

**LAND AT TROWS LANE FARM,
CASTLETON**

GROUND INVESTIGATION

For: GLP Ltd.

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TROWS LANE FARM

GROUND INVESTIGATION

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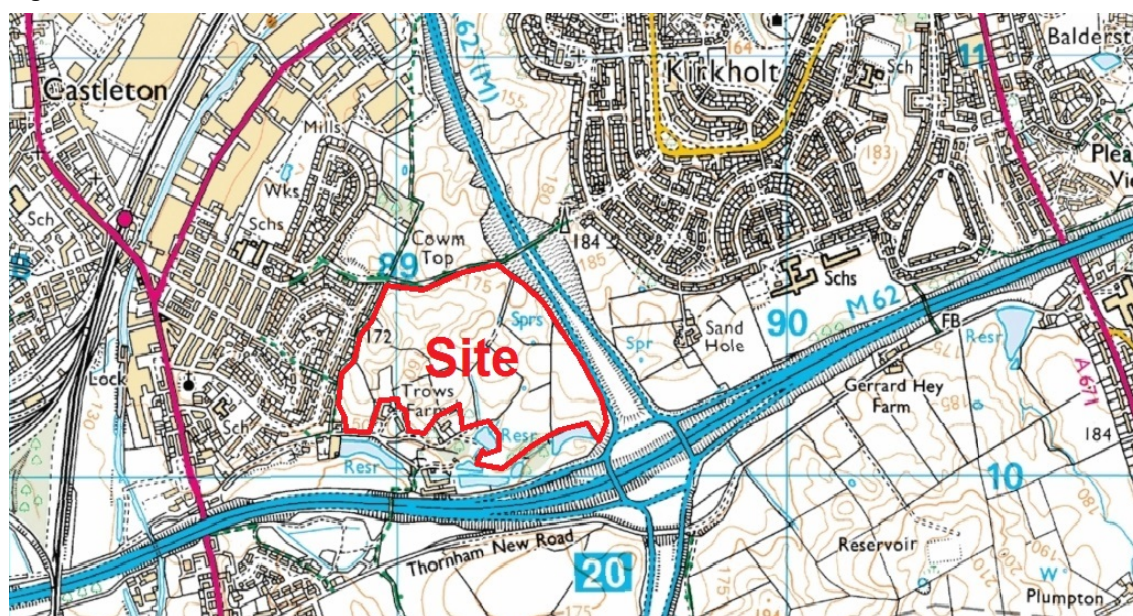
1. Introduction

- 1.1. GLP Ltd instructed Smith Grant LLP (SGP) to undertake a Ground Investigation on a parcel of land to the north of Trows Lane Farm, Castleton, Rochdale, OL11 2UF. Site details are:

Table 1.1: Site Details

Address	Land to north of Trows Farm, Trows Lane, Castleton, OL11 2UF
National Grid Reference	389188, 410262 (centre)
Local Authority	Rochdale Borough Council
Site Areas	Approximately 20 Ha
Current Use of Sites	Open fields use for grazing
Site Access	Off Trows Lane via Trows Farm from south or Cripple Gate Lane from north
Proposed Use	Low-rise residential development

Figure 1.1: Site Location



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- 1.2. Previously a Stage 1 Geo-environmental Appraisal (Ref R2228-R01-v01, January 2016) and Preliminary Phase I and II Contamination and Geotechnical Assessment (Ref: R2228-R02-v2 August 2016) had been undertaken to identify major potential constraints to redevelopment as a result of land contamination or ground instability.
- 1.3. These had identified relatively minor potential impacts from contamination, but the shallow entries had confirmed variable ground conditions on the site, including the presence of made ground, soft natural strata and characteristically variable glacial deposits. The site is also highly variable in its topography; following preliminary discussions with potential developers GLP

confirmed that a significant regrading exercise would be required to deliver a usable development platform with cut and fill up to 10m depths in parts of the site. In order to improve confidence in the geotechnical assessment of the ground and allow development of a specification for earthworks and assess the likely foundation and infrastructure design, further intrusive investigation was deemed necessary.

- 1.4. At this stage, only very preliminary design information for the proposed redevelopment is available; the assumptions made in determining which areas need to be subject to investigation, and to what depths characterisation soils is required has therefore involved a number of broad assumptions. For instance, that the route and stand-off to the high-pressure gas main crossing the site would be maintained, that cut and fill operations would provide a generally consistent slope in the central parts of the site, and that the development would comprise low-rise housing with supporting access roads, utility corridors, parking and open space.
- 1.5. This report contains factual information of intrusive investigation work undertaken by SGP in accordance with the site investigation requirements. This report describes the findings of Stage 2017 Ground Investigation supplemented by the results of the previous site investigation undertaken by SGP in 2016. The report discusses the ground conditions encountered with their implications regarding the proposed development based on fieldwork and subsequent laboratory testing. The assessment methodology was carried out in accordance with BS 5930:2015. The report contains some discussion of the implications of the findings with respect to the existing physical constraints to development of the site and may be regarded as an interpretive report in this respect but is not intended as a design document.
- 1.6. The report only considered the geotechnical aspects of the site assessment, reference to the earlier geo-environmental reporting should be made for consideration of the limited constraints imposed by ground contamination which have been identified on the site.

2. Information Sources

2.1. The principle sources of information consulted in the preparation of this report include:

Table 2.1: Information Sources

Date and reference	Author and source	Purpose and information content
Geo-environmental Appraisal January 2016 Ref: R2228 R01-v1	SGP	Ground contamination desk study
Preliminary Phase I and Phase II Contamination and Geotechnical Assessment August 2016 Ref R2228 R02-v2	SGP	Phase I Ground Contamination Assessment (Desk Study) Phase II Ground Investigation, geotechnical assessment,

3. Development History and Site Characterisation

3.1. Historical Development

3.1.1. Historical plans indicate that the site has mostly remained open fields throughout its mapped history, and no indications of previous industrial activity or disturbance associated with mineral extraction or mining have been identified within the site. Several small buildings have been identified in the historical mapping and satellite imagery around the perimeter of the site.

3.1.2. A pond towards the north of the site appears to have been in-filled around 60 years ago. This could contain waste materials. A more significant change in site levels appears to have taken place in the south east of the site at around the time of construction of the adjacent motorway and the most southerly part of the western valley, and a small area near the northern boundary appear to have been filled in. Two small areas of tipped granular ashy materials are also visible at the site surface, although these appear to be superficial surface tipping.

3.2. Current Land Condition

3.2.1. A summary of existing significant features noted during SGP's site inspections and previous reports is presented below.

Table 3.2: Present Land Condition

Site Description	The site currently comprises open fields, divided by stock fencing. The fields are in use for grazing.
Access	Access to the various areas is gained from Trows Farm off Trows Lane
Boundaries	North: Stock fencing and hedgerows onto a public footpath/track known as Cripple Gate Lane. East: Stock fencing onto top of cutting for A627(M) road. South: Stock fencing and hedgerows onto Trows Lane or properties/land (Trows House, Trows Farm, The Grange) off Trows Lane. West: Stock fencing and hedgerows onto a public footpath to rear of adjacent housing.
Drainage	A number of springs, and issues are mapped as arising on the site which appear to flow to the south to the ponds and reservoirs, most drainage from the site probably ultimately enters a number of reservoirs present to the south of the site over Trows Lane, occupying the base of a valley which appears to form the upper reaches, or a tributary of Trub Brook. No standing surface water except one area in the base of a valley in the south-west of the site was observed on the site during the inspections and investigations which have been variously carried out in summer and winter, although several area of wet and marshy ground are present following periods of wet weather and the presence of wetland plant species in the low lying parts of the site, as well as a large area of level land in the southeast of the site indicate poor drainage and seasonal waterlogging in these areas. It is apparent that drainage from the main (westerly) valley is collected by a pipe (which is exposed in a number of locations) which exits the site under the stable block of the farm to the south and a similar route, although exposed at the surface exists in the east of the site.

Structures	The only above ground structures visible or identifiable from contemporary satellite imagery is a dilapidated small building in the northwest corner of the site. The dwellings and outbuildings of Trows House, Trows Farm and the Grange all appear to lie outside the site boundary provided to SGP.
Services and Utilities	Warning signs and marker posts for a high-pressure gas main near the western ends of the southern and northern site boundaries: a number of marker posts are also present within the site which appear to link these two locations, indicating the presence of a high-pressure gas pipeline crossing the west of the site. The presence of high-pressure gas main was confirmed with utility plans and a National Grid engineer attended the site over both phases of investigation to mark out the route and advise on stand-offs and crossing points. Two overhead electricity lines enter the site from the northeast corner and cross the northeast part of the site although the location where they exit the site to the east or south was not confirmed during the site walkover but observed on utility plan. However, the survey does not constitute a comprehensive utility services search and relies on information provided by third parties.
Topography	The site generally slopes down from the highest point at the northeast corner (180m AOD) to the south towards the tributary of Trub Brook and the associated reservoirs in the base of the Valley to the south of Trows Lane (150m AOD). However, the site exhibits significant undulations with a series of internal valleys and spurs changing levels locally by up to 20m in the western areas.
Mapped Geology	The site lies within a large area of glacial sands and gravels extending from Rochdale to the North of Oldham and west to Heywood. Locally the deposits are classified as Hummocky Glacial Terrain comprising moraines and mounds deposited by meltwaters and subject to scouring and erosion to form undulating deposits of variable sediments but dominated by sands and gravels. In the southwest parts of the site glacial till, likely to be dominated by more cohesive (clay) sediments may be present as these outcrop along the southern boundary. The nearest available borehole log immediately to the north of the site adjacent to Cripple Gate Lane (BHSD81SE421), indicates sandy clay forms at significant depth of the superficial deposits, whereas the nearest borehole to the west, around 100m away off Vicarage Road (BHSD81SE333) indicates sand, clay and gravel overlying stiff clays. Bedrock geology is mapped as the Pennine Lower Coal Measures comprising mudstone siltstone and sandstone. Two thicker, named sandstone units are mapped as sub cropping beneath the site, both marked as the Lawrence Rock formation.
Mapped Hydrogeology	Soils on the site are of high leaching potential. The underlying superficial deposits are classed as a Secondary A aquifer. These designations reflect the likely presence of permeable strata within the granular sand and gravel deposits mapped on the site. The bedrock underlying the site is classed as a Secondary A Aquifer, of variable permeability. The Coal Measures are probably mainly of low primary permeability, although the thicker sandstone units mapped on the site may contain more mobile groundwater. The site is not within the catchment of a Groundwater Source Protection Zone within an area classed as of Low Groundwater Vulnerability. The nearest recorded ground water abstraction is over 800m from the site.

Natural Ground Stability Hazards	The site has been assessed by BGS as being at very low risk or no hazard of collapsible ground, landslide, running sand and shrinking or swelling clay, and with no compressible or dissolution ground hazards, however it is apparent that there are some areas of very soft and waterlogged ground on the site and superficially at least weak soils and considerable settlement under loading may be anticipated in these areas. It is also possible that cohesive soils may be present, although these locally have a very low potential for generating shrinking or swelling instability hazards. Given the potential variability of the hummocky glacial deposits and the presence of springs and issues on the site, SGP considered there may be some risk of running sands and excavation stability in parts of the site. There is evidence of some slope movement or slip on some of the steepest slopes on the site indicating that these are at or near their natural angle of repose and slope stability may present a hazard on the site, particularly if any steepening of any slopes is considered to increase development areas or as part of temporary work.
Excavation and Land filling	The development history of the site does not indicate that significant extraction of materials or filling has taken place within the site. No Local Authority information on landfills has been identified and the Environment Agency mapping indicates an active inert landfill (Ashfield Valley) around 500m to the north and the nearest historical landfills (Thornhall Old Road & Newhay Farm) being relatively small and at similar distances to the southeast and southwest. Anecdotally two parts of the site were used for unspecified tipping and the presence of ashy materials at the surface in one of these, and a third location supports the conclusion that the site has been subject to at least small-scale waste disposal operations in the past. There is evidence of significant earthworks in the surrounding area on the available historical plans; a number of workings, reservoirs and sand pits to the south of the site were backfilled as part of the M62 road construction. A marsh to the northwest may have been infilled to construct the modern industrial estate at the Crown Business Park. The other works to construct the motorways appear to have mainly involved excavations of deep cuttings to the east of the site. In the southeast part of the site, changes in the surface height contours between historical maps which pre-date and post-date the motorway construction may indicate some of the earthworks extended onto the site. Infill to the southern part of the western valley system also appears to have taken place.
Mining	The site is in an area unaffected by historical coal mining activity according the Coal Authority as no worked seams have been identified at depths with the potential to influence the site. A number of sand pits are marked on the historical plans of the area, the nearest of which is 45m to the northwest of the northwest corner of the site, with several others indicated at greater distances in excess of 100 to the west, south west and south.
Surfaces / Vegetation	The large fields which make up the majority of the site areas appear to be grassed with hedgerows and trees internally present at the various field boundaries. Some parts of the site appear to be rough scrub or heath. No invasive species were recorded during the site inspections however the survey does not constitute a comprehensive ecological assessment. Two areas without vegetation and a surface comprising loose black gravel of ash, clinker and coke as well as pieces of mica and drilled stone, cement sheeting and glass were noted during the investigation

4. Investigation Methodology

4.1. Objectives and Rationale

4.1.1. It is proposed to develop the site to accommodate low-rise residential housing development.

Given the variable topography which exhibits significant undulations with a series of internal valleys and spurs, potentially changing levels locally by up to 10m, extensive earthworks will be required.

4.1.2. The current phase of investigation is required to provide information on ground conditions to assist in assessing the likely design requirements for:

- Earthworks required to provide acceptable slopes for site access and sensibly level development platforms,
- Foundations for development, pavement design and infrastructure,
- Site drainage.

4.1.3. Intrusive investigations have therefore been undertaken to:

- confirm the ground conditions underlying the site and provide information to advise appropriate earthwork and foundation solutions for the site development based on soil classification, in-situ strength parameters and compaction testing;
- sample and classify materials within the likely areas of “cut” with respect to their potential for replacement as engineered fill in the low-lying areas by collection of bulk samples and analysis for classification and compaction testing,
- carry out in-situ testing at depths below the likely level “cut” to determine soil characteristics and potential foundation solutions following regrade,
- carry out in-situ testing and laboratory testing and sampling within the likely areas of “fill” to determine the soil characteristics for areas which will act as the foundation soils for the engineered fill,
- improve delineation of the lateral extent of the area of possible cohesive made ground material in the southeast and of soft alluvial sediments in the base of the valleys,
- include samples of foundation bearing strata for potential aggressive conditions for concrete;
- obtain information if possible on the presence and depth of groundwater;
- to obtain permeability parameters.

4.1.4. The investigation was carried out in accordance with the instruction provided by the client and completed under the appropriate guidance for site investigations (BS5930 and BS EN ISO 22476).

4.2. Fieldwork

- 4.2.1. A total of 57 exploratory holes were excavated at site during site investigations in June 2016 and in May 2017 consisting of 21 trial pits (2016) and 10 cable percussive boreholes, 13 window sampling boreholes, 13 super heavy dynamic probes (2017) under the supervision of SGP Consultant C Salwa.
- 4.2.2. The positions of the exploratory holes were selected by SGP to provide a wide coverage of information on the site area however some parts of the site were not accessible due to the stand-off to the high-pressure gas main and electricity cables, complex topography and steep slopes and very soft waterlogged boggy ground conditions in low-lying areas.
- 4.2.3. The positions were selected in order to provide information on the stratigraphy and geotechnical parameters for areas of future earthworks and developable areas. The ground investigation was focused on important cut and fill areas, areas of low-lying valleys and suspected fill (made ground) areas.
- 4.2.4. The position of all exploratory holes undertaken at the site can be seen on the Exploratory Hole Location Plan in Drawing 001. The first ground investigation in June 2016 consisted in excavation of trial pits. Trial pits TP01 to TP21 were excavated with a Yanmar 8T tracked midi excavator to a maximum depth of 3.4m below ground level. Nine bulk samples for geotechnical testing were taken at regular intervals down to the base of the entries for subsequent laboratory testing and inspection. The 2017 investigation comprised a mixture of windowless sampling boreholes, cable percussion boreholes and dynamic probe tests.
- 4.2.5. WS1 to WS13, were put down using tracked Archway Competitor and Archway Dart rigs, and LLAMR – Lightweight Limited Access Modular Rig to maximum depths of between 2.5m and 6.45m. Boreholes were advanced using a plastic lined steel tube sampling system, driven into the ground by a top drive percussive hammer. A near continuous 87mm – 67mm diameter core sample was recovered of the sampled materials for examination and sub-sampling. Standard penetration tests (SPTs) were undertaken at 1m intervals down to the base of boreholes in most locations. The drilling of windowless sampling boreholes was undertaken by Structural Soils Ltd and Topdrill Ltd.
- 4.2.6. Super Heavy Dynamic Probing, DPSH01 – DPSH13 (excluding DPSH5 -not completed) was carried out to give an indication of the relative density and consistency of the soils encountered. The in-situ testing was undertaken by Structural Soils Ltd and Topdrill Ltd.
- 4.2.7. Cable percussive boreholes, BH D to BH N, were drilled utilising a standard cable percussion rig (Dando 3000), at a diameter of 150mm, down to maximum depth of 20.45m below ground level. Metal casing was extended to a maximum depth of 20m, to avoid the collapse of the loose deposits within the upper parts of the boreholes and seal out groundwater inflows. Disturbed

bulk samples and small plastic tub samples were collected at regular intervals throughout the boreholes for future laboratory inspection and testing. Standard Penetration Tests (SPTs) were at 1m intervals and locally 1.5m intervals after 10m depth, down to the base of boreholes.

4.2.8. On completion of the cable percussion boreholes BHD, BHG, BHH, BHI, BHK, BHL, BHM and BHN were utilised for the installation of a 50mm diameter slotted PVC standpipes from bases of boreholes at depths between 20m and 10m up to between 1m or 10m below existing ground level. From depths between 1m or 10m up to ground level plain pipes were added. The slotted sections of standpipes were surrounded with filter sock and gravel, while expansive bentonite clay was added around the plain pipes. The standpipes were finished with raised covers, which were then concreted flush with ground level. Details of installations in boreholes are summarised below:

Table 4.1: Details of installations in boreholes

Hole ID	Plain section (m)	Slotted section (m)	Total depth of installation (m)
BHD	0-1	1-9	10.45
BHF	No installation		
BHG	0-10	10-20	20.45
BHH	0-10	10-20	20.45
BHI	0-10	10-20	20.45
BHJ	No installation		
BHK	0-5	5-15	15.45
BHL	0-10	10-20	20.45
BHM	0-1	1-9	10.45
BHN	0-5	5-15	15.45

4.2.9. Representative small tub samples were collected from boreholes and submitted to Scientific Analysis Laboratories Ltd, (SAL) in Manchester to determine sulphate content and pH.

4.2.10. The disturbed samples, including small tub samples and bulk samples, collected from boreholes were submitted to Professional Soils Laboratory Ltd (PSL) for geotechnical identification testing which included Atterberg limits; plastic and liquid limits, size distribution testing by wet sieve method as well as compaction testing including CBR tests and Proctor tests (determination of the dry density/moisture content relationship).

4.2.11. Falling head permeability testing was undertaken in BHD, BHG, BHH, BHI, BHK, BHL, BHM and BHN.

4.2.12. Conclusions relating to ground conditions made within this report are based on data obtained from the site investigation, however it should be noted that variations, which affect these conclusions, may occur between and beyond the test locations. Also, water levels may vary with time due to season variation.

5. Investigation Observations and Results

5.1. Summary of Ground Conditions

5.1.1. The following information summarises findings of site investigations carried out by SGP between 08.05.17 and 31.05.17 and the previous site investigation performed between 28.06.16 and 30.06.16. SGP investigation logs are provided in appendices A, B, C and D; Geotechnical and Chemical Testing Results are presented in appendices H and I, and summarised in the appendix J.

5.1.2. All depths provided in the following sections are from ground levels contemporaneous with the site investigation dates. Classifications are based on field descriptions, laboratory results and *in-situ* testing.

5.1.3. The site lies within the local superficial surface unit of Hummocky Glacial Deposits that have characteristic mounded topographic form.

5.1.4. These deposits are highly variable lithologically and include complex interdigitations of matrix and clast supported diamicton (*unsorted to poorly sorted material which contains particles ranging in size from clay to gravel, suspended in a matrix of silt or sand*), slightly stratified and unstratified sand, silt, clay and gravel with variable proportions.

5.1.5. Some of the site areas are overlain by localised alluvium deposits, made ground and engineered fill overlying the Hummocky Glacial Deposits.

5.1.6. Therefore, the whole site has been divided in the following areas:

I – Made Ground - undivided; depressed area to the south-west and locally to the north, northeast and central areas

II – Made Ground - Engineered Fill; to the east of the site and north-east

III – Alluvium; valley bases

IV – Hummocky Glacial Deposits not overlain by made ground, fill or alluvium

Topsoil

5.1.7. Topsoil was encountered at each test location (natural or reworked topsoil) as a veneer overlying natural deposits, undivided made ground and engineered fill from ground level down to depths of between 0.2m and 0.6m. The topsoil is represented in general by dark brown or blackish dark brown slightly clayey sandy or silty organic soil with grass roots and rootlets.

Relict Topsoil

- 5.1.8. Relict Topsoil was encountered in the Zone II Engineered Fill in WS11, WS12 and WS13 as a layer between overlying fill and underlying Hummocky Glacial Deposits from depths of between 3.3m and 5.4m down to depths of between 3.7m and 5.8m. Represented in general by blackish dark brown sandy clay or clayey sand with relict roots, rootlets and occasional gravel of sandstone.

Zone I - Made Ground undivided

- 5.1.9. Made ground (undivided) was encountered in TP03, TP08, TP14, TP15, WS09 and WS10 from between GL and 0.6m depth down to depths of between 0.7m and 3.1m bgl. Made ground is located in the depressed area to the south-west and to the north and north-east in proximity to Cripple Gate Lane. Represented in general by a variable mix of brown to black sandy gravel, gravelly clay, gravelly slightly clayey sand; gravel is brick, ceramic, sandstone, limestone; slag and clinker with ash in TP03 and WS10; slag, rags, glass, iron frames, shoe soles in TP08; wood in TP15 and WS10; soda ash in WS10.

Zone II - Made Ground – Engineered Fill

- 5.1.10. Made ground (engineered fill) was encountered in TP08, TP13, WS11, WS12 and WS13 from between GL and 2.2m depth down to depths of 3.3m and 5.4m. Engineered fill occupies the eastern portion of the site and locally in proximity of Cripple Gate Lane to the north. Represented in general by soft to stiff slightly sandy to sandy clay with occasional gravel of tarmac, sandstone, coal and red brick fragments.

- 5.1.11. N_{SPT} values derived from standard penetration tests within made ground in the boreholes ranged from 4 to 15 reflecting the variable consistency of the fill.

Zone III – Alluvium

- 5.1.12. Alluvium deposits were encountered in low lying areas, in the valley trending from north-east to south-west in the western part of the site and in the valley trending from north to south in the central-eastern part of the site. Not all of the areas suspected to contain alluvium could be accessed due to soft ground and other constraints, and deeper areas may exist locally.

- 5.1.13. Alluvium deposits were observed in WS9, BHD, BHM, TP3 and TP5 and inferred from Dynamic Probes DPSH6, DPSH7 and DPSH8 from depths of between GL and 1.1m down to depths of between 0.9m and 2.1m, with the maximum thickness inferred from DPSH results of approximately of 2m. Represented in general by very soft to soft sandy locally slightly gravelly clay and loose to medium dense silty locally slightly gravelly sand.

- 5.1.14. N_{SPT} values derived from standard penetration tests within sandy Alluvium in the boreholes WS9 and BHM, 4 and 16, indicate very loose to medium dense soil
- 5.1.15. The results of the Super Heavy Dynamic Probing indicated that the Alluvium is of very soft consistency or very loose relative density.
- 5.1.16. Only one sample of Alluvium was tested for Particle Size Distribution indicating a soil of 85% of fines and classified as slightly sandy slightly clayey silt.

Zone IV - Hummocky Glacial Deposits

- 5.1.17. Hummocky Glacial Deposits were encountered in each test location, underlying the previously described surface deposits, except TP08 and TP13 where the upper boundary of these deposits below the existing fill was not confirmed. The deposits extended to the maximum depth achieved in each entry down to a maximum 20.45m bgl. The full thickness was not proved during the ground investigation. These deposits are highly variable, represented in general by alternating layers of variable proportions of predominantly silt and sand, locally clay and gravel.
- 5.1.18. Because of intrinsic features of hummocky deposits, the site is characterised by uneven topography comprising some small rounded hills, locally relatively steep slopes and some low-lying areas. The latter frequently contain bogs or minor/seasonal watercourses and morphologically of small valleys. The land near the central and southern parts of the eastern boundary is less hummocky forming a broad slope to the south.
- 5.1.19. Classifications tests on 19 cohesive samples showed that moisture contents ranged from 15% to 35% with the fines fraction revealing modified plasticity index ranging from 7% to 32%. 8 samples were classified soils of low volume change potential (7%-19%) and 11 samples were classified as soils of medium volume change potential (20%-32).
- 5.1.20. Particle size distribution analyses revealed highly variable fraction of fines of between 1% and 99%.
- 5.1.21. Pocket penetrometer tests undertaken in the cohesive samples revealed undrained shear strengths ranging from 38kPa to 220kPa with a general increase in strength with depth.
- 5.1.22. The undrained shear strength values derived from N_{SPT} values ranged from 30kPa to a maximum value of 250kPa showing a general increase in strength with depth.
- 5.1.23. N_{SPT} values derived from Standard Penetration Tests in the boreholes ranged from 6 to more than 50 (refusal), with one value of $N_{SPT}=1$, reflecting the general increase in consistency/relative density with depth.

5.1.24. The results of the Super Heavy Dynamic Probing indicated that the Hummocky Glacial Deposits varied with depth from very loose/very soft to very dense/very stiff.

California Bearing (CBR) Tests

5.1.25. Laboratory CBR tests were undertaken in the Hummocky Glacial Deposits encountered at the site. Results of the testing ranged between 0.1% and 4.7%. The results are resumed in the table below.

Table 5.1: Summary of CBR tests for different soils of the Hummocky Glacial Deposits

Soil	CBR (%)
very silty SAND	0.5
slightly sandy SILT	1.7
sandy SILT	0.2
sandy SILT	0.8
sandy SILT	0.1
sandy SILT	0.1
CLAY	1.0-1.2
silty SAND	4.2-4.7

Dry density/Moisture Proctor Tests

5.1.26. 2.5kg rammer tests – Proctor Tests were undertaken in the Hummocky Glacial Deposits in areas assumed to form part of the ‘cut’ (and which will therefore require placement and compaction in other areas) to determine the maximum dry density versus optimum moisture content relationship. The results are resumed in the table below.

Table 5.2: Summary of 2.5kg rammer tests (Proctor method) for different soils of the Hummocky Glacial Deposits

Soil	Maximum density (Mg/m3)	Optimum moisture (%)
silty SAND	1.76	14
sandy SILT	1.99	10
sandy SILT	1.99	12
slightly sandy SILT	1.91	11
sandy SILT	1.73	15
CLAY	1.67	19
silty SAND	1.68	15
slightly gravelly slightly sandy CLAY	1.71	19

5.2. Groundwater Conditions

5.2.1. Groundwater was encountered as seepages or inflows in 5 of the 21 trial pits undertaken in June 2016, groundwater was observed typically in low-lying areas, during the fieldwork, mainly as seepages and inflows within the sandy layers of Hummocky Glacial Deposits and in alluvium layer in TP05. The groundwater levels (trial pits June 2016 and surface water features) are summarised below:

Table 5.3: Summary of groundwater levels, June 2016, Report R2228.

Exploratory hole	GW level (m bgl)	Type	Material	Total depth (m)	Approximate hole ground elevation (m)
TP03	1.8	Inflow	Sand (Hummocky)	3.0	~155
TP05	0.6	Inflow	Made Ground	2.6	~158
	1.3	Inflow	Alluvium		
	2.4	Standing level after 10min	Sand (Hummocky)		
TP09	2.7	Seepage	Sand (Hummocky)	2.7	~152
TP10	2.0	Seepage	Sand (Hummocky)	2.0	~167
TP16	0.8	Seepage	Sand (Hummocky)	3.0	~166
	1.3	Seepage	Sand (Hummocky)		
	1.8	Seepage	Sand (Hummocky)		
Spring 1	-	spring	Sand (Hummocky)	-	~155
Spring 2	-	spring	Sand (Hummocky)	-	~164
Farm Water supply	-	Supply draining groundwater from Sand (Hummocky)	Sand (Hummocky)	-	~155

5.2.2. On completion of the cable percussion boreholes BHD, BHG, BHH, BHI, BHK, BHL, BHM and BHN were utilised for the installation of a 50mm diameter PVC standpipes for groundwater monitoring programme. Details of groundwater monitoring are summarised below:

Table 5.4: Summary of groundwater monitoring (m).

Exploratory hole	09/06/17	Total depth
BHD	9.65	10.45
BHG	not measured	20.45
BHH	6.78	20.45
BHI	20.24	20.45
BHK	dry	15.45
BHL	not measured	20.45
BHM	0.99	10.45
BHN	4.32	15.45

5.2.3. Falling head permeability testing was undertaken in BHD, BHG, BHH, BHI, BHK, BHL, BHM and BHN. Results are provided in the table below:

Table 5.5: Summary of permeability results

Exploratory hole	permeability k (m/s)
BHD	1.4×10^{-7}
BHG	4.9×10^{-7}
BHH	1.9×10^{-6}

Exploratory hole	permeability k (m/s)
BHI	2.8×10^{-7}
BHK	5.8×10^{-7}
BHL	1.4×10^{-6}
BHM	1.1×10^{-6}
BHN	1×10^{-6}

5.3. Results of Soil and Groundwater Chemical Analysis

5.3.1. The complete soil analytical data are presented in report R2228 Preliminary Phase I & II Contamination and Geotechnical Assessment (2016). With respect to BRE Special Digest SD1 (2009) chemical tests on selected soil samples have recorded soluble sulphate concentrations ranging from 1.5*mg/l to 168mg/l. The pH values ranged from 4.9 to 8.2.

6. Geotechnical Assessment

6.1. General Conditions

- 6.1.1. We understand the proposed development comprises the construction low-rise residential dwellings with supporting infrastructure and that the site will have to be regraded to sensibly level development platforms and appropriate gradients for access roads.
- 6.1.2. The exploratory work from both investigations have proven the expected general strata sequence comprising highly variable mixes of sand, silt, clay and locally gravel of Hummocky Glacial Deposits locally overlain by alluvium in the base of the valley features, and by localised made ground in a few specific areas and a more extensive deposit of engineered fill. The projected lateral extent of these deposits based on the site investigation logs and observations at the surface is provided on Drawing 001.
- 6.1.3. Made ground – within the various areas identified during the site investigations extends to depths of between 0.7m and 3.1m. The more substantial deposit of made ground interpreted as engineered fill placed during construction of the adjacent motorway is substantially deeper, extending to depths of 3.3m and 5.4m.
- 6.1.4. Topsoil occurs as a veneer from ground level down to depths of between 0.2m and 0.6m. Relict Topsoil was observed in the eastern portion of the site below the engineered fill at depths from between 3.3m and 5.4m down to depths of between 3.7m and 5.8m.
- 6.1.5. The Alluvium was observed in the valleys in the western and in the central-eastern portion of the site. The maximum recorded thickness if Alluvium is about 2m, however is possible that greater depths may be present given the variability of the underlying glacial basement strata.
- 6.1.6. The Hummocky Glacial Deposits are highly variable, represented in general by alternating layers of variable proportions of predominantly silt and sand, locally clay and gravel. The consistency of fine soils and relative density of granular soils increase with depth.
- 6.1.7. Groundwater ingress into entries was encountered at different depths depending upon the seasonal variations, and ground conditions. The first site investigation in June 2016 has been completed during continuous heavy rains, while groundwater monitoring in June 2017 has been performed after a prolonged dry period with occasional precipitations. Groundwater is expected at shallow depths (0.6m-1m) or near the surface in the valleys. It should be noted that some depressed areas are permanently waterlogged.

6.1.8. Groundwater level relative to the surface within the mounds of Hummocky Glacial Deposits is highly variable and depends upon the topography. Groundwater level varied between 1mbgl and 20.2mbgl and groundwater levels may not have fully stabilised in the wells by the time the initial monitoring round was carried out, so some caution should be applied to the results.

6.1.9. The results of the permeability testing indicate that the minor aquifer beneath the site has a permeability varying in the order from 10^{-6} to 10^{-7} . According to BS8004 the results indicate poor drainage conditions, typical for fine sand, silt and clay.

6.2. Site Excavation and Cuttings

6.2.1. Conventional hydraulic plant should be satisfactory for excavating service trenches within natural soils, made ground and engineered fill. Heavy plant and earthmoving equipment will be required to complete the site regrading earthworks, which could involve the excavation, movement and placement of 250,000m³ of materials to achieve an acceptable gradient depending on design levels.

6.2.2. In line with HSE guidelines, all excavations requiring personnel access should be adequately supported to avoid the risk of collapse. Excavations within the made ground and natural ground above ground water level are likely to remain stable in the short term. Excavations below levels of groundwater seepages are expected to be unstable, particularly at the boundaries between layers of fine grained and course grained soils.

6.2.3. It should be appreciated however that seasonal variations may exist and hence groundwater entries may vary particularly during wetter months or after periods of inclement weather and result in instability of even shallow excavations. Some areas on the site are permanently waterlogged in depressed areas. Steep slopes and waterlogged areas must be taken into consideration when scheduling preparatory earthworks and construction activities. Dewatering will be required for excavations in lower areas. Conventional pumping from sumps should be satisfactory to maintain a dry excavation at shallow depths.

6.2.4. Preparatory earthworks may locally cause instability at greater scales; observations of the site surface and investigations (the presence of slickenside surfaces in BHI) points towards previous instability in some of the slopes on the site. This should be mitigated within the site by a regrade to slopes with acceptable gradients for construction and access, however if any steepening of slopes or surcharging during temporary works is required then careful assessment will be required, particularly where the ground is saturated as different properties of clays and sands/silts may lead to lubrication along the boundary surfaces when saturated which potentially may cause slope instability.

6.2.5. If retaining structures or permeant slopes are required to maximise the developable area (for example around the site boundaries) these will require site-specific investigations for detailed design.

6.3. Site Filling and Embankments

6.3.1. The Proctor compaction test indicate that for sandy silt/silty sand materials maximum dry densities of between 1.68Mg/m^3 – 1.99Mg/m^3 can be achieved with optimum moisture of between 10% and 15%. For clay and sandy clay maximum dry density of 1.67Mg/m^3 and 1.71Mg/m^3 can be achieved with optimum moisture of 19%.

6.3.2. The fill materials will have to be selected, placed and compacted to an appropriate specification so that the ground remains stable for its intended use, a method compaction or end-product specification can be considered to achieve this, and site trials and monitoring will have to be carried out to confirm the performance. In particular, the earthworks specification must make careful consideration of the base and topography of the areas to be filled, and the interaction of the earthworks with the existing site drainage; the low-lying parts of the site which will require raising contain soft alluvial sediments and are seasonally or permanently waterlogged at the existing surface. It may not be possible to achieve a suitable degree of compaction in placed, engineered fill in some of these areas unless overlying soft sediments are removed and/or drainage is improved.

6.4. Foundation Solutions

6.4.1. The selection and design of foundation solutions will depend on the earthworks completed locally within the site to the structure. In general terms where the existing made-ground, fill and alluvium are present under the footprint of structures, these are considered unsuitable as a bearing stratum due to its variability, and potential for unacceptable total and differential settlement under applied foundation loadings. For example, the alluvium in low lying areas is characterised by low values of N_{SPT} and $DPSH$ which indicates allowable bearing capacity of less than 25kPa.

6.4.2. The Hummocky Glacial Deposits typically are considered to be a suitable bearing stratum for foundations and engineered fills. Typically, a minimum safe bearing capacity at proposed foundations levels in different materials (sand/silt/clay) is varying between 60kPa and 120kPa and may be adopted for foundations not exceeding 1m in width at shallow depths. This would allow for settlement generally not to exceed 25mm.

- 6.4.3. It should be noted that the position of the groundwater level, relative to the foundation, has an important effect on the ultimate bearing capacity of foundations on non-cohesive soils. With high groundwater levels, in case of seasonal changes, the effective stresses in the ground are lower when the granular soils immediately below the foundations are dry, and the ultimate bearing capacity is reduced. In extreme cases, the ultimate bearing capacity of a flooded foundation may be only one-half of that in a dry condition, which are the values estimated above.
- 6.4.4. If pockets of unsuitable soils are encountered these should be excavated and the foundation deepened. However, it should be noted that the soils are highly variable lithologically, and different rates of settlement, primary settlements and secondary consolidations, are expected. Foundations should be designed with suitable reinforcement to account for local variations and differential settlement within the various materials.
- 6.4.5. Where excavation into the Hummocky Glacial Deposits out carried out to reduce levels, a conservative assumption would be that similar bearing capacities may be anticipated as founding depths as the removal of overburden would result into relative over consolidation of the soils.
- 6.4.6. Where levels require raising, the situation is more complicated. It should be feasible to compact the fill materials to a sufficient specification to allow consideration of spread strip or raft foundations. This must be achieved with a very high degree of confidence as it cannot be assumed that further, ground improvement through vibrofloatation methods will be appropriate due to the variable and frequently high fines content. Furthermore, the variability in the thickness of placed fill, due to the variable topography, and the presence of soft sediments within the areas that require raising present the prospect of long-term settlement and differential settlement which may be difficult to predict and require a substantial monitoring period to provide confidence unacceptable movement has ceased.
- 6.4.7. For the large area of cohesive made ground in the south-east of the site, and potentially for the area of alluvium in this area where no substantial change in levels is required, it should be assumed that piled foundations will be required, although these will probably be of limited length, the deposits not being expected to extend for more than 5m in depth.
- 6.4.8. The cohesive soils should be considered as being of low to medium volume change potential; heave protection to allow for shrinking and swelling of cohesive soils and the influence of trees is not likely to be required, however some clays of medium volume change potential were identified and considering the potential for construction over made ground/alluvium and engineered fills suspended ground floors should be assumed.

6.5. Pavement design

6.5.1. The structural design of a road or hard standing is based on the strength of the subgrade, which is assessed on the California Bearing Ratio (CBR) scale. With reference to existing guidelines, it is recommended that for formation prepared in undisturbed soils of the Hummocky Glacial Deposits CBR values of 2.5% to 5% should be considered.

6.5.2. However, the CBR values obtained were frequently less than 2.5%; the CBR for sandy silt varied between 0.1% and 1.7%, for sandy silt the values were of 0.5, 4.2 and 4.7% and for one sample in clay the CBR values was of 1% and 1.2%. Furthermore, low or unacceptably variable CBR values can be assumed for all of the areas of made ground/fill and alluvium. CBR values for the areas of placed fill will be dependent on the achieved compaction regime.

6.5.3. The minimum permitted Design CBR is 2.5% CBR. Where a subgrade has a lower CBR it is considered unsuitable support for a pavement foundation. It should therefore be permanently improved:

- Cement or lime stabilization should be applied for proposed subgrade through in-situ treatment,
- Improving the existing subgrade by introducing sub-soil drainage,
- Deleterious material can be replaced by a more suitable material; unbound or stabilised granular fill material,
- For certain conditions, the incorporation of a geosynthetic material may be advantageous.

6.5.4. Any areas of soft deleterious material should be excavated and replaced with properly compacted granular fill. Pavement construction may be considered on this existing fill and it is recommended that geogrids or similar soil reinforcement techniques be employed to provide a subgrade with a known CBR value. If this option is pursued, discussion should be held with a soil reinforcement company who would design a subgrade to a specified CBR value.

6.6. Concrete Classification

6.6.1. Chemical tests on selected soil samples have recorded soluble sulphate concentrations ranging from less than 1.5mg/l to 168*mg/l and pH values ranging from 4.9 to 8.2 This would correspond to a Design Sulphate Class of DS-1.

6.6.2. In terms of BRE Special Digest 1, the land has never been developed and may be considered to be natural ground. The groundwater beneath the sites should be considered mobile. The results correspond to Aggressive Chemical Environment for Concrete (ACEC) class AC-1.

7. Conclusions and Recommendations

7.1. Conclusions

7.1.1. The historical development of the site does not indicate the presence of significant previous development. Some very minor obstructions may be present associated with small historical buildings on the site periphery, but the presence of significant relict structures is not anticipated. A number of areas of made ground and fill materials have resulted from historical deposition of waste soils and other materials on the site.

7.1.2. A high-pressure gas pipeline crosses the western parts of the site, assuming this is to remain on its current route, part of the western area will require a stand-off from built development. Discussions with National Grid will be required to determine the full impact of the asset on the proposed development; as a priority, the design of the preparatory earthworks must not cause any instability which could impact the integrity of the pipeline.

7.1.3. The exploratory work from both investigations (June 2016 and May 2017) have proven the expected general strata sequence comprising highly variable mixes of sand, silt, clay and locally gravel of Hummocky Glacial Deposits locally overlain by made ground, fill materials and alluvium.

7.1.4. The existing made ground, fill and alluvium are considered unsuitable as a bearing stratum due to its variability, and potential for unacceptable total and differential settlement under applied foundation loadings. Where these areas underlie proposed development, traditional foundations are unlikely to be suitable, and alternatives such as piling may be considered; the three major areas likely to be classified as such (and the total site area) they represent are:

- The south-eastern area of cohesive fill, 3-5m deep approximately of 14,650m² (around 7.3%)
- The south-eastern valley and associated alluvium of approximately 6,850m² (around 3.4%)
- The south – western valley and associated alluvium of approximately 9,500m² (around 4.8%)

7.1.5. One of the above areas, the south-western valley base, is likely to require substantial infilling to provide a developable platform, depending on the specification and the performance of the earthworks in this area, it may be possible to revert to a traditional foundation solution or rafts, however the presence of the alluvium could result in settlement issues in this area.

7.1.6. A number of more minor areas of deposited waste materials are present, however in the context of the proposed development, these are not considered major constraints, although will require excavation, assessment and potentially an element of treatment or disposal for deleterious materials.

- 7.1.7. The Hummocky Glacial Deposits typically are considered to be a suitable bearing stratum for foundations, where these remain undisturbed at formation following the site regrade.
- 7.1.8. Typically, a minimum safe bearing capacity at proposed foundations levels in different materials represented by the Hummocky Glacial Deposits (sand/silt/clay) varies between 60kPa and 120kPa and may be adopted for foundations not exceeding 1m in width at shallow depths. However, it should be noted that the soils are characteristically variable, and different rates of settlement, primary settlements and secondary consolidations, are expected, *in particular if the ground is saturated at the level of foundations bearing capacities may be substantially lower.* Foundations should be designed with suitable reinforcement to account for local variations and differential settlement within the various materials.
- 7.1.9. The available data suggests that the Hummocky Glacial Deposits are capable of re-compaction to 1.7-2.0 Mg/m³, which should be adequate to form the embankments and engineered backfill to low-lying areas required to develop the site, provided the required moisture content and compaction can be achieved.
- 7.1.10. Selection of appropriate foundations for the infilled parts of the site will depend on the designed and achieved level of compaction for the placed materials, taking into consideration settlement within the engineered fills and the underlying basal soils, which include made ground and soft alluvium. The full extent of these areas will depend on the final regrade contours for the site but may be assumed to extend to approximately 25% of the site (including the part of the south-western valley containing alluvium described in 7.1.4).
- 7.1.11. These factors will also need to be carefully considered in when the required engineering behaviour of the site fills is specified in terms of their general stability. The earthworks scheme and the site drainage design must be integrated to ensure adequate drainage is provided and existing drainage routes are maintained.
- 7.1.12. The potential exists for the large-scale earthworks required to develop the site to cause instability on a similar scale, in particular where slopes are temporarily or permanently steepened or where significant surcharging takes place. The potential for impacts on the stability of surrounding land and structures, and in particular the high-pressure gas main within the site, must be assessed as part of the general design and specification for the works.
- 7.1.13. The laboratory testing shows the soils to have low to medium volume change potential as defined by NHBC Building Standards, Chapter 4.2.
- 7.1.14. Chemical tests on selected soil samples correspond to a Design Sulphate Class of DS-1. The results correspond to Aggressive Chemical Environment for Concrete (ACEC) class AC-1.
- 7.1.15. Groundwater level within the mounds of Hummocky Glacial Deposits is highly variable and

depends upon the topography. Groundwater level varied between 1mbgl and 20.2mbgl during the monitoring completed to date, although it is considered likely that establishment of groundwater conditions over a longer period will be required to inform detailed design of earthworks and drainage.

7.1.16. The results of the permeability testing indicate that the minor aquifer beneath the site has a permeability varying in the order from 10^{-6} to 10^{-7} . According to BS8004 the results indicate poor drainage conditions, typical for fine sand, silt and clay.

7.1.17. CBR values obtained in the majority of the tested samples were less than 2.5%; the CBR for sandy silt varied between 0.1% and 1.7%, for sandy silt the values were of 0.5, 4.2 and 4.7% and for one sample in clay the CBR values was of 1% and 1.2%. The minimum permitted Design CBR is 2.5% CBR. Where a subgrade has a lower CBR it is considered unsuitable support for a pavement foundation. It should therefore be permanently improved, although as with other aspects of design this will have to be reassessed following site earthworks.

7.1.18. Conventional hydraulic plant should be satisfactory for excavating service trenches within natural soils, made ground and engineered fill and heavy excavation, earthmoving and compaction plant will be required for the preparatory earthworks phase. Dewatering will be required in lower areas., some of them permanently waterlogged, conventional pumping from sumps should be satisfactory to maintain a dry excavation at shallow depths.

7.2. Recommendations -Geotechnical

7.2.1. Groundwater monitoring on the site should continue to provide additional confidence that the groundwater levels at the site have been adequately assessed; future levelling of groundwater should be made in comparison to datum levels.

7.2.2. This report, and the factual information provided in the appendices, should be provided to potential earthworks contractors for the site to assist in preparation of tenders for the works and the development of an earthworks specification programme to prepare the site for development. This must take into consideration the design requirements of the development, existing infrastructure and the surrounding environment, particularly where drainage and stability issues are of concern.

7.2.3. The criteria for engineered fill to support structures may be more critical than those commonly adopted for other applications such as highway embankments and while there may be a commercial requirement to achieve an appropriate specification for a specific foundation requirement, conversely it may more economical to pursue a lower specification to the earthworks and utilise ground improvement or piling to reduce risks from damage to structures from settlement.

7.2.4. Further testing will be required to determine the appropriate compaction regime for the earthworks, whatever specification is determined by the designers, and an appropriate level of supervision and testing will be required to ensure correct implementation.

