Sampling			-	-	-
Time of Sampling			-	-	-
Sample Matrix			Clay	Clay	Clay
Determinant	Units	Accreditation			
Water soluble sulphate (as SO ₄)	(mg/l)	u	82	380	280
Acid Soluble Sulphate	(%)	u	0.04	0.10	0.09
Total Sulphur	(%)	UKAS	0.04	0.38	0.58
pH Value	pH Units	MCERTS	8.4	8.0	8.1



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L24/09833/GSL - 24-51276

Project Reference - Havant Railway Station Footbridge TF-24-356

Sample Descriptions

Lab Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Description	Moisture Content (%)	Stone Content (%)	Passing 2mm test sieve (%)
409702	BH01B4	BH01	B	-	Brown slightly gravelly silty sand with occasional rootlets	-	-	100
409703	BH01D5	BH01	D	-	Brown very gravelly silty sand with rare rootlets	-	-	85
409704	BH01B10	BH01	B	-	Brown very gravelly silty clay	-	-	100
409705	BH01B13	BH01	B	-	Brown slightly gravelly silty sand	-	-	100
409706	BH01B15	BH01	B	-	Brown slightly gravelly silty sand	-	-	100
409707	BH01B20	BH01	B	-	Grey silty sand	-	-	100
409708	BH01B27	BH01	B	-	Grey silty sand	-	-	100
409709	BH02B4	BH02	B	-	Brown silty sand with rare rootlets	-	-	100
409710	BH02B5	BH02	B	-	Brown very gravelly silty clay	-	-	83
409711	BH02B9	BH02	B	-	Brown slightly gravelly silty sand	-	-	86
409712	BH02B11	BH02	B	-	Brown sandy clay	-	-	87
409713	BH02B14	BH02	B	-	Grey sandy clay	-	-	100
409714	BH02B19	BH02	B	-	Grey silty clay	-	-	100
409715	WS01B4	WS1	B	-	Brown very gravelly silty clay	-	-	92
409716	WS02B5	WS02	B	-	Brown slightly gravelly silty clay	-	-	100
409717	WS03D4	WS03	D	-	Grey slightly sandy crushed rock	-	-	81
409718	WS04B6	WS04	B	-	Grey sandy clay	-	-	100
409719	WS04B7	WS04	B	-	Grey slightly gravelly silty clay	-	-	100
409720	WS05B3	WS05	B	-	Brown very gravelly silty clay	-	-	100
409721	WS05B6	WS05	B	-	Grey sandy clay	-	-	100
409722	WS05B7	WS05	B	-	Grey slightly gravelly sandy clay	-	-	100



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L24/09833/GSL - 24-51276

Project Reference - Havant Railway Station Foortbridge TF-24-356

Sample Comments

Lab Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Comments
409702	BH01B4	BH01	B	-	
409703	BH01D5	BH01	D	-	
409704	BH01B10	BH01	B	-	
409705	BH01B13	BH01	B	-	
409706	BH01B15	BH01	B	-	
409707	BH01B20	BH01	B	-	
409708	BH01B27	BH01	B	-	
409709	BH02B4	BH02	B	-	
409710	BH02B5	BH02	B	-	
409711	BH02B9	BH02	B	-	
409712	BH02B11	BH02	B	-	
409713	BH02B14	BH02	B	-	
409714	BH02B19	BH02	B	-	
409715	WS01B4	WS1	B	-	
409716	WS02B5	WS02	B	-	
409717	WS03D4	WS03	D	-	
409718	WS04B6	WS04	B	-	
409719	WS04B7	WS04	B	-	
409720	WS05B3	WS05	B	-	
409721	WS05B6	WS05	B	-	
409722	WS05B7	WS05	B	-	



L24/09833/GSL - 24-51276

Project Reference - Havant Railway Station Foortbridge TF-24-356

Analysis Methodologies

Test Code	Test Name / Reference	Sample condition for analysis	Sample Preparation	Test Details
ANIONSS	MS - CL - Anions by Aquakem (2:1Extract)	Oven dried	Passing 2mm test sieve	Determination of Anions (inc Sulphate, chloride etc.) in soils by Aquakem. Analysis is based on a 2:1 water to soil extraction ratio
PHS	MS - CL - pH in Soils	As received	Passing 10mm test sieve	Determination of pH in soils using a pH probe (using a 1:3 soil to water extraction)
ASSO4S	MS - CL - Acid Soluble Sulphate	Oven Dried	Passing 2mm test sieve	Determination of total sulphate in soils by acid extraction followed by ICP analysis
SAMPLEPREP	MS - CL - Sample Preparation	-	-	Preparation of samples (including determination of moisture content) to allow for subsequent analysis
1377TS-ELT	BS1377 Total Sulphur Content by HTC	Oven dried	BS1377 : Part 1 : 2016	Total Sulphur Content testing of Soil in accordance with BS 1377 : Part 3 : 2018 + A1 : 2021 Clause 7.10 (using Eltra CS-800 Analyser)



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L24/09833/GSL - 24-51276

Project Reference - Havant Railway Station Footbridge TF-24-356

Sample Deviations

Deviations are listed below against each sample and associated test method, where deviation(s) are noted it means data may not be representative of the sample at the time of sampling and it is possible that results provided may be compromised.

Observations on receipt

A - No date of sampling provided

C - Received in inappropriate container

H - Contains headspace

T - Temperature on receipt exceeds storage temperature

R - Sample(s) received with less than 96 hours for testing to commence/complete, any result formally classed as deviating will be marked with an X against the applicable test (i.e. RX)

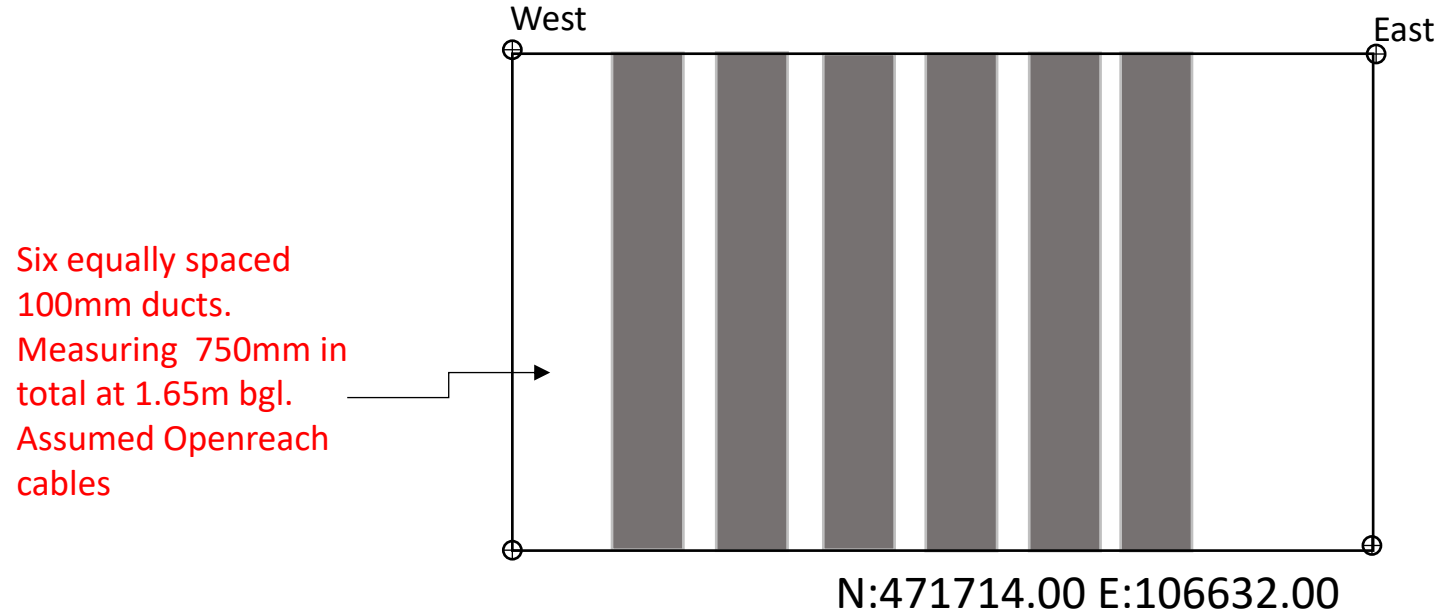
Observations whilst in laboratory

X - Exceeds sampling to extraction or analysis timescales

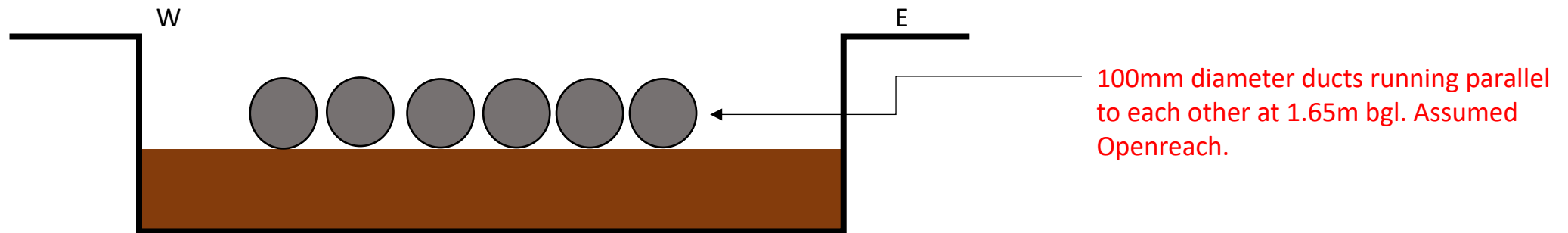
Lab Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Test	Deviations
409702	BH01B4	BH01	B	-		A
409703	BH01D5	BH01	D	-		A
409704	BH01B10	BH01	B	-		A
409705	BH01B13	BH01	B	-		A
409706	BH01B15	BH01	B	-		A
409707	BH01B20	BH01	B	-		A
409708	BH01B27	BH01	B	-		A
409709	BH02B4	BH02	B	-		A
409710	BH02B5	BH02	B	-		A
409711	BH02B9	BH02	B	-		A
409712	BH02B11	BH02	B	-		A
409713	BH02B14	BH02	B	-		A
409714	BH02B19	BH02	B	-		A
409715	WS01B4	WS1	B	-		A
409716	WS02B5	WS02	B	-		A
409717	WS03D4	WS03	D	-		A
409718	WS04B6	WS04	B	-		A
409719	WS04B7	WS04	B	-		A
409720	WS05B3	WS05	B	-		A
409721	WS05B6	WS05	B	-		A
409722	WS05B7	WS05	B	-		A