7.2.5. Retaining structures, foundations, pavements, drainage and supporting infrastructure design can only be finalised once detailed design proposals are available; some or all of these may require further investigations to confirm conditions at site-specific locations, or following completion or preparatory earthworks.

7.2.6. be satisfactory to maintain a dry excavation at shallow depths.

7.3. Recommendations – Land Contamination

7.3.1. Overall the site presents limited hazards and risks associated with land contamination and only limited further assessment is considered necessary.

7.3.2. A potential external ground gas source was identified in a historical gravel pit 40m to the northwest of the site, in the absence of monitoring at the site boundary near this location (where access is severely constrained by slopes, vegetation and the high-pressure gas main), a precautionary approach to mitigation could be adopted by installing basic gas protection measures appropriate for CIRIA CS2 or NHBC Amber 1 conditions depending on the floor construction of the planned dwellings. Monitoring inside the site could be undertaken following preparatory earthworks to reduce this, however the use of gas protection in a small number of plots, within 100m of the feature for example, is not considered an unacceptable constraint in the context of the development.

7.3.3. The only internal sources of contamination are the tip areas encountered; where these have been identified to date they should be delineated and sampled to determine their waste classification for disposal/any requirements for a site cover system. In most cases the ash materials and inert wastes may be retained within the development provided these are isolated from future residents, some deposits of deleterious (degradable or unstable) fill materials may require segregation and disposal. Provided this is accomplished measures such as gas protection and a cover system for the other parts of the site should not be required.

7.3.4. Topsoil stripped from the site outside of the identified tip areas, and stockpiled for use in gardens, landscaped areas or export of any surplus will require testing at a frequency appropriate for low risk-greenfield sources.

7.3.5. The analysis of the springs indicated viable pollution sources currently impacting surface waters were absent, however it is considered prudent that a watching brief be adopted during preparatory earthworks and construction excavations, and that site supervisors and operatives are briefed on the potential for buried uncharacterised wastes and report any encountered for assessment.

7.4. Limitations

Stratigraphy

7.4.1. The evidence of stratigraphy is taken from discrete borehole and trial pit locations, and from information provided by other parties. Whilst it is usually reasonable to infer that similar conditions may extend between these locations; caution should be exercised, especially in the case where natural strata exhibits significant lateral and vertical variation, or where fill materials/made ground is present, both of which are the case on the site under consideration.

Contamination

7.4.2. The site investigation involved sampling at discrete locations, and it should be recognised that further areas or types of contamination may exist between investigation positions. The analyses performed are drawn from a typical suite of tests used to screen potentially contaminated land and specified to fall within the available budget. It is always possible that other substances may be present that have not been included within the standard range of tests.

Soil gas and groundwater

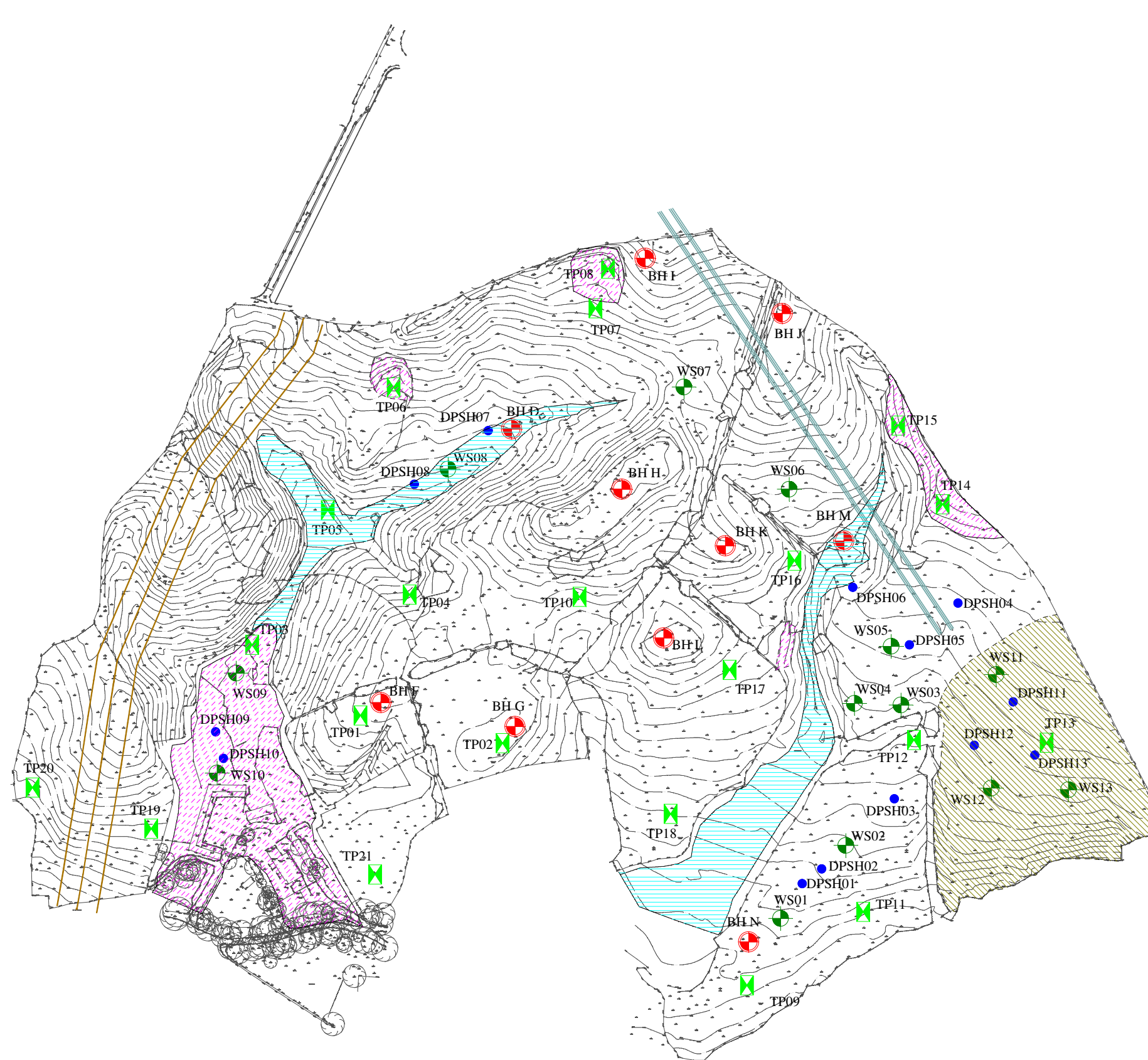
7.4.3. Any comments made on gas and/or groundwater conditions are based on observations or tests made at the time that the work was carried out. It should be noted that gas concentrations and pressures and groundwater levels and concentrations of substances may vary according to seasonal or weather-related effects, sometimes in an unpredictable fashion.

General

7.5. This report has been prepared by SGP for the sole and exclusive use of GLP Ltd. Reasonable skill, care and diligence has been exercised within the budget available, and in accordance with the technical requirements of the brief given. Notwithstanding the efforts made by the professional team in undertaking the assessment and preparing this report, it is possible that other ground conditions and contamination as yet undetected may exist. Reliance on the findings of this report must therefore be limited accordingly. Such reliance must be based on the whole report and not on extracts which may lead to incomplete or incorrect conclusions when taken out of context.

7.6. SGP reserves the right to alter any of the foregoing information in the event of new information being disclosed or provided and in the light of changes to legislation, guidelines and responses by the statutory and regulatory authorities.

DRAWINGS



- TP Trial Pits
- BH Cable Percussive Boreholes
- WS Window Sampling Boreholes
- DPHS Super Heavy Dynamic Probes

- Zone I Various Made Ground
- Zone II Placed cohesive fill
- Zone III Alluvium
- Zone IV Hummocky Glacial Deposits

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Project:
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Drawing:
Intrusive Investigations & Zoning

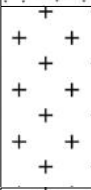
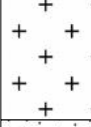
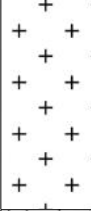
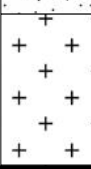
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Date: 21/07/2017	Scale: 1:2,500
Job No: R2392	Drg No: 001

APPENDIX A

Cable Percussion Borehole Logs

SHEET:	LOCATION: Rochdale	PROJECT: Trows Lane Farm	ENGINEER: CS	JOB NO. R2392	WINDOW SAMPLE NO. BHD		
		DRILL TYPE: Cable Percussive	CLIENT: Molesworth Estates Ltd	DATE: 11/05/2017			
SPT BLOWS/7.5cm/ N value		DEPTH (m)	SAMPLES/ TESTING	Standpipe/casing PP values	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
2 1 1 1 2 3 N=7		1.5 1.95	B SPT (D) B	Plain standpipe bentonite 0m-1m	0	Soft blackish brown slightly sandy clayey TOPSOIL with grass roots and rootlets.	
					0.4	Soft dark brown slightly sandy CLAY (ALLUVIUM).	
1 2 2 3 3 4 N=12		2.3 2.5 2.95	B SPT (D)	150mm casing 0m-10m	1.2	Firm locally stiff brown mottled grey slightly sandy CLAY (CL) (HUMMOCKY GLACIAL DEPOSITS).	
					2.4	Brown slightly sandy SILT (HUMMOCKY GLACIAL DEPOSITS).	
1 1 3 3 4 4 N=14		3.95	SPT (D)	PP=1kg/cm2 PP=2kg/cm2 PP=3.5kg/cm2 PP=1kg/cm2 PP=1.5kg/cm2	3.8	Stiff to very stiff brown slightly sandy silty CLAY with rare fine gravel (HUMMOCKY GLACIAL DEPOSITS).	
					4.0		
2 3 3 5 5 5 N=18		4.95	SPT (D)	PP=2kg/cm2	5.0		
4 7 8 9 12 11 N=40		5.95	SPT (D)	PP=3.5kg/cm2	5.5	Dense orangish light brown silty SAND (HUMMOCKY GLACIAL DEPOSITS).	
5 7 9 9 11 11 N=40		6.95	SPT (D)	Slotted standpipe gravel 1m-10m			
4 8 9 10 8 12 N=39		7.95	SPT (D)				
6 9 11 14 14 11 N=50		8.95	SPT (D)				
2 2 2 5 5 6 N=18		9.95	SPT (D)		9.5	Dense becoming medium dense from 9.5m orangish light brown sandy SILT	
					10		
 SMITH GRANT Environmental Consultancy LLP Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk							
GROUND WATER: Dry							
REMARKS: Rig: Dando 3000 Operator: JB Site Investigations Ltd							
SCALE: 1:500				LOGGED BY: CS		FIGURE NO.	
SPT: Standard Penetration Test D: small disturbed sample B: bulk disturbed sample PP: Pocket penetrometer							

[illegible]

SHEET: 1 of 1	LOCATION: Rochdale	PROJECT: Trows Lane Farm	ENGINEER: CS	JOB NO. R2392	WINDOW SAMPLE NO. BHF		
		DRILL TYPE: Cable Percussive	CLIENT: Molesworth Estates Ltd	DATE: 08/05/2017			
SPT BLOWS/7.5cm/ N value	DEPTH (m)	SAMPLES/ TESTING	Standpipe/casing	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND	
1 1 1 2 2 2 N=7 1 2 2 3 3 5 N=13 1 2 3 3 3 4 N=13 1 0 2 2 3 3 N=10 0 1 2 3 4 4 N=13		B	150mm casing from GL to 15m	0	Soft blackish brown slightly clayey sandy TOPSOIL with roots and rootlets.		
	0.8			0.6	Orangish light brown silty SAND with partings of silty clay and lenses of firm slightly sandy silt (HUMMOCKY GLACIAL DEPOSITS).		
				2	Orangish light brown sandy SILT (HUMMOCKY GLACIAL DEPOSITS).		
	2			3.2	Orangish light brown mottled light grey slightly sandy SILT (HUMMOCKY GLACIAL DEPOSITS).		
	3	B		4	Orangish light brown silty SAND with partings of silty clay and lenses of firm slightly sandy silt (HUMMOCKY GLACIAL DEPOSITS).		
				5.0	Firm becoming stiff orangish light brown sandy SILT (HUMMOCKY GLACIAL DEPOSITS).		
	5.45	SPT (D)		6.4	Medium dense orangish light brown silty SAND with lenses of silty clay (HUMMOCKY GLACIAL DEPOSITS).		
					9	Stiff to very stiff orangish light brown laminated sandy SILT (HUMMOCKY GLACIAL DEPOSITS).	
					10		
		GROUND WATER: Dry					
Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk		REMARKS:					
		Rig: Dando 3000 Operator: JB Site Investigations Ltd					
		SPT: Standard Penetration Test D: small disturbed sample B: bulk disturbed sample PP: Pocket penetrometer					
SCALE: 1:500		LOGGED BY: CS		FIGURE NO.			

SHEET: 1 of 1	LOCATION: Rochdale	PROJECT: Trows Lane Farm	ENGINEER: CS	JOB NO. R2392	WINDOW SAMPLE NO. BHF
		DRILL TYPE: Cable Percussive	CLIENT: Molesworth Estates Ltd	DATE: 08/05/2017	

SPT BLOWS/7.5cm/ N value	DEPTH (m)	SAMPLES/ TESTING	Standpipe/casing	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
1 2 2 2 3 3 N=10	10.4 5	SPT	150mm casing from GL to 15m	10	Stiff to very stiff orangish light brown laminated sandy SILT (HUMMOCKY GLACIAL DEPOSITS).	+ + + + + + + + + + + + + + + + + + + +
3 4 6 6 7 7 N=26	11.45	SPT (D)				
2 4 7 6 7 7 N=27	12.45	SPT (D)				
5 7 8 11 13 12 N=44	13.95	SPT (D)				
4 8 17 19 14 (12) N=R	15.45	SPT (D)				
			No installation	13.9	Very dense light brown slightly gravelly SAND. Gravel is fine to medium subrounded limestone (HUMMOCKY GLACIAL DEPOSITS).	+ + + + + + + + + + + + + + + + + + + +
					Complete at 15.45m	

 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk	GROUND WATER: Dry	
	REMARKS:	
	Rig: Dando 3000 Operator: JB Site Investigations Ltd SPT: Standard Penetration Test D: small disturbed sample B: bulk disturbed sample PP: Pocket penetrometer	
SCALE: 1:500	LOGGED BY: CS	FIGURE NO.

SHEET:	LOCATION: Rochdale	PROJECT: Trows Lane Farm	ENGINEER: CS	JOB NO. R2392	WINDOW SAMPLE NO. BHG
		DRILL TYPE: Cable Percussive	CLIENT: Molesworth Estates Ltd	DATE: 31/03/2017	

SPT BLOWS/7.5cm/ N value	DEPTH (m)	SAMPLES/ TESTING	Standpipe/casing	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
				0	Soft blackish brown slightly clayey sandy TOPSOIL with grass roots and rootlets.	
	1.3	B	150mm casing 0m-20m	0.5	Light brown sandy SILT, slightly gravelly from 4m. Gravel is fine to coarse subangular, subrounded limestone. Lenses of silt between 4.3m and 5.4m (HUMMOCKY GLACIAL DEPOSITS).	
	2.3	B				
	3.3	B				
	4.3	B	Plain standpipe bentonite 0m-10m	4.0		
	5.4	B		5.0		
	6.3	B		6.3	Brown sandy SILT (HUMMOCKY GLACIAL DEPOSITS).	
	7.3	B				
	8	B		8	Loose becoming dense light brown SAND (HUMMOCKY GLACIAL DEPOSITS).	
	9.3	B		10		

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	REMARKS: Standpipe installation 0m-20.45m Casing 150mm Rig: Dando 3000 Operator: JB Site Investigations Ltd	
	SPT: Standard Penetration Test D: small disturbed sample B: bulk disturbed sample PP: Pocket penetrometer	SCALE: 1:500
		FIGURE NO.

SHEET:	LOCATION: Rochdale	PROJECT: Trows Lane Farm	ENGINEER: CS	JOB NO. R2392	WINDOW SAMPLE NO. BHG
		DRILL TYPE: Cable Percussive	CLIENT: Molesworth Estates Ltd	DATE: 31/03/2017	

SPT BLOWS/7.5cm/ N value	DEPTH (m)	SAMPLES/ TESTING	Standpipe/casing	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND	
2 2 2 1 2 4 N=9	10.45	SPT (D)	Slotted standpipe gravel 10m-20.45m	10	Loose becoming dense light brown SAND (HUMMOCKY GLACIAL DEPOSITS).		
2 5 6 9 9 9 N=33	11.45	SPT (D)		12	Medium dense light brown locally blackish brown silty SAND with rare gravel fine to medium of coal (HUMMOCKY GLACIAL DEPOSITS).		x x x x
3 2 7 8 7 7 N=29	12.45	SPT		13	Medium dense light brown sandy SILT with rare gravel (HUMMOCKY GLACIAL DEPOSITS).	x x x x	
4 8 6 5 8 8 N=27	13.45	SPT (D)		14.5	Stiff light brown sandy SILT (HUMMOCKY GLACIAL DEPOSITS).		+ +
4 6 7 7 8 9 N=31	14.45 14.5	SPT (D) B		14.9	Medium dense becoming dense light brown silty SAND (HUMMOCKY GLACIAL DEPOSITS).	x x x x	
3 4 5 6 6 5 N=22	15.45	SPT (D)					x x x x
2 4 5 6 6 7 N=24	16.45	SPT				x x x x	
4 5 6 7 9 10 N=32	17.45	SPT (D)					x x x x
6 5 8 11 11 11 N=41	18.45	SPT (D)				x x x x	
3 6 7 9 11 12 N=39	19.45	SPT (D)					x x x x
					20		

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	REMARKS: Standpipe installation 0m-20.45m Casing 150mm Rig: Dando 3000 Operator: JB Site Investigations Ltd	
	SCALE: 1:500	LOGGED BY: CS

SPT: Standard Penetration Test
 D: small disturbed sample
 B: bulk disturbed sample
 PP: Pocket penetrometer

SHEET:	LOCATION: Rochdale	PROJECT: Trows Lane Farm	ENGINEER: CS		JOB NO. R2392	WINDOW SAMPLE NO. BHG	
		DRILL TYPE: Cable Percussive	CLIENT: Molesworth Estates Ltd		DATE: 31/03/2017		
SPT BLOWS/7.5cm/ N value		DEPTH (m)	SAMPLES/ TESTING	Standpipe/casing	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
4 5 9 9 10 11 N=39		20.45	SPT (D)		20	Dense light brown SAND (HUMMOCKY GLACIAL DEP.).	
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk		GROUND WATER: Dry					
		REMARKS: Standpipe installation 0m-20.45m Casing 150mm Rig: Dando 3000 Operator: JB Site Investigations Ltd					
		SPT: Standard Penetration Test D: small disturbed sample B: bulk disturbed sample PP: Pocket penetrometer					
		SCALE: 1:500		LOGGED BY: CS		FIGURE NO.	

SHEET:	LOCATION: Rochdale	PROJECT: Trows Lane Farm	ENGINEER: CS	JOB NO. R2392	WINDOW SAMPLE NO. BHH
		DRILL TYPE: Cable Percussive	CLIENT: Molesworth Estates Ltd	DATE: 11/05/2017	

SPT BLOWS/7.5cm/ N value	DEPTH (m)	SAMPLES/ TESTING	Standpipe/casing	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
				0	Soft blackish brown slightly clayey sandy TOPSOIL with roots and rootlets.	
			150mm casing 0m-20m	0.4	Light brown mottled grey slightly sandy clayey SILT (HUMMOCKY GLACIAL DEPOSITS).	
				1.5	Light brown silty SAND with lenses of silty clay (HUMMOCKY GLACIAL DEPOSITS).	
			Plain standpipe bentonite 0m-10m	4.0	Light brown mottled grey slightly sandy clayey SILT (HUMMOCKY GLACIAL DEPOSITS).	
				5.0		
				10		

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	REMARKS: Standpipe installation 0m-20.45m Casing 150mm Rig: Dando 3000 Operator: JB Site Investigations Ltd	
	SCALE: 1:500	LOGGED BY: CS

SPT: Standard Penetration Test
 D: small disturbed sample
 B: bulk disturbed sample
 PP: Pocket penetrometer

SHEET:	LOCATION: Rochdale	PROJECT: Trows Lane Farm	ENGINEER: CS	JOB NO. R2392	WINDOW SAMPLE NO. BHH
		DRILL TYPE: Cable Percussive	CLIENT: Molesworth Estates Ltd	DATE: 11/05/2017	

SPT BLOWS/7.5cm/ N value	DEPTH (m)	SAMPLES/ TESTING	Standpipe/casing	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND	
2 3 3 4 4 5 N=16	10	SPT (D)	Slotted standpipe gravel 10m-20.45m	10	Medium dense light brown very silty SAND (HUMMOCKY GLACIAL DEPOSITS).		
2 4 3 4 4 5 N=16	10.45	B					
2 4 3 4 4 5 N=16	11.45	SPT					
2 3 4 5 5 4 N=18	12.45	SPT					
3 5 4 5 5 5 N=19	13.45	SPT (D)		13	Medium dense becoming dense from 15m light brown slightly silty SAND (HUMMOCKY GLACIAL DEPOSITS).		
4 3 5 5 6 6 N=22	14.45	SPT (D)					
4 7 8 8 9 9 N=34	15.45	SPT					
5 6 9 9 9 9 N=36	16.45	SPT					
4 7 8 9 8 9 N=34	18.95	SPT					
				19	Dense becoming medium dense from 20m light brown slightly silty SAND (HUMMOCKY GLACIAL DEPOSITS).		
			20				

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	REMARKS: Standpipe installation 0m-20.45m Casing 150mm Rig: Dando 3000 Operator: JB Site Investigations Ltd		
	SCALE: 1:500	LOGGED BY: CS	FIGURE NO.

SPT: Standard Penetration Test
 D: small disturbed sample
 B: bulk disturbed sample
 PP: Pocket penetrometer

SHEET:	LOCATION: Rochdale	PROJECT: Trows Lane Farm	ENGINEER: CS		JOB NO. R2392	WINDOW SAMPLE NO. BHH	
		DRILL TYPE: Cable Percussive	CLIENT: Molesworth Estates Ltd		DATE: 11/05/2017		
SPT BLOWS/7.5cm/ N value		DEPTH (m)	SAMPLES/ TESTING	Standpipe/casing	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
5 3 4 4 8 8 N=24		20.45	SPT (D)		20	Cont.	
Complete at 20.45m							
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk		GROUND WATER: Dry					
		REMARKS: Standpipe installation 0m-20.45m Casing 150mm Rig: Dando 3000 Operator: JB Site Investigations Ltd					
		SPT: Standard Penetration Test D: small disturbed sample B: bulk disturbed sample PP: Pocket penetrometer					
		SCALE: 1:500		LOGGED BY: CS		FIGURE NO.	

SHEET:	LOCATION: Rochdale	PROJECT: Trows Lane Farm	ENGINEER: CS	JOB NO. R2392	WINDOW SAMPLE NO. BHI
		DRILL TYPE: Cable Percussive	CLIENT: Molesworth Estates Ltd	DATE: 09/05/2017	

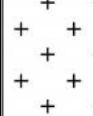
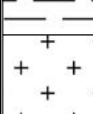
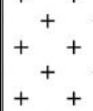
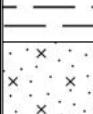
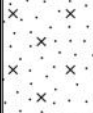
SPT BLOWS/7.5cm/ N value	DEPTH (m)	SAMPLES/ TESTING	Standpipe/casing	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
				0	Soft blackish brown slightly clayey sandy TOPSOIL with grass roots and rootlets.	
			150mm casing 0m-20m	0.5	Light brown sandy SILT (HUMMOCKY GLACIAL DEPOSITS).	
	2	B				
			Plain standpipe bentonite 0m-10m	4.0		
	4	B				
				5.0		
	6	B		5	Firm brown laminated slightly sandy slightly silty CLAY (CL). With rare gravel of fine subangular limestone (HUMMOCKY GLACIAL DEPOSITS).	
				10		

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	REMARKS: Standpipe installation 0m-20.45m Casing 150mm Rig: Dando 3000 Operator: JB Site Investigations Ltd	
	SCALE: 1:500	LOGGED BY: CS

SPT: Standard Penetration Test
 D: small disturbed sample
 B: bulk disturbed sample
 PP: Pocket penetrometer

SHEET:	LOCATION: Rochdale	PROJECT: Trows Lane Farm	ENGINEER: CS	JOB NO. R2392	WINDOW SAMPLE NO. BHI			
		DRILL TYPE: Cable Percussive	CLIENT: Molesworth Estates Ltd	DATE: 09/05/2017				
SPT BLOWS/7.5cm/ N value		DEPTH (m)	SAMPLES/ TESTING	Standpipe/casing	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND	
4 6 6 7 8 8 N=29		10.45 10	SPT ^B (D)	Slotted standpipe gravel 10m-20.45m	10	Light brown slightly sandy SILT (HUMMOCKY GLACIAL DEPOSITS).	+ + + + + + + + + + + + + + + + + + + +	
3 6 7 7 8 7 N=29		11.4 5	SPT		PP=3kg/cm2 PP=4.5kg/cm2 PP=3.5kg/cm2	13	Very stiff brown laminated silty CLAY (CH) with partings of light brown fine sand and rare fine gravel (HUMMOCKY GLACIAL DEPOSITS).	+ + + + + + + + + + + + + + + + + + + +
5 12 15 13 12 8 N=48		12.45 12	SPT (D)					
6 7 9 11 14 12 N=46		13.45 13	SPT (D)					
6 8 10 11 13 17 N=R		14.45 14	SPT (D)	PP=4kg/cm2 PP=4.5kg/cm2	15	Very stiff brown laminated silty CLAY (CH) with partings of light brown fine sand and rare fine gravel (HUMMOCKY GLACIAL DEPOSITS).	+ + + + + + + + + + + + + + + + + + + +	
5 6 9 12 13 16 N=R		15.45 15.5	SPT (D) B	PP=4.5kg/cm2 PP=3.5kg/cm2				
6 10 11 12 14 13 N=R		16.95 17	SPT (D) B	PP=4.5kg/cm2				
2 3 7 10 13 11 N=41		18.45	SPT (D)		17	Dense to very dense light brown very silty fine SAND Very stiff brown laminated silty CLAY with partings of light brown fine sand and rare fine gravel (HUMMOCKY GLACIAL DEPOSITS).	x x x x x x x x x x x x x x x x x x x x	
					20			
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk		GROUND WATER: Dry						
		REMARKS: Standpipe installation 0m-20.45m Casing 150mm Rig: Dando 3000 Operator: JB Site Investigations Ltd						
		SCALE: 1:500		LOGGED BY: CS		FIGURE NO.		
SPT: Standard Penetration Test D: small disturbed sample B: bulk disturbed sample PP: Pocket penetrometer								

SHEET:	LOCATION: Rochdale	PROJECT: Trows Lane Farm	ENGINEER: CS		JOB NO. R2392	WINDOW SAMPLE NO. BHI	
		DRILL TYPE: Cable Percussive	CLIENT: Molesworth Estates Ltd		DATE: 09/05/2017		
SPT BLOWS/7.5cm/ N value		DEPTH (m)	SAMPLES/ TESTING	Standpipe/casing	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
8 11 17 20 13 N=R		20.45	SPT		20	Light brown sandy SILT (HUMMOCKY GLACIAL DEPOSITS).	+ + + +
Complete at 20.45m							
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk		GROUND WATER: Dry					
		REMARKS: Standpipe installation 0m-20.45m Casing 150mm Rig: Dando 3000 Operator: JB Site Investigations Ltd					
		SCALE: 1:500		LOGGED BY: CS		FIGURE NO.	
SPT: Standard Penetration Test D: small disturbed sample B: bulk disturbed sample PP: Pocket penetrometer							

SHEET:	LOCATION: Rochdale	PROJECT: Trows Lane Farm	ENGINEER: CS	JOB NO. R2392	WINDOW SAMPLE NO. BHJ		
		DRILL TYPE: Cable Percussive	CLIENT: Molesworth Estates Ltd	DATE: 17/05/2017			
SPT BLOWS/7.5cm/ N value	DEPTH (m)	SAMPLES/ TESTING	Standpipe/casing	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND	
5 8 6 8 7 9 N=30		B	150mm casing from GL to 15m	0	Soft blackish brown slightly clayey sandy TOPSOIL with roots abd rootlets.		
				0.6	Beige light brown mottled orangish brown slightly gravelly sandy SILT (HUMMOCKY GLACIAL DEPOSITS).		
	1.8			1.5	Firm brown mottled light grey silty CLAY (HUMMOCKY GLACIAL DEPOSITS).		
		2.5		Light brown sandy SILT (HUMMOCKY GLACIAL DEPOSITS).			
	2.8	B		No installation	4.0	Brown laminated silty CLAY (Cl) (HUMMOCKY GLACIAL DEPOSITS).	
	4	B			5.0	Light brown slightly sandy SILT (HUMMOCKY GLACIAL DEPOSITS).	
	4.4	B			8	Medium dense light brown fine to medium SAND with lenses of light brown silt (HUMMOCKY GLACIAL DEPOSITS).	
	4.8	B			9	Very stiff brown laminated CLAY (CH) with partings of light brown silt and fine sand (HUMMOCKY GLACIAL DEPOSITS).	
		B SPT (D)		5.5			
		SPT (D)		5.45			
	3 5 6 7 8 10 N=31			6.45			
		SPT (D)		7.45			
	4 5 5 7 7 5 N=24						
		SPT (D)		8.45			
	3 4 7 5 5 5 N=22						
	B SPT		9.5				
			9.45				
2 4 4 4 5 6 N=19				10			
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		REMARKS:					
		Rig: Dando 3000 Operator: JB Site Investigations Ltd					
		SPT: Standard Penetration Test D: small disturbed sample B: bulk disturbed sample PP: Pocket penetrometer					
SCALE: 1:500		LOGGED BY: CS		FIGURE NO.			

SHEET:	LOCATION: Rochdale	PROJECT: Trows Lane Farm	ENGINEER: CS	JOB NO. R2392	WINDOW SAMPLE NO. BHJ
		DRILL TYPE: Cable Percussive	CLIENT: Molesworth Estates Ltd	DATE: 17/05/2017	

SPT BLOWS/7.5cm/ N value	DEPTH (m)	SAMPLES/ TESTING	Standpipe/casing	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
4 5 6 7 7 7 N=27	10.45	SPT	150mm casing from GL to 15m	10	Very stiff brown laminated CLAY (CH) with partings of light brown silt and fine sand (HUMMOCKY GLACIAL DEPOSITS).	
3 5 4 5 6 7 N=22	11.45	SPT (D)				
4 6 6 6 8 8 N=28	12.45	SPT				
3 5 6 7 7 6 N=26	13.45	SPT				
3 5 7 6 7 7 N=27	14.45	SPT (D)				
4 6 8 7 7 8 N=30	15.45	SPT	No installation			
					Complete at 15.45m	

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	REMARKS:	
	Rig: Dando 3000 Operator: JB Site Investigations Ltd SPT: Standard Penetration Test D: small disturbed sample B: bulk disturbed sample PP: Pocket penetrometer	
SCALE: 1:500	LOGGED BY: CS	FIGURE NO.

SHEET:	LOCATION: Rochdale	PROJECT: Trows Lane Farm	ENGINEER: CS		JOB NO. R2392	WINDOW SAMPLE NO. BHK	
		DRILL TYPE: Cable Percussive	CLIENT: Molesworth Estates Ltd		DATE: 18/05/2017		
SPT BLOWS/7.5cm/ N value		DEPTH (m)	SAMPLES/ TESTING	Standpipe/casing	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
				150mm casing 0m-15m	0	Soft blackish brown slightly sandy clayey TOPSOIL with grass roots and rootlets.	
					0.4	Orangish brown silty SAND with lenses of silty clay (HUMMOCKY GLACIAL DEPOSITS).	
				Plain standpipe bentonite 0m-5m	4.0		
					5.0		
2 2 2 2 3 4 N=11	5.45	SPT (D)		Slotted standpipe gravel 5m-15.45m	5	Medium dense brown slightly gravelly slightly clayey SAND. Gravel is fine subangular limestone (HUMMOCKY GLACIAL DEPOSITS).	
2 3 2 3 3 3 N=11	6.45	SPT (D)			6	Medium dense brown sandy SILT with occasional fine subangular gravel of limestone. Stained black along subvertical fissures filled with medium sand (HUMMOCKY GLACIAL DEPOSITS).	
2 3 5 5 5 5 N=20	7.45	SPT (D)			7	Medium dense light brown slightly laminated fine to medium SAND (HUMMOCKY GLACIAL DEPOSITS).	
2 3 4 4 4 4 N=16	8.45	SPT (D)			8	Medium dense brown mottled blackish brown sandy SILT with occasional layers of medium sand (HUMMOCKY GLACIAL DEPOSITS).	
1 3 3 3 4 4 N=14	9.45	SPT					
					10		
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk		GROUND WATER: Dry					
		REMARKS: Rig: Dando 3000 Operator: JB Site Investigations Ltd SPT: Standard Penetration Test D: small disturbed sample B: bulk disturbed sample PP: Pocket penetrometer					
		SCALE: 1:500		LOGGED BY: CS		FIGURE NO.	

SHEET:	LOCATION: Rochdale	PROJECT: Trows Lane Farm	ENGINEER: CS	JOB NO. R2392	WINDOW SAMPLE NO. BHK
		DRILL TYPE: Cable Percussive	CLIENT: Molesworth Estates Ltd	DATE: 18/05/2017	

SPT BLOWS/7.5cm/ N value	DEPTH (m)	SAMPLES/ TESTING	Standpipe/casing	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
2 3 4 3 4 4 N=15	10.45	SPT (D)	Slotted standpipe gravel 5m-15.45m	10	Medium dense brown mottled blackish brown sandy SILT with occasional layers of medium sand (HUMMOCKY GLACIAL DEPOSITS).	
2 3 3 4 5 4 N=16	11.45	SPT (D)				
2 4 4 4 5 6 N=19	12.45	SPT		12	Brown sandy SILT (HUMMOCKY GLACIAL DEPOSITS).	
3 3 5 12 15 18 N=R	13.95	SPT (D)		14	Very dense light brown SAND (HUMMOCKY GLACIAL DEPOSITS).	
4 5 10 13 16 11 N=R	15.45	SPT (D)		15	Very dense light brown SAND (HUMMOCKY GLACIAL DEPOSITS).	
					Complete at 15.45m	

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	REMARKS: Rig: Dando 3000 Operator: JB Site Investigations Ltd	
	SCALE: 1:500	LOGGED BY: CS

SPT: Standard Penetration Test
 D: small disturbed sample
 B: bulk disturbed sample
 PP: Pocket penetrometer

SHEET:	LOCATION: Rochdale	PROJECT: Trows Lane Farm	ENGINEER: CS	JOB NO. R2392	WINDOW SAMPLE NO. BHL
		DRILL TYPE: Cable Percussive	CLIENT: Molesworth Estates Ltd	DATE: 24/05/2017	

SPT BLOWS/7.5cm/ N value	DEPTH (m)	SAMPLES/ TESTING	Standpipe/casing	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
				0	Soft blackish brown slightly clayey sandy TOPSOIL with roots and rootlets.	
			150mm casing 0m-20m	0.4	Brown and light brown slightly silty SAND with partings of silt (HUMMOCKY GLACIAL DEPOSITS).	
	2	B		2	Brown SAND with occasional subrounded gravel of limestone (HUMMOCKY GLACIAL DEPOSITS).	
	4	B	Plain standpipe bentonite 0m-10m	3	Light brown silty SAND (HUMMOCKY GLACIAL DEPOSITS).	
				4.0		
				5.0		
	6	B				
	8	B				
	9.5	B				
				10		

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	REMARKS: Standpipe installation 0m-20.45m Casing 150mm	
	Rig: Dando 3000 Operator: JB Site Investigations Ltd	
	SCALE: 1:500	LOGGED BY: CS
		FIGURE NO.

SPT: Standard Penetration Test
 D: small disturbed sample
 B: bulk disturbed sample
 PP: Pocket penetrometer

SHEET:	LOCATION: Rochdale	PROJECT: Trows Lane Farm	ENGINEER: CS	JOB NO. R2392	WINDOW SAMPLE NO. BHL		
		DRILL TYPE: Cable Percussive	CLIENT: Molesworth Estates Ltd	DATE: 24/05/2017			
SPT BLOWS/7.5cm/ N value		DEPTH (m)	SAMPLES/ TESTING	Standpipe/casing	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
2 2 2 2 4 4 N=12		10.45	SPT (D)	Slotted standpipe gravel 10m-20.45m	10	Medium dense light brown medium SAND with occasional fine gravel of coal (HUMMOCKY GLACIAL DEPOSITS).	
2 3 3 3 3 4 N=13		11.5 11.45	SPT ^B (D)				
2 4 5 6 5 5 N=21		12.45	SPT		12	Medium dense light brown sandy SILT with occasional fine gravel of coal (HUMMOCKY GLACIAL DEPOSITS).	x x x x x x x x x x x x
2 3 4 5 5 5 N=19		13.45	SPT (D)				
3 4 5 6 5 6 N=22		14.45	SPT (D)		14	Medium dense becoming dense light brown slightly silty SAND with occasional fine subrounded gravel of limestone (HUMMOCKY GLACIAL DEPOSITS).	
4 7 9 11 13 16 N=49		15.45	SPT (D)				
5 4 5 12 12 12 N=41		16.5 16.45	SPT ^B (D)		16	Dense becoming very dense orangish light brown fine sand locally with lenses of silt (HUMMOCKY GLACIAL DEPOSITS).	
3 5 9 11 11 13 N=44		17.45	SPT (D)				
4 9 9 11 12 15 N=47		18.45	SPT				
5 10 10 12 13 15 N=50R		19.45	SPT				
					20		
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk		GROUND WATER: Dry					
		REMARKS: Standpipe installation 0m-20.45m Casing 150mm Rig: Dando 3000 Operator: JB Site Investigations Ltd SPT: Standard Penetration Test D: small disturbed sample B: bulk disturbed sample PP: Pocket penetrometer					
		SCALE: 1:500		LOGGED BY: CS		FIGURE NO.	

SHEET:	LOCATION: Rochdale	PROJECT: Trows Lane Farm	ENGINEER: CS		JOB NO. R2392	WINDOW SAMPLE NO. BHL	
		DRILL TYPE: Cable Percussive	CLIENT: Molesworth Estates Ltd		DATE: 24/05/2017		
SPT BLOWS/7.5cm/ N value		DEPTH (m)	SAMPLES/ TESTING	Standpipe/casing	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
6 8 11 15 16 8 N=50R		20.45	SPT (D)		20	Cont.	
Complete at 20.45m							
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk		GROUND WATER: Dry					
		REMARKS: Standpipe installation 0m-20.45m Casing 150mm Rig: Dando 3000 Operator: JB Site Investigations Ltd					
		SPT: Standard Penetration Test D: small disturbed sample B: bulk disturbed sample PP: Pocket penetrometer					
		SCALE: 1:500		LOGGED BY: CS		FIGURE NO.	

SHEET:	LOCATION: Rochdale	PROJECT: Trows Lane Farm	ENGINEER: CS	JOB NO. R2392	WINDOW SAMPLE NO. BHM		
		DRILL TYPE: Cable Percussive	CLIENT: Molesworth Estates Ltd	DATE: 25/05/2017			
SPT BLOWS/7.5cm/ N value		DEPTH (m)	SAMPLES/ TESTING	Standpipe/casing PP values	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
				Plain standpipe bentonite 0m-1m	0	Soft blackish brown slightly sandy clayey TOPSOIL with grass roots and rootlets. Loose light brown mottled blackish slightly sandy slightly clayey SILT with occasional rootlets ALLUVIUM.	
					0.3		
1 1 1 1 1 1 N=4		1.95 1.9	SPT B	150mm casing 0m-10m		Greyish brown sandy SILT (HUMMOCKY GLACIAL DEPOSITS).	
					1.9		
1 2 1 2 2 1 N=6		2.5 2.95	B SPT (D)		2.5	Firm greyish brown slightly sandy slightly gravelly CLAY (HUMMOCKY GLACIAL DEPOSITS).	
1 1 2 2 1 2 N=7		3.95	SPT (D)		3.5	Greyish brown slightly sandy slightly clayey SILT with partings of orangisg brown sand from 4.5m (HUMMOCKY GLACIAL DEPOSITS).	
					4.0		
1 2 1 2 2 1 N=6		4.95	SPT (D)		5.0		
2 3 3 2 3 3 N=11		5.95 6	SPT B	Slotted standpipe gravel 1m-10m	5.5	Medium dense light brown silty SAND (HUMMOCKY GLACIAL DEPOSITS).	
					6		
1 2 2 3 3 4 N=12		6.95	SPT (D)		6.5	Medium dense brown silty SAND (HUMMOCKY GLACIAL DEPOSITS).	
4 4 6 6 5 6 N=23		7.5 7.95	B SPT		7.5	Brown mottled light grey laminated slightly sandy SILT (HUMMOCKY GLACIAL DEPOSITS).	
5 6 9 9 9 9 N=36		8.95	SPT (D)				
5 7 12 12 8 8 N=40		9.5 9.95	B SPT		9.5	Dense brown laminated silty SAND (HUMMOCKY GLACIAL DEPOSITS).	
					10		
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk		GROUND WATER: Dry					
		REMARKS: Rig: Dando 3000 Operator: JB Site Investigations Ltd SPT: Standard Penetration Test D: small disturbed sample B: bulk disturbed sample PP: Pocket penetrometer					
SCALE: 1:500		LOGGED BY: CS		FIGURE NO.			

SHEET:	LOCATION: Rochdale	PROJECT: Trows Lane Farm	ENGINEER: CS	JOB NO. R2392	WINDOW SAMPLE NO. BHM
		DRILL TYPE: Cable Percussive	CLIENT: Molesworth Estates Ltd	DATE: 25/05/2017	

SPT BLOWS/7.5cm/ N value	DEPTH (m)	SAMPLES/ TESTING	Standpipe/casing PP values	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
6 9 11 12 13 13 N=49	10.45	SPT (D)		10	Brown mottled light grey laminated sandy SILT (HUMMOCKY GLACIAL DEPOSITS).	+ + + +
					Complete at 10.45m	

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	REMARKS: Rig: Dando 3000 Operator: JB Site Investigations Ltd	
	SCALE: 1:500	LOGGED BY: CS

SPT: Standard Penetration Test
D: small disturbed sample
B: bulk disturbed sample
PP: Pocket penetrometer

SHEET:	LOCATION: Rochdale	PROJECT: Trows Lane Farm	ENGINEER: CS	JOB NO. R2392	WINDOW SAMPLE NO. BHN		
		DRILL TYPE: Cable Percussive	CLIENT: Molesworth Estates Ltd	DATE: 30/05/2017			
SPT BLOWS/7.5cm/ N value		DEPTH (m)	SAMPLES/ TESTING	Standpipe/casing	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
3 5 7 8 9 9 N=33 							

SPT: Standard Penetration Test
D: small disturbed sample
B: bulk disturbed sample
PP: Pocket penetrometer

SHEET:	LOCATION: Rochdale	PROJECT: Trows Lane Farm	ENGINEER: CS	JOB NO. R2392	WINDOW SAMPLE NO. BHN
		DRILL TYPE: Cable Percussive	CLIENT: Molesworth Estates Ltd	DATE: 30/05/2017	

SPT BLOWS/7.5cm/ N value	DEPTH (m)	SAMPLES/ TESTING	Standpipe/casing	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND	
5 5 7 8 9 10 N=34	10	B SPT	Slotted standpipe gravel 5m-15.45m	10	Light brown slightly sandy SILT (HUMMOCKY GLACIAL DEPOSITS).	+ +	
	10.45						
5 6 7 9 10 10 N=36		SPT (D)					
	11.45						
5 5 7 8 7 8 N=30		SPT (D)			12		Brown slightly slightly gravelly slightly sandy SILT (HUMMOCKY GLACIAL DEPOSITS).
	12.45						
4 7 8 7 7 7 N=29		SPT (D)					
	13.95						
6 9 11 12 12 13 N=48		SPT (D)					
	15.45				Complete at 15.45m		

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	REMARKS: Rig: Dando 3000 Operator: JB Site Investigations Ltd	
	SCALE: 1:500	LOGGED BY: CS

SPT: Standard Penetration Test
D: small disturbed sample
B: bulk disturbed sample
PP: Pocket penetrometer

APPENDIX B

Window Sampler Logs

SHEET: 1 of 1	LOCATION: Rochdale	PROJECT: Trows Lane Farm	ENGINEER: SM	JOB NO. R2392	WINDOW SAMPLE NO. WS1
		EXCAVATED BY: Window Sampling	CLIENT: Molesworth Estates Ltd.	DATE: 15/05/2017	

IN-SITU TESTING	DEPTH (m)	SAMPLES/ TESTING	FIELD RECORDS	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
SPT BLOWS/7.5cm/ N value				0	Blackish dark brown, sandy, clayey TOPSOIL with roots and rootlets.	
				0.3	Light brown, locally orangish to dark yellow, dark brown mottled SAND with occasional gravel of sandstone (HUMMOCKY GLACIAL DEPOSITS).	
	4 6 4 5 6 5 N=20	D		1	Orangish light brown sandy SILT (HUMMOCKY GLACIAL DEPOSITS).	
	0.6	SPT				
	1.45	D				
	1.5					
	1 0 0 1 0 1 N=1	SPT				
	2.45					
	1 0 1 2 2 2 N=7	SPT		3	Firm becoming very stiff from 5m brown silty CLAY (HUMMOCKY GLACIAL DEPOSITS).	
	3.45					
1 1 1 2 3 3 N=9	SPT					
4.45	D					
4.5						
2 3 3 5 6 6 N=20	SPT					
5.45						
					Borehole terminated at 5.45m bgl	

 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk	GROUND WATER: Not encountered		
	REMARKS:		
	Rig: Archway Dart Operator: Structural Soils Ltd		
	SCALE: 1:500	LOGGED BY: SM	FIGURE NO. 1

SPT: Standard Penetration Test
 D: small disturbed sample
 B: bulk disturbed sample
 PP: Pocket penetrometer

SHEET: 1 of 1	LOCATION: Rochdale	PROJECT: Trows Lane Farm	ENGINEER: SM		JOB NO. R2392	WINDOW SAMPLE NO. WS2
		EXCAVATED BY: Window Sampling	CLIENT: Molesworth Estates Ltd.		DATE: 16/05/2017	
IN-SITU TESTING	DEPTH (m)	SAMPLES/ TESTING	FIELD RECORDS	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
SPT BLOWS/7.5cm/ N value 1 0 1 1 2 2 N=6 1 2 2 2 2 2 N=8 3 3 3 2 2 3 N=10 3 3 3 2 2 3 N=10 5 5 6 8 8 8 N=30				0	Blackish dark brown, sandy, clayey TOPSOIL with rootlets and occasional gravel of sandstone Light brown mottled grey slightly sandy SILT with occasional gravel of sandstone (grey sandy parting present at 0.2m-0.3m and orange sandy parting at 0.7m-0.8m) (HUMMOCKY GLACIAL DEPOSITS). Very soft becoming firm/stiff greyish brown slightly sandy CLAY (CI - CL) with silty clay partings (HUMMOCKY GLACIAL DEPOSITS).	
				0.2		
	0.8	D				
	1.45	SPT		1		
	1.4	D				
	2.45	SPT				
	3.45	SPT				
	4.45	SPT				
	4.6	D				
	5.45	SPT				
			Soft and very wet from 4.5m to 5m bgl		Borehole terminated at 5.45m bgl	
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk		GROUND WATER: Not encountered				
		REMARKS: Borehole collapsing between 3m and 4m.				
		Rig: Archway Dart Operator: Structural Soils Ltd				
		SPT: Standard Penetration Test D: small disturbed sample B: bulk disturbed sample PP: Pocket penetrometer				
SCALE: 1:500			LOGGED BY: SM		FIGURE NO. 1	

SHEET: 1 of 1	LOCATION: Rochdale	PROJECT: Trows Lane Farm	ENGINEER: SM	JOB NO. R2392	WINDOW SAMPLE NO. WS3
		EXCAVATED BY: Window Sampling	CLIENT: Molesworth Estates Ltd.	DATE: 16/05/2017	

IN-SITU TESTING	DEPTH (m)	SAMPLES/ TESTING	FIELD RECORDS	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND	
SPT BLOWS/7.5cm/ N value				0	Dark brown slightly clayey sandy TOPSOIL with rootlets and rare sub-angular to sub-rounded gravel of sandstone.		
				0.6	Orangish light brown slightly silty SAND with occasional sub-angular to sub-rounded gravel of sandstone (HUMMOCKY GLACIAL DEPOSITS). Medium dense grey mottled orangish light brown slightly slightly sandy SILT (HUMMOCKY GLACIAL DEPOSITS). Orangish dark brown slightly silty fine to medium grained SAND (HUMMOCKY GLACIAL DEPOSITS). Orangish light brown sandy SILT (HUMMOCKY GLACIAL DEPOSITS).		
			0.85				
			1.7				
	4 5 7 8 6 5 N=26		D SPT		1.9		
			D				
	2 3 4 4 3 3 N=14		SPT D				
	3 4 5 5 5 5 N=20		SPT D		3.8	Brown sandy SILT (sand is fine grained) (HUMMOCKY GLACIAL DEPOSITS). Borehole terminated at 4m bgl	

 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk	GROUND WATER: Not encountered	
	REMARKS: Borehole collapsing between 3m and 4m.	
	Rig: Archway Dart Operator: Structural Soils Ltd	SPT: Standard Penetration Test D: small disturbed sample B: bulk disturbed sample PP: Pocket penetrometer
SCALE: 1:500	LOGGED BY: SM	FIGURE NO. 1

SHEET: 1 of 1	LOCATION: Rochdale	PROJECT: Trows Lane Farm	ENGINEER: SM	JOB NO. R2392	WINDOW SAMPLE NO. WS4
		EXCAVATED BY: Window Sampling	CLIENT: Molesworth Estates Ltd.	DATE: 16/05/2017	

IN-SITU TESTING	DEPTH (m)	SAMPLES/ TESTING	FIELD RECORDS	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
SPT BLOWS/7.5cm/ N value 3 4 6 6 7 6 N=25 1 0 2 2 2 2 N=8 4 3 3 2 3 3 N=11				0	Blackish dark brown slightly silty sandy TOPSOIL with rootlets and occasional gravel of sandstone Extremely weak yellow micaceous SANDSTONE - cemented sand (HUMMOCKY GLACIAL DEPOSITS). Very stiff reddish brown mottled light grey slightly gravelly sandy SILT (HUMMOCKY GLACIAL DEPOSITS). Loose becoming medium dense brown very silty SAND with lenses of silt (HUMMOCKY GLACIAL DEPOSITS).	
				0.35		
				0.55		
	0.8	D				
	1.45	SPT				
	1.6	D				
	2.45	SPT				
	3.45	SPT				
	3.6	D				
					Borehole terminated at 4m bgl	

 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk	GROUND WATER: Not encountered		
	REMARKS: Borehole collapse from 3m to 4m.		
	RIG: Archway Dart Operator: Structural Soils Ltd	SPT: Standard Penetration Test D: small disturbed sample B: bulk disturbed sample PP: Pocket penetrometer	
	SCALE: 1:500	LOGGED BY: SM	FIGURE NO. 1

SHEET: 1 of 1	LOCATION: Rochdale	PROJECT: Trows Lane Farm	ENGINEER: SM	JOB NO. R2392	WINDOW SAMPLE NO. WS5
		EXCAVATED BY: Window Sampling	CLIENT: Molesworth Estates Ltd.	DATE: 17/05/2017	

IN-SITU TESTING	DEPTH (m)	SAMPLES/ TESTING	FIELD RECORDS	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
SPT BLOWS/7.5cm/ N value 2 2 3 4 4 4 N=15 1 1 2 2 4 5 N=13 3 3 3 3 3 4 N=13 4 6 6 6 6 7 N=25 4 4 4 6 8 8 N=26			PP=1.25kg/cm2 PP=1.5kg/cm2 PP=0.75kg/cm2 PP=1kg/cm2	0	Blackish dark brown slightly silty sandy TOPSOIL with grass roots and rootlets.	
	0.8	D		0.4	Light grey mottled blackish brown slightly silty SAND with occasional rootlets (HUMMOCKY GLACIAL DEPOSITS).	
	1.45	SPT		0.55		
	1.5	D		1.65	Medium dense light brown mottled orangish brown and light grey gravelly very silty SAND with rare cobbles. Gravel is medium to coarse subangular to subrounded sandstone and limestone (HUMMOCKY GLACIAL DEPOSITS).	
	2.45	SPT		1.95	Firm brown silty CLAY (HUMMOCKY GLACIAL DEPOSITS).	
	2.4	D		3.35	Medium dense brown silty SAND with lenses of clayey silt (HUMMOCKY GLACIAL DEPOSITS).	
	3.45	SPT		4	Firm brown silty CLAY (CI) (HUMMOCKY GLACIAL DEPOSITS).	
	3.7	D		4.15	Medium dense brown silty SAND (HUMMOCKY GLACIAL DEPOSITS).	
	4.45	SPT		4.9	Brown sandy SILT (HUMMOCKY GLACIAL DEPOSITS).	
	5.45	SPT			Medium dense orangish brown SAND (HUMMOCKY GLACIAL DEPOSITS).	
					Borehole terminated at 5.45m bgl	

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	REMARKS:	
	Rig: Dart Operator: Structural Soils Ltd	SPT: Standard Penetration Test D: small disturbed sample B: bulk disturbed sample PP: Pocket penetrometer
SCALE: 1:500	LOGGED BY: SM	FIGURE NO. 1

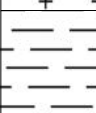
SHEET: 1 of 1	LOCATION: Rochdale	PROJECT: Trows Lane Farm	ENGINEER: SM	JOB NO. R2392	WINDOW SAMPLE NO. WS6
		EXCAVATED BY: Window Sampling	CLIENT: Molesworth Estates Ltd.	DATE: 18/05/2017	

IN-SITU TESTING	DEPTH (m)	SAMPLES/ TESTING	FIELD RECORDS	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
SPT BLOWS/7.5cm/ N value 1 1 2 2 3 3 N=10 1 1 1 2 6 7 N=16 5 6 7 8 8 9 N=32 5 5 6 6 7 7 N=26 10 6 6 7 7 7 N=27				0	Dark brown very slightly sandy clayey TOPSOIL with frequent rootlets.	
				0.3	Orangish brown mottled light grey slightly gravelly sandy CLAY (CL) (HUMMOCKY GLACIAL DEPOSITS).	
	0.8	D		1	Medium dense orangish light brown medium grained SAND with occasional weathered fine gravel of coal (HUMMOCKY GLACIAL DEPOSITS).	
	1.45	SPT				
	1.6	D				
	2.45	SPT				
	2.6	D				
	3.45	SPT				
	4.45					
	4.5	SBT				
	5.45	SPT				
					Borehole terminated at 5.45m bgl	

 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk	GROUND WATER: Not encountered		
	REMARKS: Rig: Archway Dart Operator: Structural Soils Ltd		
	SCALE: 1:500	LOGGED BY: SM	FIGURE NO. 1

SPT: Standard Penetration Test
 D: small disturbed sample
 B: bulk disturbed sample
 PP: Pocket penetrometer

SHEET: 1 of 1	LOCATION: Rochdale	PROJECT: Trows Lane Farm	ENGINEER: SM	JOB NO. R2392	WINDOW SAMPLE NO. WS7
		EXCAVATED BY: Window Sampling	CLIENT: Molesworth Estates Ltd.	DATE: 18/05/2017	

IN-SITU TESTING	DEPTH (m)	SAMPLES/ TESTING	FIELD RECORDS	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
SPT BLOWS/7.5cm/ N value				0	Blackish dark brown slightly sandy clayey TOPSOIL with frequent rootlets.	
	0.5	D		0.4	grey sandy SILT (HUMMOCKY GLACIAL DEPOSITS). Firm orangish brown mottled grey sandy silty CLAY (HUMMOCKY GLACIAL DEPOSITS).	
				0.5		
	1.45	B SPT		1.2	Medium dense grey mottled orangish brown silty to very silty fine SAND (HUMMOCKY GLACIAL DEPOSITS).	
	2	B SPT				
2.5 2.45						
1 1 2 2 3 3 N=10					Borehole terminated at 2.5m bgl due to blowing sand	
1 1 1 4 6 7 N=18						

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	REMARKS: Blowing sand at 2.5m	
	Rig: Archway Dart Operator: Structural Soils Ltd	SPT: Standard Penetration Test D: small disturbed sample B: bulk disturbed sample PP: Pocket penetrometer
SCALE: 1:500	LOGGED BY: SM	FIGURE NO. 1

SHEET: 1 of 1	LOCATION: Rochdale	PROJECT: Trows Lane Farm	ENGINEER: SM	JOB NO. R2392	WINDOW SAMPLE NO. WS8
		EXCAVATED BY: Window Sampling	CLIENT: Molesworth Estates Ltd.	DATE: 18/05/2017	

IN-SITU TESTING	DEPTH (m)	SAMPLES/ TESTING	FIELD RECORDS	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND	
SPT BLOWS/7.5cm/ N value 1 0 1 0 1 0 N=2 1 1 1 2 3 2 N=8 1 2 2 2 2 2 N=8 3 3 3 6 6 6 N=21 4 4 5 6 8 8 N=27	0			0	Blackish dark brown, slightly sandy, clayey TOPSOIL with rootlets and occasional coarse gravel of limestone.		
	0.4			0.4	Very loose grey mottled orangish brown slightly silty SAND with silty clay partings and occasional fine to coarse sub-rounded gravel of sandstone (HUMMOCKY GLACIAL DEPOSITS).		
	0.8	D					
	1	D					
	1.45	SPT					
	1.6				1.6	Loose grey mottled brown fine SAND (with very silty sand partings at 1.8-2.8m bgl) (HUMMOCKY GLACIAL DEPOSITS).	
	2.45	SPT	Very wet between 2 and 2.6m bgl				
	2.6	D					
	3.45	SPT	Very wet between 3 and 3.2m bgl				
	4.45	SPT			3.2	Medium dense grey mottled brown sandy SILT with occasional sub-rounded to angular gravel (HUMMOCKY GLACIAL DEPOSITS).	
	4.6	D					
	5.45	SPT				Borehole terminated at 5.45m bgl	

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	REMARKS: Rig: Archway Dart Operator: Structural Soils Ltd	
	SCALE: 1:500	LOGGED BY: SM

SPT: Standard Penetration Test
 D: small disturbed sample
 B: bulk disturbed sample
 PP: Pocket penetrometer

FIGURE NO. **1**

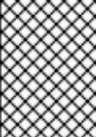
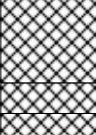
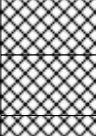
SHEET: 1 of 1	LOCATION: Rochdale	PROJECT: Trows Lane Farm	ENGINEER: SM	JOB NO. R2392	WINDOW SAMPLE NO. WS9
		EXCAVATED BY: Window Sampling	CLIENT: Molesworth Estates Ltd.	DATE: 23/05/2017	

IN-SITU TESTING	DEPTH (m)	SAMPLES/ TESTING	FIELD RECORDS	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
SPT BLOWS/7.5cm/ N value 2 3 3 4 4 4 N=16 4 5 6 6 6 7 N=25 2 2 2 2 2 2 N=8 5 7 9 9 9 9 N=36 5 5 7 7 8 7 N=29 2 5 6 6 5 4 N=21				0	MADE GROUND: Blackish dark brown, slightly clayey, sandy topsoil fill with rootlets and frequent fine to coarse, sub-rounded to angular gravel including occasional red brick fragments and rare ceramic and occasional angular cobbles of sandstone. Medium dense grey mottled orangish light brown orange stained black silty slightly gravelly SAND, becoming a slightly sandy SILT at depth. Gravel is fine to coarse subrounded to subangular gravel of sandstone and occasional subrounded to subangular cobbles of sandstone (HUMMOCKY GLACIAL DEPOSITS). Medium dense, loose at 3m, dense at 4m, orangish/yellowish light brown mottled grey fine SAND with partings of clayey silt and rare subrounded gravel including weathered coal (HUMMOCKY GLACIAL DEPOSITS). Borehole terminated at 6.45m bgl	  
				0.6		
	1	D		1.2		
	1.45	SPT				
	2.45	SPT				
	2.6	D				
	3.45	SPT				
	3.8	D				
	4.45	SPT				
	5.45	SPT				
5.5	D					
6.45	SPT					

 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk	GROUND WATER: Not encountered	
	REMARKS: Rig: LLAMR modular rig Operator: Topdrill Ltd	
	SCALE: 1:500	LOGGED BY: SM

SPT: Standard Penetration Test
 D: small disturbed sample
 B: bulk disturbed sample
 PP: Pocket penetrometer

SHEET: 1 of 1	LOCATION: Rochdale	PROJECT: Trows Lane Farm	ENGINEER: SM	JOB NO. R2392	WINDOW SAMPLE NO. WS10
		EXCAVATED BY: Window Sampling	CLIENT: Molesworth Estates Ltd.	DATE: 23/05/2017	

IN-SITU TESTING	DEPTH (m)	SAMPLES/ TESTING	FIELD RECORDS	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
SPT BLOWS/7.5cm/ N value 0 0 0 0 1 N=1 0 1 0 0 1 N=1 1 0 1 1 2 2 N=6 10 9 10 11 12 +50 N=R				0	Blackish sandy clayey TOPSOIL with grass roots and rootlets.	    
				0.2	MADE GROUND: Blackish dark brown gravelly slightly clayey SAND. Gravel is fine to coarse subangular sandstone, clinker and with wood and with soda ash at 1.3m.	
	1.45	SPT		1.8	MADE GROUND: Greyish brown slightly silty SAND.	
	1.5	D		2	MADE GROUND: Very soft light grey mottled brown and blackish grey sandy CLAY with partings of sand.	
				2.5	MADE GROUND: Blackish dark brown slightly gravelly sandy SILT.	
	2.45	SPT		2.9	MADE GROUND: Loose grey slightly gravelly slightly silty SAND. Gravel is fine to coarse subrounded to subangular limestone and occasional brick.	
	2.6	D		3.1	Firm becoming very stiff grey sandy CLAY (CL) with partings of medium sand (HUMMOCKY GLACIAL DEPOSITS).	
					Borehole terminated at 4.3m bgl	

 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk	GROUND WATER: Not encountered		
	REMARKS: Rig: Archway Competitor Operator: Topdrill Ltd		
	SCALE: 1:500	LOGGED BY: CS	FIGURE NO. 1

SPT: Standard Penetration Test
 D: small disturbed sample
 B: bulk disturbed sample
 PP: Pocket penetrometer

SHEET: 1 of 1	LOCATION: Rochdale	PROJECT: Trows Lane Farm	ENGINEER: SM	JOB NO. R2392	WINDOW SAMPLE NO. WS11
		EXCAVATED BY: Window Sampling	CLIENT: Molesworth Estates Ltd.	DATE: 24/05/2017	

IN-SITU TESTING	DEPTH (m)	SAMPLES/ TESTING	FIELD RECORDS	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
SPT BLOWS/7.5cm/ N value				0	MADE GROUND - FILL: Dark brown slightly sandy, clayey topsoil fill with roots and occasional fine to medium, subrounded to angular gravel including red brick fragments and sandstone.	
				0.3		
	1 1 1 1 1 2 N=5	1.45	SPT	Very wet between 2 and 2.3m bgl	MADE GROUND - FILL: Firm to stiff brown mottled grey sandy CLAY with sand partings and occasional fine to coarse, angular to subrounded, gravel including tarmac and red brick fragments	
		1.5	D			
	2 3 3 2 3 2 N=10	2.45	SPT			
		2.6	D			
	2 2 1 2 3 3 N=9	3.45	SPT	Very wet between 4 and 4.5m bgl	Stiff blackish dark brown sandy CLAY with relict roots, rootlets and occasional subrounded to subangular gravel of sandstone (Original TOPSOIL)	
		3.8	D			
	4 4 5 6 6 7 N=24	4.45	SPT			
		4.8	D			
				3.3	Medium dense grey to orangish brown very silty fine to medium SAND with rare coarse gravel of rounded sandstone (HUMMOCKY GLACIAL DEPOSITS). Borehole terminated at 4.45m bgl	
				3.7		

 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk	GROUND WATER: Not encountered	
	REMARKS:	
	RIG: Archway Competitor Operator: Topdrill Ltd	SPT: Standard Penetration Test D: small disturbed sample B: bulk disturbed sample PP: Pocket penetrometer
SCALE: 1:500	LOGGED BY: SM	FIGURE NO. 1

SHEET: 1 of 1	LOCATION: Rochdale	PROJECT: Trows Lane Farm	ENGINEER: SM	JOB NO. R2392	WINDOW SAMPLE NO. WS12
		EXCAVATED BY: Window Sampling	CLIENT: Molesworth Estates Ltd.	DATE: 24/05/2017	

IN-SITU TESTING	DEPTH (m)	SAMPLES/ TESTING	FIELD RECORDS	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND		
SPT BLOWS/7.5cm/ N value				0	MADE GROUND - FILL: Dark brown silty sandy topsoil fill with roots and occasional fine angular gravel of red brick.	    		
				0.5			MADE GROUND - FILL: Soft to stiff brown slightly sandy to sandy CLAY with sandy, gravelly partings and fine to coarse, angular to subrounded, gravel including red brick fragments, sandstone and coal and rare subrounded cobbles.	
	1 1 2 1 2 2 N=7	1.45	SPT					
		1.8	D					
	1 1 1 1 1 1 N=4	2.45	SPT					
	1 2 3 4 4 4 N=15	3.45	SPT					
	2 4 4 4 4 5 N=17	4.45	D		3.9		Blackish dark brown clayey SAND with relict roots and rootlets and occasional fine to medium, subrounded to subangular gravel (Original TOPSOIL).	
		4.1	D		4.1			
17 25 24 +50 N=R	4.4	SPT			Medium dense becoming very dense grey to orangish brown gravelly silty fine to medium SAND. Gravel is medium to coarse, subrounded to subangular limestone (HUMMOCKY GLACIAL DEPOSITS). Borehole terminated due to refusal at 4.9m bgl			
	4.9							



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Tel: 01978822367
Fax: 019788247182
www.smithgrant.co.uk
email: consult@smithgrant.co.uk

GROUND WATER:
Not encountered

REMARKS:

Rig: Archway Competitor
Operator: Topdrill Ltd

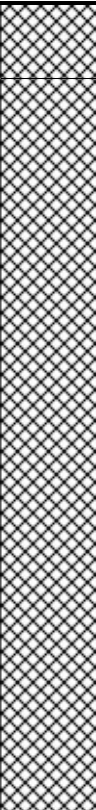
SPT: Standard Penetration Test
D: small disturbed sample
B: bulk disturbed sample
PP: Pocket penetrometer

SCALE: 1:500

LOGGED BY: SM

FIGURE NO. 1

SHEET: 1 of 1	LOCATION: Rochdale	PROJECT: Trows Lane Farm	ENGINEER: SM	JOB NO. R2392	WINDOW SAMPLE NO. WS13
		EXCAVATED BY: Window Sampling	CLIENT: Molesworth Estates Ltd.	DATE: 24/05/2017	

IN-SITU TESTING	DEPTH (m)	SAMPLES/ TESTING	FIELD RECORDS	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
SPT BLOWS/7.5cm/ N value				0	MADE GROUND - FILL: Dark brown silty slightly gravelly sandy topsoil with roots and rootlets.	  
				0.5	Gravel is fine to coarse subangular brick.	
	1 1 2 2 1 2 N=7	1.45	SPT		MADE GROUND - FILL: Firm to stiff brown slightly sandy to sandy CLAY (CL) with orangish brown and grey slightly gravelly sandy partings and occasional fine to medium subangular gravel of brick.	
	0 0 1 1 2 2 N=6	2.45	SPT	PP=2kg/cm2 PP=2.5kg/cm2		
		2.6	D			
	1 2 3 4 3 4 N=14	3.45	SPT			
	2 1 2 2 2 2 N=8	4.45	SPT	Black organic material present at between 4.5 and 5m bgl		
1 1 1 1 2 2 N=6	5.45	SPT		5.4	Soft black slightly sandy CLAY with relict roots and rootlets (Original TOPSOIL).	
	5.6	D		5.8	Medium dense orangish light brown slightly silty SAND (HUMMOCKY GLACIAL DEPOSITS).	
3 4 5 5 6 10 N=26	6.45	SPT			Borehole terminated at 6.45m bgl	

 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk	GROUND WATER: Not encountered	
	REMARKS:	
	Rig: Archway Competitor Operator: Topdrill Ltd	SPT: Standard Penetration Test D: small disturbed sample B: bulk disturbed sample PP: Pocket penetrometer
SCALE: 1:500	LOGGED BY: SM	FIGURE NO. 1

APPENDIX C

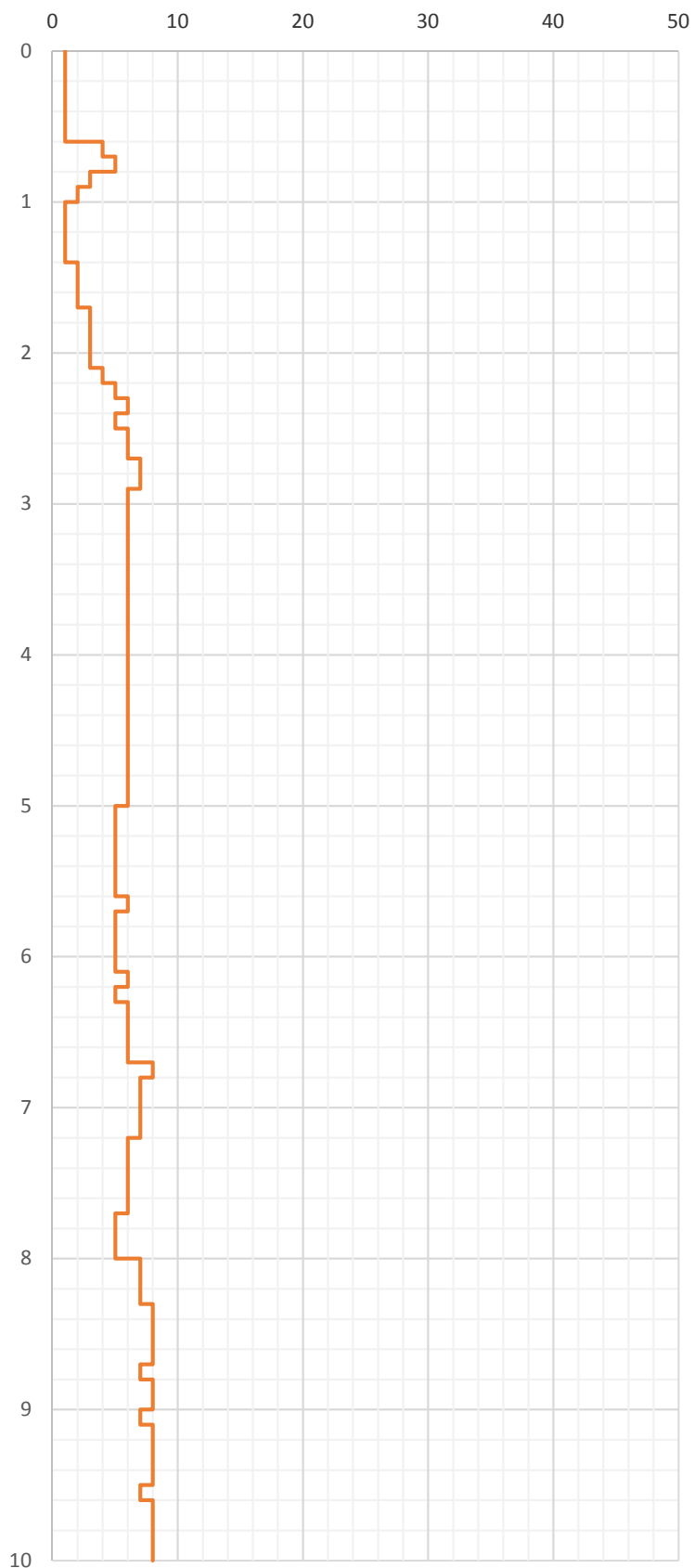
Super Heavy Dynamic Probe Results

Dynamic Probe Log - DPSH 01

Depth (m)	N ₁₀	Depth (m)	N ₁₀	Depth (m)	N ₁₀
0.00 0.10	1	4.70 4.80	6	9.40 9.50	8
0.10 0.20	1	4.80 4.90	6	9.50 9.60	7
0.20 0.30	1	4.90 5.00	6	9.60 9.70	8
0.30 0.40	1	5.00 5.10	5	9.70 9.80	8
0.40 0.50	1	5.10 5.20	5	9.80 9.90	8
0.50 0.60	1	5.20 5.30	5	9.90 10.00	8

0.60 0.70	4	5.30 5.40	5	Torque	
0.70 0.80	5	5.40 5.50	5		
0.80 0.90	3	5.50 5.60	5	Depth	N/m
0.90 1.00	2	5.60 5.70	6		
1.00 1.10	1	5.70 5.80	5		
1.10 1.20	1	5.80 5.90	5		
1.20 1.30	1	5.90 6.00	5		
1.30 1.40	1	6.00 6.10	5		
1.40 1.50	2	6.10 6.20	6		
1.50 1.60	2	6.20 6.30	5		
1.60 1.70	2	6.30 6.40	6		
1.70 1.80	3	6.40 6.50	6		
1.80 1.90	3	6.50 6.60	6		
1.90 2.00	3	6.60 6.70	6		
2.00 2.10	3	6.70 6.80	8		
2.10 2.20	4	6.80 6.90	7		
2.20 2.30	5	6.90 7.00	7		
2.30 2.40	6	7.00 7.10	7		
2.40 2.50	5	7.10 7.20	7		
2.50 2.60	6	7.20 7.30	6		
2.60 2.70	6	7.30 7.40	6		
2.70 2.80	7	7.40 7.50	6		
2.80 2.90	7	7.50 7.60	6		
2.90 3.00	6	7.60 7.70	6		
3.00 3.10	6	7.70 7.80	5		
3.10 3.20	6	7.80 7.90	5		
3.20 3.30	6	7.90 8.00	5		
3.30 3.40	6	8.00 8.10	7		
3.40 3.50	6	8.10 8.20	7		
3.50 3.60	6	8.20 8.30	7		
3.60 3.70	6	8.30 8.40	8		
3.70 3.80	6	8.40 8.50	8		
3.80 3.90	6	8.50 8.60	8		
3.90 4.00	6	8.60 8.70	8		
4.00 4.10	6	8.70 8.80	7		
4.10 4.20	6	8.80 8.90	8		
4.20 4.30	6	8.90 9.00	8		
4.30 4.40	6	9.00 9.10	7		
4.40 4.50	6	9.10 9.20	8		
4.50 4.60	6	9.20 9.30	8		
4.60 4.70	6	9.30 9.40	8		

DPSH 01



Remarks:



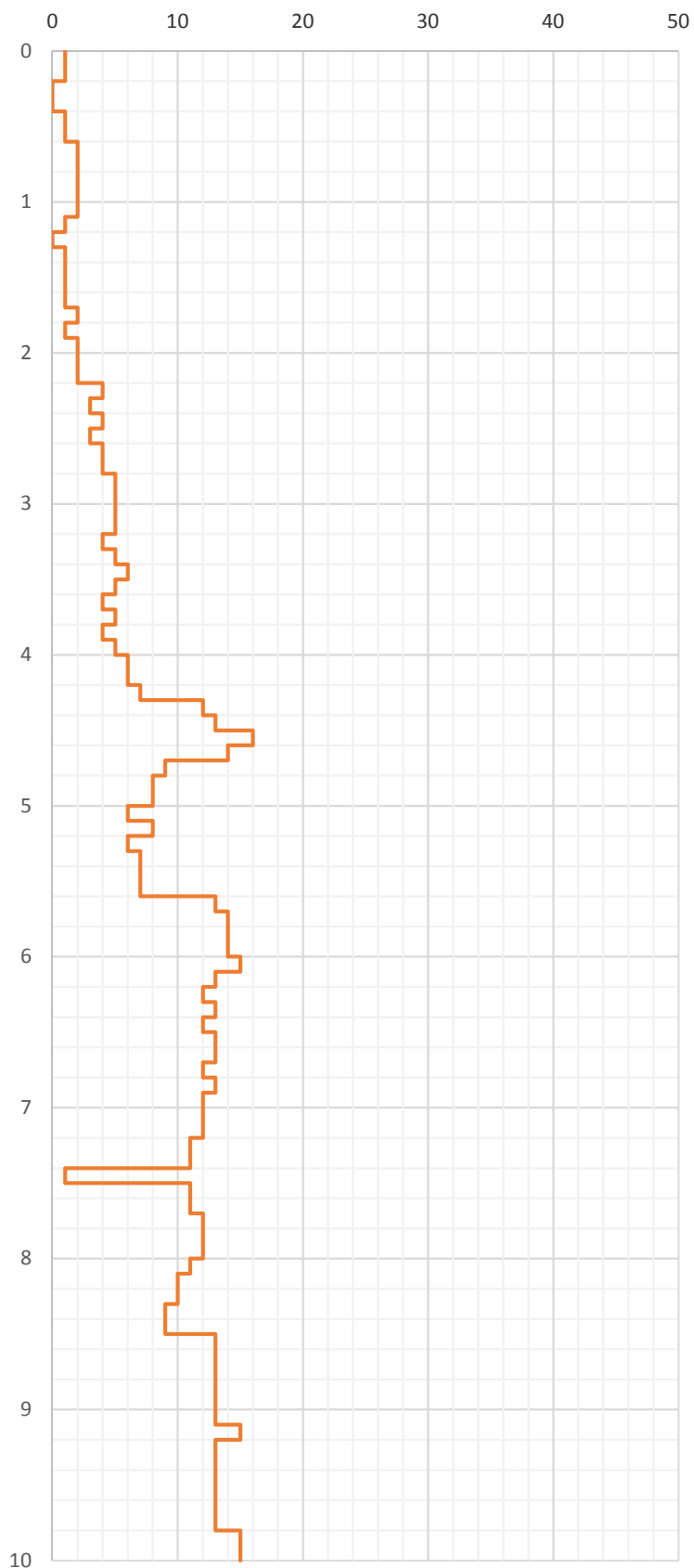
Project name:	R2392 Trows Lane Farm
Date:	15/15/2017
Hammer Weight:	63.5kg
Drop Height:	750mm
Equipment:	Archway Dart (Structural Soils Ltd)

Dynamic Probe Log - DPSH 02

Depth (m)	N ₁₀	Depth (m)	N ₁₀	Depth (m)	N ₁₀
0.00	0.10	1	4.70	4.80	9
0.10	0.20	1	4.80	4.90	8
0.20	0.30	0	4.90	5.00	8
0.30	0.40	0	5.00	5.10	6
0.40	0.50	1	5.10	5.20	8
0.50	0.60	1	5.20	5.30	6
0.60	0.70	2	5.30	5.40	7
0.70	0.80	2	5.40	5.50	7
0.80	0.90	2	5.50	5.60	7
0.90	1.00	2	5.60	5.70	13
1.00	1.10	2	5.70	5.80	14
1.10	1.20	1	5.80	5.90	14
1.20	1.30	0	5.90	6.00	14
1.30	1.40	1	6.00	6.10	15
1.40	1.50	1	6.10	6.20	13
1.50	1.60	1	6.20	6.30	12
1.60	1.70	1	6.30	6.40	13
1.70	1.80	2	6.40	6.50	12
1.80	1.90	1	6.50	6.60	13
1.90	2.00	2	6.60	6.70	13
2.00	2.10	2	6.70	6.80	12
2.10	2.20	2	6.80	6.90	13
2.20	2.30	4	6.90	7.00	12
2.30	2.40	3	7.00	7.10	12
2.40	2.50	4	7.10	7.20	12
2.50	2.60	3	7.20	7.30	11
2.60	2.70	4	7.30	7.40	11
2.70	2.80	4	7.40	7.50	1
2.80	2.90	5	7.50	7.60	11
2.90	3.00	5	7.60	7.70	11
3.00	3.10	5	7.70	7.80	12
3.10	3.20	5	7.80	7.90	12
3.20	3.30	4	7.90	8.00	12
3.30	3.40	5	8.00	8.10	11
3.40	3.50	6	8.10	8.20	10
3.50	3.60	5	8.20	8.30	10
3.60	3.70	4	8.30	8.40	9
3.70	3.80	5	8.40	8.50	9
3.80	3.90	4	8.50	8.60	13
3.90	4.00	5	8.60	8.70	13
4.00	4.10	6	8.70	8.80	13
4.10	4.20	6	8.80	8.90	13
4.20	4.30	7	8.90	9.00	13
4.30	4.40	12	9.00	9.10	13
4.40	4.50	13	9.10	9.20	15
4.50	4.60	16	9.20	9.30	13
4.60	4.70	14	9.30	9.40	13

Torque
Depth
N/m

DPSH 02



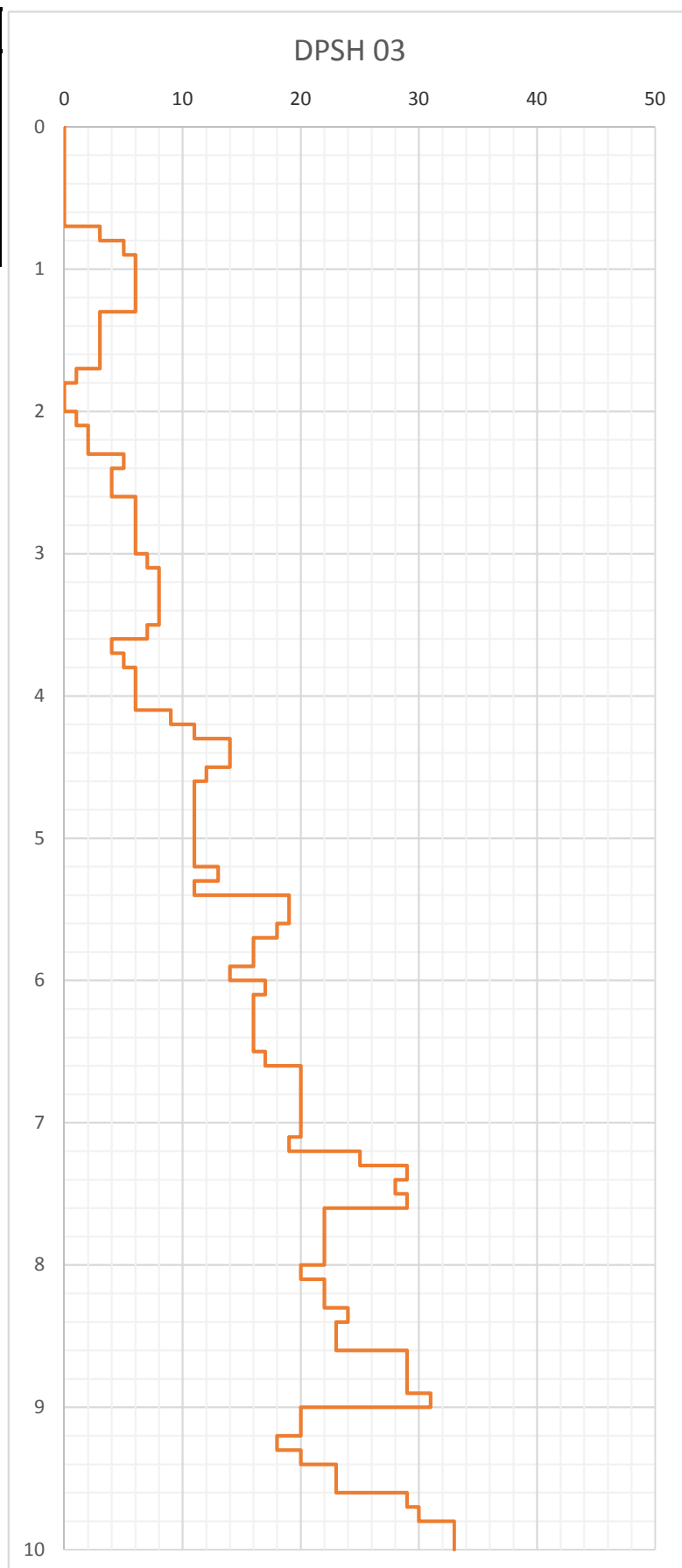
Remarks:



Project name:	R2392 Trows Lane Farm
Date:	16/15/2017
Hammer Weight:	63.5kg
Drop Height:	750mm
Equipment:	Archway Dart (Structural Soils Ltd)

Dynamic Probe Log - DPSH 03

Depth (m)	N ₁₀	Depth (m)	N ₁₀	Depth (m)	N ₁₀
0.00	0	4.70	11	9.40	23
0.10	0	4.80	11	9.50	23
0.20	0	4.90	11	9.60	29
0.30	0	5.00	11	9.70	30
0.40	0	5.10	11	9.80	33
0.50	0	5.20	13	9.90	33
0.60	0	5.30	11		
0.70	3	5.40	19	Torque	
0.80	5	5.50	19	Depth	N/m
0.90	6	5.60	18		
1.00	6	5.70	16		
1.10	6	5.80	16		
1.20	6	5.90	14		
1.30	3	6.00	17		
1.40	3	6.10	16		
1.50	3	6.20	16		
1.60	3	6.30	16		
1.70	1	6.40	16		
1.80	0	6.50	17		
1.90	0	6.60	20		
2.00	1	6.70	20		
2.10	2	6.80	20		
2.20	2	6.90	20		
2.30	5	7.00	20		
2.40	4	7.10	19		
2.50	4	7.20	25		
2.60	6	7.30	29		
2.70	6	7.40	28		
2.80	6	7.50	29		
2.90	6	7.60	22		
3.00	7	7.70	22		
3.10	8	7.80	22		
3.20	8	7.90	22		
3.30	8	8.00	20		
3.40	8	8.10	22		
3.50	7	8.20	22		
3.60	4	8.30	24		
3.70	5	8.40	23		
3.80	6	8.50	23		
3.90	6	8.60	29		
4.00	6	8.70	29		
4.10	9	8.80	29		
4.20	11	8.90	31		
4.30	14	9.00	20		
4.40	14	9.10	20		
4.50	12	9.20	18		
4.60	11	9.30	20		



Remarks:



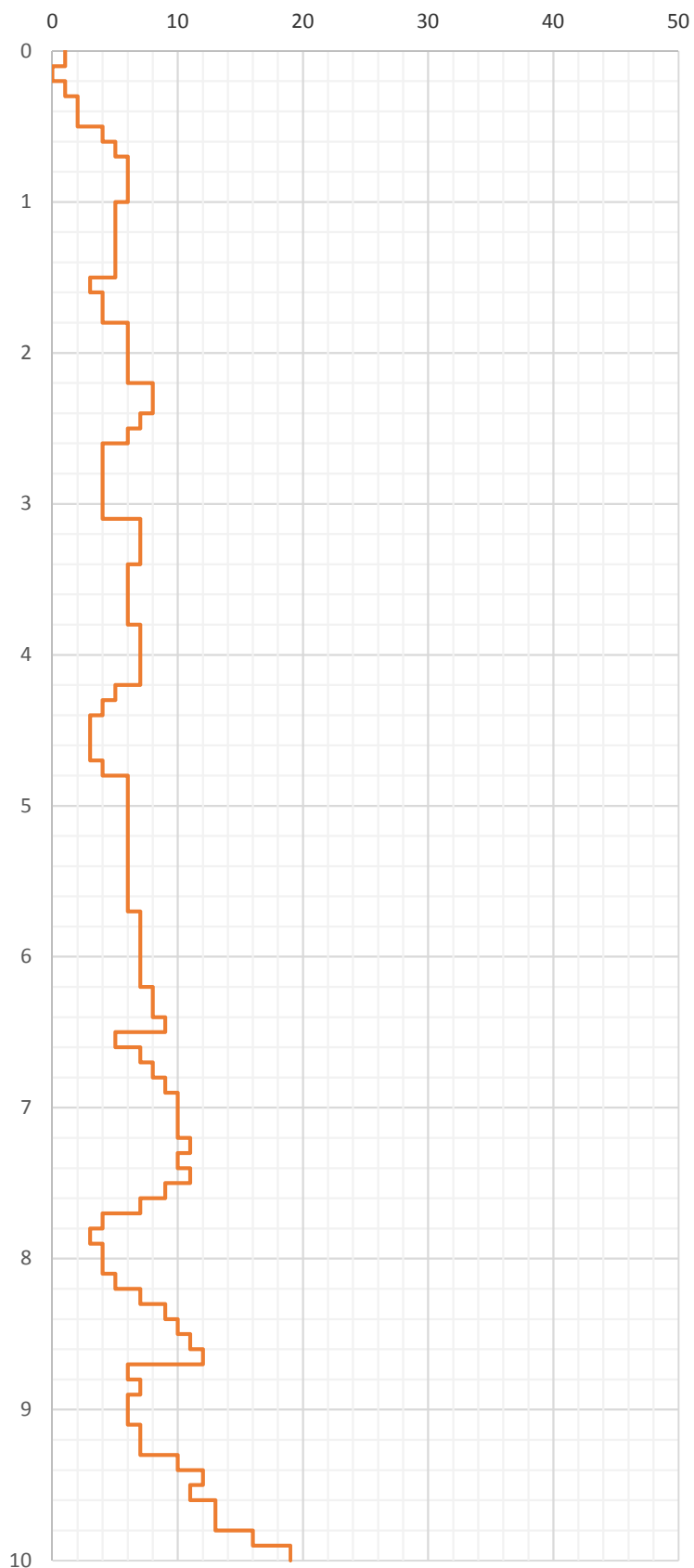
Project name:	R2392 Trows Lane Farm
Date:	16/15/2017
Hammer Weight:	63.5kg
Drop Height:	750mm
Equipment:	Archway Dart (Structural Soils Ltd)

Dynamic Probe Log - DPSH 04

Depth (m)	N ₁₀	Depth (m)	N ₁₀	Depth (m)	N ₁₀
0.00 0.10	1	4.70 4.80	4	9.40 9.50	12
0.10 0.20	0	4.80 4.90	6	9.50 9.60	11
0.20 0.30	1	4.90 5.00	6	9.60 9.70	13
0.30 0.40	2	5.00 5.10	6	9.70 9.80	13
0.40 0.50	2	5.10 5.20	6	9.80 9.90	16
0.50 0.60	4	5.20 5.30	6	9.90 10.00	19

0.60 0.70	5	5.30 5.40	6	Torque	
0.70 0.80	6	5.40 5.50	6		
0.80 0.90	6	5.50 5.60	6	Depth	N/m
0.90 1.00	6	5.60 5.70	6		
1.00 1.10	5	5.70 5.80	7		
1.10 1.20	5	5.80 5.90	7		
1.20 1.30	5	5.90 6.00	7		
1.30 1.40	5	6.00 6.10	7		
1.40 1.50	5	6.10 6.20	7		
1.50 1.60	3	6.20 6.30	8		
1.60 1.70	4	6.30 6.40	8		
1.70 1.80	4	6.40 6.50	9		
1.80 1.90	6	6.50 6.60	5		
1.90 2.00	6	6.60 6.70	7		
2.00 2.10	6	6.70 6.80	8		
2.10 2.20	6	6.80 6.90	9		
2.20 2.30	8	6.90 7.00	10		
2.30 2.40	8	7.00 7.10	10		
2.40 2.50	7	7.10 7.20	10		
2.50 2.60	6	7.20 7.30	11		
2.60 2.70	4	7.30 7.40	10		
2.70 2.80	4	7.40 7.50	11		
2.80 2.90	4	7.50 7.60	9		
2.90 3.00	4	7.60 7.70	7		
3.00 3.10	4	7.70 7.80	4		
3.10 3.20	7	7.80 7.90	3		
3.20 3.30	7	7.90 8.00	4		
3.30 3.40	7	8.00 8.10	4		
3.40 3.50	6	8.10 8.20	5		
3.50 3.60	6	8.20 8.30	7		
3.60 3.70	6	8.30 8.40	9		
3.70 3.80	6	8.40 8.50	10		
3.80 3.90	7	8.50 8.60	11		
3.90 4.00	7	8.60 8.70	12		
4.00 4.10	7	8.70 8.80	6		
4.10 4.20	7	8.80 8.90	7		
4.20 4.30	5	8.90 9.00	6		
4.30 4.40	4	9.00 9.10	6		
4.40 4.50	3	9.10 9.20	7		
4.50 4.60	3	9.20 9.30	7		
4.60 4.70	3	9.30 9.40	10		

DPSH 04



Remarks:



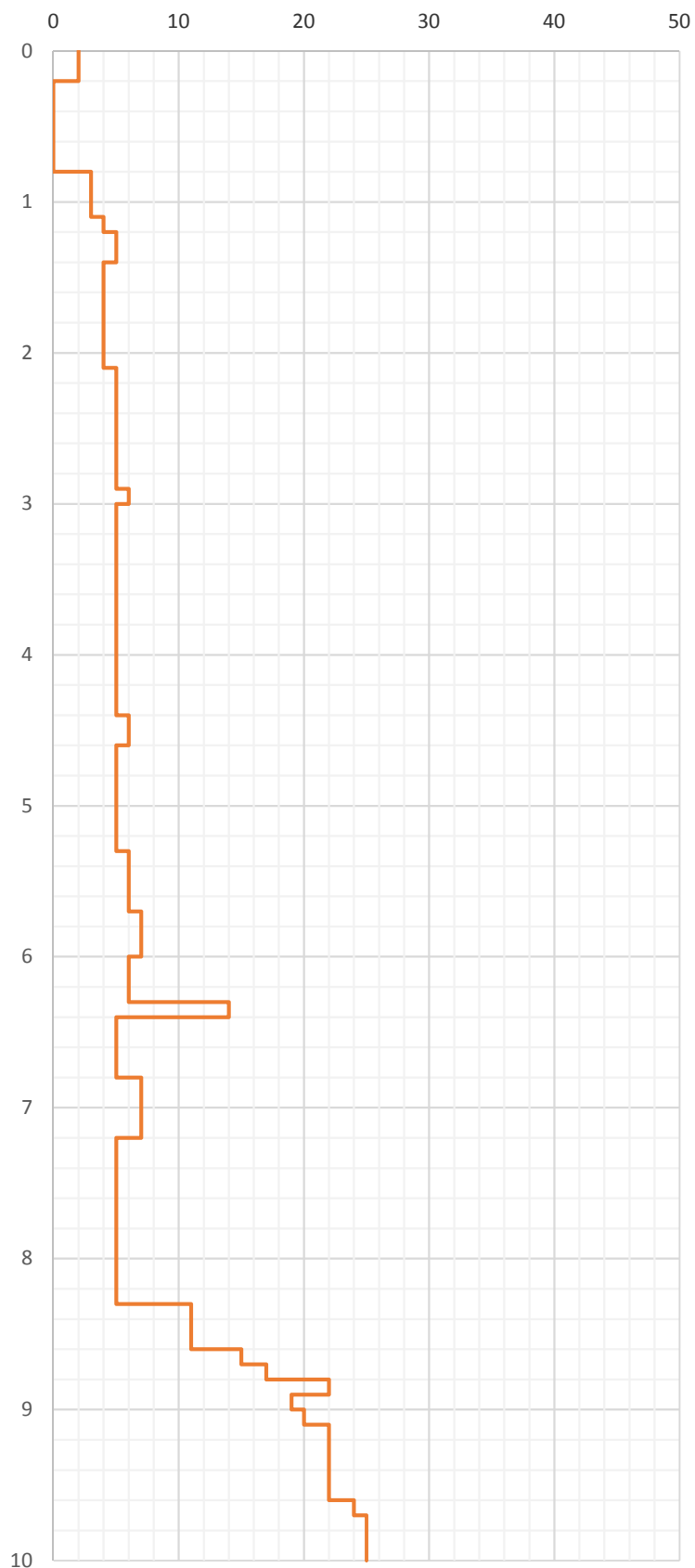
Project name:	R2392 Trows Lane Farm
Date:	17/15/2017
Hammer Weight:	63.5kg
Drop Height:	750mm
Equipment:	Archway Dart (Structural Soils Ltd)

Dynamic Probe Log - DPSH 06

Depth (m)	N ₁₀	Depth (m)	N ₁₀	Depth (m)	N ₁₀
0.00 0.10	2	4.70 4.80	5	9.40 9.50	22
0.10 0.20	2	4.80 4.90	5	9.50 9.60	22
0.20 0.30	0	4.90 5.00	5	9.60 9.70	24
0.30 0.40	0	5.00 5.10	5	9.70 9.80	25
0.40 0.50	0	5.10 5.20	5	9.80 9.90	25
0.50 0.60	0	5.20 5.30	5	9.90 10.00	25

0.60 0.70	0	5.30 5.40	6	Torque	
0.70 0.80	0	5.40 5.50	6		
0.80 0.90	3	5.50 5.60	6	Depth	N/m
0.90 1.00	3	5.60 5.70	6		
1.00 1.10	3	5.70 5.80	7		
1.10 1.20	4	5.80 5.90	7		
1.20 1.30	5	5.90 6.00	7		
1.30 1.40	5	6.00 6.10	6		
1.40 1.50	4	6.10 6.20	6		
1.50 1.60	4	6.20 6.30	6		
1.60 1.70	4	6.30 6.40	14		
1.70 1.80	4	6.40 6.50	5		
1.80 1.90	4	6.50 6.60	5		
1.90 2.00	4	6.60 6.70	5		
2.00 2.10	4	6.70 6.80	5		
2.10 2.20	5	6.80 6.90	7		
2.20 2.30	5	6.90 7.00	7		
2.30 2.40	5	7.00 7.10	7		
2.40 2.50	5	7.10 7.20	7		
2.50 2.60	5	7.20 7.30	5		
2.60 2.70	5	7.30 7.40	5		
2.70 2.80	5	7.40 7.50	5		
2.80 2.90	5	7.50 7.60	5		
2.90 3.00	6	7.60 7.70	5		
3.00 3.10	5	7.70 7.80	5		
3.10 3.20	5	7.80 7.90	5		
3.20 3.30	5	7.90 8.00	5		
3.30 3.40	5	8.00 8.10	5		
3.40 3.50	5	8.10 8.20	5		
3.50 3.60	5	8.20 8.30	5		
3.60 3.70	5	8.30 8.40	11		
3.70 3.80	5	8.40 8.50	11		
3.80 3.90	5	8.50 8.60	11		
3.90 4.00	5	8.60 8.70	15		
4.00 4.10	5	8.70 8.80	17		
4.10 4.20	5	8.80 8.90	22		
4.20 4.30	5	8.90 9.00	19		
4.30 4.40	5	9.00 9.10	20		
4.40 4.50	6	9.10 9.20	22		
4.50 4.60	6	9.20 9.30	22		
4.60 4.70	5	9.30 9.40	22		

DPSH 06



Remarks:

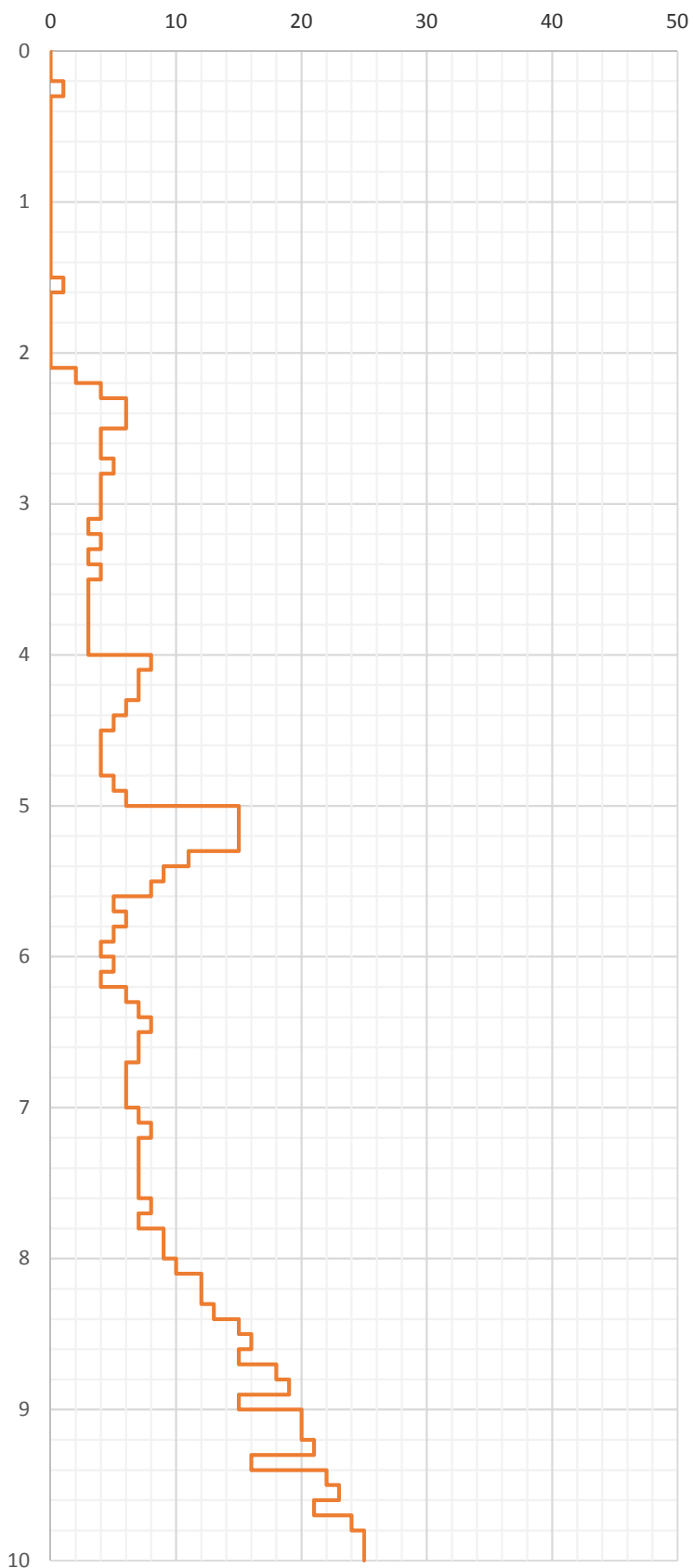


Project name:	R2392 Trows Lane Farm
Date:	17/15/2017
Hammer Weight:	63.5kg
Drop Height:	750mm
Equipment:	Archway Dart (Structural Soils Ltd)

Dynamic Probe Log - DPSH 07

Depth (m)	N ₁₀	Depth (m)	N ₁₀	Depth (m)	N ₁₀
0.00	0	4.70	4	9.40	22
0.10	0	4.80	5	9.50	23
0.20	1	4.90	6	9.60	21
0.30	0	5.00	15	9.70	24
0.40	0	5.10	15	9.80	25
0.50	0	5.20	15	9.90	25
0.60	0	5.30	11		
0.70	0	5.40	9	Torque	
0.80	0	5.50	8	Depth	N/m
0.90	0	5.60	5		
1.00	0	5.70	6		
1.10	0	5.80	5		
1.20	0	5.90	4		
1.30	0	6.00	5		
1.40	0	6.10	4		
1.50	1	6.20	6		
1.60	0	6.30	7		
1.70	0	6.40	8		
1.80	0	6.50	7		
1.90	0	6.60	7		
2.00	0	6.70	6		
2.10	2	6.80	6		
2.20	4	6.90	6		
2.30	6	7.00	7		
2.40	6	7.10	8		
2.50	4	7.20	7		
2.60	4	7.30	7		
2.70	5	7.40	7		
2.80	4	7.50	7		
2.90	4	7.60	8		
3.00	4	7.70	7		
3.10	3	7.80	9		
3.20	4	7.90	9		
3.30	3	8.00	10		
3.40	4	8.10	12		
3.50	3	8.20	12		
3.60	3	8.30	13		
3.70	3	8.40	15		
3.80	3	8.50	16		
3.90	3	8.60	15		
4.00	8	8.70	18		
4.10	7	8.80	19		
4.20	7	8.90	15		
4.30	6	9.00	20		
4.40	5	9.10	20		
4.50	4	9.20	21		
4.60	4	9.30	16		

DPSH 07



Remarks:

Project name:	R2392 Trows Lane Farm
Date:	18/15/2017
Hammer Weight:	63.5kg
Drop Height:	750mm
Equipment:	Archway Dart (Structural Soils Ltd)

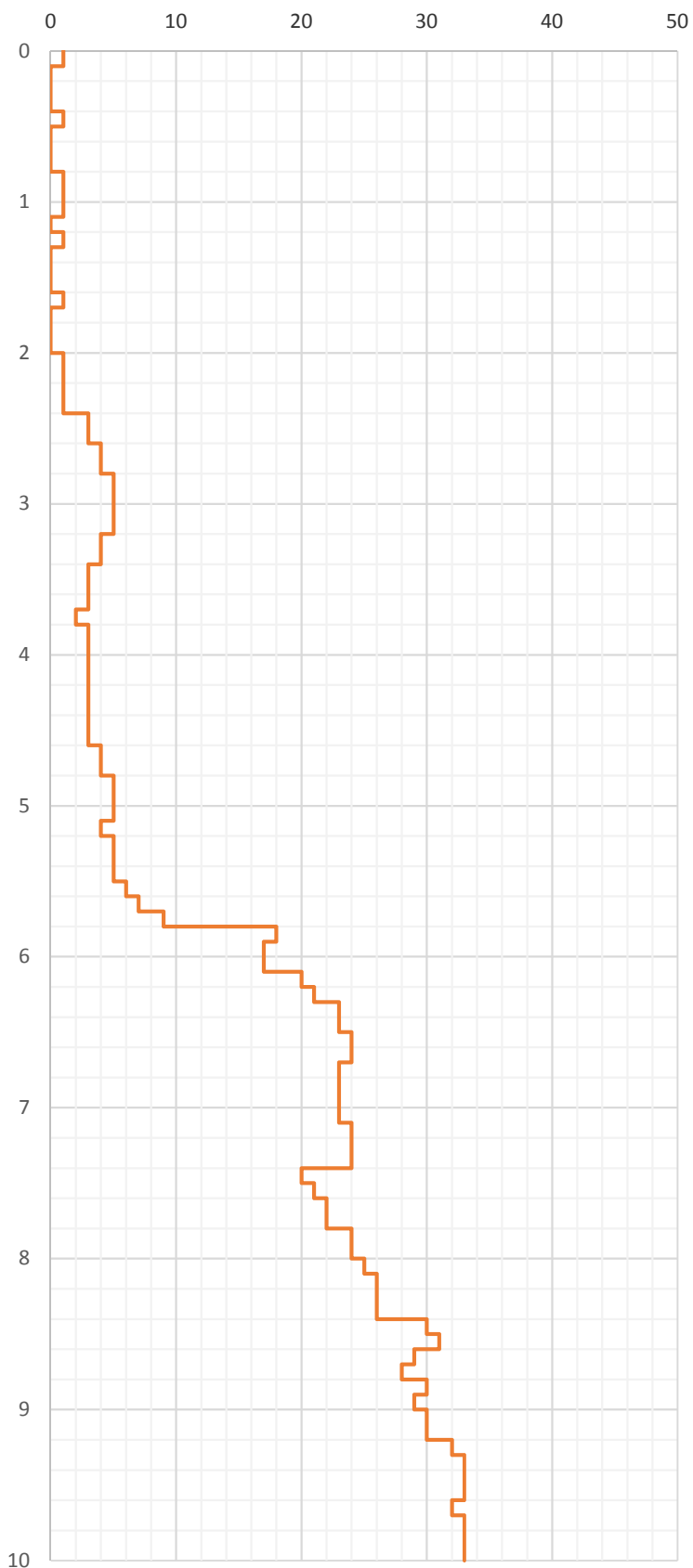


Dynamic Probe Log - DPSH 08

Depth (m)	N ₁₀	Depth (m)	N ₁₀	Depth (m)	N ₁₀
0.00 0.10	1	4.70 4.80	4	9.40 9.50	33
0.10 0.20	0	4.80 4.90	5	9.50 9.60	33
0.20 0.30	0	4.90 5.00	5	9.60 9.70	32
0.30 0.40	0	5.00 5.10	5	9.70 9.80	33
0.40 0.50	1	5.10 5.20	4	9.80 9.90	33
0.50 0.60	0	5.20 5.30	5	9.90 10.00	33

0.60 0.70	0	5.30 5.40	5	Torque	
0.70 0.80	0	5.40 5.50	5	Depth	N/m
0.80 0.90	1	5.50 5.60	6		
0.90 1.00	1	5.60 5.70	7		
1.00 1.10	1	5.70 5.80	9		
1.10 1.20	0	5.80 5.90	18		
1.20 1.30	1	5.90 6.00	17		
1.30 1.40	0	6.00 6.10	17		
1.40 1.50	0	6.10 6.20	20		
1.50 1.60	0	6.20 6.30	21		
1.60 1.70	1	6.30 6.40	23		
1.70 1.80	0	6.40 6.50	23		
1.80 1.90	0	6.50 6.60	24		
1.90 2.00	0	6.60 6.70	24		
2.00 2.10	1	6.70 6.80	23		
2.10 2.20	1	6.80 6.90	23		
2.20 2.30	1	6.90 7.00	23		
2.30 2.40	1	7.00 7.10	23		
2.40 2.50	3	7.10 7.20	24		
2.50 2.60	3	7.20 7.30	24		
2.60 2.70	4	7.30 7.40	24		
2.70 2.80	4	7.40 7.50	20		
2.80 2.90	5	7.50 7.60	21		
2.90 3.00	5	7.60 7.70	22		
3.00 3.10	5	7.70 7.80	22		
3.10 3.20	5	7.80 7.90	24		
3.20 3.30	4	7.90 8.00	24		
3.30 3.40	4	8.00 8.10	25		
3.40 3.50	3	8.10 8.20	26		
3.50 3.60	3	8.20 8.30	26		
3.60 3.70	3	8.30 8.40	26		
3.70 3.80	2	8.40 8.50	30		
3.80 3.90	3	8.50 8.60	31		
3.90 4.00	3	8.60 8.70	29		
4.00 4.10	3	8.70 8.80	28		
4.10 4.20	3	8.80 8.90	30		
4.20 4.30	3	8.90 9.00	29		
4.30 4.40	3	9.00 9.10	30		
4.40 4.50	3	9.10 9.20	30		
4.50 4.60	3	9.20 9.30	32		
4.60 4.70	4	9.30 9.40	33		

DPSH 08



Remarks:

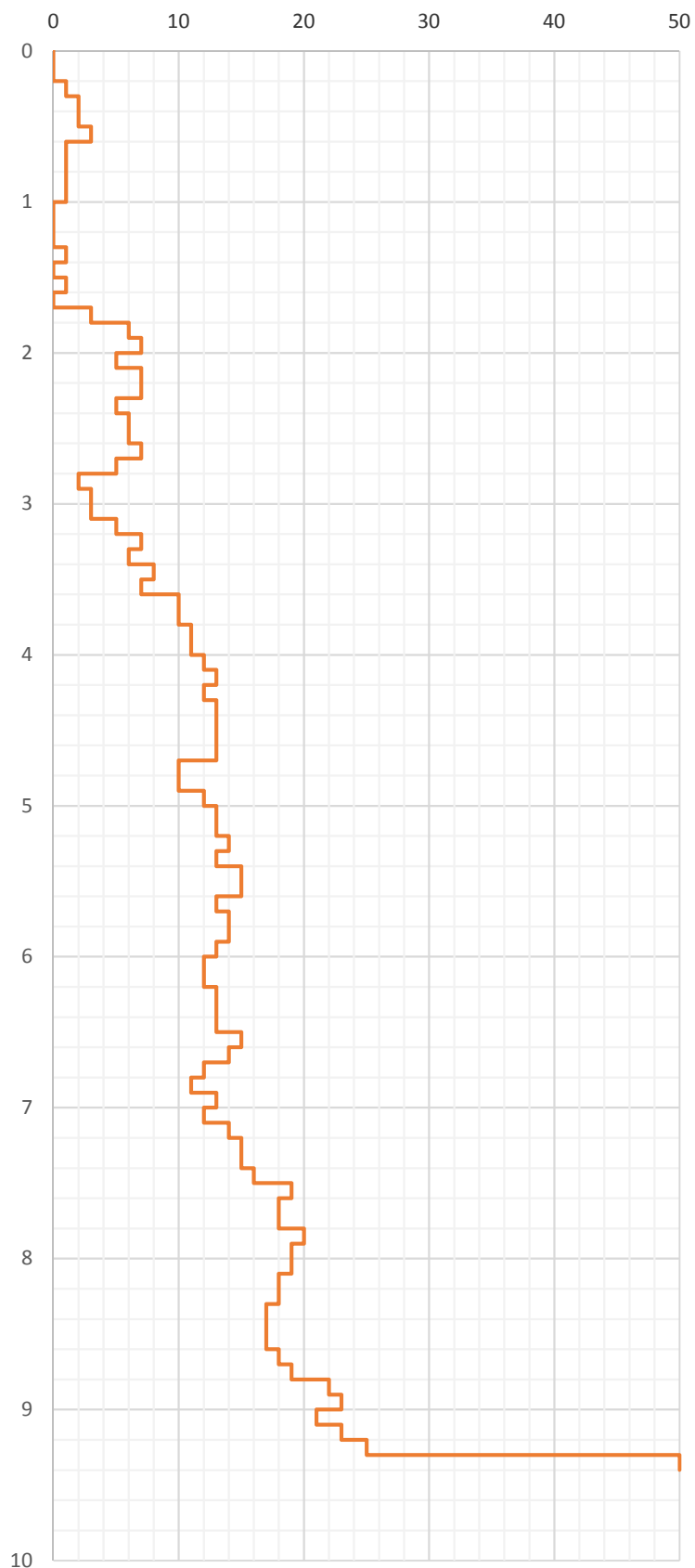
Project name:	R2392 Trows Lane Farm
Date:	18/15/2017
Hammer Weight:	63.5kg
Drop Height:	750mm
Equipment:	Archway Dart (Structural Soils Ltd)



Dynamic Probe Log - DPSH 09

Depth (m)	N ₁₀	Depth (m)	N ₁₀	Depth (m)	N ₁₀
0.00	0	4.70	10	9.40	
0.10	0	4.80	10	9.50	
0.20	1	4.90	12	9.60	
0.30	2	5.00	13	9.70	
0.40	2	5.10	13	9.80	
0.50	3	5.20	14	9.90	
0.60	1	5.30	13		
0.70	1	5.40	15	Torque	
0.80	1	5.50	15	Depth	N/m
0.90	1	5.60	13		
1.00	0	5.70	14		
1.10	0	5.80	14		
1.20	0	5.90	13		
1.30	1	6.00	12		
1.40	0	6.10	12		
1.50	1	6.20	13		
1.60	0	6.30	13		
1.70	3	6.40	13		
1.80	6	6.50	15		
1.90	7	6.60	14		
2.00	5	6.70	12		
2.10	7	6.80	11		
2.20	7	6.90	13		
2.30	5	7.00	12		
2.40	6	7.10	14		
2.50	6	7.20	15		
2.60	7	7.30	15		
2.70	5	7.40	16		
2.80	2	7.50	19		
2.90	3	7.60	18		
3.00	3	7.70	18		
3.10	5	7.80	20		
3.20	7	7.90	19		
3.30	6	8.00	19		
3.40	8	8.10	18		
3.50	7	8.20	18		
3.60	10	8.30	17		
3.70	10	8.40	17		
3.80	11	8.50	17		
3.90	11	8.60	18		
4.00	12	8.70	19		
4.10	13	8.80	22		
4.20	12	8.90	23		
4.30	13	9.00	21		
4.40	13	9.10	23		
4.50	13	9.20	25		
4.60	13	9.30	50		

DPSH 09



Remarks: Refusal at 9.37m



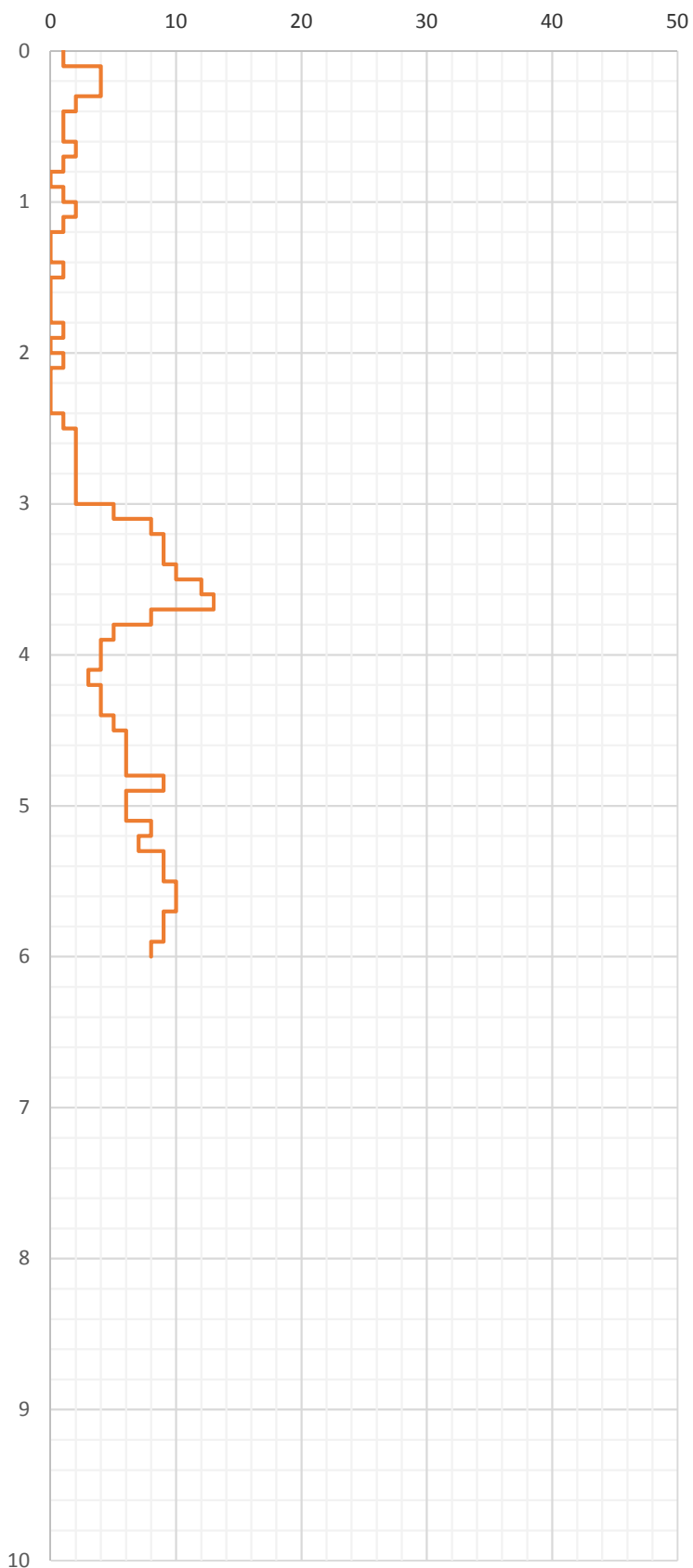
Project name:	R2392 Trows Lane Farm
Date:	23/15/2017
Hammer Weight:	63.5kg
Drop Height:	750mm
Equipment:	Archway Competitor (Topdrill Ltd)

Dynamic Probe Log - DPSH 10

Depth (m)	N ₁₀	Depth (m)	N ₁₀	Depth (m)	N ₁₀
0.00	0.10	1	4.70	4.80	6
0.10	0.20	4	4.80	4.90	9
0.20	0.30	4	4.90	5.00	6
0.30	0.40	2	5.00	5.10	6
0.40	0.50	1	5.10	5.20	8
0.50	0.60	1	5.20	5.30	7
0.60	0.70	2	5.30	5.40	9

0.70	0.80	1	5.40	5.50	9	Torque	
0.80	0.90	0	5.50	5.60	10	Depth	N/m
0.90	1.00	1	5.60	5.70	10		
1.00	1.10	2	5.70	5.80	9		
1.10	1.20	1	5.80	5.90	9		
1.20	1.30	0	5.90	6.00	8		
1.30	1.40	0	6.00	6.10			
1.40	1.50	1	6.10	6.20			
1.50	1.60	0	6.20	6.30			
1.60	1.70	0	6.30	6.40			
1.70	1.80	0	6.40	6.50			
1.80	1.90	1	6.50	6.60			
1.90	2.00	0	6.60	6.70			
2.00	2.10	1	6.70	6.80			
2.10	2.20	0	6.80	6.90			
2.20	2.30	0	6.90	7.00			
2.30	2.40	0	7.00	7.10			
2.40	2.50	1	7.10	7.20			
2.50	2.60	2	7.20	7.30			
2.60	2.70	2	7.30	7.40			
2.70	2.80	2	7.40	7.50			
2.80	2.90	2	7.50	7.60			
2.90	3.00	2	7.60	7.70			
3.00	3.10	5	7.70	7.80			
3.10	3.20	8	7.80	7.90			
3.20	3.30	9	7.90	8.00			
3.30	3.40	9	8.00	8.10			
3.40	3.50	10	8.10	8.20			
3.50	3.60	12	8.20	8.30			
3.60	3.70	13	8.30	8.40			
3.70	3.80	8	8.40	8.50			
3.80	3.90	5	8.50	8.60			
3.90	4.00	4	8.60	8.70			
4.00	4.10	4	8.70	8.80			
4.10	4.20	3	8.80	8.90			
4.20	4.30	4	8.90	9.00			
4.30	4.40	4	9.00	9.10			
4.40	4.50	5	9.10	9.20			
4.50	4.60	6	9.20	9.30			
4.60	4.70	6	9.30	9.40			

DPSH 10



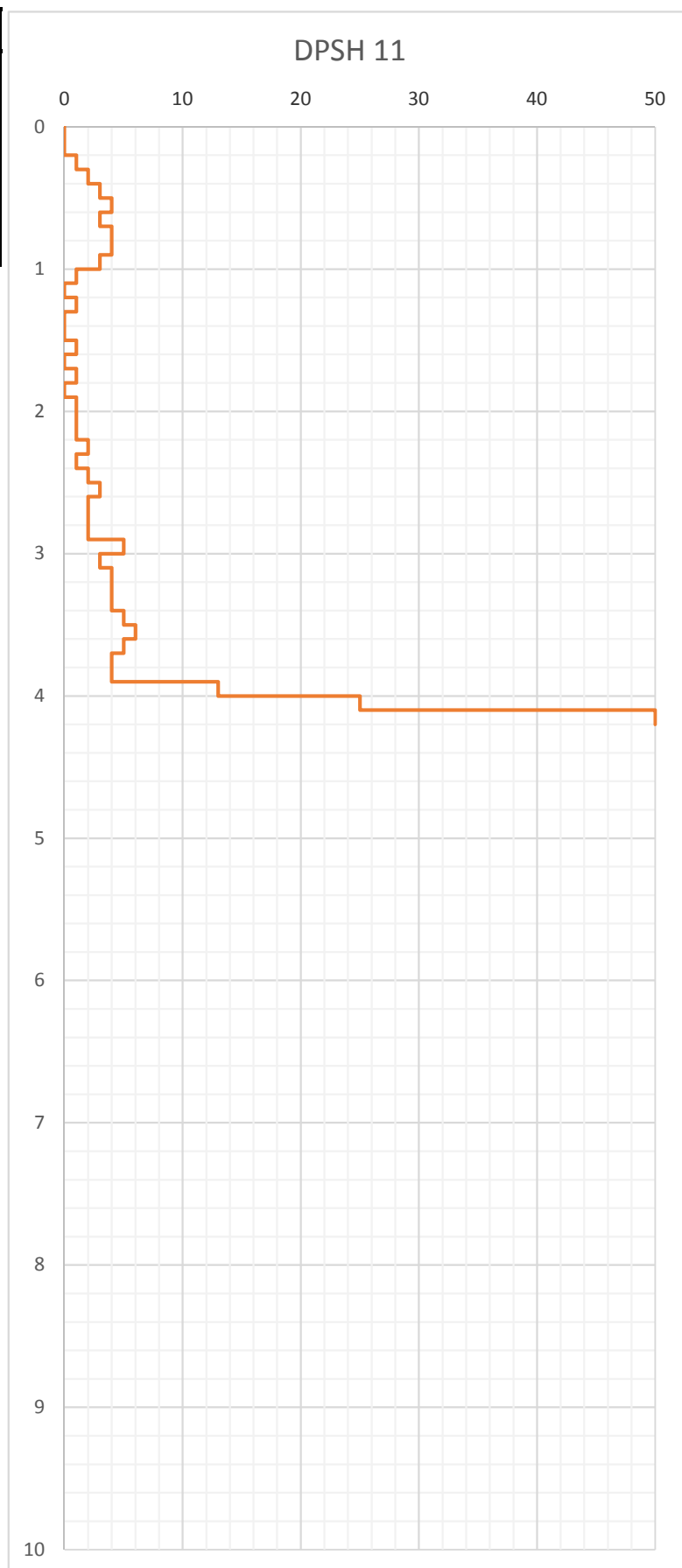
Remarks:



Project name:	R2392 Trows Lane Farm
Date:	23/15/2017
Hammer Weight:	63.5kg
Drop Height:	750mm
Equipment:	Archway Competitor (Topdrill Ltd)

Dynamic Probe Log - DPSH 11

Depth (m)	N ₁₀	Depth (m)	N ₁₀	Depth (m)	N ₁₀
0.00	0	4.70		9.40	
0.10	0	4.80		9.50	
0.20	1	4.90		9.60	
0.30	2	5.00		9.70	
0.40	3	5.10		9.80	
0.50	4	5.20		9.90	
0.60	3	5.30		10.00	
0.70	4	5.40		Torque	
0.80	4	5.50			
0.90	3	5.60		Depth	N/m
1.00	1	5.70			
1.10	0	5.80			
1.20	1	5.90			
1.30	0	6.00			
1.40	0	6.10			
1.50	1	6.20			
1.60	0	6.30			
1.70	1	6.40			
1.80	0	6.50			
1.90	1	6.60			
2.00	1	6.70			
2.10	1	6.80			
2.20	2	6.90			
2.30	1	7.00			
2.40	2	7.10			
2.50	3	7.20			
2.60	2	7.30			
2.70	2	7.40			
2.80	2	7.50			
2.90	5	7.60			
3.00	3	7.70			
3.10	4	7.80			
3.20	4	7.90			
3.30	4	8.00			
3.40	5	8.10			
3.50	6	8.20			
3.60	5	8.30			
3.70	4	8.40			
3.80	4	8.50			
3.90	13	8.60			
4.00	25	8.70			
4.10	50	8.80			
4.20		8.90			
4.30		9.00			
4.40		9.10			
4.50		9.20			
4.60		9.30			



Remarks: Refusal at 4.15m

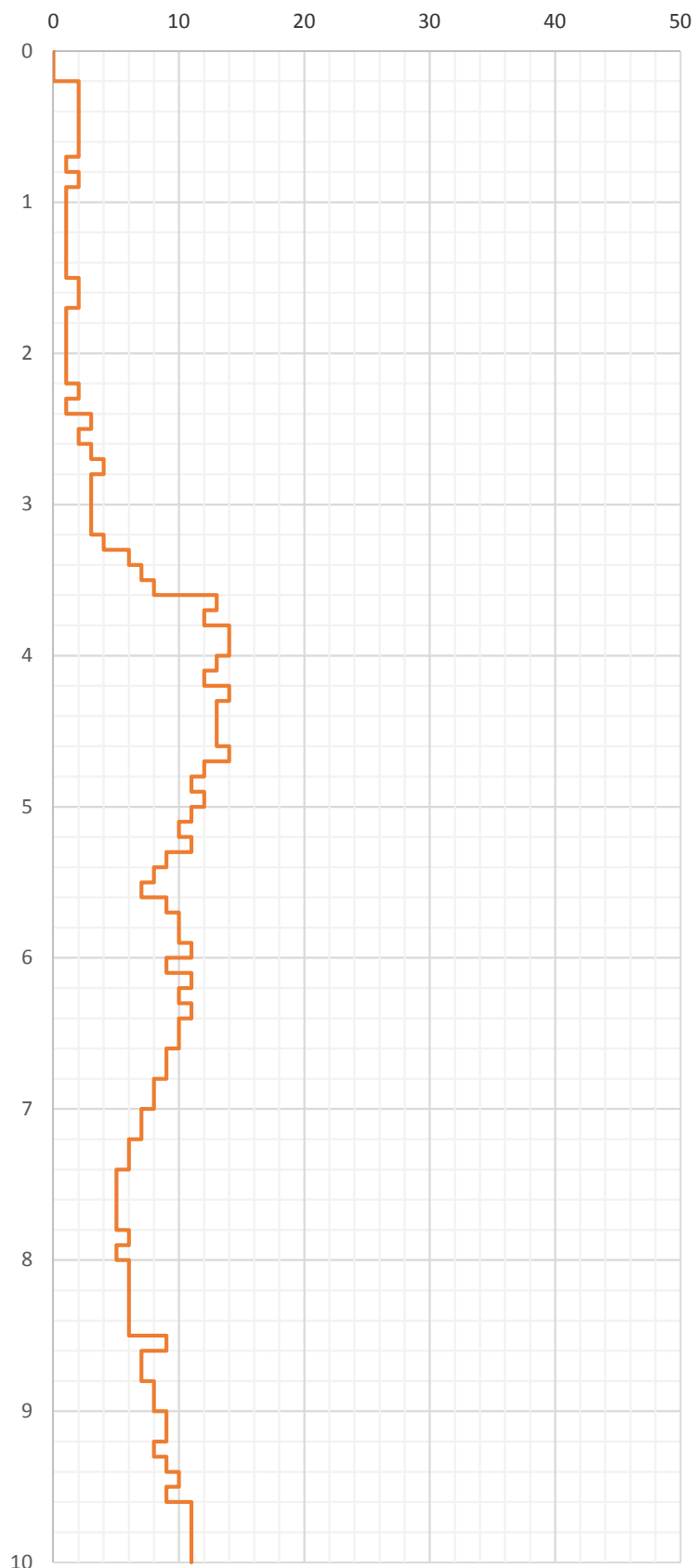
Project name:	R2392 Trows Lane Farm
Date:	24/15/2017
Hammer Weight:	63.5kg
Drop Height:	750mm
Equipment:	Archway Competitor (Topdrill Ltd)



Dynamic Probe Log - DPSH 12

Depth (m)	N ₁₀	Depth (m)	N ₁₀	Depth (m)	N ₁₀
0.00	0	4.70	12	9.40	10
0.10	0	4.80	11	9.50	9
0.20	2	4.90	12	9.60	11
0.30	2	5.00	11	9.70	11
0.40	2	5.10	10	9.80	11
0.50	2	5.20	11	9.90	11
0.60	2	5.30	9	Torque	
0.70	1	5.40	8		
0.80	2	5.50	7	Depth	N/m
0.90	1	5.60	9		
1.00	1	5.70	10		
1.10	1	5.80	10		
1.20	1	5.90	11		
1.30	1	6.00	9		
1.40	1	6.10	11		
1.50	2	6.20	10		
1.60	2	6.30	11		
1.70	1	6.40	10		
1.80	1	6.50	10		
1.90	1	6.60	9		
2.00	1	6.70	9		
2.10	1	6.80	8		
2.20	2	6.90	8		
2.30	1	7.00	7		
2.40	3	7.10	7		
2.50	2	7.20	6		
2.60	3	7.30	6		
2.70	4	7.40	5		
2.80	3	7.50	5		
2.90	3	7.60	5		
3.00	3	7.70	5		
3.10	3	7.80	6		
3.20	4	7.90	5		
3.30	6	8.00	6		
3.40	7	8.10	6		
3.50	8	8.20	6		
3.60	13	8.30	6		
3.70	12	8.40	6		
3.80	14	8.50	9		
3.90	14	8.60	7		
4.00	13	8.70	7		
4.10	12	8.80	8		
4.20	14	8.90	8		
4.30	13	9.00	9		
4.40	13	9.10	9		
4.50	13	9.20	8		
4.60	14	9.30	9		

DPSH 12



Remarks:



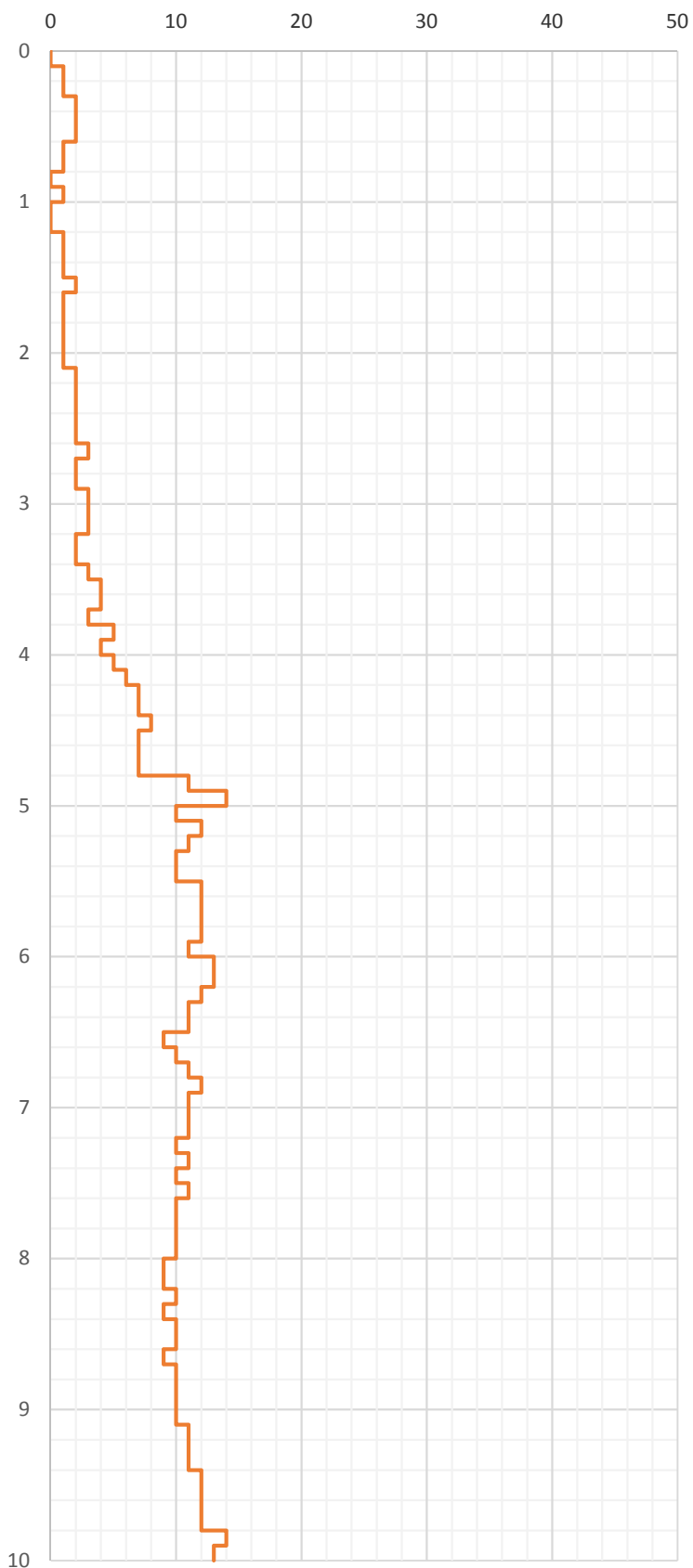
Project name:	R2392 Trows Lane Farm
Date:	24/15/2017
Hammer Weight:	63.5kg
Drop Height:	750mm
Equipment:	Archway Competitor (Topdrill Ltd)

Dynamic Probe Log - DPSH 13

Depth (m)	N ₁₀	Depth (m)	N ₁₀	Depth (m)	N ₁₀
0.00 0.10	0	4.70 4.80	7	9.40 9.50	12
0.10 0.20	1	4.80 4.90	11	9.50 9.60	12
0.20 0.30	1	4.90 5.00	14	9.60 9.70	12
0.30 0.40	2	5.00 5.10	10	9.70 9.80	12
0.40 0.50	2	5.10 5.20	12	9.80 9.90	14
0.50 0.60	2	5.20 5.30	11	9.90 10.00	13

0.60 0.70	1	5.30 5.40	10	Torque	
0.70 0.80	1	5.40 5.50	10		
0.80 0.90	0	5.50 5.60	12	Depth	N/m
0.90 1.00	1	5.60 5.70	12		
1.00 1.10	0	5.70 5.80	12		
1.10 1.20	0	5.80 5.90	12		
1.20 1.30	1	5.90 6.00	11		
1.30 1.40	1	6.00 6.10	13		
1.40 1.50	1	6.10 6.20	13		
1.50 1.60	2	6.20 6.30	12		
1.60 1.70	1	6.30 6.40	11		
1.70 1.80	1	6.40 6.50	11		
1.80 1.90	1	6.50 6.60	9		
1.90 2.00	1	6.60 6.70	10		
2.00 2.10	1	6.70 6.80	11		
2.10 2.20	2	6.80 6.90	12		
2.20 2.30	2	6.90 7.00	11		
2.30 2.40	2	7.00 7.10	11		
2.40 2.50	2	7.10 7.20	11		
2.50 2.60	2	7.20 7.30	10		
2.60 2.70	3	7.30 7.40	11		
2.70 2.80	2	7.40 7.50	10		
2.80 2.90	2	7.50 7.60	11		
2.90 3.00	3	7.60 7.70	10		
3.00 3.10	3	7.70 7.80	10		
3.10 3.20	3	7.80 7.90	10		
3.20 3.30	2	7.90 8.00	10		
3.30 3.40	2	8.00 8.10	9		
3.40 3.50	3	8.10 8.20	9		
3.50 3.60	4	8.20 8.30	10		
3.60 3.70	4	8.30 8.40	9		
3.70 3.80	3	8.40 8.50	10		
3.80 3.90	5	8.50 8.60	10		
3.90 4.00	4	8.60 8.70	9		
4.00 4.10	5	8.70 8.80	10		
4.10 4.20	6	8.80 8.90	10		
4.20 4.30	7	8.90 9.00	10		
4.30 4.40	7	9.00 9.10	10		
4.40 4.50	8	9.10 9.20	11		
4.50 4.60	7	9.20 9.30	11		
4.60 4.70	7	9.30 9.40	11		

DPSH 13



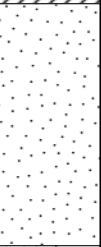
Remarks:

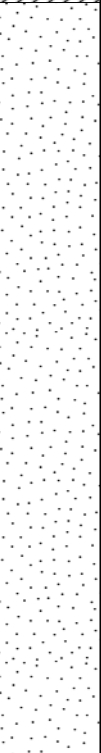


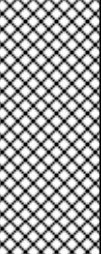
Project name:	R2392 Trows Lane Farm
Date:	24/15/2017
Hammer Weight:	63.5kg
Drop Height:	750mm
Equipment:	Archway Competitor (Topdrill Ltd)

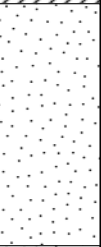
APPENDIX D

Trial Pit Logs and Photographs

SHEET: 1 of 1	LOCATION: See Plan	PROJECT: Land at Trows Lane Farm	ENGINEER: CS		JOB NO. R2228	TRIAL PIT NO. TP01
		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: Rob Grey		DATE: 28-30 June 2016	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
			0	Black slightly clayey sandy TOPSOIL with rootlets.		
			0.4	Slightly clayey slightly gravelly SAND. Gravel is fine to coarse subangular to subrounded sandstone (HUMMOCKY GLACIAL DEPOSITS).		
			1.2	Light brown laminated silty SAND (HUMMOCKY GLACIAL DEPOSITS).		
				Base of excavation at 2.9m.		
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk GROUND WATER: No groundwater encountered REMARKS: Sidewalls stable J: jar sample D: small disturbed sample B: bulk disturbed sample SCALE: 1:250 LOGGED BY: CS FIGURE NO. 1						