Annex D: Inspection Pit Schematic Drawings

IP01 - Havant Railway Footbridge - Plan View

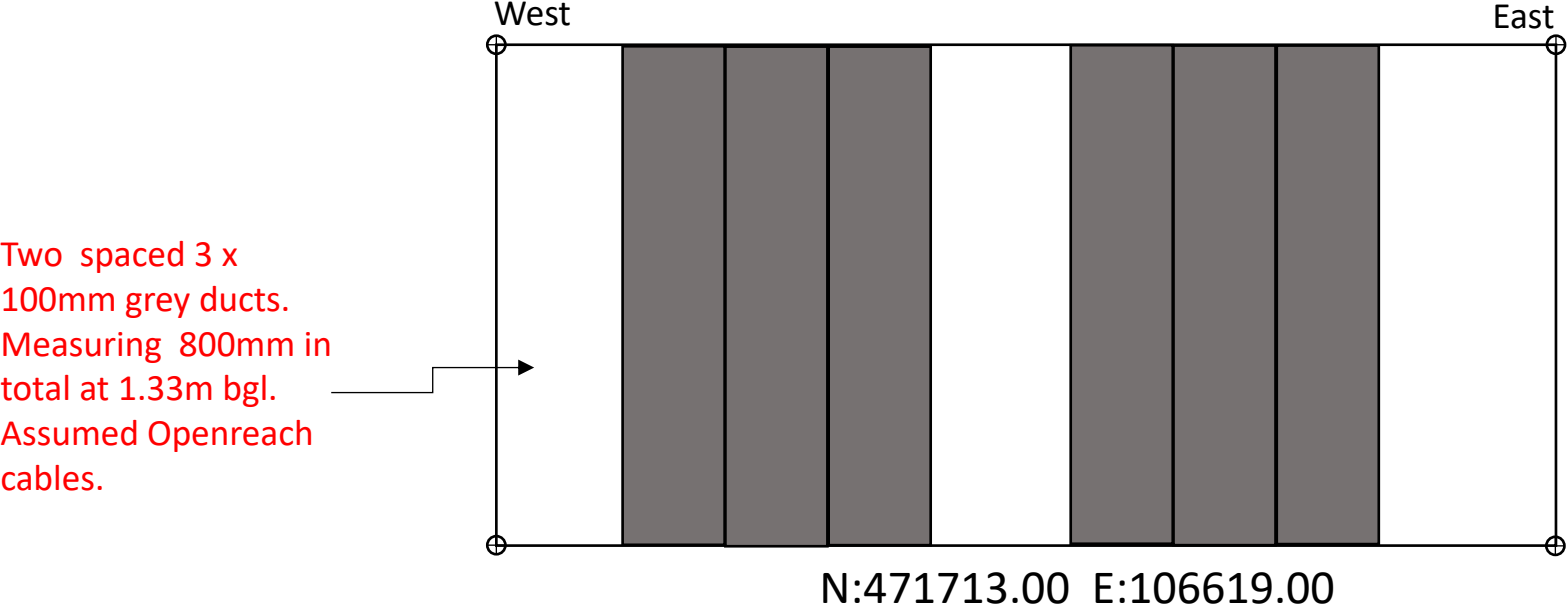


IP01 - Havant Railway Footbridge - Cross Section

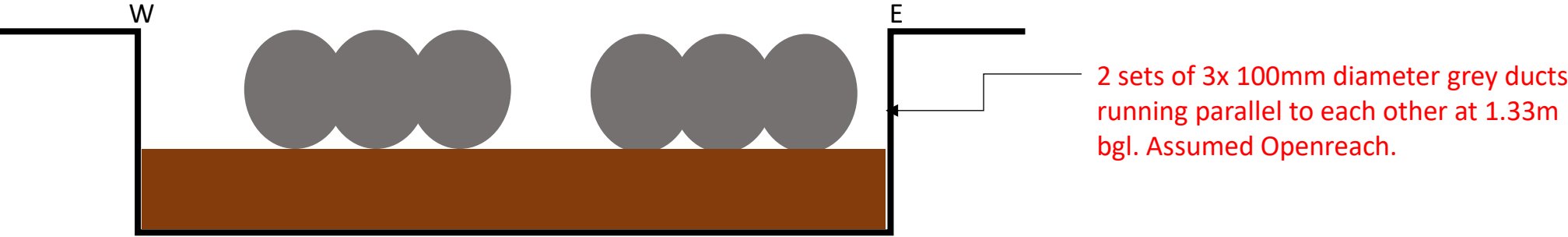


*Drawing not to scale. All service types and ownerships are presumed from the GPR survey undertaken for the works.

IP02 - Havant Railway Footbridge - Plan View