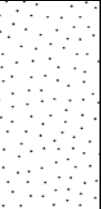
SHEET: 1 of 1	LOCATION: See Plan	PROJECT: Land at Trows Lane Farm	ENGINEER: CS		JOB NO. R2228	TRIAL PIT NO. TP02
		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: Rob Grey		DATE: 28-30 June 2016	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
0.2	J1		0	Blackish dark grey slightly clayey sandy TOPSOIL with rootlets.		
			0.3	Light brown weathered reddish brown occasionally laminated fine SAND locally slightly cemented locally with lenses of brown clay (HUMMOCKY GLACIAL DEPOSITS).		
				Base of excavation at 2.8m.		
 SMITH GRANT <i>Environmental Consultancy</i> LLP Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk GROUND WATER: No groundwater encountered REMARKS: Sidewalls stable J: jar sample D: small disturbed sample B: bulk disturbed sample SCALE: 1:250 LOGGED BY: CS FIGURE NO. 1						

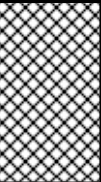
SHEET: 1 of 1	LOCATION: See Plan	PROJECT: Land at Trows Lane Farm	ENGINEER: CS		JOB NO. R2228	TRIAL PIT NO. TP03	
		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: Rob Grey		DATE: 28-30 June 2016		
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND	
	J1		0	Black clayey slightly sandy TOPSOIL with rootlets.			
0.3			0.1	MADE GROUND: Black sandy GRAVEL of slag, clinker and brick with ash.			
			1.1	Very soft light grey slightly gravelly CLAY. Gravel is fine to coarse subangular to subrounded sandstone (ALLUVIUM).			
1.3	D		1.5	Light brown fine SAND locally with lenses of brown clay (HUMMOCKY GLACIAL DEPOSITS).			
				Base of excavation at 3m.			
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk GROUND WATER: Inflow of water at 1.8m REMARKS: Side walls collapsing below groundwater inflow. J: jar sample D: small disturbed sample B: bulk disturbed sample							
SCALE: 1:250			LOGGED BY: CS		FIGURE NO. 1		

SHEET: 1 of 1	LOCATION: See Plan	PROJECT: Land at Trows Lane Farm	ENGINEER: CS		JOB NO. R2228	TRIAL PIT NO. TP04
		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: Rob Grey		DATE: 28-30 June 2016	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
0.8	B		0	Blackish dark grey slightly gravelly sandy TOPSOIL with rootlets and occasional roots.		
			0.4	Light brown slightly gravelly SAND. Gravel is fine to coarse subrounded sandstone (HUMMOCKY GLACIAL DEPOSITS).		
			1.2	Light brown locally slightly cemented fine SAND (HUMMOCKY GLACIAL DEPOSITS).		
				Base of excavation at 2.8m.		
 SMITH GRANT Environmental Consultancy LLP Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk GROUND WATER: No groundwater encountered REMARKS: Sidewalls stable J: jar sample D: small disturbed sample B: bulk disturbed sample SCALE: 1:250 LOGGED BY: CS FIGURE NO. 1						

SHEET: 1 of 1	LOCATION: See Plan	PROJECT: Land at Trows Lane Farm	ENGINEER: CS		JOB NO. R2228	TRIAL PIT NO. TP05
		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: Rob Grey		DATE: 28-30 June 2016	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
0.6	D		0	Very soft blackish dark grey clayey TOPSOIL with rootlets.		
			0.4	Very soft light grey weathered orangish brown slightly gravelly sandy CLAY. Gravel is fine to coarse subrounded sandstone (ALLUVIUM).		
			1.2	Light brown locally slightly cemented fine SAND (HUMMOCKY GLACIAL DEPOSITS).		
				Excavation finished at 2.6m due to sidewalls collapse.		
 SMITH GRANT <i>Environmental Consultancy</i> LLP Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk GROUND WATER: Groundwater inflow between 0.6m and 1.3m. Groundwater at 2.4m after 10min. REMARKS: Sidewalls collapsing below 0.6m. J: jar sample D: small disturbed sample B: bulk disturbed sample SCALE: 1:250 LOGGED BY: CS FIGURE NO. 1						

SHEET: 1 of 1	LOCATION: See Plan	PROJECT: Land at Trows Lane Farm	ENGINEER: CS		JOB NO. R2228	TRIAL PIT NO. TP06
		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: Rob Grey		DATE: 28-30 June 2016	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
0.1	J1		0	Blackish dark grey sandy clayey TOPSOIL with rootlets.		
			0.4	Firm becoming stiff light grey weathered orangish brown slightly gravelly slightly sandy CLAY with partings of sand. Gravel is fine to coarse subangular sandstone (HUMMOCKY GLACIAL DEPOSITS).		
1.1	B		1.3	Stiff light grey slightly gravelly slightly sandy CLAY. Gravel is fine to coarse subangular sandstone, occasional coal (HUMMOCKY GLACIAL DEPOSITS).		
				Difficult excavation at 2.5m due to clay stiffness. Finished at 2.5m.		
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk		GROUND WATER: No groundwater encountered REMARKS: Sidewalls stable J: jar sample D: small disturbed sample B: bulk disturbed sample				
SCALE: 1:250		LOGGED BY: CS		FIGURE NO. 1		

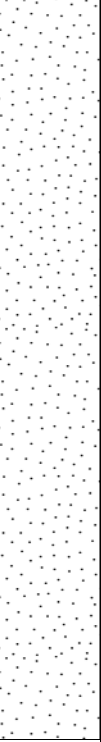
SHEET: 1 of 1	LOCATION: See Plan	PROJECT: Land at Trows Lane Farm	ENGINEER: CS		JOB NO. R2228	TRIAL PIT NO. TP07
		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: Rob Grey		DATE: 28-30 June 2016	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
0.1	J1		0	Blackish dark grey slightly clayey sandy TOPSOIL with rootlets.		
	D		0.3	Light grey weathered reddish brown slightly gravelly slightly clayey fine SAND with lenses of brown locally stained black clay. Gravel is fine to coarse subrounded sandstone (HUMMOCKY GLACIAL DEPOSITS).		
0.6			1	Firm reddish brown slightly gravelly slightly sandy CLAY. Gravel is fine to coarse subrounded sandstone (HUMMOCKY GLACIAL DEPOSITS).		
				Base of excavation at 3m.		
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk GROUND WATER: No groundwater encountered REMARKS: Sidewalls stable J: jar sample D: small disturbed sample B: bulk disturbed sample SCALE: 1:250 LOGGED BY: CS FIGURE NO. 1						

SHEET: 1 of 1	LOCATION: See Plan	PROJECT: Land at Trows Lane Farm	ENGINEER: CS		JOB NO. R2228	TRIAL PIT NO. TP08
		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: Rob Grey		DATE: 28-30 June 2016	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
0.2	J1		0	MADE GROUND: Brown sand with rags, gravel of brick and wood.		
0.7	D		0.6	MADE GROUND: Gravel of slag and brick, bottle glas, nails, iron frames, shoe soles and rags.		
			2.2	Very soft to soft light grey laminated yellowish grey slightly gravelly CLAY (POSSIBLE FILL).		
				Base of excavation at 3.1m.		
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk GROUND WATER: No groundwater encountered REMARKS: Sidewalls unstable within Made Ground J: jar sample D: small disturbed sample B: bulk disturbed sample						
SCALE: 1:250			LOGGED BY: CS		FIGURE NO. 1	

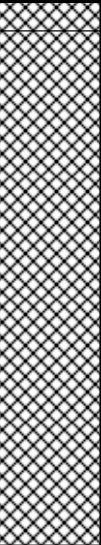
SHEET: 1 of 1	LOCATION: See Plan	PROJECT: Land at Trows Lane Farm	ENGINEER: CS		JOB NO. R2228	TRIAL PIT NO. TP09
		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: Rob Grey		DATE: 28-30 June 2016	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
0.9	B		0	Blackish dark grey slightly clayey slightly gravelly sandy TOPSOIL.		
			0.3	Light brown sandy GRAVEL. Gravel is fine to coarse subrounded sandstone and limestone (HUMMOCKY GLACIAL DEPOSIT).		
			1.1	Light brown slightly gravelly SAND. Gravel is fine to coarse subrounded sandstone and limestone (HUMMOCKY GLACIAL DEPOSIT).		
				Base of excavation at 2.8m.		
 SMITH GRANT Environmental Consultancy LLP Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk GROUND WATER: Seepage in sand at 2.7m. REMARKS: Sidewalls stable J: jar sample D: small disturbed sample B: bulk disturbed sample SCALE: 1:250 LOGGED BY: CS FIGURE NO. 1						

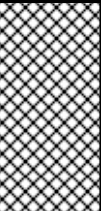
SHEET: 1 of 1	LOCATION: See Plan	PROJECT: Land at Trows Lane Farm	ENGINEER: CS		JOB NO. R2228	TRIAL PIT NO. TP10
		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: Rob Grey		DATE: 28-30 June 2016	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
1.3	B		0	Very soft blackish dark grey clayey TOPSOIL.		
			0.7	Light brown slightly gravelly SAND. Gravel is fine to coarse subangular to subrounded sandstone (HUMMOCKY GLACIAL DEPOSIT).		
			1.7	Orangish light brown locally stained black fine SAND (HUMMOCKY GLACIAL DEPOSIT).		
				Base of excavation at 3.2m.		
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk			GROUND WATER: Seepage from 2m.			
			REMARKS: Sidewalls collapsing from 0.3m.			
			SCALE: 1:250		LOGGED BY: CS	
			FIGURE NO. 1			

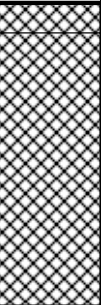
J: jar sample
D: small disturbed sample
B: bulk disturbed sample

SHEET: 1 of 1	LOCATION: See Plan	PROJECT: Land at Trows Lane Farm	ENGINEER: CS		JOB NO. R2228	TRIAL PIT NO. TP11
		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: Rob Grey		DATE: 28-30 June 2016	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
0.1	J1		0	Black slightly clayey sandy TOPSOIL with rootlets.		
1.6	D		0.25	Light brown slightly gravelly SAND. Gravel is fine to coarse subangular to subrounded sandstone (HUMMOCKY GLACIAL DEPOSIT).		
				Base of excavation at 2.7m.		
 SMITH GRANT Environmental Consultancy LLP Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk GROUND WATER: No groundwater encountered REMARKS: Sidewalls stable J: jar sample D: small disturbed sample B: bulk disturbed sample SCALE: 1:250 LOGGED BY: CS FIGURE NO. 1						

SHEET: 1 of 1	LOCATION: See Plan	PROJECT: Land at Trows Lane Farm	ENGINEER: CS		JOB NO. R2228	TRIAL PIT NO. TP12
		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: Rob Grey		DATE: 28-30 June 2016	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
0.9	D		0	Blackish dark grey sandy clayey TOPSOIL with rootlets.		
			0.4	Soft becoming firm light grey weathered brown sandy CLAY with partings of sand and occasional gravel (HUMMOCKY GLACIAL DEPOSIT).		
			1.1	Light brown locally stained black SAND (HUMMOCKY GLACIAL DEPOSIT).		
				Base of excavation at 2.7m.		
 SMITH GRANT <i>Environmental Consultancy</i> LLP Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk GROUND WATER: No groundwater encountered REMARKS: Sidewalls stable J: jar sample D: small disturbed sample B: bulk disturbed sample SCALE: 1:250 LOGGED BY: CS FIGURE NO. 1						

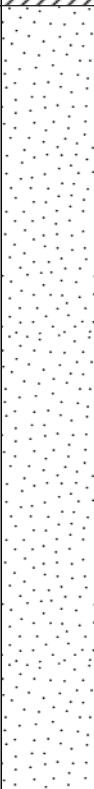
SHEET: 1 of 1	LOCATION: See Plan	PROJECT: Land at Trows Lane Farm	ENGINEER: CS		JOB NO. R2228	TRIAL PIT NO. TP13
		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: Rob Grey		DATE: 28-30 June 2016	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
0	J1		0	MADE GROUND: Black slightly clayey sandy TOPSOIL with rootlets.		
0.3			0.1	MADE GROUND: Greyish brown slightly sandy slightly gravelly CLAY. Gravel is angular brick.		
	D		1.8	Very soft grey slightly gravelly CLAY. Gravel is fine to coarse subrounded sandstone (POSSIBLE FILL).		
3				Base of excavation at 3.4m.		
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk		GROUND WATER: No groundwater encountered				
		REMARKS: Sidewalls stable				
		J: jar sample D: small disturbed sample B: bulk disturbed sample				
SCALE: 1:250		LOGGED BY: CS		FIGURE NO. 1		

SHEET: 1 of 1	LOCATION: See Plan	PROJECT: Land at Trows Lane Farm	ENGINEER: CS		JOB NO. R2228	TRIAL PIT NO. TP14
		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: Rob Grey		DATE: 28-30 June 2016	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
1.5	B		0	MADE GROUND: Blackish dark grey slightly gravelly TOPSOIL. Gravel is sandstone and ceramic.		
			0.7	Reddish brown locally stained black SAND (HUMMOCKY GLACIAL DEPOSIT).		
			1.6	Light brown sandy fine to coarse subrounded GRAVEL of sandstone with boulders ((HUMMOCKY GLACIAL DEPOSIT).		
			2.1	Brown fine SAND (HUMMOCKY GLACIAL DEPOSIT).		
				Base of excavation at 3m.		
 SMITH GRANT Environmental Consultancy LLP Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk GROUND WATER: No groundwater encountered REMARKS: Sidewalls stable J: jar sample D: small disturbed sample B: bulk disturbed sample SCALE: 1:250 LOGGED BY: CS FIGURE NO. 1						

SHEET: 1 of 1	LOCATION: See Plan	PROJECT: Land at Trows Lane Farm	ENGINEER: CS		JOB NO. R2228	TRIAL PIT NO. TP15
		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: Rob Grey		DATE: 28-30 June 2016	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
0	J1		0	MADE GROUND: Blackish dark grey slightly gravelly TOPSOIL. Gravel is fine to medium subangular sandstone.		
0.3			0.1	MADE GROUND: Blackish dark brown slightly gravelly CLAY. Gravel is brick, ceramic and bits of decayed wood.		
1.3	D		1	Light brown slightly clayey gravelly SAND. Gravel is fine to coarse subrounded sandstone (HUMMOCKY GLACIAL DEPOSIT).		
				Base of excavation at 2.8m.		
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk		GROUND WATER: No groundwater encountered				
		REMARKS: Sidewalls stable				
		J: jar sample D: small disturbed sample B: bulk disturbed sample				
SCALE: 1:250		LOGGED BY: CS		FIGURE NO. 1		

SHEET: 1 of 1	LOCATION: See Plan	PROJECT: Land at Trows Lane Farm	ENGINEER: CS		JOB NO. R2228	TRIAL PIT NO. TP16
		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: Rob Grey		DATE: 28-30 June 2016	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
1	B		0	Black slightly clayey sandy TOPSOIL with rootlets.		
			0.4	Light grey slightly gravelly SAND with lenses of clayey sand. Gravel is fine to coarse subrounded sandstone (HUMMOCKY GLACIAL DEPOSIT).		
			1.6	Light brown SAND with lenses of firm orangish brown clay (HUMMOCKY GLACIAL DEPOSIT).		
				Base of excavation at 3m.		
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk		GROUND WATER: Seepages observed at 0.8m, 1.3m and 1.8m				
		REMARKS: Sidewalls unstable because of seepage				
		SCALE: 1:250		LOGGED BY: CS		FIGURE NO. 1

J: jar sample
D: small disturbed sample
B: bulk disturbed sample

SHEET: 1 of 1	LOCATION: See Plan	PROJECT: Land at Trows Lane Farm	ENGINEER: CS	JOB NO. R2228	TRIAL PIT NO. TP17
		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: Rob Grey	DATE: 28-30 June 2016	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
0.1	J1		0	Blackish dark grey slightly clayey sandy TOPSOIL	
			0.4	Light brown locally stained dark brown locally slightly cemented SAND (HUMMOCKY GLACIAL DEPOSIT).	
1.1	D			Base of excavation at 3m.	



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GROUND WATER:
No groundwater encountered

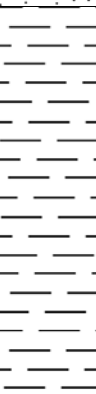
REMARKS:
Sidewalls stable

J: jar sample
 D: small disturbed sample
 B: bulk disturbed sample

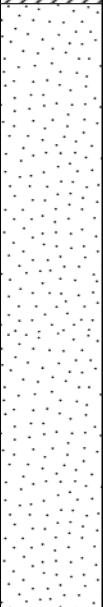
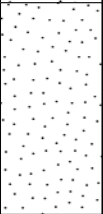
SCALE: **1:250**

LOGGED BY: **CS**

FIGURE NO. **1**

SHEET: 1 of 1	LOCATION: See Plan	PROJECT: Land at Trows Lane Farm	ENGINEER: CS		JOB NO. R2228	TRIAL PIT NO. TP18
		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: Rob Grey		DATE: 28-30 June 2016	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
0.1	J1		0	Blackish dark grey slightly clayey sandy TOPSOIL with tree roots and rootlets.		
			0.3	Light brown gravelly SAND with partings of clayey sand. Gravel is fine to coarse subrounded sandstone (HUMMOCKY GLACIAL DEPOSIT).		
1	B		1.5	Stiff light brown to light grey CLAY (HUMMOCKY GLACIAL DEPOSIT).		
2.5	B		Base of excavation at 2.8m.			
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk		GROUND WATER: No groundwater encountered				
		REMARKS: Sidewalls stable				
		SCALE: 1:250		LOGGED BY: CS		FIGURE NO. 1

J: jar sample
D: small disturbed sample
B: bulk disturbed sample

SHEET: 1 of 1	LOCATION: See Plan	PROJECT: Land at Trows Lane Farm	ENGINEER: CS		JOB NO. R2228	TRIAL PIT NO. TP19
		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: Rob Grey		DATE: 28-30 June 2016	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
1.4	B		0	Dark brown slightly gravelly sandy TOPSOIL with rootlets.		
			0.4	Light brown gravelly SAND. Gravel is fine to coarse subrounded sandstone (HUMMOCKY GLACIAL DEPOSIT).		
			2.4	Light brown slightly gravelly SAND. Gravel is fine to coarse subrounded sandstone (HUMMOCKY GLACIAL DEPOSIT).		
				Base of excavation at 3.1m.		
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk		GROUND WATER: No groundwater encountered				
		REMARKS: Sidewalls stable				
		SCALE: 1:250	LOGGED BY: CS		FIGURE NO. 1	

J: jar sample
D: small disturbed sample
B: bulk disturbed sample

SHEET: 1 of 1	LOCATION: See Plan	PROJECT: Land at Trows Lane Farm	ENGINEER: CS		JOB NO. R2228	TRIAL PIT NO. TP20
		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: Rob Grey		DATE: 28-30 June 2016	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
1	D		0	Blackish dark brown slightly gravelly sandy TOPSOIL.		
			0.3	Dark brown becoming light brown gravelly SAND. Gravel is fine to coarse subrounded sandstone and limestone (HUMMOCKY GLACIAL DEPOSIT).		
				Base of excavation at 2.9m.		
 SMITH GRANT Environmental Consultancy LLP Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk GROUND WATER: No groundwater encountered REMARKS: Sidewalls stable J: jar sample D: small disturbed sample B: bulk disturbed sample SCALE: 1:250 LOGGED BY: CS FIGURE NO. 1						

SHEET: 1 of 1	LOCATION: See Plan	PROJECT: Land at Trows Lane Farm	ENGINEER: CS		JOB NO. R2228	TRIAL PIT NO. TP21
		EXCAVATED BY: Yanmar 8T tracked midi excavator	CLIENT: Rob Grey		DATE: 28-30 June 2016	
DEPTH (m)	SAMPLES	Lab testing	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
1.5	D		0	Blackish dark brown slightly gravelly sandy TOPSOIL.		
			0.4	Light brown gravelly becoming slightly gravelly SAND. Gravel is fine to coarse subrounded sandstone and limestone (HUMMOCKY GLACIAL DEPOSIT).		
				Base of excavation at 2.8m.		
 SMITH GRANT Environmental Consultancy LLP Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk GROUND WATER: No groundwater encountered REMARKS: Sidewalls stable J: jar sample D: small disturbed sample B: bulk disturbed sample SCALE: 1:250 LOGGED BY: CS FIGURE NO. 1						

TP01



TP01



TP02



TP02



TP03



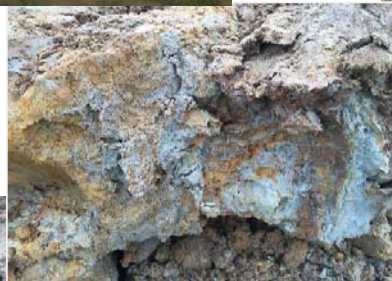
TP04



TP05



TP06



TP07



TP07



TP08



TP08



TP09



TP10



TP11



TP12



TP13



TP14



TP15



TP16



TP17



TP18



TP19



TP20



TP21



APPENDIX E

Entries Locations Photographs

Boreholes locations



BHD



BHF



BH G



BHH



BHI



BHJ



BHK



BHL



BHM



BHN



WS01

WS2 16/05/17



WS02



WS03

WS04 16/05/17



WS04

WS05 17/05/2017



WS05

WS06 18/05/17



WS06

WS07 18/05/17



WS07

WS08 18/05/17



WS08

WS09 23/05/2017



WS09

WS10 23/05/2017



WS10

WS11 25/05/2017



WS11

WS12 24/05/2017



WS12

WS13 - 23/05/2017



WS13

Locations of Dynamic Probes Super Heavy (DPSH)

DP1 15/05/17 	DP2 16/05/17 	DP3 16/05/17 
DPSH01	DPSH02	DPSH03
DP4 17/05/17 	DP5 17/05/17 	DP6 17/05/17 
DPSH04	DPSH05	DPSH06
DP7 18/05/17 	DP8 18/05/17 	DP9 23/05/17 
DPSH07	DPSH08	DPSH09
DP10 	DP11 24/05/17 	
DPSH10	DPSH11	
DP12 24/05/17 	DP13 24/05/17 	
DPSH12	DPSH13	

APPENDIX F

Window Sampler Logs Photographs

Boreholes logs photographs



WS01 From 0m to 5m.



WS02 From 0m to 5m.



WS03 From 0m to 4m.



WS04 From 0m to 4m.



WS05 From 0m to 5m.



WS06 From 0m to 4m.



WS07 From 0m to 2.5m.



WS08 From 0m to 5m.



WS09 From 0m to 1m.



WS09 From 1m to 6m.



WS10 From GL to 1m.



WS10 From 1m to 2m.



WS10 From 2m to 4m.



WS11
From GL to 1m.



WS11 From 1m to 5m.



WS12 From GL to 1m.



WS12 From 1m to 4.7m.



WS13 From GL to 1m.



WS13 From 1m to 6m.

APPENDIX G

SPT and DPSH Table and Graphs

In-situ Strength Test Results

SI Date	May 2017
Project	Trows Lane Farm
Project Number	R2392
Site	Trows Lane Farm, Rochdale
Strata	Made Ground
	Hummocky Glacial Deposits

Hole ID	Geology	Material Type	SPT 'N' depth [mbgl]	SPT N value	5	Pocket Penetrometer Multiplier:		50
					cu = SPT NxY (Y=4.5) [kPa]	Depth of pocket penetrometer (mbgl)	Penetrometer result (kg/cm ²)	Penetrometer (kPa)
WS01	Hummocky Glacial Deposits	sandy silt	1	20				
	Hummocky Glacial Deposits	sandy silt	2	1				
	Hummocky Glacial Deposits	silty clay	3	7	35			
	Hummocky Glacial Deposits	silty clay	4	9	45			
	Hummocky Glacial Deposits	silty clay	5	20	100			
WS02	Hummocky Glacial Deposits	clayey silt	1	6				
	Hummocky Glacial Deposits	clayey silt	2	8				
	Hummocky Glacial Deposits	clayey silt	3	10				
	Hummocky Glacial Deposits	clayey silt	4	10				
	Hummocky Glacial Deposits	clayey silt	5	30				
WS03	Hummocky Glacial Deposits	silty sand	1	26				
	Hummocky Glacial Deposits	silty sand	2	14				
	Hummocky Glacial Deposits	silty sand	3	20				
WS04	Hummocky Glacial Deposits	silty sand	1	25				
	Hummocky Glacial Deposits	silty sand	2	8				
	Hummocky Glacial Deposits	silty sand	3	11				
WS05	Hummocky Glacial Deposits	sand	1	15				
	Hummocky Glacial Deposits	silty sand	2	13		1.65	1.25	63
	Hummocky Glacial Deposits	clayey silt	3	13	65	1.7	1.5	75
	Hummocky Glacial Deposits	sand/silt	4	25		3.4	0.75	38
	Hummocky Glacial Deposits	sand	5	26		3.5	1	50
	Hummocky Glacial Deposits	sand	1	10				
	Hummocky Glacial Deposits	sand	2	16				

Hole ID	Geology	Material Type	SPT 'N' depth [mbgl]	SPT N value	cu = SPT NxY (Y=4.5) [kPa]	Depth of pocket penetrometer (mbgl)	Penetrometer result (kg/cm ²)	Penetrometer (kPa)
WS06	Hummocky Glacial Deposits	sand	3	32				
	Hummocky Glacial Deposits	sand	4	26				
	Hummocky Glacial Deposits	sand	5	27				
WS07	Hummocky Glacial Deposits	silty sand	1	10				
	Hummocky Glacial Deposits	silty sand	2	18				
WS08	Hummocky Glacial Deposits	sand	1	2				
	Hummocky Glacial Deposits	sand	2	8				
	Hummocky Glacial Deposits	sandy silt	3	8				
	Hummocky Glacial Deposits	sandy silt	4	21				
	Hummocky Glacial Deposits	sandy silt	5	27				
WS09	Hummocky Glacial Deposits	silty sand	1	16				
	Hummocky Glacial Deposits	sand	2	25				
	Hummocky Glacial Deposits	sand	3	8				
	Hummocky Glacial Deposits	sand	4	36				
	Hummocky Glacial Deposits	sand	5	29				
	Hummocky Glacial Deposits	sand	6	21				
WS10	Made Ground	clayey sand	1	1				
	Made Ground	sandy clay	2	1				
	Hummocky Glacial Deposits	sandy silt	3	6				
	Hummocky Glacial Deposits	sandy silt	4	50				
WS11	Made Ground	sandy clay	1	5				
	Made Ground	sandy clay	2	10				
	Made Ground	sandy clay	3	9				
	Hummocky Glacial Deposits	sand	4	24				
WS12	Made Ground	sandy clay	1	7				
	Made Ground	sandy clay	2	7				
	Made Ground	sandy clay	3	15				
	Hummocky Glacial Deposits	sand	4	17				
	Hummocky Glacial Deposits	sand	4.5	50				
WS13	Made Ground	sandy clay	1	7				
	Made Ground	sandy clay	2	6				
	Made Ground	sandy clay	3	14				
	Made Ground	sandy clay	4	8				
	Made Ground	sandy clay	5	6				

Hole ID	Geology	Material Type	SPT 'N' depth [mbgl]	SPT N value	cu = SPT NxY (Y=4.5) [kPa]	Depth of pocket penetrometer (mbgl)	Penetrometer result (kg/cm ²)	Penetrometer (kPa)
	Hummocky Glacial Deposits	silty sand	6	26				
BHD	Hummocky Glacial Deposits	clay	1.5	7	35	2	1	50
	Hummocky Glacial Deposits	clay	2.5	12	60	2.1	2	100
	Hummocky Glacial Deposits	clay	3.5	14	70	2.3	3.5	175
	Hummocky Glacial Deposits	clay	4.5	18	90	2.5	1	50
	Hummocky Glacial Deposits	sand	5.5	40		2.7	1.5	75
	Hummocky Glacial Deposits	sand	6.5	40				
	Hummocky Glacial Deposits	sand	7.5	39				
	Hummocky Glacial Deposits	sand	8.5	50				
	Hummocky Glacial Deposits	silt	9.5	18				
	Hummocky Glacial Deposits	silt	10	21				
BHF	Hummocky Glacial Deposits	silt	5	7				
	Hummocky Glacial Deposits	sand	6	13				
	Hummocky Glacial Deposits	sand	7	13				
	Hummocky Glacial Deposits	sand	8	10				
	Hummocky Glacial Deposits	silt	9	13				
	Hummocky Glacial Deposits	silt	10	10				
	Hummocky Glacial Deposits	silt	11	26				
	Hummocky Glacial Deposits	silt	12	27				
	Hummocky Glacial Deposits	silt	13.5	44				
	Hummocky Glacial Deposits	sand	15	50				
BHG	Hummocky Glacial Deposits	sand	10	9				
	Hummocky Glacial Deposits	sand	11	33				
	Hummocky Glacial Deposits	sand	12	29				
	Hummocky Glacial Deposits	sand	13	27				
	Hummocky Glacial Deposits	sand	14	31				
	Hummocky Glacial Deposits	sand	15	22				
	Hummocky Glacial Deposits	sand	16	24				
	Hummocky Glacial Deposits	sand	17	32				
	Hummocky Glacial Deposits	sand	18	41				
	Hummocky Glacial Deposits	sand	19	39				
	Hummocky Glacial Deposits	sand	20	39				
	Hummocky Glacial Deposits	silty sand	10	16				
	Hummocky Glacial Deposits	silty sand	11	16				

Hole ID	Geology	Material Type	SPT 'N' depth [mbgl]	SPT N value	cu = SPT NxY (Y=4.5) [kPa]	Depth of pocket penetrometer (mbgl)	Penetrometer result (kg/cm ²)	Penetrometer (kPa)
BHH	Hummocky Glacial Deposits	silty sand	12	18				
	Hummocky Glacial Deposits	sand	13	19				
	Hummocky Glacial Deposits	sand	14	22				
	Hummocky Glacial Deposits	sand	15	34				
	Hummocky Glacial Deposits	sand	16	36				
	Hummocky Glacial Deposits	sand	18.5	34				
	Hummocky Glacial Deposits	silty sand	20	24				
BHI	Hummocky Glacial Deposits	silty sand	10	29				
	Hummocky Glacial Deposits	silty sand	11	29		13.1	3	150
	Hummocky Glacial Deposits	silty sand	12	48		13.2	4.5	225
	Hummocky Glacial Deposits	silty clay	13	46	230	13.3	3.5	175
	Hummocky Glacial Deposits	silty clay	14	50	250	14	4	200
	Hummocky Glacial Deposits	clay	15	50	250	14.5	4.5	225
	Hummocky Glacial Deposits	clay	16.5	50	250	15	4.5	225
	Hummocky Glacial Deposits	silty sand	18	41		15.5	3.5	175
	Hummocky Glacial Deposits	sandy silt	20	50		16	4.5	225
BHJ	Hummocky Glacial Deposits	silty sand	5	30				
	Hummocky Glacial Deposits	silty sand	6	31				
	Hummocky Glacial Deposits	silty sand	7	24				
	Hummocky Glacial Deposits	sand	8	22				
	Hummocky Glacial Deposits	silty clay	9	19	95			
	Hummocky Glacial Deposits	silty clay	10	27	135			
	Hummocky Glacial Deposits	silty clay	11	22	110			
	Hummocky Glacial Deposits	silty clay	12	28	140			
	Hummocky Glacial Deposits	silty clay	13	26	130			
	Hummocky Glacial Deposits	silty clay	14	27	135			
	Hummocky Glacial Deposits	silty clay	15	30	150			
BHK	Hummocky Glacial Deposits	sand	5	11				
	Hummocky Glacial Deposits	sand	6	11				
	Hummocky Glacial Deposits	sand	7	20				
	Hummocky Glacial Deposits	sand	8	16				
	Hummocky Glacial Deposits	sand	9	14				
	Hummocky Glacial Deposits	sand	10	15				
	Hummocky Glacial Deposits	sand	11	16				

Hole ID	Geology	Material Type	SPT 'N' depth [mbgl]	SPT N value	cu = SPT NxY (Y=4.5) [kPa]	Depth of pocket penetrometer (mbgl)	Penetrometer result (kg/cm ²)	Penetrometer (kPa)
	Hummocky Glacial Deposits	sandy silt	12	19				
	Hummocky Glacial Deposits	sandy silt	13.5	50				
	Hummocky Glacial Deposits	sand	15	50				
BHL	Hummocky Glacial Deposits	sand	10	12				
	Hummocky Glacial Deposits	sand	11	13				
	Hummocky Glacial Deposits	silty sand	12	21				
	Hummocky Glacial Deposits	silty sand	13	19				
	Hummocky Glacial Deposits	sand	14	22				
	Hummocky Glacial Deposits	sand	15	49				
	Hummocky Glacial Deposits	sand	16	41				
	Hummocky Glacial Deposits	sand	17	44				
	Hummocky Glacial Deposits	sand	18	47				
	Hummocky Glacial Deposits	sand	19	50				
	Hummocky Glacial Deposits	sand	20	50				
	Hummocky Glacial Deposits	silty sand	1.5	4				
BHM	Hummocky Glacial Deposits	sandy clay	2.5	6	30			
	Hummocky Glacial Deposits	clayey silt	3.5	7				
	Hummocky Glacial Deposits	clayey silt	4.5	6				
	Hummocky Glacial Deposits	silty sand	5.5	11				
	Hummocky Glacial Deposits	silty sand	6.5	12				
	Hummocky Glacial Deposits	sandy silt	7.5	23				
	Hummocky Glacial Deposits	sandy silt	8.5	36				
	Hummocky Glacial Deposits	silty sand	9.5	40				
	Hummocky Glacial Deposits	sandy silt	10	49				
	Hummocky Glacial Deposits	gravel	5	33				
BHN	Hummocky Glacial Deposits	gravel	6	24				
	Hummocky Glacial Deposits	silty clay	7	17	85			
	Hummocky Glacial Deposits	silty clay	8	27	135			
	Hummocky Glacial Deposits	gravelly sand	9	25				
	Hummocky Glacial Deposits	sandy silt	10	34				
	Hummocky Glacial Deposits	sandy silt	11	36				
	Hummocky Glacial Deposits	silt	12	30				
	Hummocky Glacial Deposits	silt	13.5	29				
	Hummocky Glacial Deposits	silt	15	48				
	Hummocky Glacial Deposits	silt						

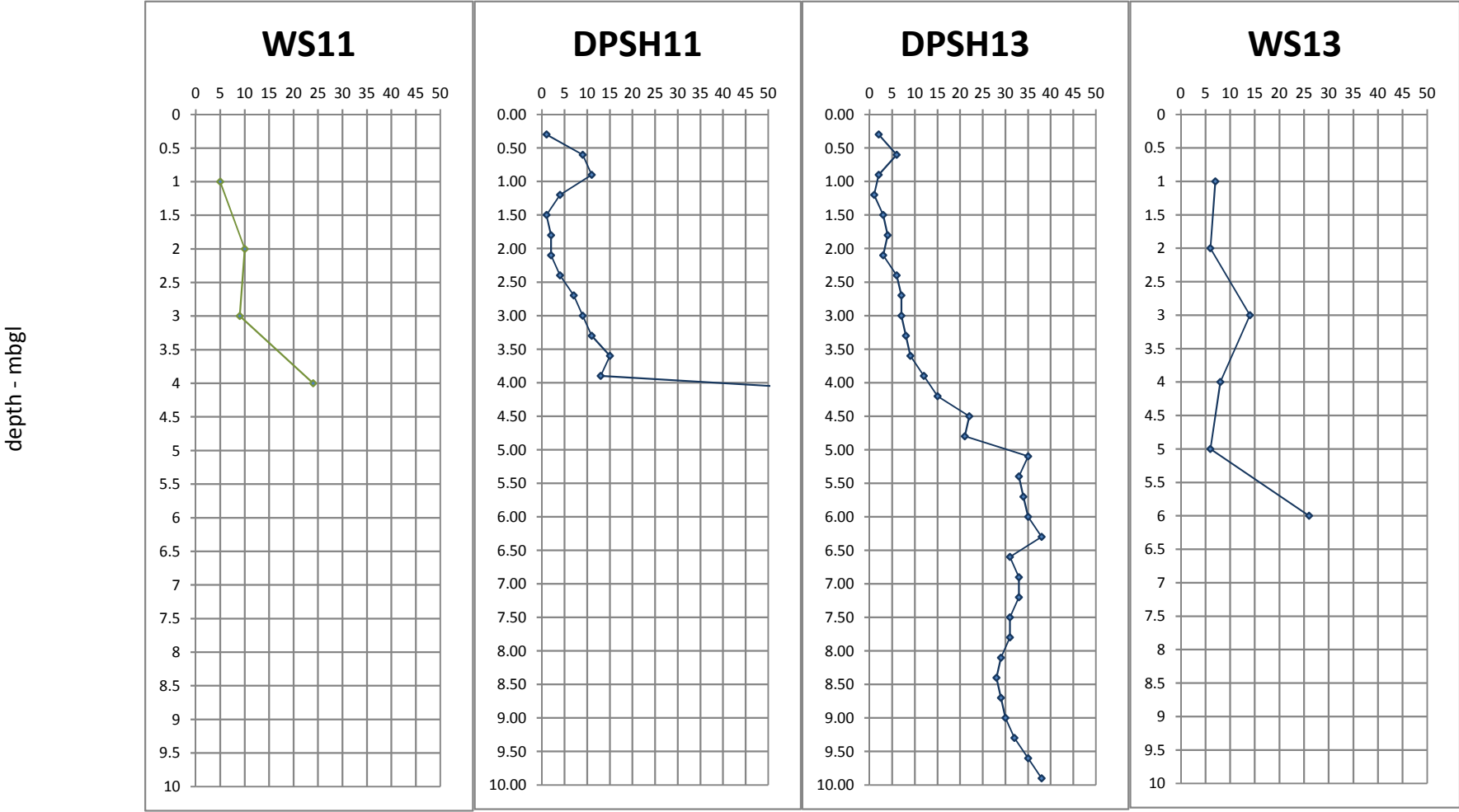
Values of Super Heavy Dynamic Probing - N_{30}

Depth (mbgl)	DPSH1	DPSH2	DPSH3	DPSH4	DPSH5	DPSH6	DPSH7
0.30	3	2	0	2		4	1
0.60	3	2	0	8		0	0
0.90	12	6	8	17		3	0
1.20	4	5	18	16		10	0
1.50	4	2	12	15		14	0
1.80	7	4	7	11		12	1
2.10	9	5	1	18		12	0
2.40	15	9	9	22		15	12
2.70	17	11	14	17		15	14
3.00	20	14	18	12		16	13
3.30	18	14	23	18		15	11
3.60	18	16	23	19		15	10
3.90	18	13	15	19		15	9
4.20	18	17	21	21		15	18
4.50	18	32	39	12		16	18
4.80	18	39	34	10		16	12
5.10	17	22	33	18		15	26
5.40	15	21	35	18		16	41
5.70	16	27	56	18		18	22
6.00	15	42	46	21		21	15
6.30	16	40	49	22		18	15
6.60	18	38	49	22		24	22
6.90	21	38	60	24		17	19
7.20	21	36	59	30		21	21
7.50	18	23	82	32		15	21
7.80	17	34	73	20		15	22
8.10	17	35	64	11		15	28
8.40	22	29	68	21		21	37
8.70	24	35	75	33		37	46
9.00	23	39	89	19		58	52
9.30	23	41	58	20		64	61
9.60	23	39	66	33		66	61
9.90	24	41	92	42		74	70

Values of Super Heavy Dynamic Probing - N₃₀

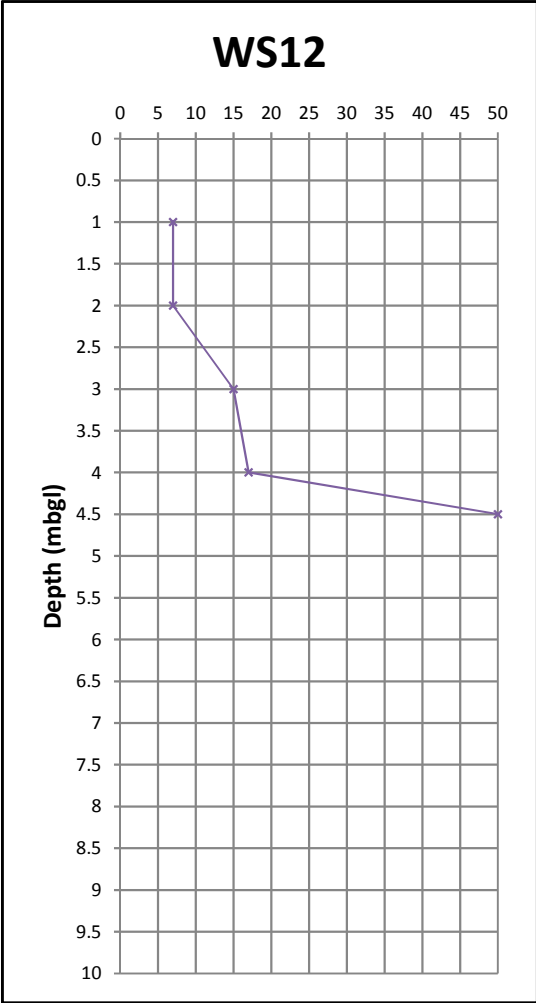
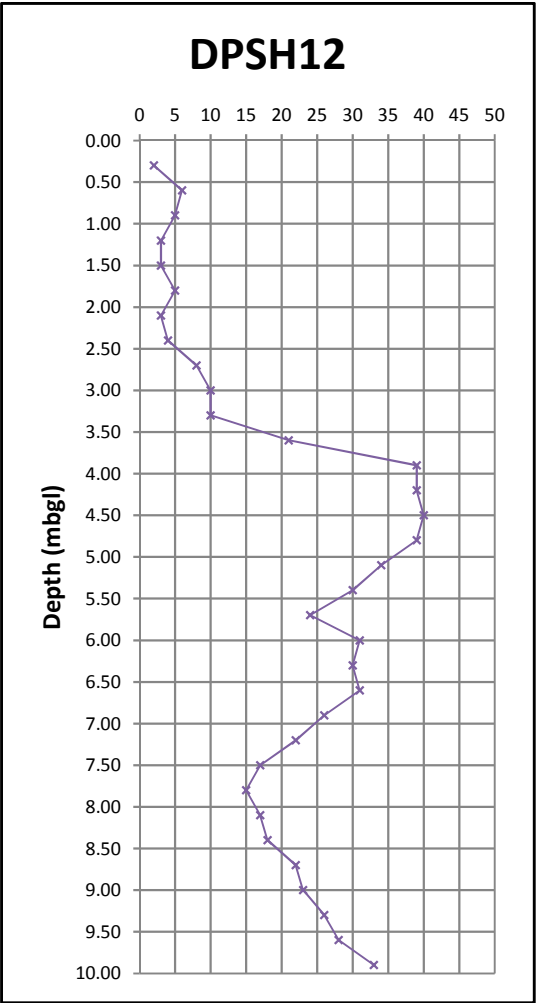
Depth (mbgl)	DPSH8	DPSH9	DPSH10	DPSH11	DPSH12	DPSH13
0.30	1	1	9	1	2	2
0.60	1	7	4	9	6	6
0.90	1	3	3	11	5	2
1.20	2	1	4	4	3	1
1.50	1	1	1	1	3	3
1.80	1	4	0	2	5	4
2.10	1	18	2	2	3	3
2.40	3	19	0	4	4	6
2.70	10	19	5	7	8	7
3.00	14	10	6	9	10	7
3.30	14	15	22	11	10	8
3.60	10	21	31	15	21	9
3.90	8	31	26	13	39	12
4.20	9	36	11	88	39	15
4.50	9	38	13		40	22
4.80	11	36	18		39	21
5.10	15	35	21		34	35
5.40	14	40	24		30	33
5.70	18	43	29		24	34
6.00	44	41	26		31	35
6.30	58	37			30	38
6.60	70	41			31	31
6.90	70	37			26	33
7.20	70	39			22	33
7.50	68	46			17	31
7.80	65	55			15	31
8.10	73	58			17	29
8.40	78	53			18	28
8.70	90	52			22	29
9.00	87	64			23	30
9.30	92	69			26	32
9.60	99	50			28	35
9.90	98				33	38

Profile WS11-DPSH11-DPSH13-WS13



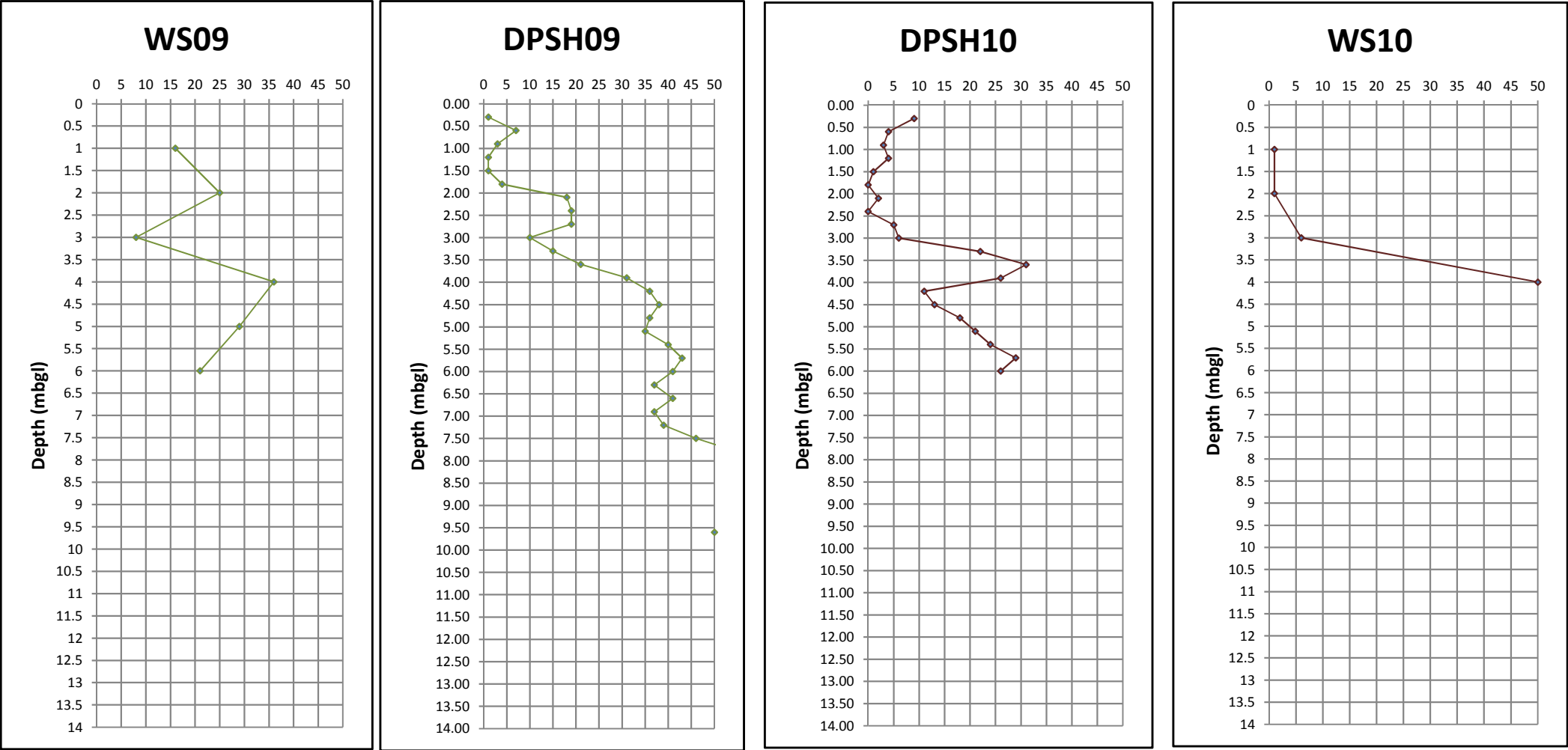
N_{SPT} and N_{30} values against the depth

Profile DPSH12 - WS12



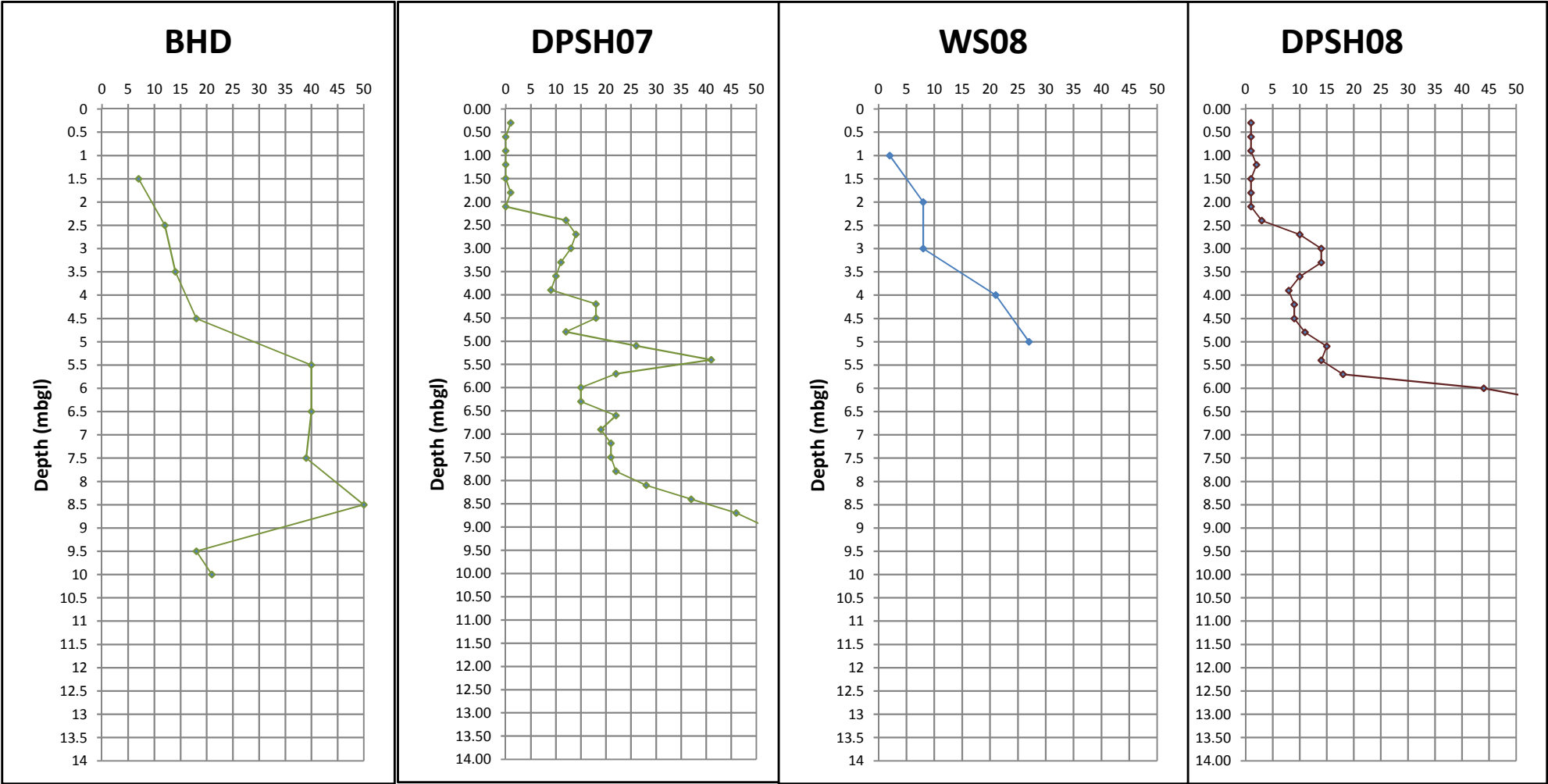
N_{SPT} and N₃₀ values against the depth

Profile WS09-DPSH09-DPSH10-WS10



N_{SPT} and N₃₀ values against the depth

Profile BHD-DPSH07-WS08 -DPSH08



N_{SPT} and N₃₀ values against the depth

APPENDIX H

Geotechnical Laboratory Test Results -PSL



LABORATORY REPORT



4043

Contract Number: PSL17/2664

Report Date: 11 July 2017
Client's Reference: R2392
Client Name: Smith Grant LLP
Station House
Station Road
Ruabon
Wrexham
LL14 6DL

For the attention of: Cezary Salwa/Ben Thomas

Contract Title: Trows Lane Farm
Date Received: 6/6/2017
Date Commenced: 6/6/2017
Date Completed: 11/7/2017

Notes: Opinions and Interpretations are outside the UKAS Accreditation

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

Checked and Approved Signatories:


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Page 1 of

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
WS1		D	1.50		Brown very sandy SILT.
WS1		D	4.50		Brown slightly sandy silty CLAY.
WS2		D	1.40		Brown slightly sandy silty CLAY.
WS2		D	4.60		Brown very sandy very silty CLAY.
WS3		D	1.10		Brown mottled grey sandy CLAY.
WS3		D	2.50		Brown very sandy SILT.
WS3		D	3.50		Brown very sandy SILT.
WS4		D	1.60		Brown very sandy CLAY.
WS5		D	0.80		Brown gravelly very clayey SAND.
WS5		D	2.40		Brown very sandy CLAY.
WS5		D	3.70		Brown slightly gravelly slightly sandy CLAY.
WS6		D	0.80		Brown slightly gravelly very sandy CLAY.
WS6		D	1.60		Brown slightly silty SAND.
WS7		D	1.20	2.00	Brown very silty SAND.
WS7		D	2.00	2.50	Brown very clayey SAND.
WS8		D	0.80		Brown mottled grey slightly gravelly very sandy CLAY.
WS8		D	2.60		Brown very silty SAND.
WS9		D	2.60		Brown very silty SAND.
WS9		D	3.80		Brown slightly sandy CLAY.



Trows Lane Farm

Contract No:

PSL17/2664

Client Ref:

R2392

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
WS9		D	5.50		Brown very sandy SILT.
WS10		D	2.60		Dark brown slightly gravelly very sandy very silty CLAY.
WS10		D	3.60		Brown slightly gravelly very sandy very silty CLAY.
WS11		D	4.80		Brown very silty SAND.
WS12		D	4.40		Brown very gravelly very silty SAND.
WS13		D	2.60		Brown slightly gravelly very sandy CLAY.
BHD		B	1.50		Brown sandy CLAY.
BHD		B	2.50		Brown slightly sandy CLAY.
BHD		D	3.50		Brown slightly gravelly slightly sandy CLAY.
BHD		D	6.50		Brown clayey silty SAND.
BHF		B	3.20	4.00	Brown slightly sandy CLAY.
BHF		B	4.00	5.00	Brown sandy SILT.
BHF		D	12.00		Brown slightly sandy CLAY.
BHF		D	15.00		Brown slightly gravelly silty SAND.
BHG		B	2.30		Dark brown slightly gravelly very sandy CLAY.
BHG		B	3.30		Dark brown slightly gravelly very sandy CLAY.
BHG		B	4.30		Dark brown slightly gravelly very sandy CLAY.
BHG		B	6.30		Dark brown sandy very silty CLAY.
BHG		B	7.30		Dark brown slightly gravelly very sandy CLAY.

		Trows Lane Farm	Contract No:
			PSL17/2664
			Client Ref:
			R2392

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
BHG		D	12.00		Brown slightly gravelly silty SAND.
BHG		B	14.50	14.90	Brown slightly gravelly very sandy CLAY.
BHG		D	19.00		Brown slightly gravelly silty SAND.
BHH		B	10.00		Brown slightly gravelly clayey very silty SAND.
BHH		D	14.00		Brown slightly silty SAND.
BHI		B	4.00		Brown slightly gravelly very sandy CLAY.
BHI		B	6.00		Brown slightly gravelly very sandy very silty CLAY.
BHI		B	10.00		Brown very sandy SILT.
BHI		B	13.00		Brown slightly gravelly sandy CLAY.
BHI		B	15.50		Brown slightly gravelly sandy CLAY.
BHI		B	17.00		Brown slightly clayey very silty SAND.
BHJ		B	2.50		Brown very sandy SILT.
BHJ		B	3.50		Brown sandy SILT.
BHJ		B	4.00		Dark brown CLAY.
BHJ		B	4.50		Dark brown slightly sandy CLAY.
BHJ		D	7.00		Brown very sandy SILT.
BHJ		B	9.00		Brown slightly sandy CLAY.
BHK		D	6.00		Brown slightly gravelly very sandy CLAY.
BHK		D	10.00		Brown very sandy SILT.



Trows Lane Farm

Contract No:

PSL17/2664

Client Ref:

R2392

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
BHL		B	3.00	4.00	Brown very silty SAND.
BHL		B	5.00	6.00	Brown very silty SAND.
BHL		D	13.00		Brown slightly gravelly very sandy CLAY.
BHL		B	16.00		Brown slightly gravelly very sandy SILT.
BHM		B	1.90		Brown slightly gravelly sandy CLAY.
BHM		D	2.50		Brown gravelly slightly sandy CLAY.
BHM		B	6.00		Brown slightly gravelly slightly sandy CLAY.
BHM		B	7.50		Brown sandy CLAY.
BHN		B	2.60		Dark brown slightly gravelly sandy CLAY.
BHN		B	4.50		Brown very sandy very clayey GRAVEL.
BHN		B	7.00		Brown slightly sandy CLAY.
BHN		B	8.90		Brown gravelly very sandy CLAY.
BHN		B	10.00		Brown slightly gravelly sandy CLAY.
BHN		D	12.00		Brown slightly gravelly slightly sandy CLAY.



Trows Lane Farm

Contract No:

PSL17/2664

Client Ref:

R2392

SUMMARY OF SOIL CLASSIFICATION TESTS

(BS1377 : PART 2 : 1990)

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Moisture Content % Clause 3.2	Linear Shrinkage % Clause 6.5	Particle Density Mg/m ³ Clause 8.2	Liquid Limit % Clause 4.3/4	Plastic Limit % Clause 5.3	Plasticity Index % Clause 5.4	Passing .425mm %	Remarks
WS1		D	4.50		24			45	25	20	100	Intermediate plasticity CI.
WS2		D	1.40		28			33	19	14	100	Low plasticity CL.
WS2		D	4.60		25			28	21	7	100	Low plasticity CL.
WS5		D	3.70		29			49	24	25	99	Intermediate plasticity CI.
WS6		D	0.80		15			31	17	14	91	Low plasticity CL.
WS7		D	1.20	2.00	17				NP			
WS10		D	3.60		16			26	15	11	89	Low plasticity CL.
WS13		D	2.60		15			30	18	12	94	Low plasticity CL.
BHD		B	1.50		28			49	23	26	98	Intermediate plasticity CI.
BHF		D	12.00		23			49	23	26	99	Intermediate plasticity CI.
BHI		B	6.00		21			28	15	13	94	Low plasticity CL.
BHI		B	13.00		26			55	23	32	95	High plasticity CH.
BHI		B	15.50		18			41	21	20	96	Intermediate plasticity CI.
BHJ		B	4.50		31			48	23	25	99	Intermediate plasticity CI.
BHJ		B	9.00		27			58	26	32	100	High plasticity CH.
BHM		D	2.50		20			47	21	26	86	Intermediate plasticity CI.
BHN		B	2.60		24			49	24	25	91	Intermediate plasticity CI.
BHN		B	7.00		23			51	23	28	99	High plasticity CH.

SYMBOLS : NP : Non Plastic

* : Liquid Limit and Plastic Limit Wet Sieved.



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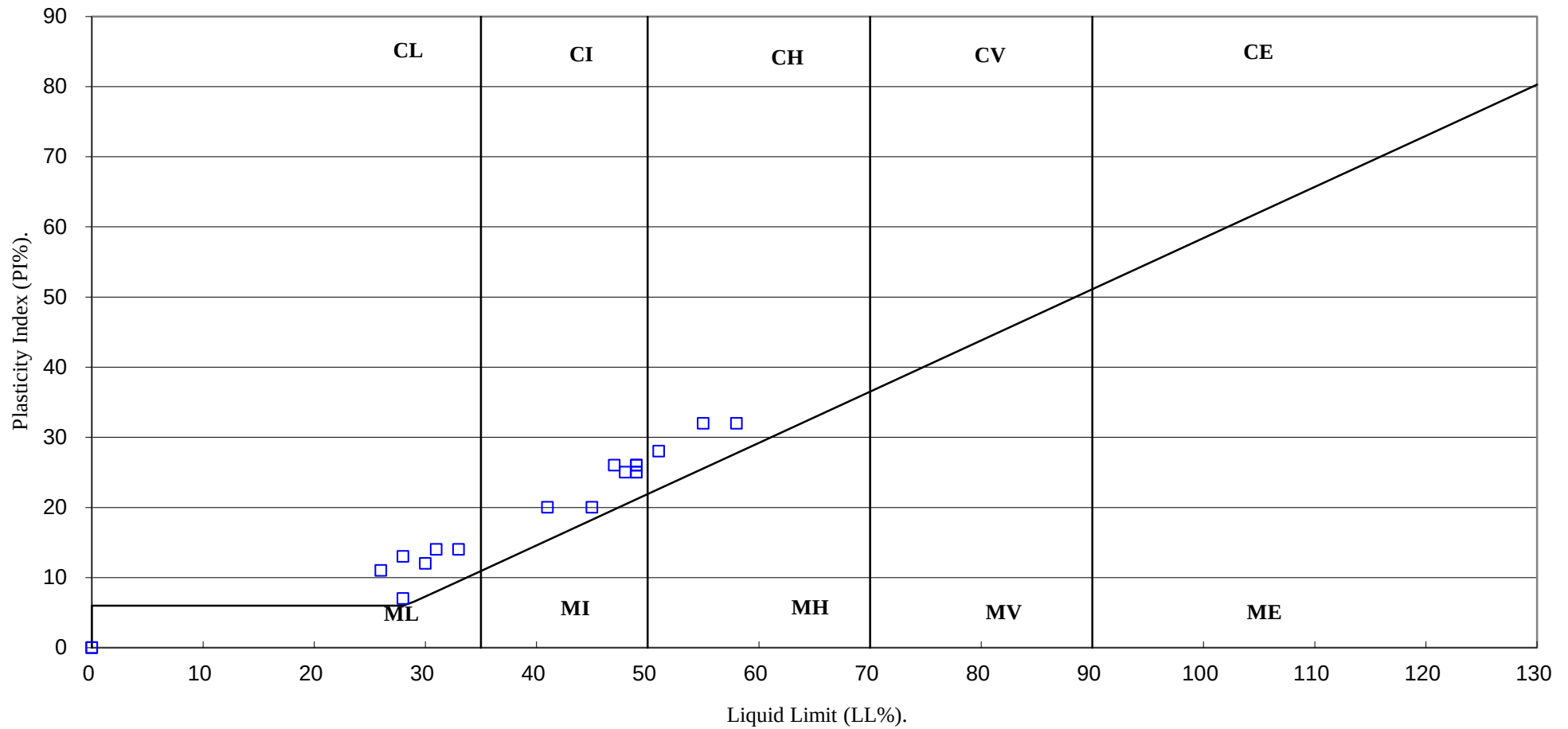
PSL17/2664

Client Ref:

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PLASTICITY CHART FOR CASAGRANDE CLASSIFICATION.

(BS5930 :2015)



4043

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Contract No:

PSL17/2664

Client Ref:

R2392

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

WS1

Top Depth (m):

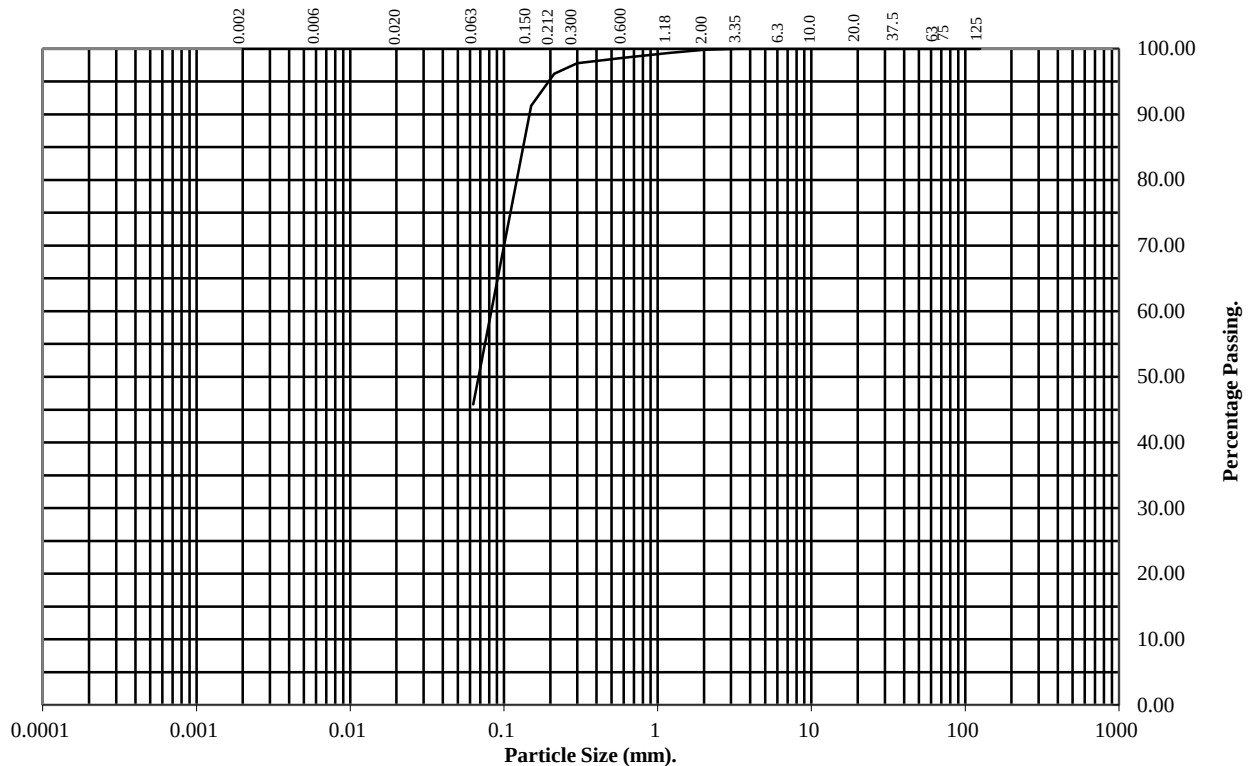
1.50

Sample Number:

Base Depth(m):

Sample Type:

D



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	99
0.6	99
0.3	98
0.212	96
0.15	91
0.063	46

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	54
Silt/Clay	46

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

WS1

Top Depth (m):

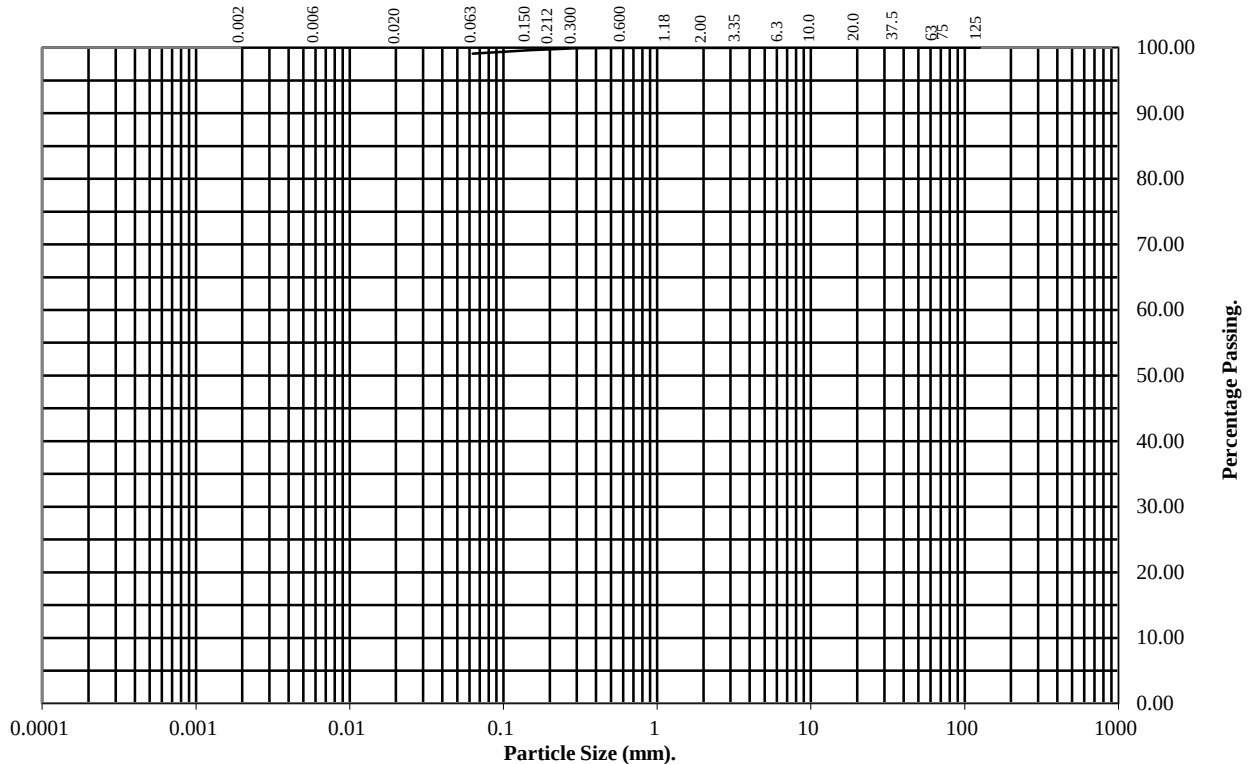
4.50

Sample Number:

Base Depth(m):

Sample Type:

D



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.6	100
0.3	100
0.212	100
0.15	100
0.063	99

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	1
Silt/Clay	99

Remarks:

See Summary of Soil Descriptions



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Contract No:

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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

WS2

Top Depth (m):

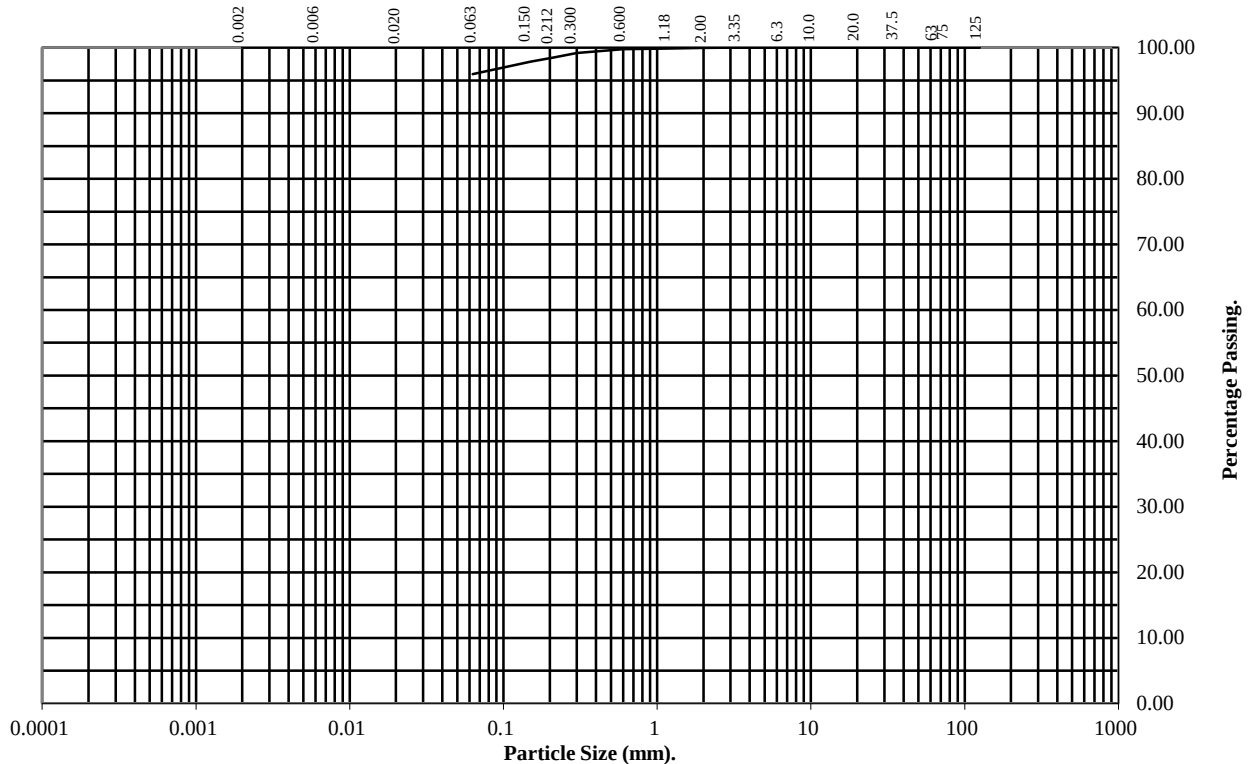
1.40

Sample Number:

Base Depth(m):

Sample Type:

D



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.6	100
0.3	99
0.212	99
0.15	98
0.063	96

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	4
Silt/Clay	96

Remarks:

See Summary of Soil Descriptions



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Trows Lane Farm

Contract No:

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Client Ref:

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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

WS2

Top Depth (m):

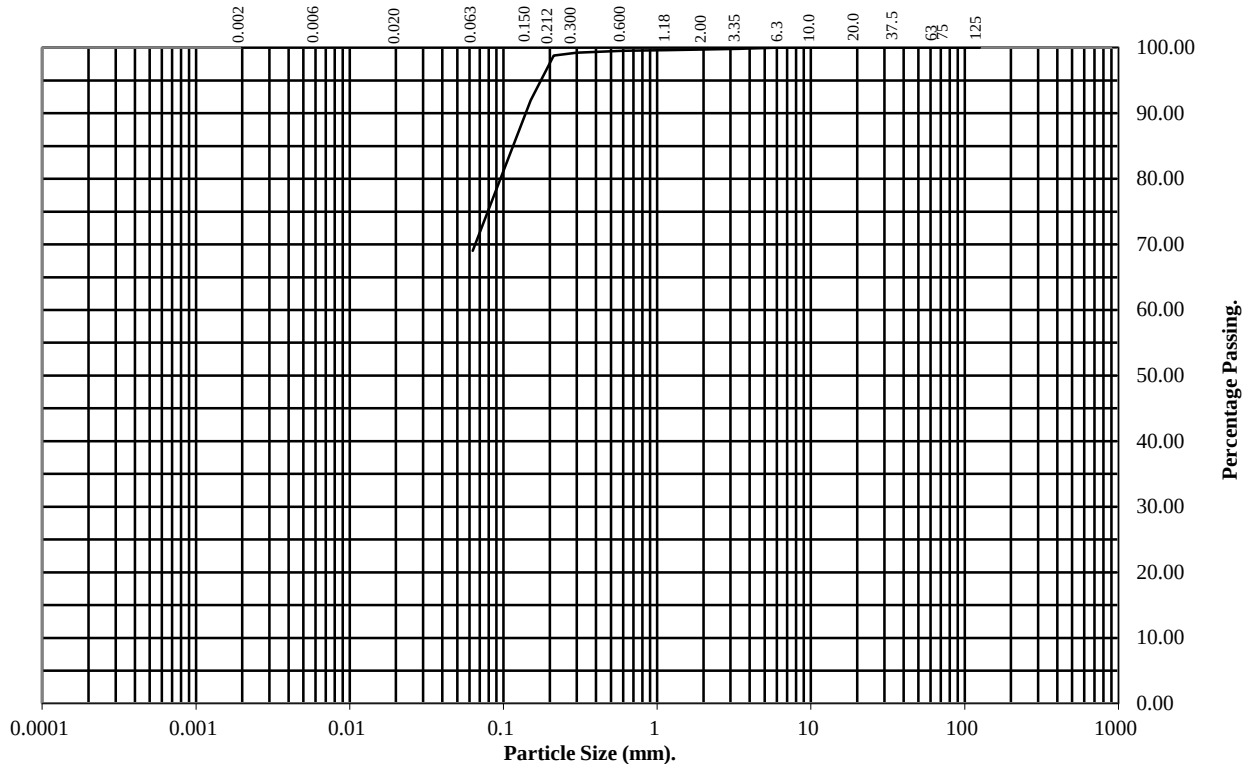
4.60

Sample Number:

Base Depth(m):

Sample Type:

D



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.6	100
0.3	99
0.212	99
0.15	92
0.063	69

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	31
Silt/Clay	69

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

WS3

Top Depth (m):

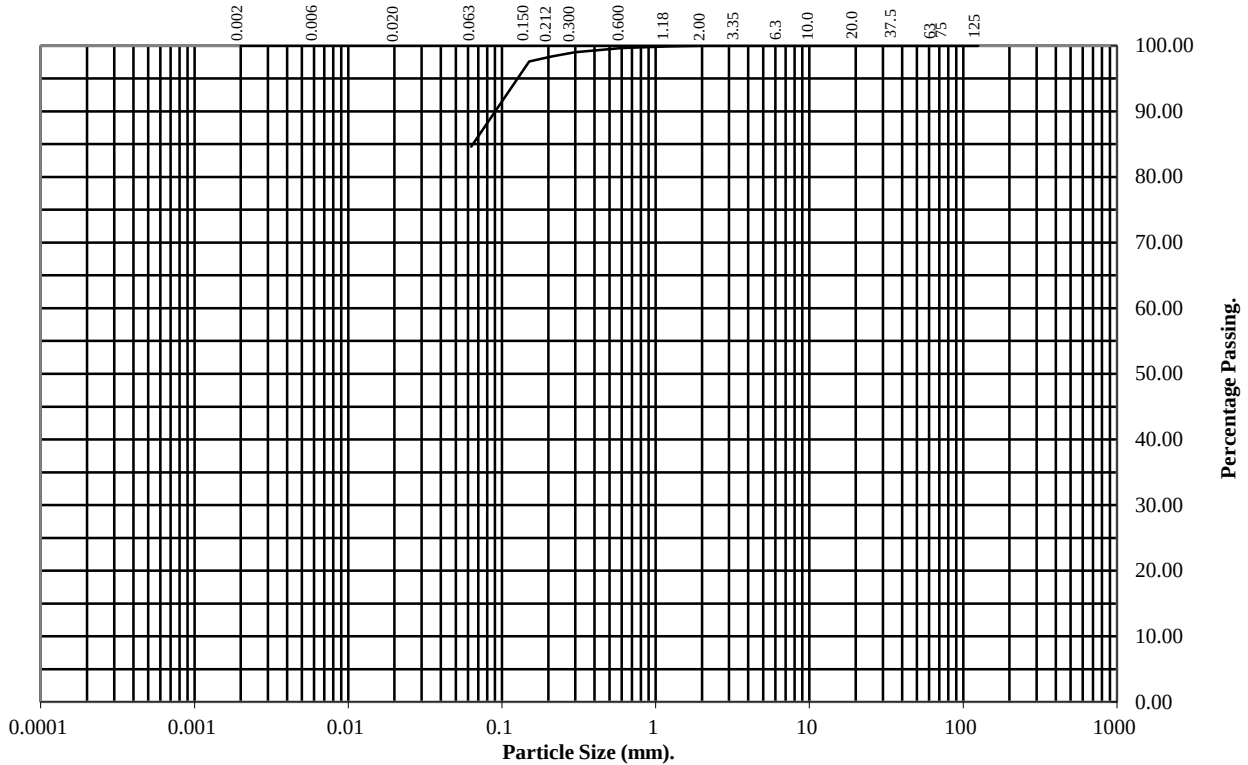
1.10

Sample Number:

Base Depth(m):

Sample Type:

D



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.6	100
0.3	99
0.212	98
0.15	98
0.063	85

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	15
Silt/Clay	85

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

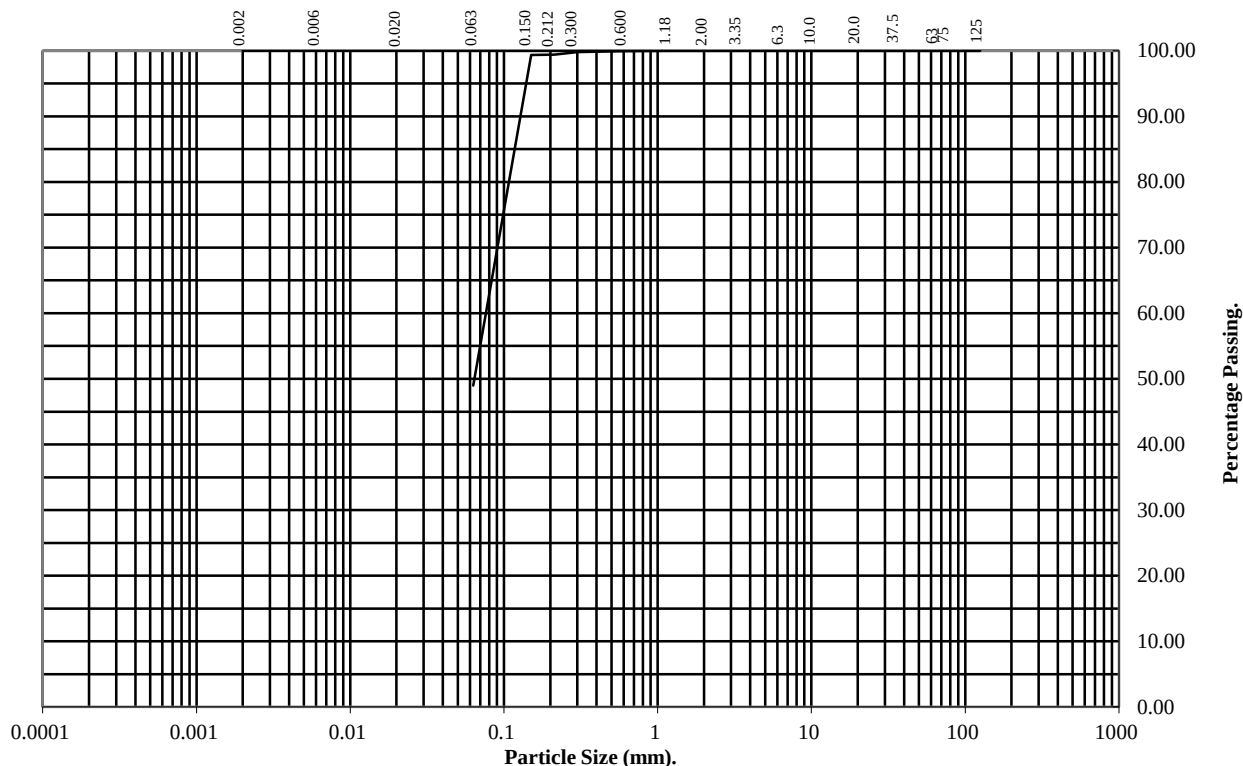
Hole Number: WS3

Top Depth (m): 2.50

Sample Number:

Base Depth(m):

Sample Type: D



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.6	100
0.3	100
0.212	99
0.15	99
0.063	49

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	51
Silt/Clay	49

Remarks:

See Summary of Soil Descriptions



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Contract No:

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Client Ref:

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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

WS3

Top Depth (m):

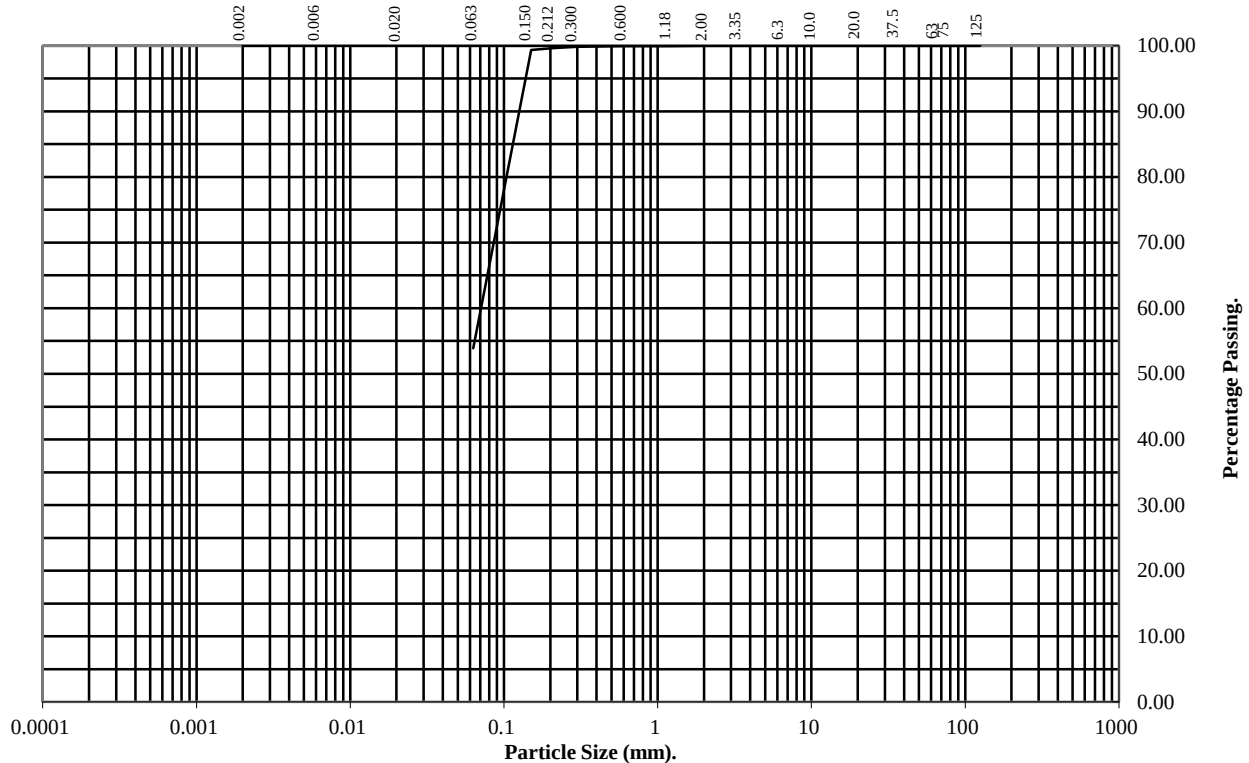
3.50

Sample Number:

Base Depth(m):

Sample Type:

D



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.6	100
0.3	100
0.212	100
0.15	99
0.063	54

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	46
Silt/Clay	54

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

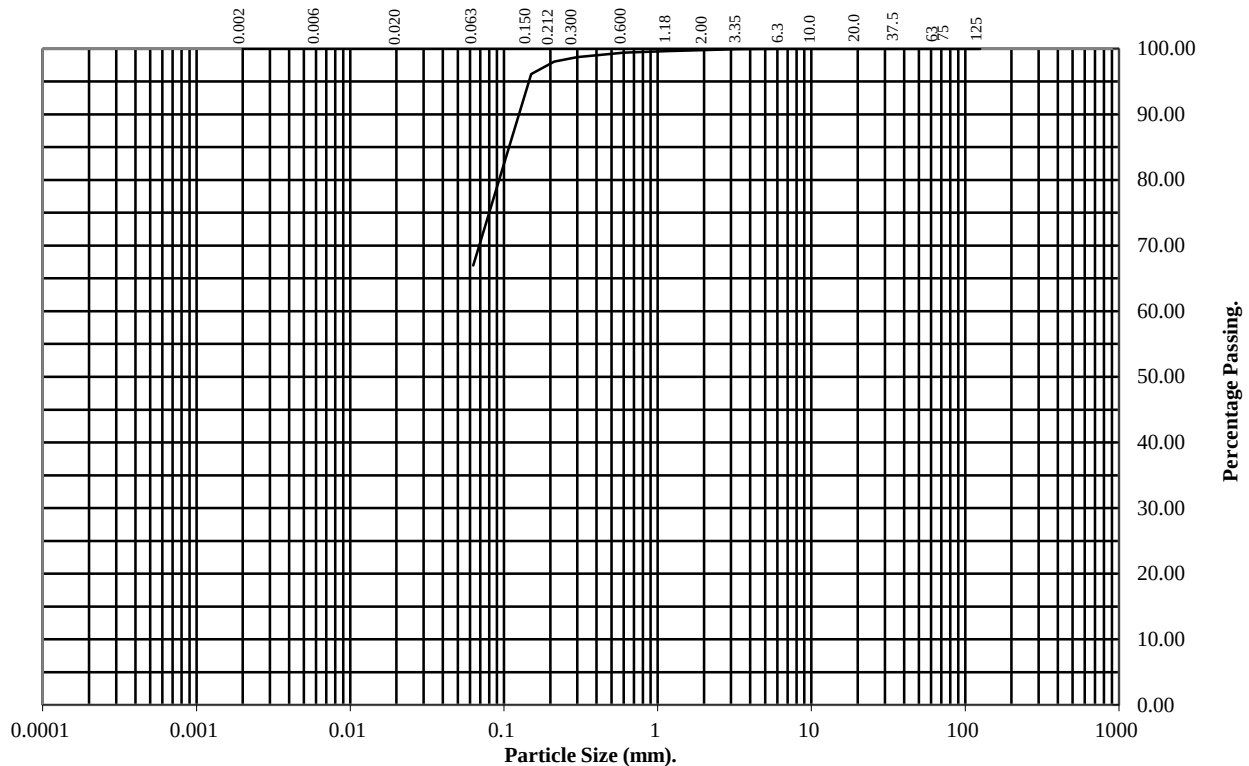
Hole Number: WS4

Top Depth (m): 1.60

Sample Number:

Base Depth(m):

Sample Type: D



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.6	99
0.3	99
0.212	98
0.15	96
0.063	67

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	33
Silt/Clay	67

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

WS5

Top Depth (m):

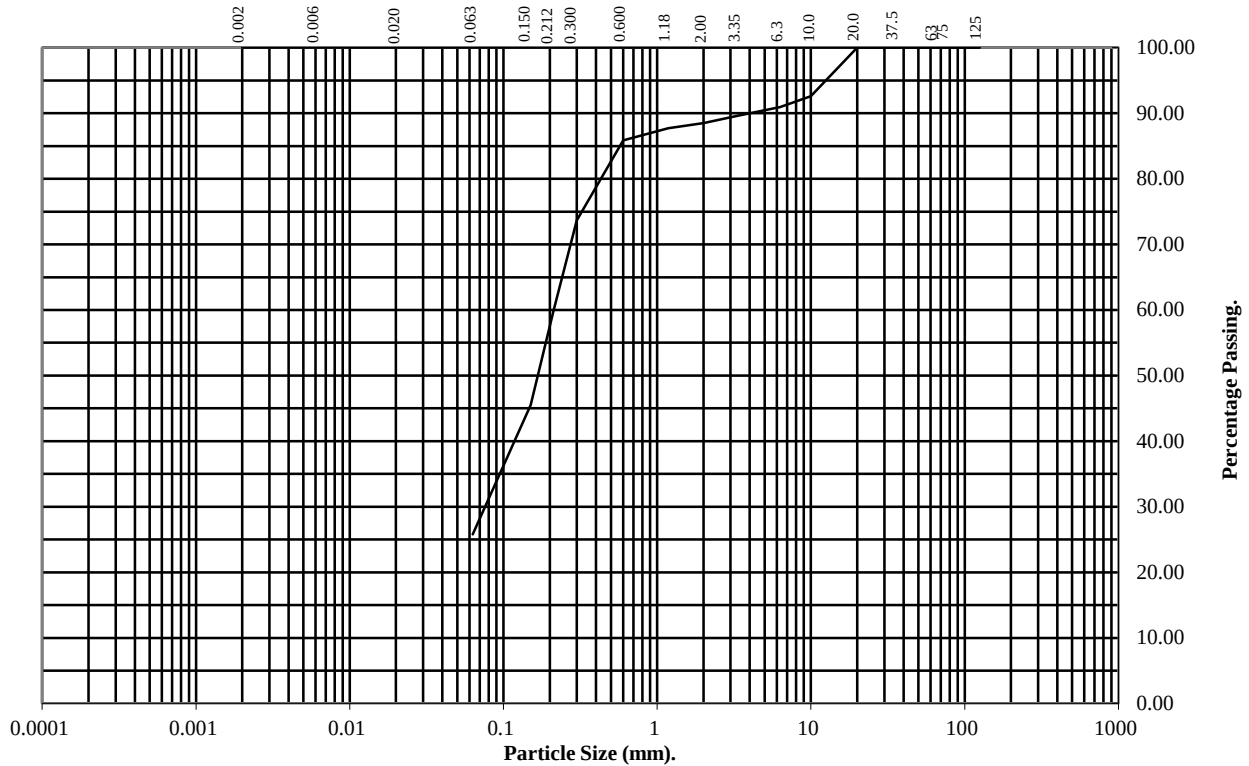
0.80

Sample Number:

Base Depth(m):

Sample Type:

D



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	93
6.3	91
3.35	90
2	88
1.18	88
0.6	86
0.3	74
0.212	60
0.15	46
0.063	26

Soil Fraction	Total Percentage
Cobbles	0
Gravel	12
Sand	62
Silt/Clay	26

Remarks:

See Summary of Soil Descriptions



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Client Ref:
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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

WS5

Top Depth (m):