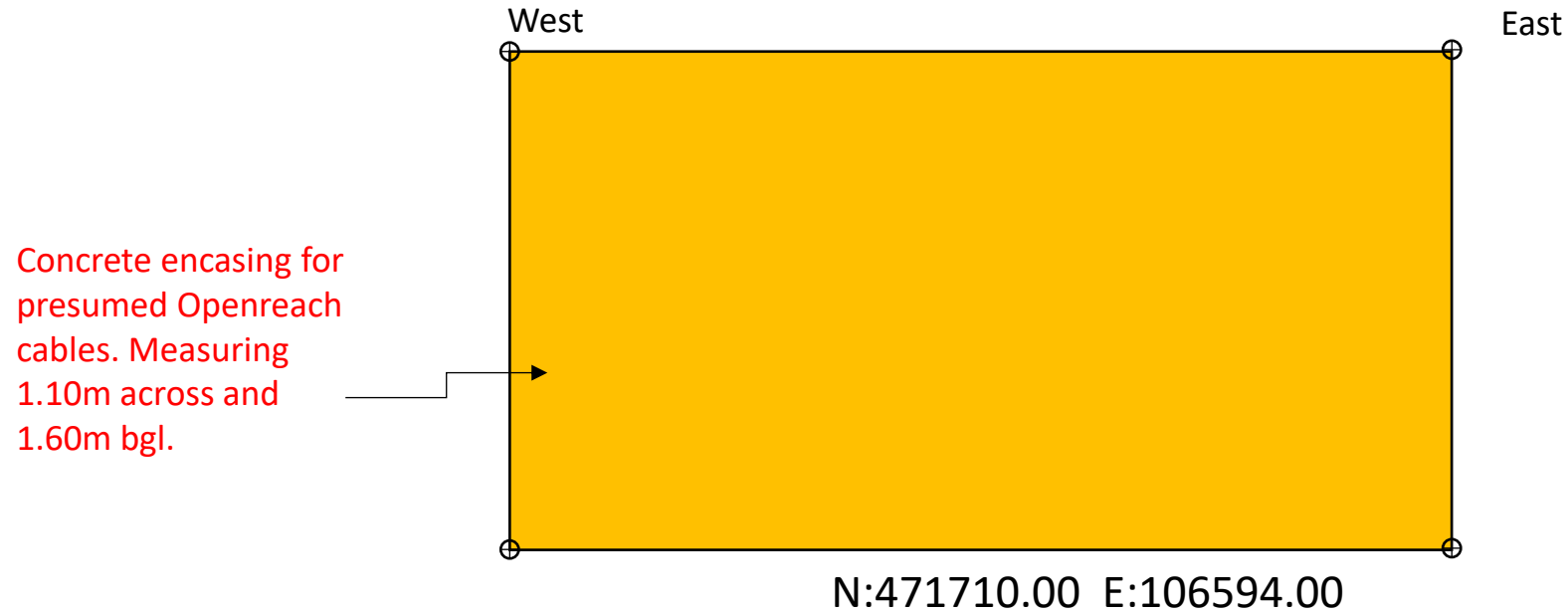


IP02 - Havant Railway Footbridge - Cross Section



*Drawing not to scale. All service types and ownerships are presumed from the GPR survey undertaken for the works.

IP03 - Havant Railway Footbridge - Plan View



IP03 - Havant Railway Footbridge - Cross Section



*Drawing not to scale. All service types and ownerships are presumed from the GPR survey undertaken for the works.