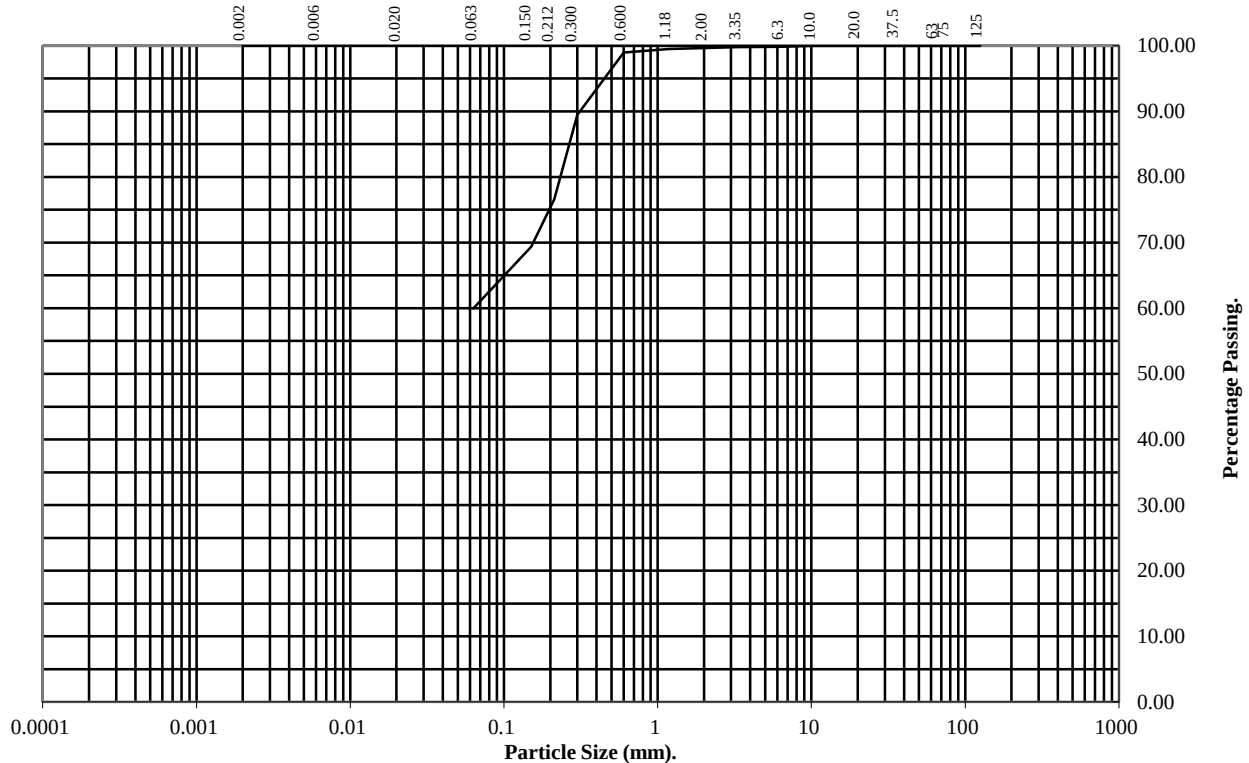
2.40

Sample Number:

Base Depth(m):

Sample Type:

D



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	99
0.6	99
0.3	89
0.212	77
0.15	69
0.063	60

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	40
Silt/Clay	60

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

WS5

Top Depth (m):

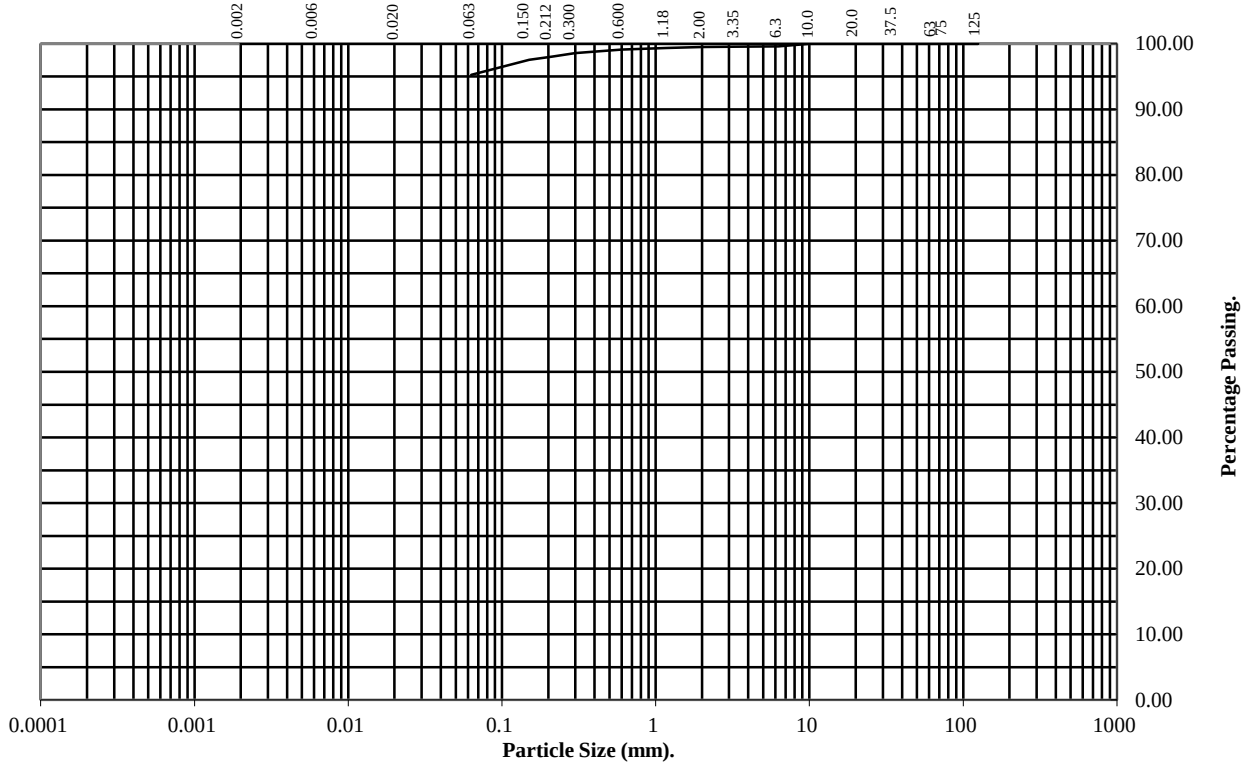
3.70

Sample Number:

Base Depth(m):

Sample Type:

D



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	99
1.18	99
0.6	99
0.3	99
0.212	98
0.15	98
0.063	95

Soil Fraction	Total Percentage
Cobbles	0
Gravel	1
Sand	4
Silt/Clay	95

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

WS6

Top Depth (m):

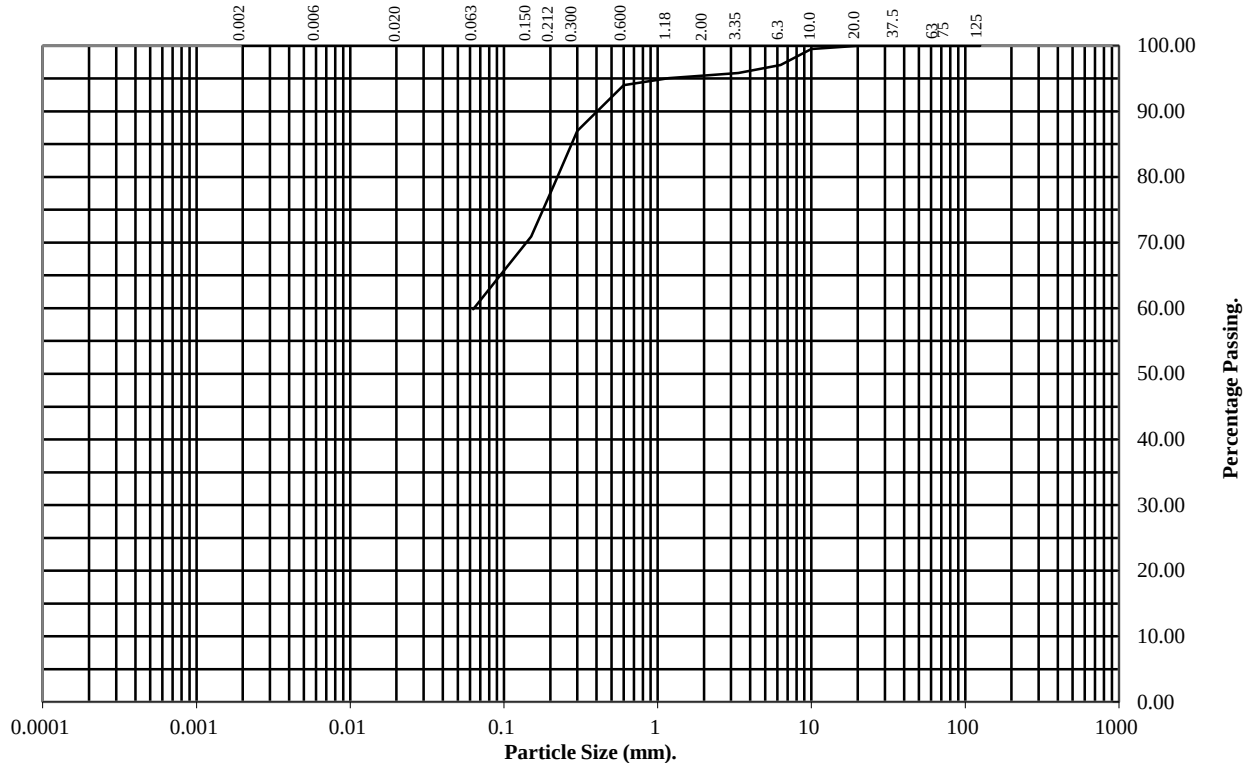
0.80

Sample Number:

Base Depth(m):

Sample Type:

D



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	99
6.3	97
3.35	96
2	95
1.18	95
0.6	94
0.3	87
0.212	79
0.15	71
0.063	60

Soil Fraction	Total Percentage
Cobbles	0
Gravel	5
Sand	35
Silt/Clay	60

Remarks:

See Summary of Soil Descriptions



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Contract No:

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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

WS6

Top Depth (m):

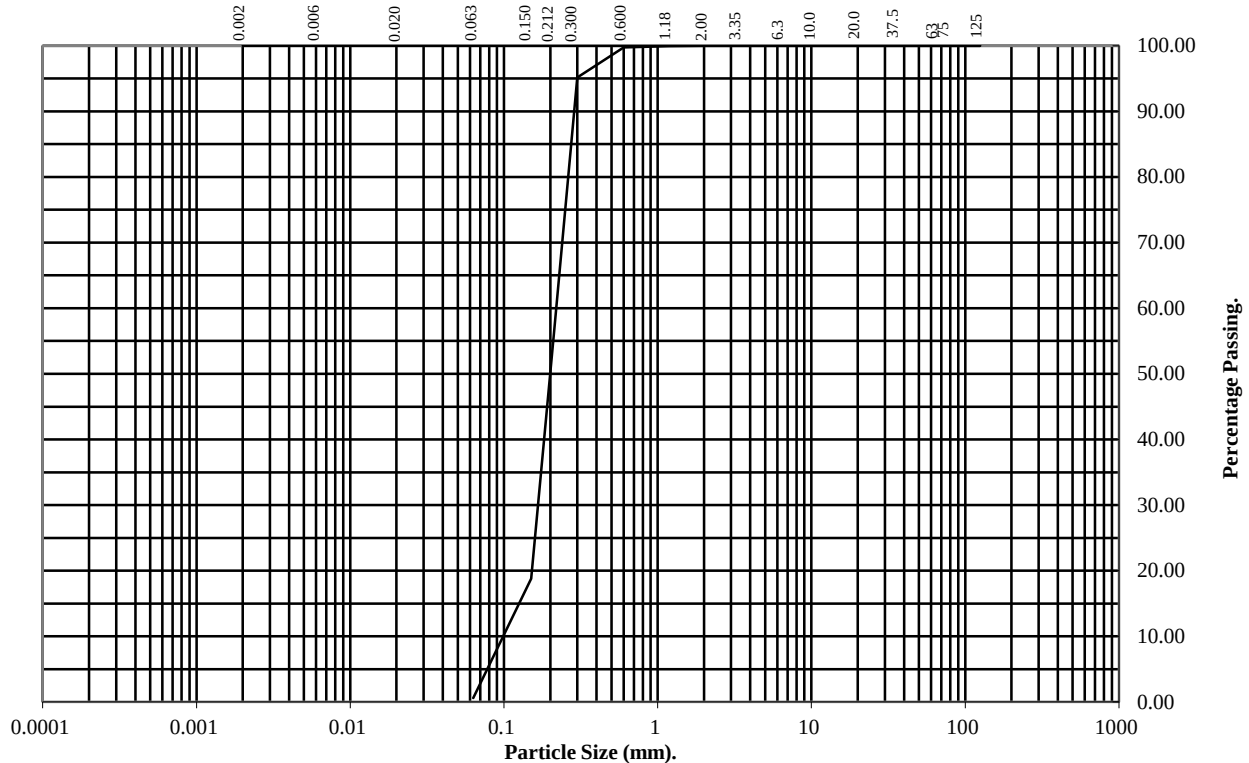
1.60

Sample Number:

Base Depth(m):

Sample Type:

D



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.6	100
0.3	95
0.212	57
0.15	19
0.063	1

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	99
Silt/Clay	1

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

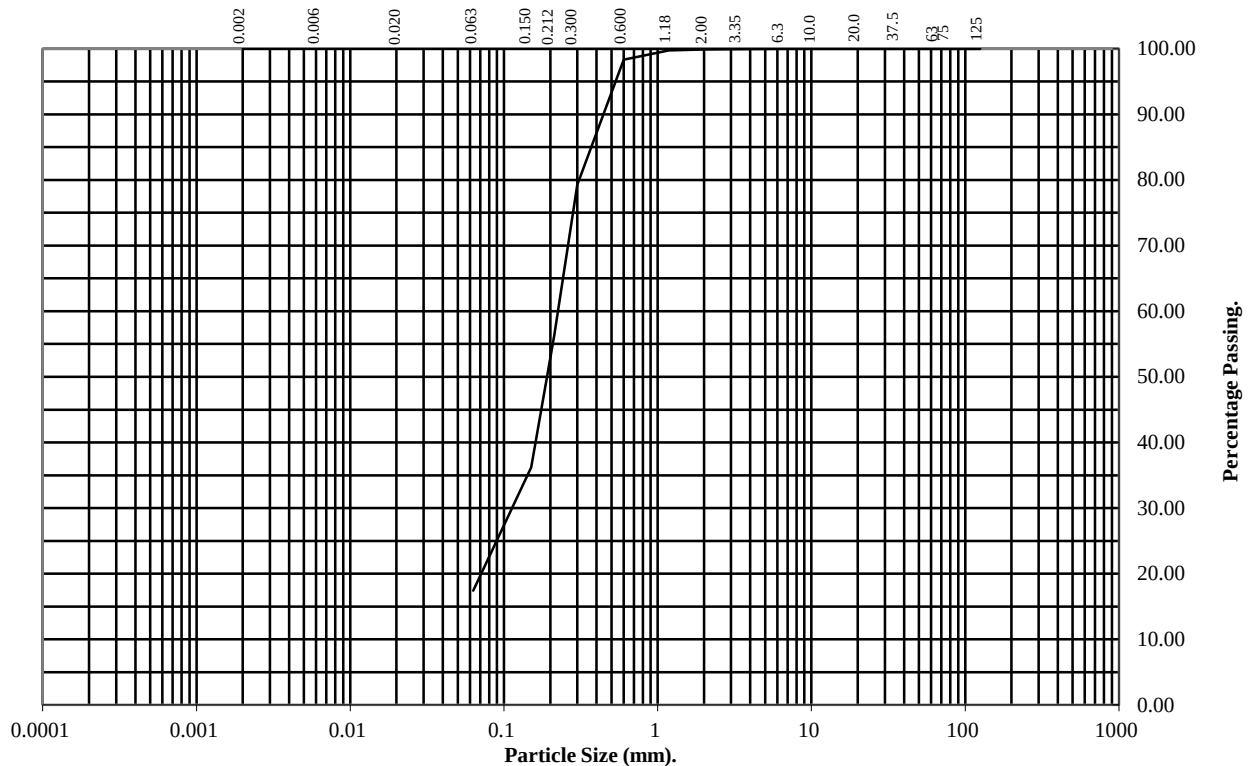
Hole Number: WS7

Top Depth (m): 1.20

Sample Number:

Base Depth(m): 2.00

Sample Type: D



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.6	98
0.3	79
0.212	56
0.15	36
0.063	17

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	83
Silt/Clay	17

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

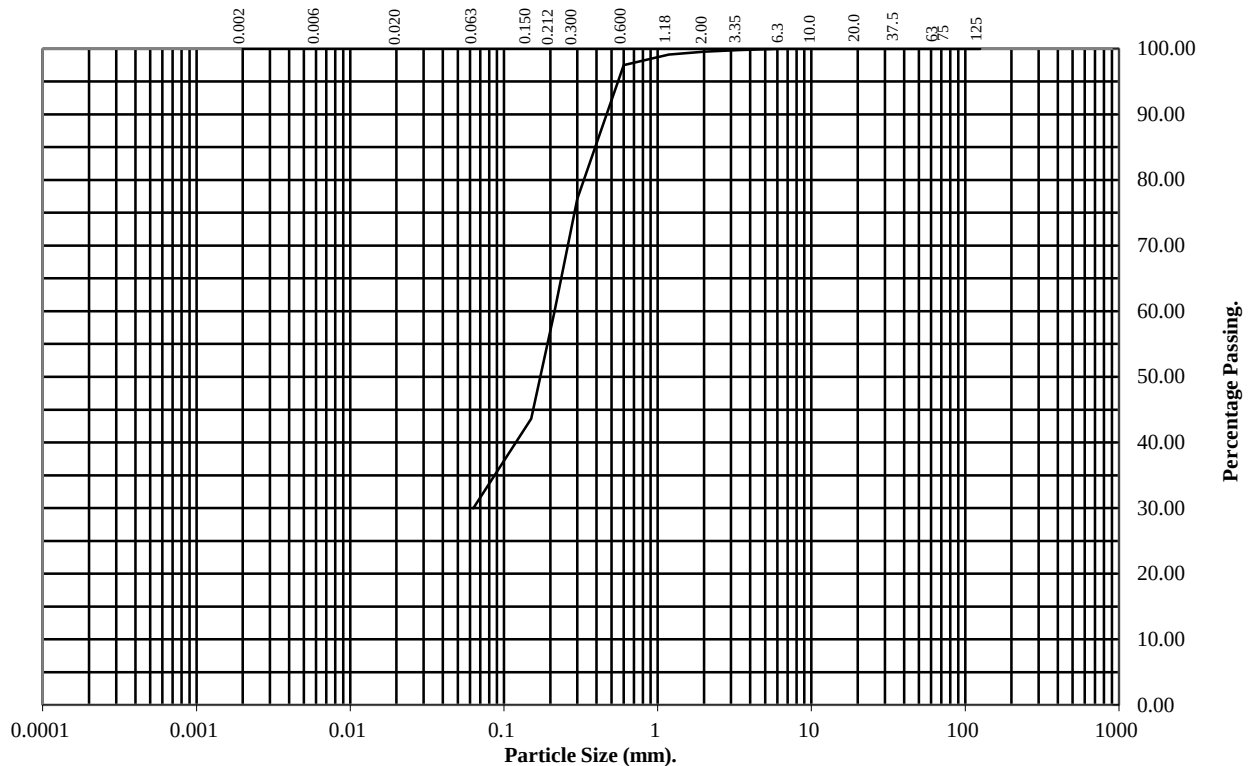
Hole Number: WS7

Top Depth (m): 2.00

Sample Number:

Base Depth(m): 2.50

Sample Type: D



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	99
0.6	98
0.3	77
0.212	60
0.15	44
0.063	30

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	70
Silt/Clay	30

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

WS8

Top Depth (m):

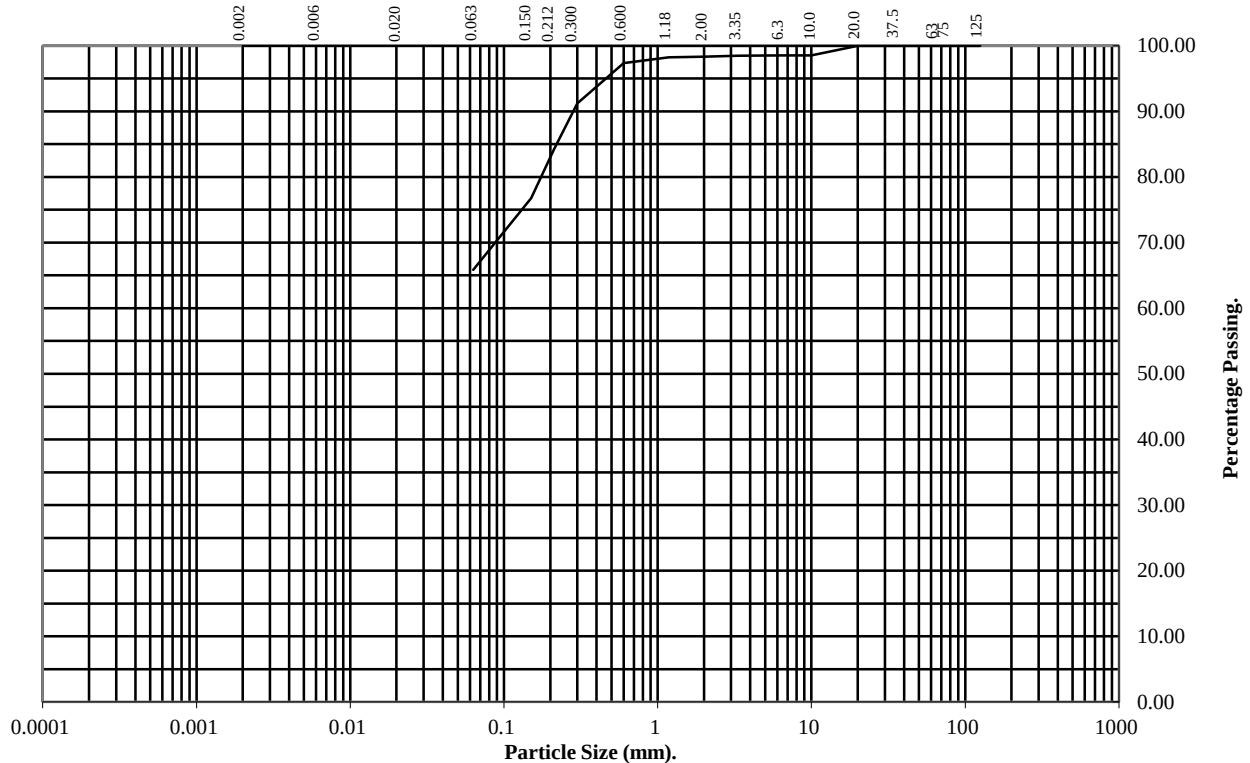
0.80

Sample Number:

Base Depth(m):

Sample Type:

D



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	99
6.3	99
3.35	98
2	98
1.18	98
0.6	97
0.3	91
0.212	84
0.15	77
0.063	66

Soil Fraction	Total Percentage
Cobbles	0
Gravel	2
Sand	32
Silt/Clay	66

Remarks:

See Summary of Soil Descriptions



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Contract No:

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Client Ref:

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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

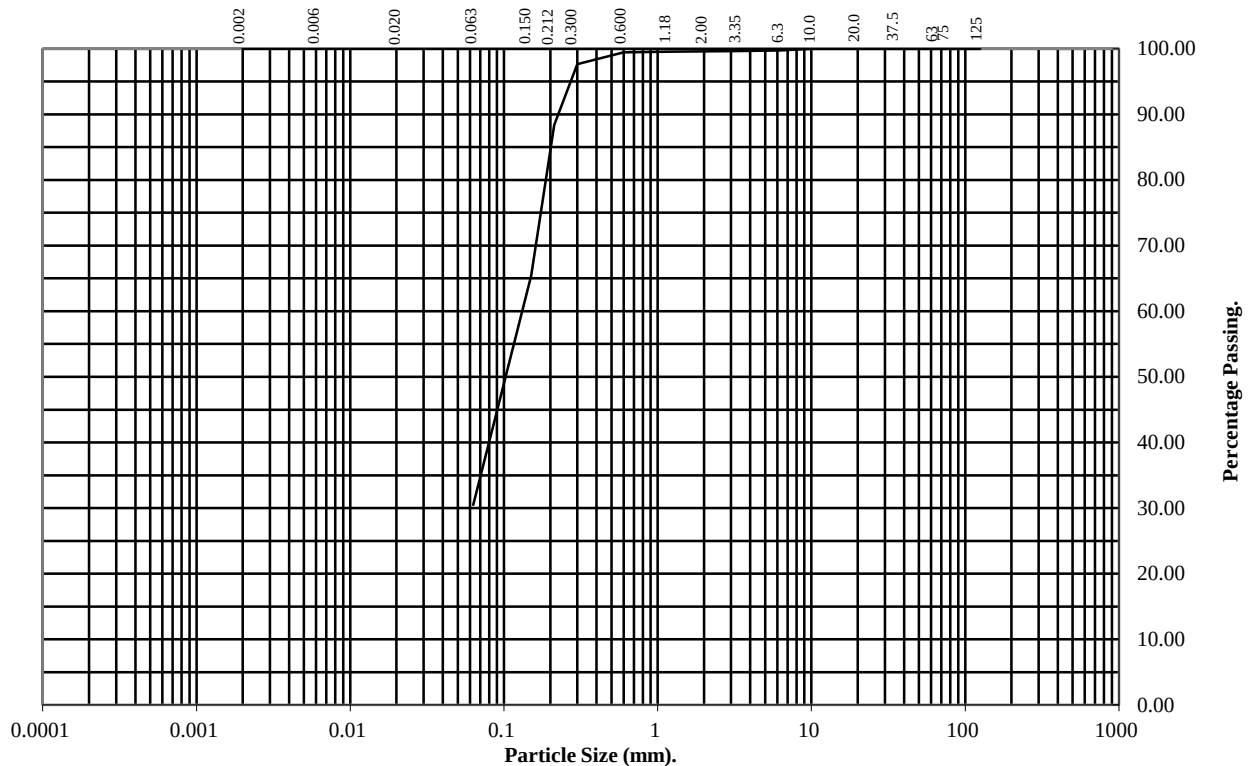
Hole Number: WS8

Top Depth (m): 2.60

Sample Number:

Base Depth(m):

Sample Type: D



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.6	99
0.3	98
0.212	88
0.15	65
0.063	31

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	69
Silt/Clay	31

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

WS9

Top Depth (m):

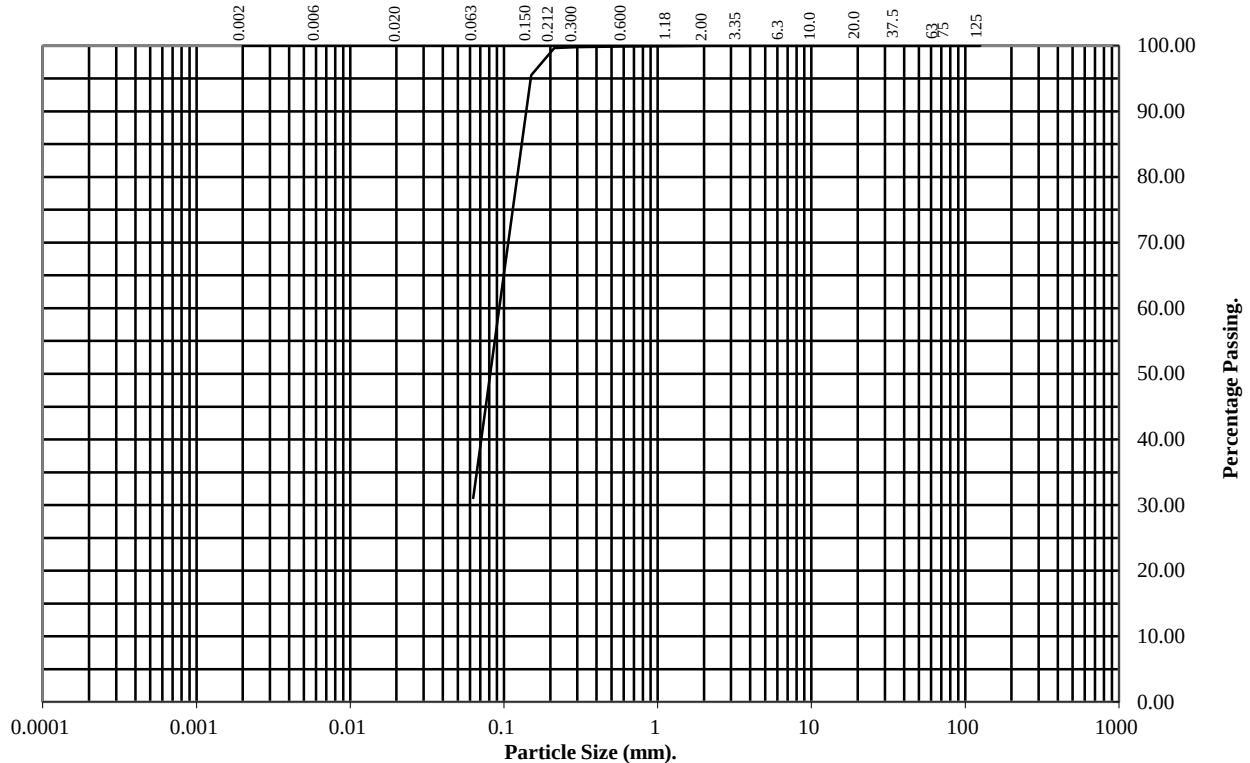
2.60

Sample Number:

Base Depth(m):

Sample Type:

D



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.6	100
0.3	100
0.212	100
0.15	95
0.063	31

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	69
Silt/Clay	31

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

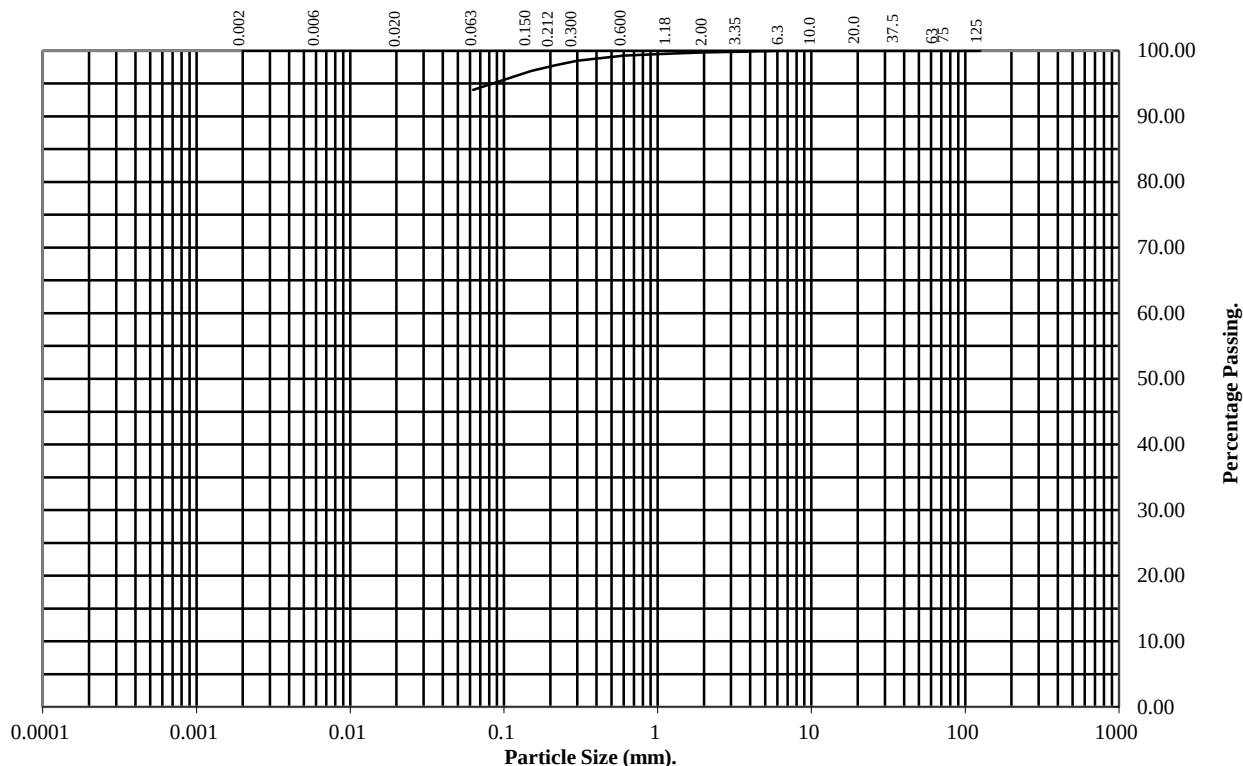
Hole Number: WS9

Top Depth (m): 3.80

Sample Number:

Base Depth(m):

Sample Type: D



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.6	99
0.3	98
0.212	98
0.15	97
0.063	94

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	6
Silt/Clay	94

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

WS9

Top Depth (m):

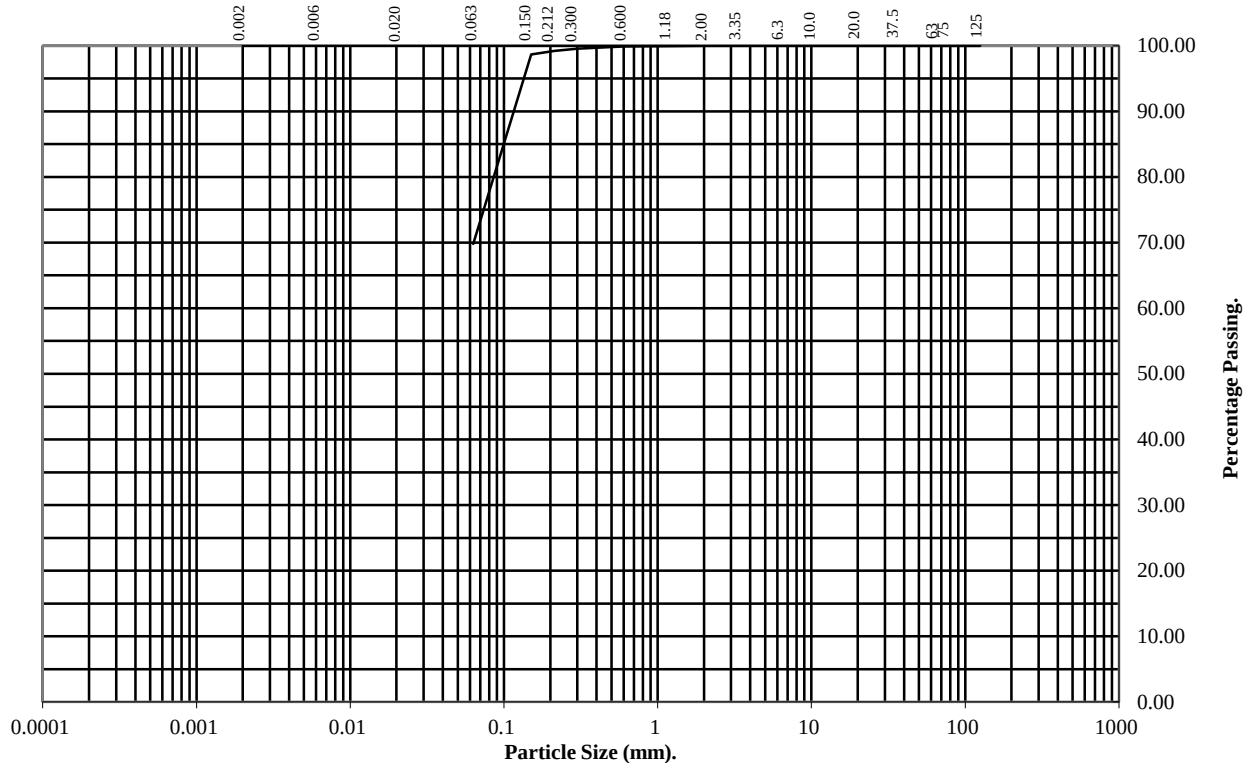
5.50

Sample Number:

Base Depth(m):

Sample Type:

D



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.6	100
0.3	100
0.212	99
0.15	99
0.063	70

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	30
Silt/Clay	70

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

WS10

Top Depth (m):

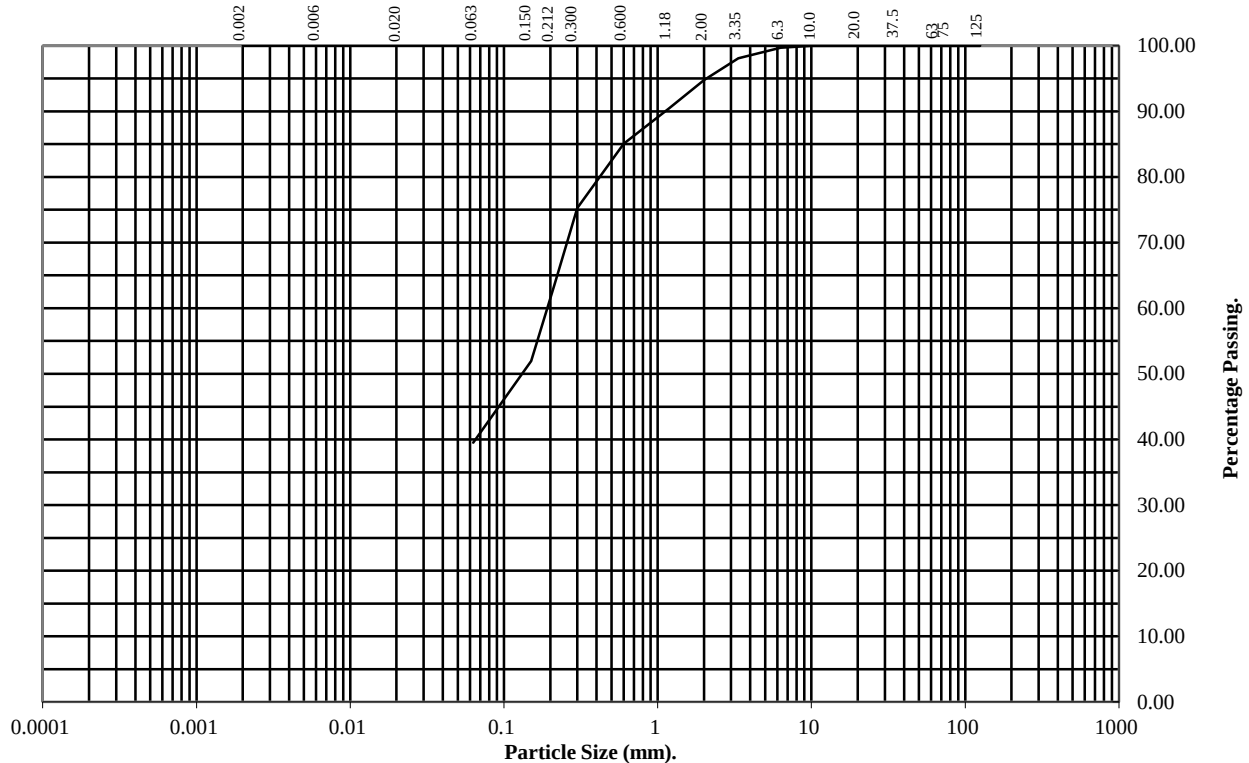
2.60

Sample Number:

Base Depth(m):

Sample Type:

D



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	98
2	95
1.18	90
0.6	85
0.3	75
0.212	63
0.15	52
0.063	40

Soil Fraction	Total Percentage
Cobbles	0
Gravel	5
Sand	55
Silt/Clay	40

Remarks:

See Summary of Soil Descriptions



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Contract No:

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Client Ref:

R2392

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

WS10

Top Depth (m):

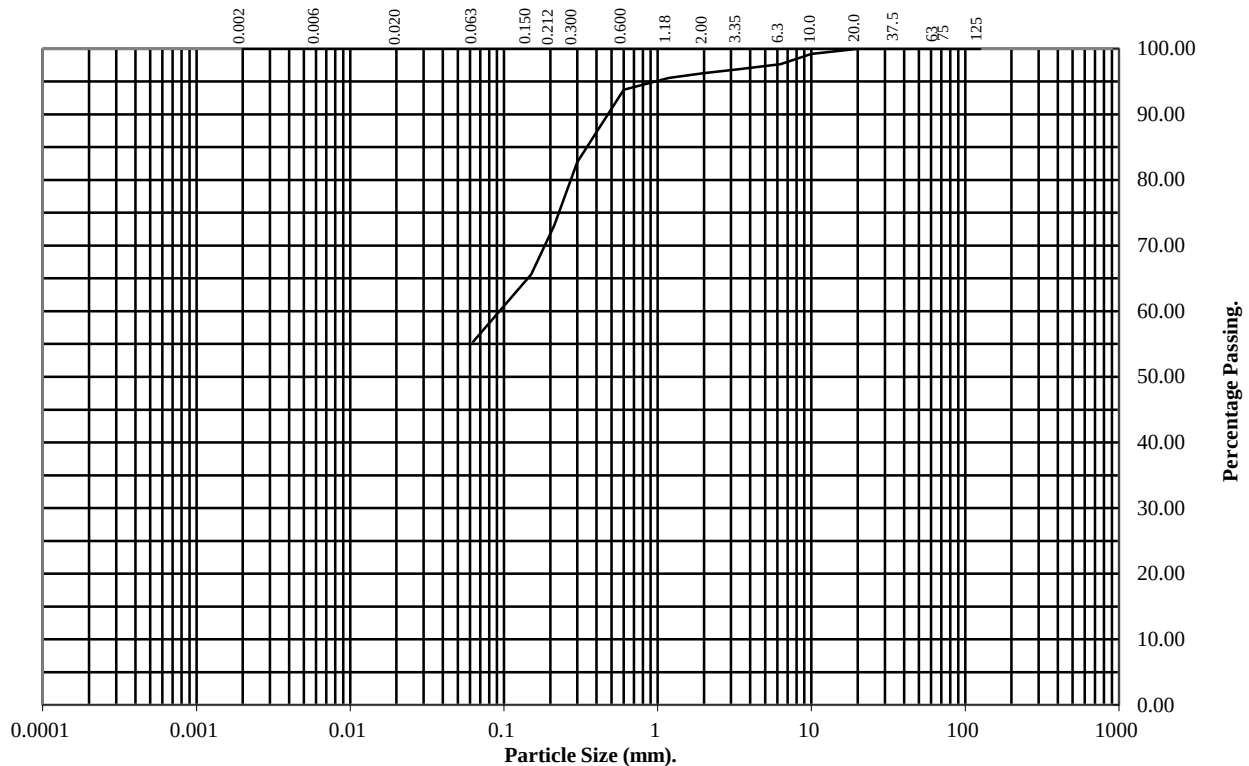
3.60

Sample Number:

Base Depth(m):

Sample Type:

D



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	99
6.3	98
3.35	97
2	96
1.18	96
0.6	94
0.3	83
0.212	73
0.15	66
0.063	55

Soil Fraction	Total Percentage
Cobbles	0
Gravel	4
Sand	41
Silt/Clay	55

Remarks:

See Summary of Soil Descriptions



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Trows Lane Farm

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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

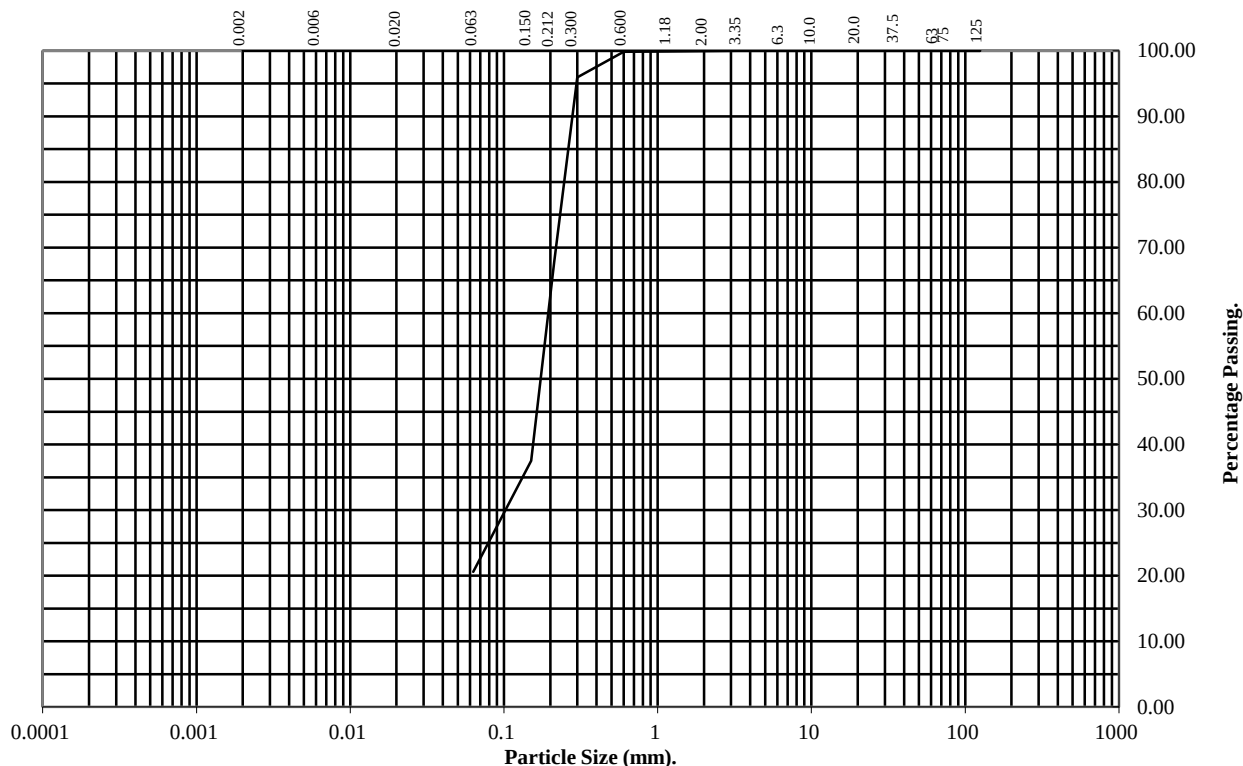
Hole Number: WS11

Top Depth (m): 4.80

Sample Number:

Base Depth(m):

Sample Type: D



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.6	100
0.3	96
0.212	68
0.15	38
0.063	21

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	79
Silt/Clay	21

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

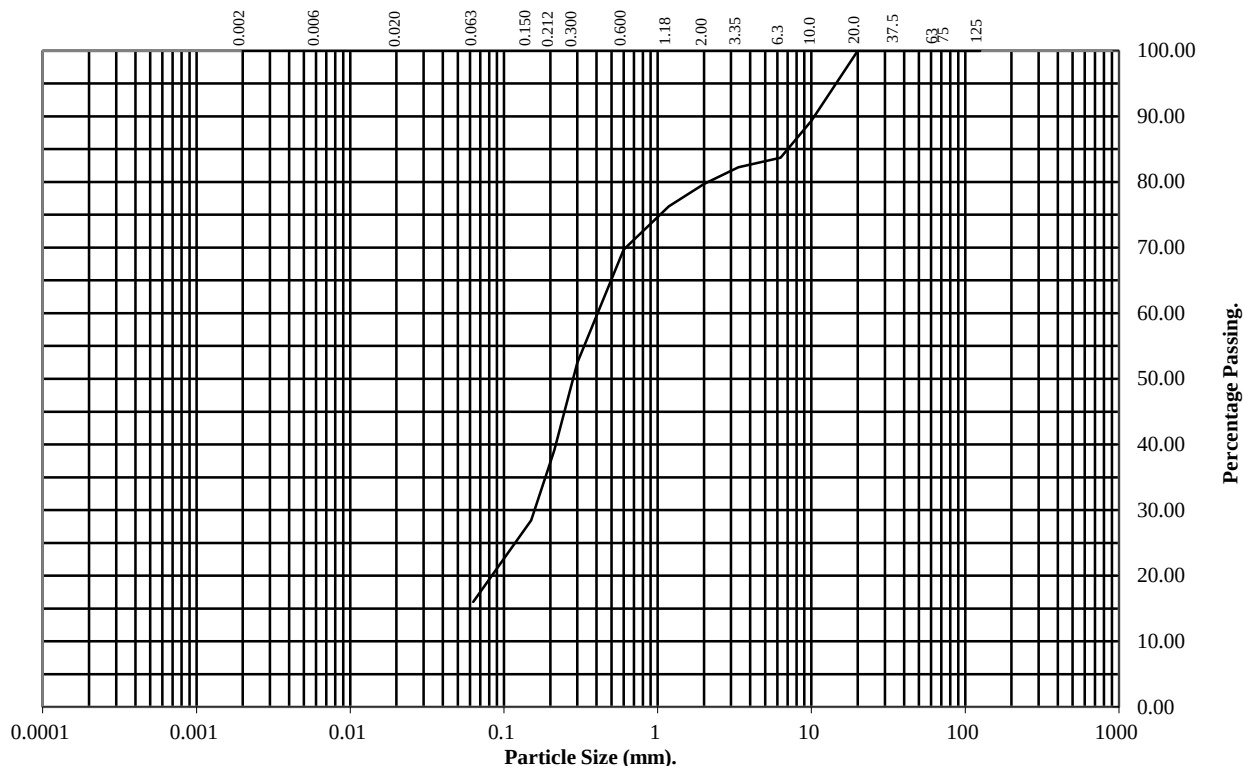
Hole Number: WS12

Top Depth (m): 4.40

Sample Number:

Base Depth(m):

Sample Type: D



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	89
6.3	84
3.35	82
2	80
1.18	76
0.6	70
0.3	52
0.212	39
0.15	28
0.063	16

Soil Fraction	Total Percentage
Cobbles	0
Gravel	20
Sand	64
Silt/Clay	16

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

WS13

Top Depth (m):

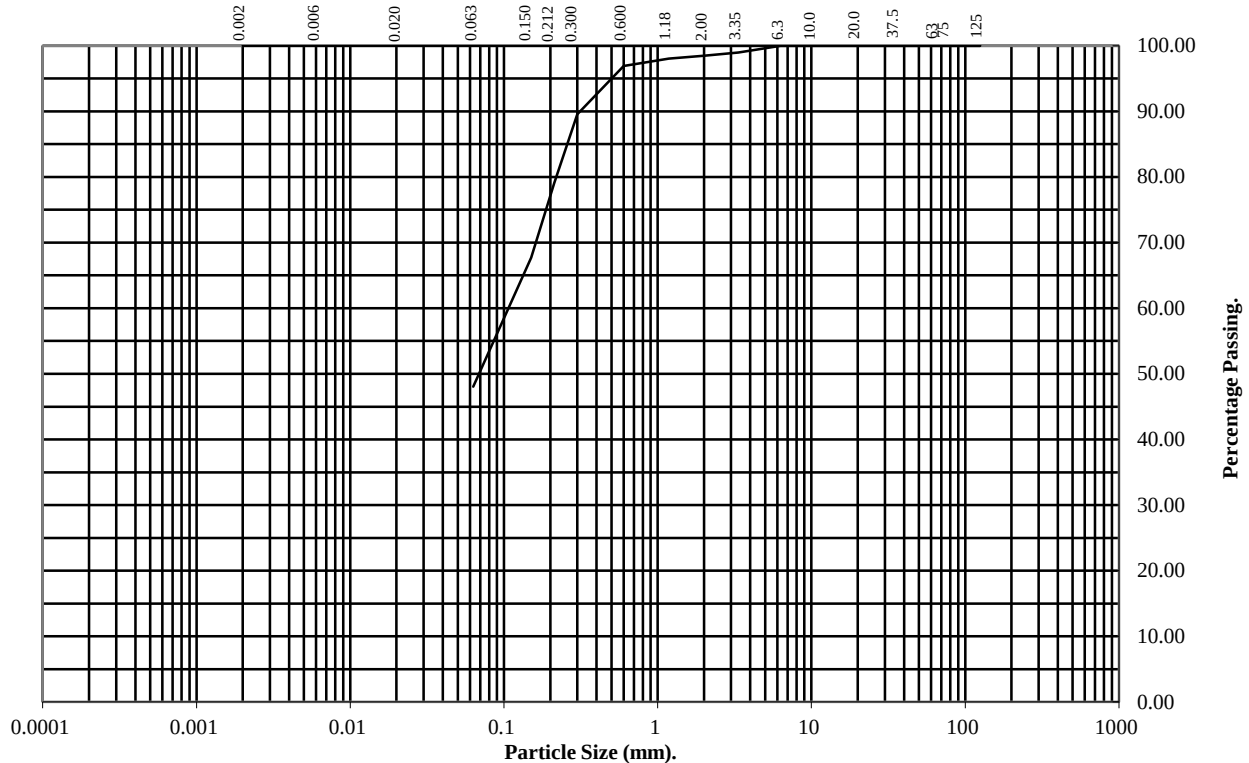
2.60

Sample Number:

Base Depth(m):

Sample Type:

D



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	99
2	98
1.18	98
0.6	97
0.3	90
0.212	79
0.15	68
0.063	48

Soil Fraction	Total Percentage
Cobbles	0
Gravel	2
Sand	50
Silt/Clay	48

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

BHD

Top Depth (m):

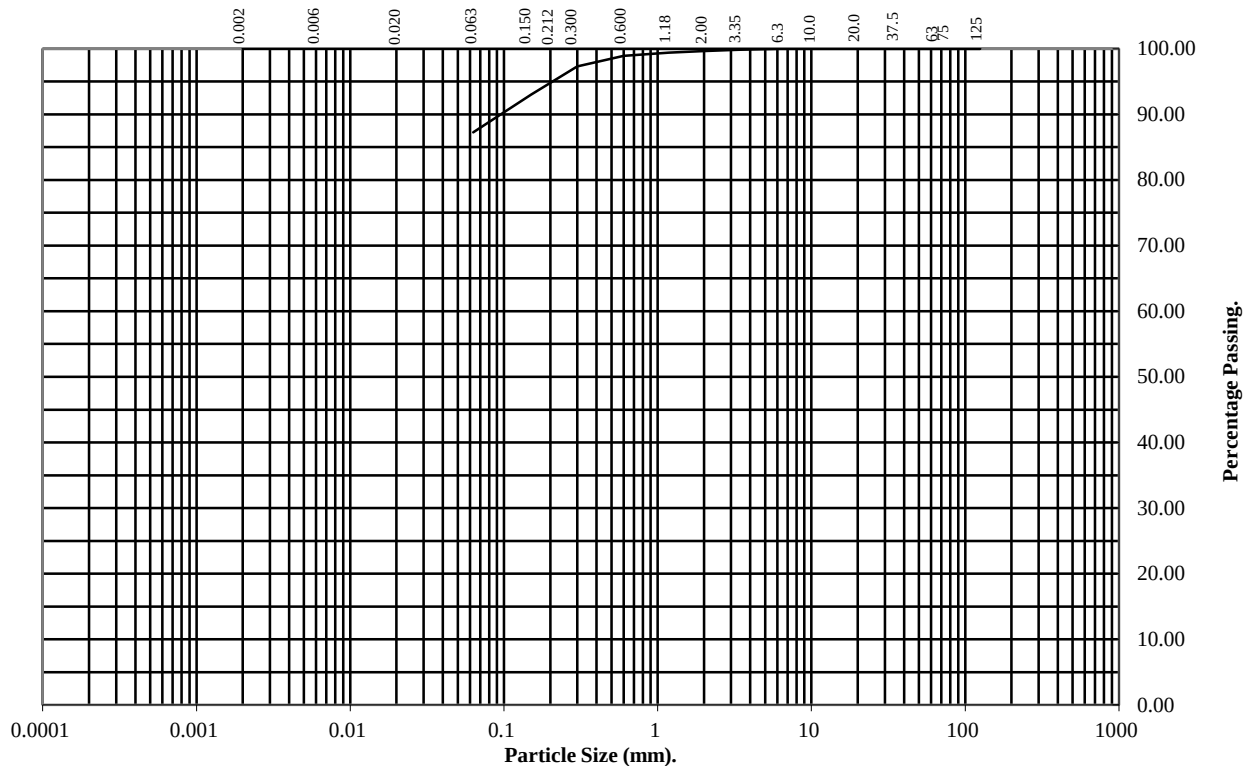
1.50

Sample Number:

Base Depth(m):

Sample Type:

B



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	99
0.6	99
0.3	97
0.212	95
0.15	93
0.063	87

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	13
Silt/Clay	87

Remarks:

See Summary of Soil Descriptions



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Client Ref:

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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

BHD

Top Depth (m):

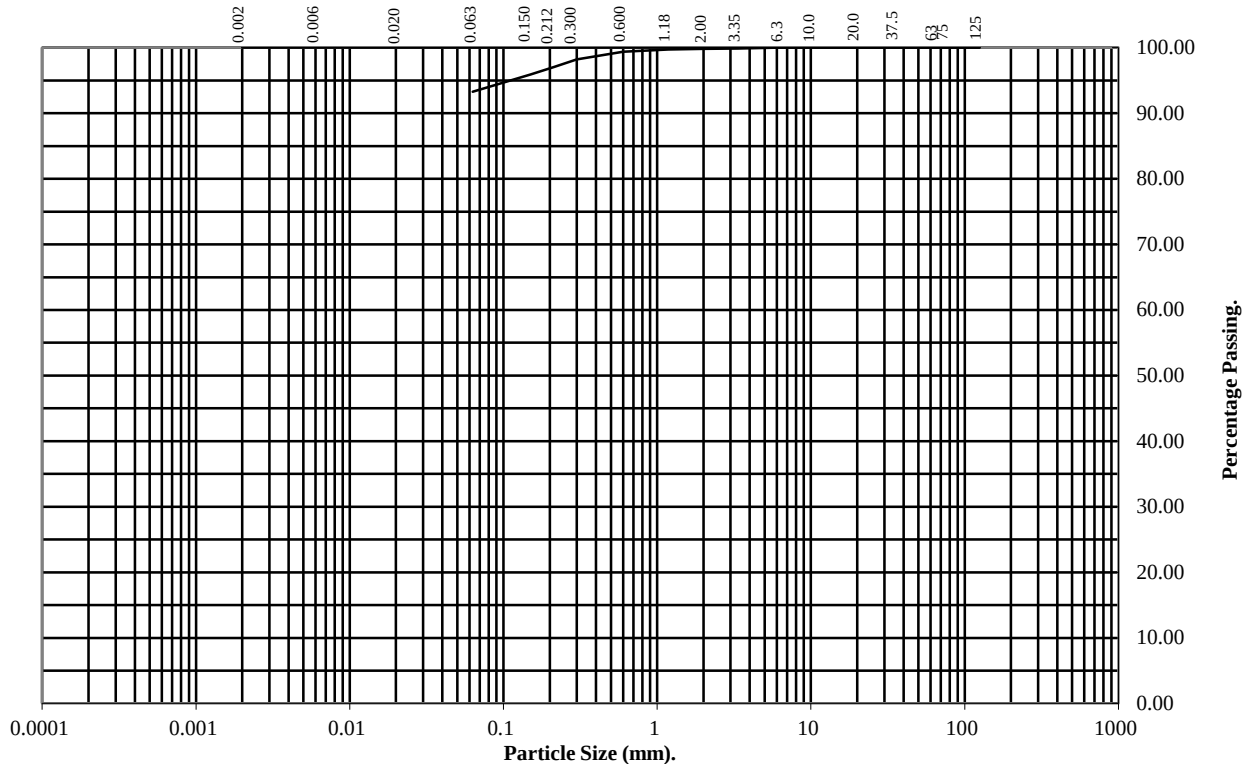
2.50

Sample Number:

Base Depth(m):

Sample Type:

B



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.6	99
0.3	98
0.212	97
0.15	96
0.063	93

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	7
Silt/Clay	93

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

BHD

Top Depth (m):

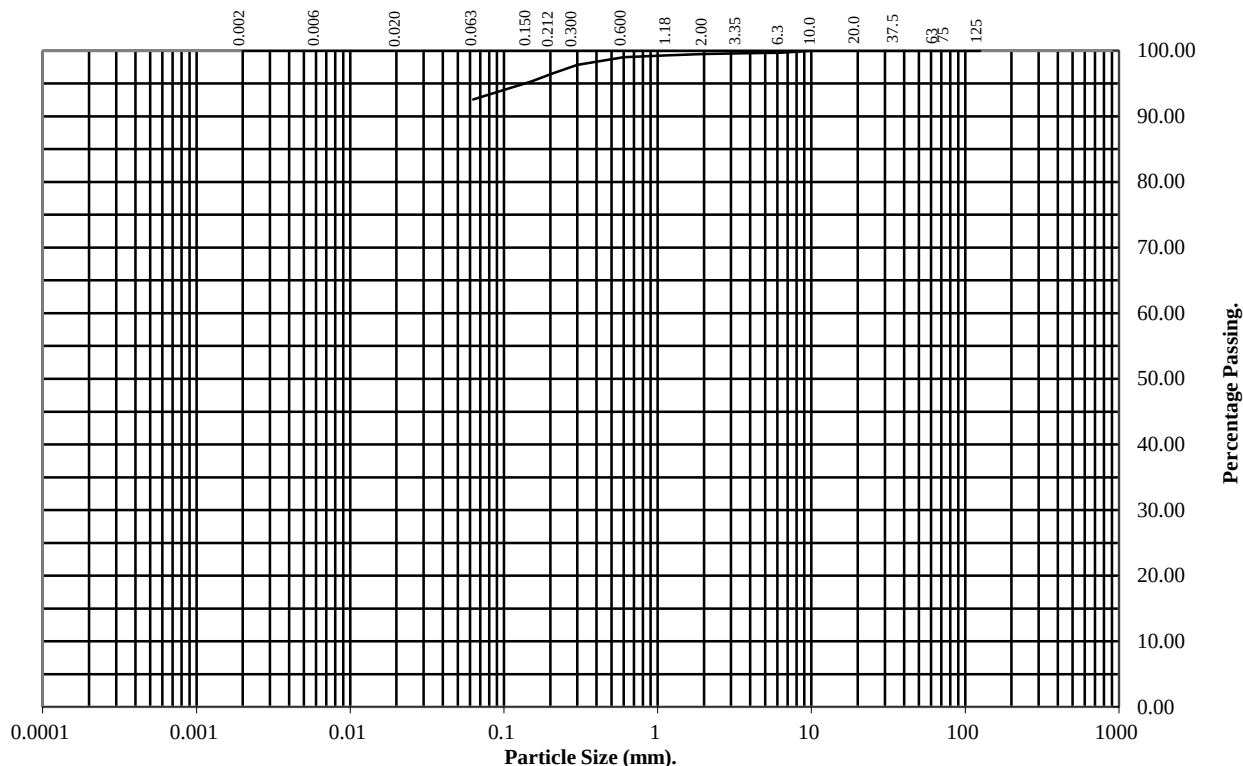
3.50

Sample Number:

Base Depth(m):

Sample Type:

D



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	99
1.18	99
0.6	99
0.3	98
0.212	97
0.15	95
0.063	93

Soil Fraction	Total Percentage
Cobbles	0
Gravel	1
Sand	6
Silt/Clay	93

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

BHD

Top Depth (m):

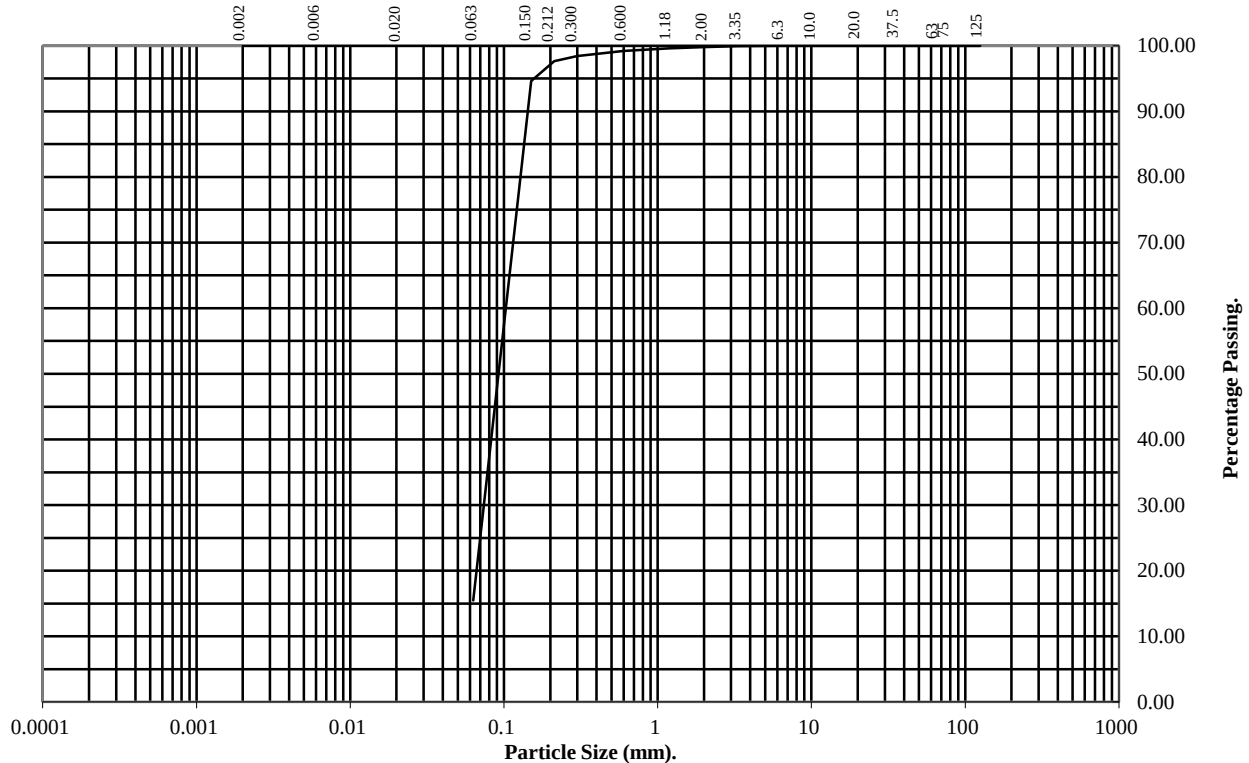
6.50

Sample Number:

Base Depth(m):

Sample Type:

D



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.6	99
0.3	98
0.212	98
0.15	95
0.063	15

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	85
Silt/Clay	15

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

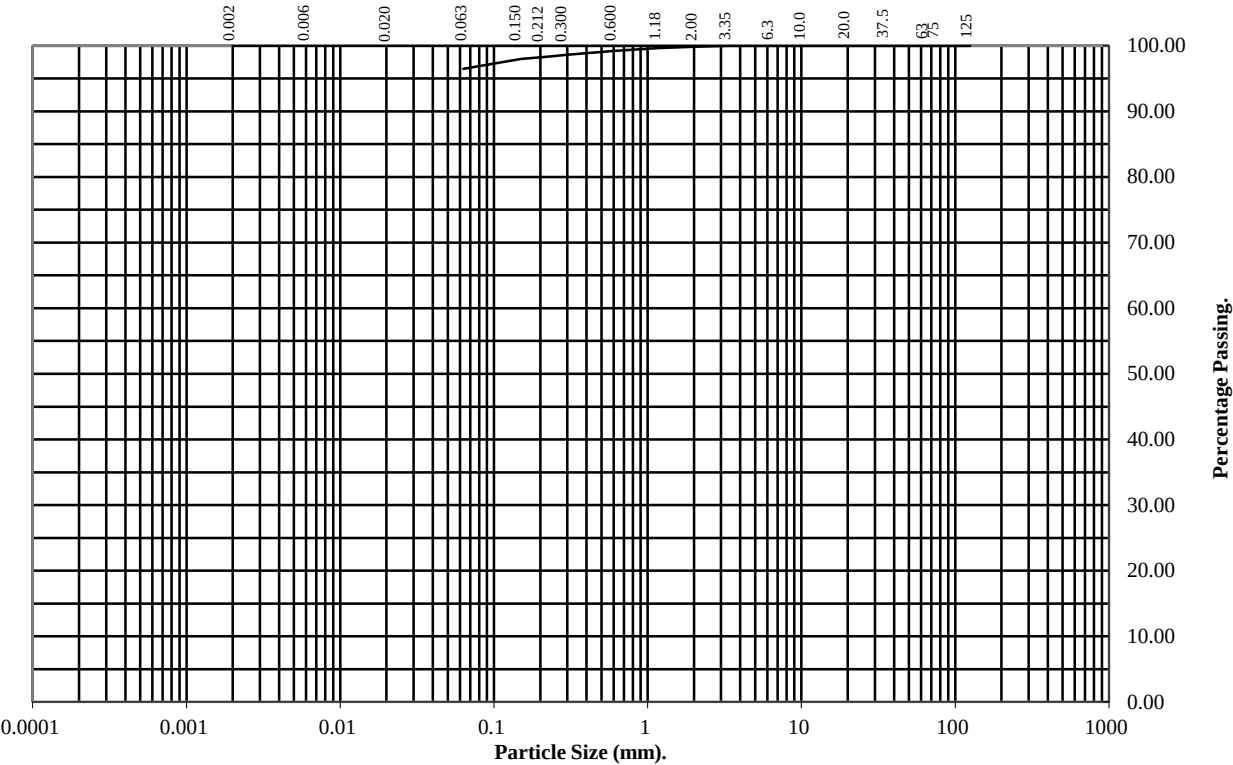
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: BHF Top Depth (m): 3.20

Sample Number: Base Depth(m): 4.00

Sample Type: B



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.6	99
0.3	99
0.212	98
0.15	98
0.063	96

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	4
Silt/Clay	96

Remarks:
See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

BHF

Top Depth (m):

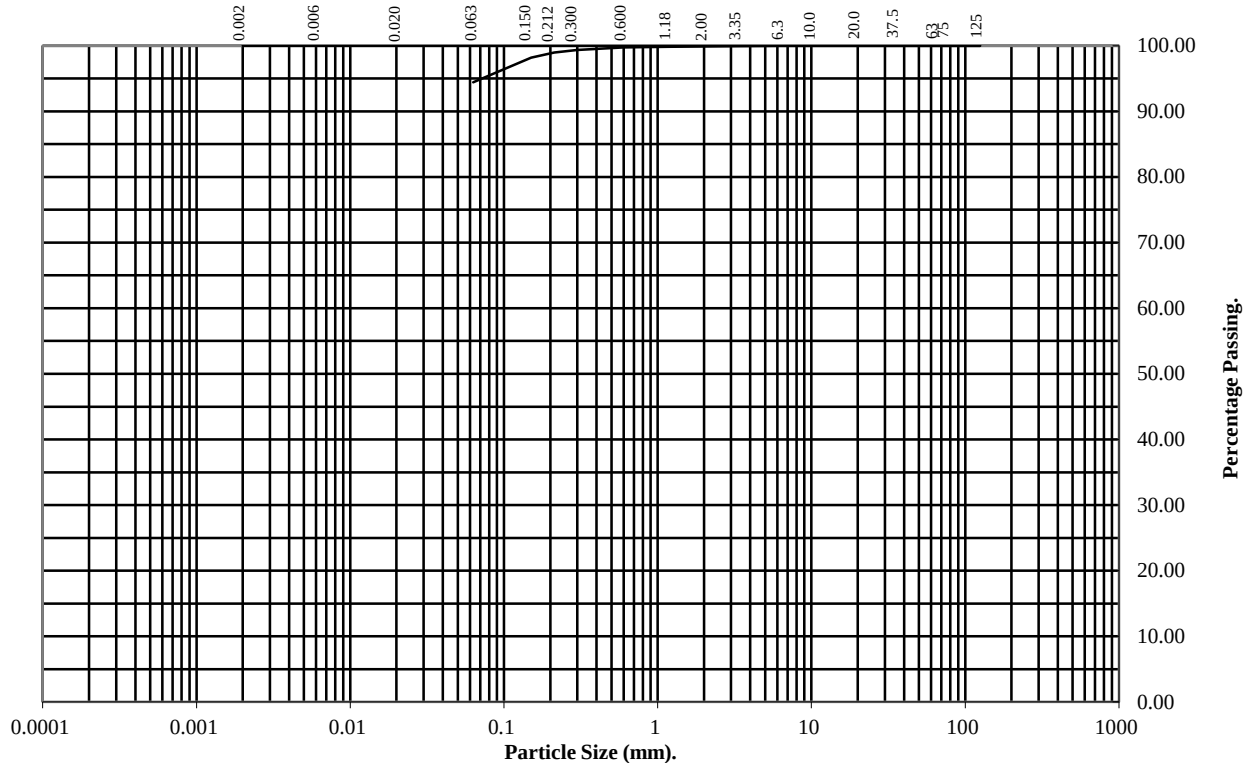
12.00

Sample Number:

Base Depth(m):

Sample Type:

D



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.6	100
0.3	99
0.212	99
0.15	98
0.063	94

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	6
Silt/Clay	94

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

BHF

Top Depth (m):

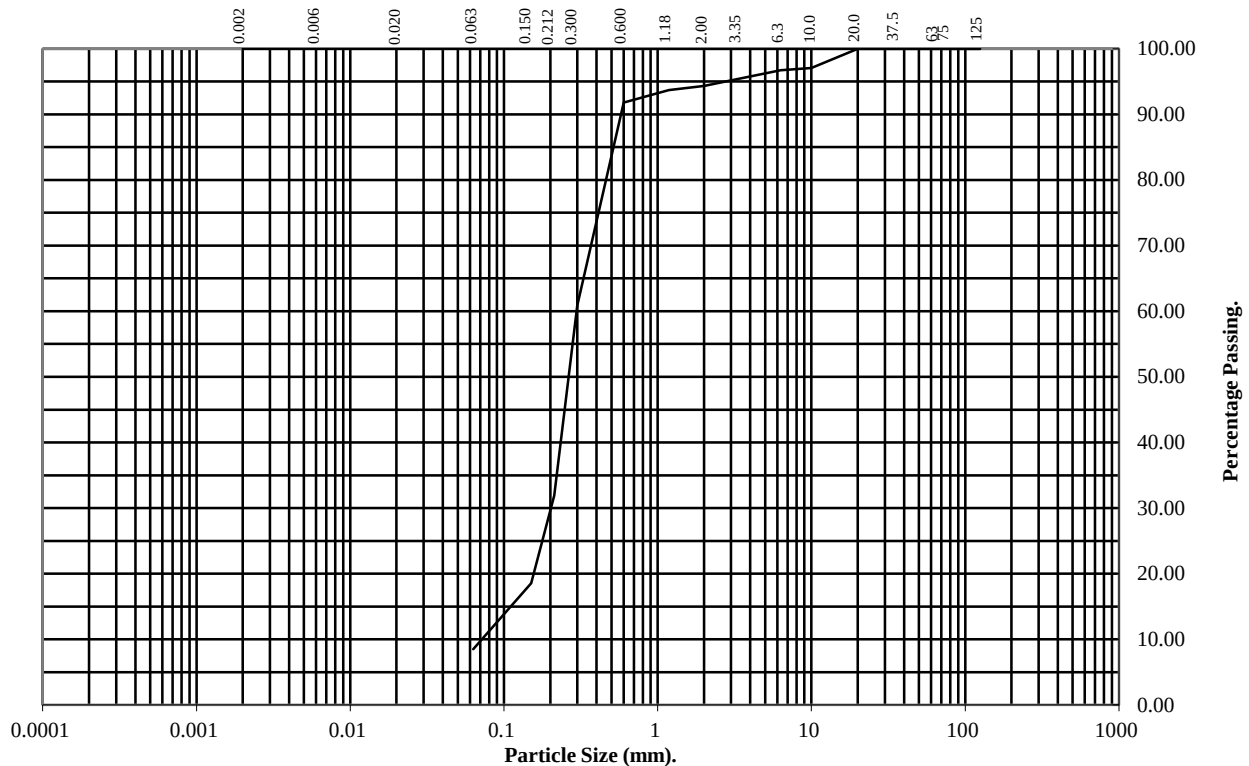
15.00

Sample Number:

Base Depth(m):

Sample Type:

D



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	97
6.3	97
3.35	95
2	94
1.18	94
0.6	92
0.3	61
0.212	32
0.15	19
0.063	9

Soil Fraction	Total Percentage
Cobbles	0
Gravel	6
Sand	85
Silt/Clay	9

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

BHG

Top Depth (m):

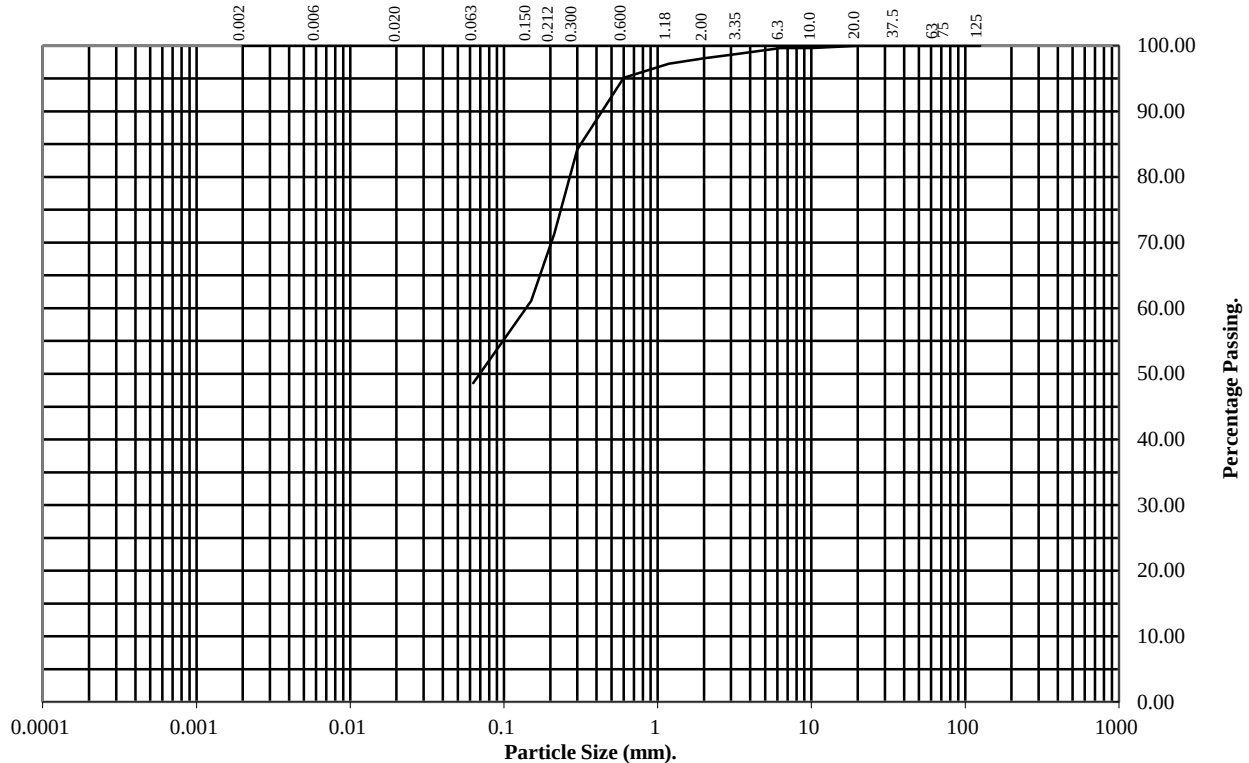
2.30

Sample Number:

Base Depth(m):

Sample Type:

B



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	99
2	98
1.18	97
0.6	95
0.3	84
0.212	71
0.15	61
0.063	49

Soil Fraction	Total Percentage
Cobbles	0
Gravel	2
Sand	49
Silt/Clay	49

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

BHG

Top Depth (m):

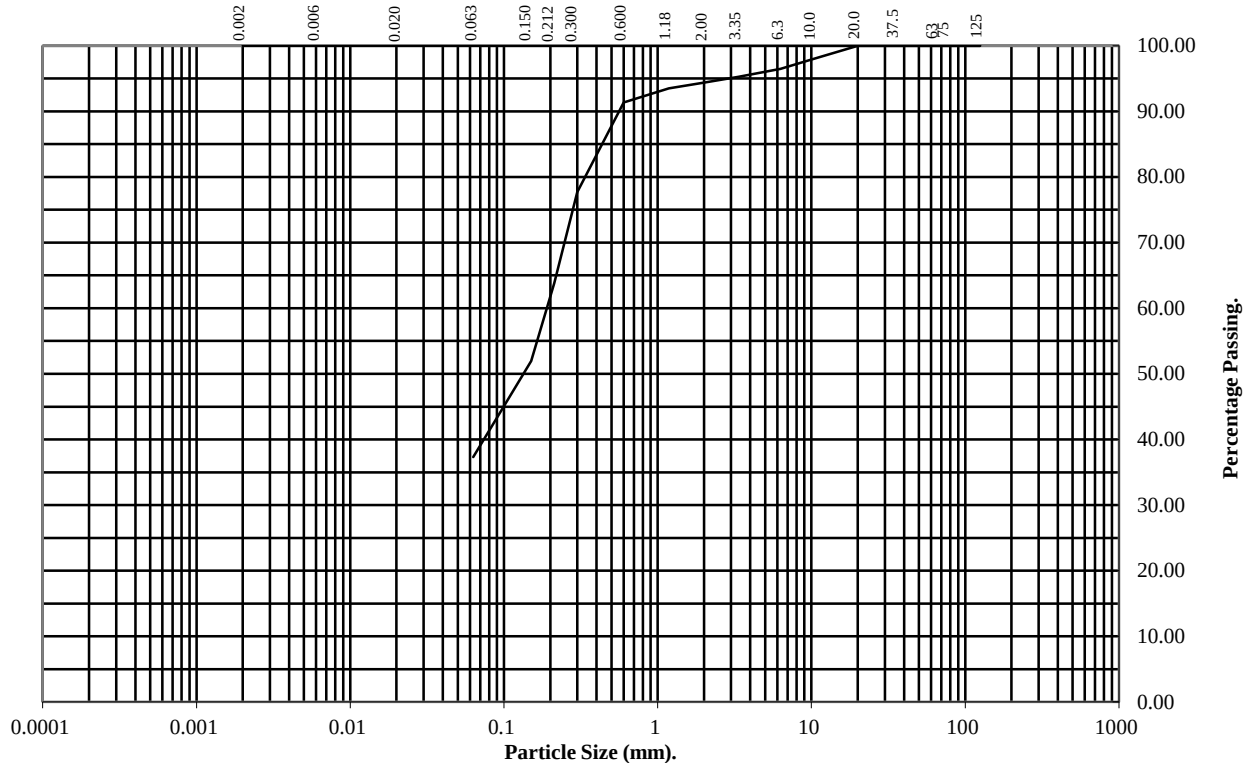
4.30

Sample Number:

Base Depth(m):

Sample Type:

B



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	98
6.3	96
3.35	95
2	94
1.18	93
0.6	91
0.3	78
0.212	64
0.15	52
0.063	37

Soil Fraction	Total Percentage
Cobbles	0
Gravel	6
Sand	57
Silt/Clay	37

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

BHG

Top Depth (m):

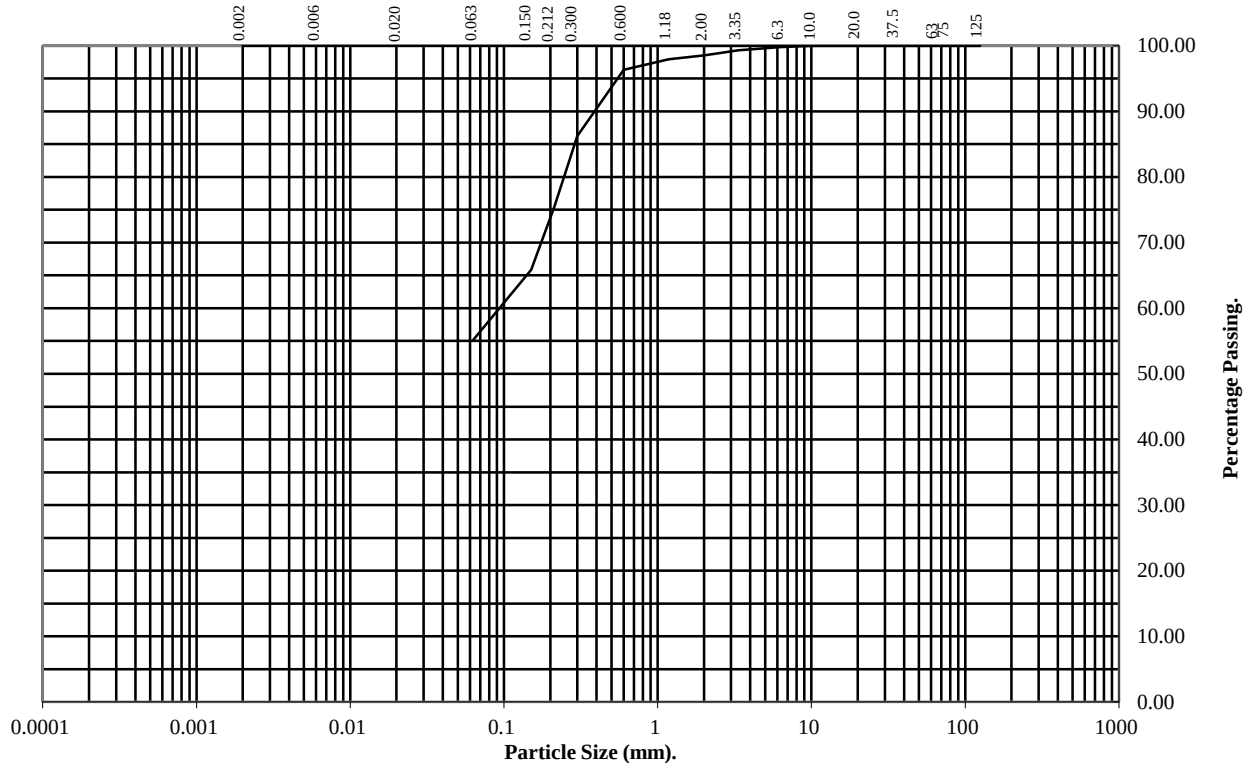
7.30

Sample Number:

Base Depth(m):

Sample Type:

B



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	99
2	99
1.18	98
0.6	96
0.3	86
0.212	75
0.15	66
0.063	55

Soil Fraction	Total Percentage
Cobbles	0
Gravel	1
Sand	44
Silt/Clay	55

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

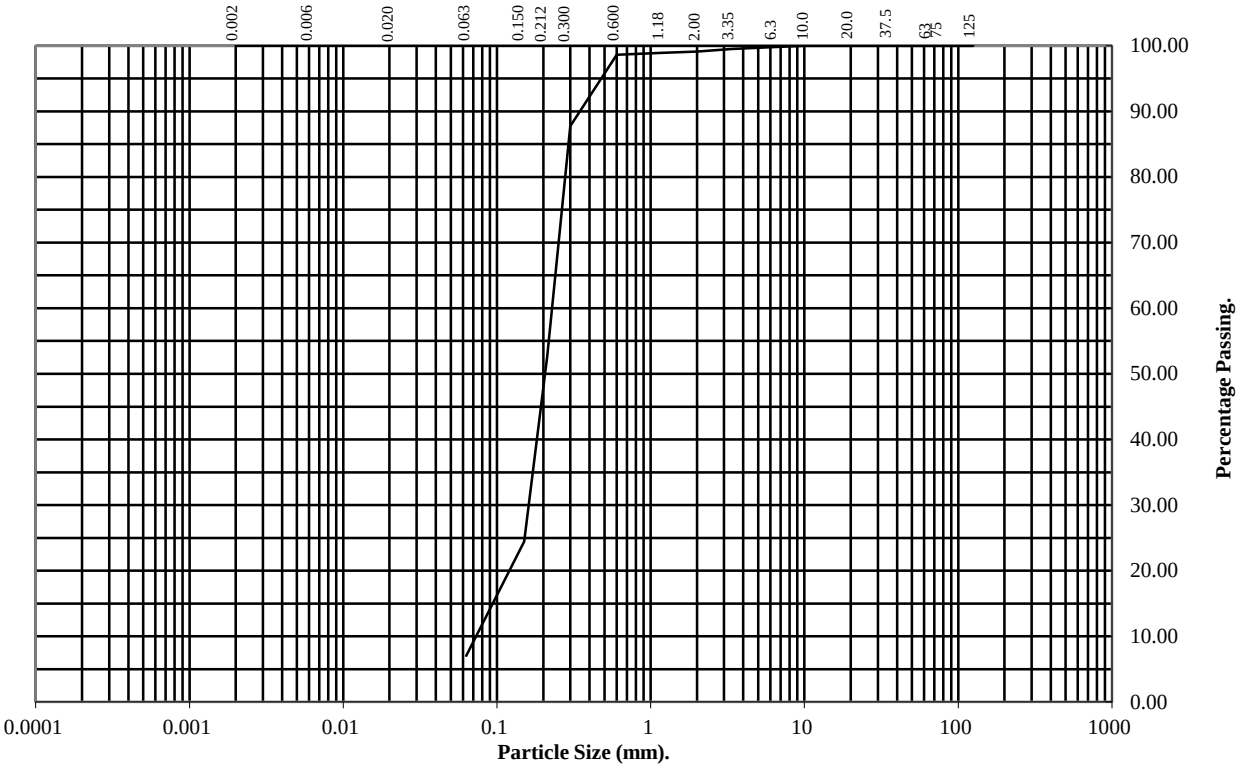
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: BHG Top Depth (m): 12.00

Sample Number: Base Depth(m):

Sample Type: D



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	99
1.18	99
0.6	99
0.3	88
0.212	53
0.15	24
0.063	7

Soil Fraction	Total Percentage
Cobbles	0
Gravel	1
Sand	92
Silt/Clay	7

Remarks:
See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

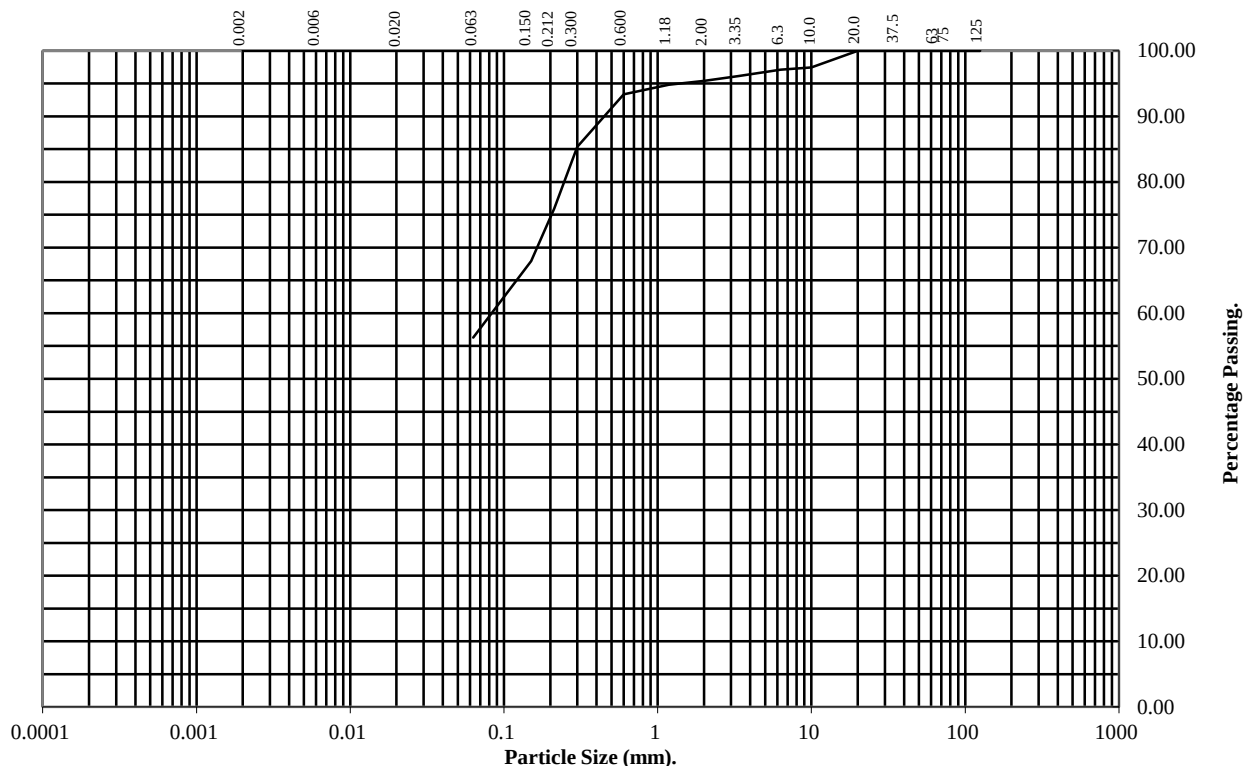
BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number: BHG Top Depth (m): 14.50

Sample Number: Base Depth(m): 14.90

Sample Type: B



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	97
6.3	97
3.35	96
2	95
1.18	95
0.6	93
0.3	85
0.212	76
0.15	68
0.063	56

Soil Fraction	Total Percentage
Cobbles	0
Gravel	5
Sand	39
Silt/Clay	56

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

BHG

Top Depth (m):

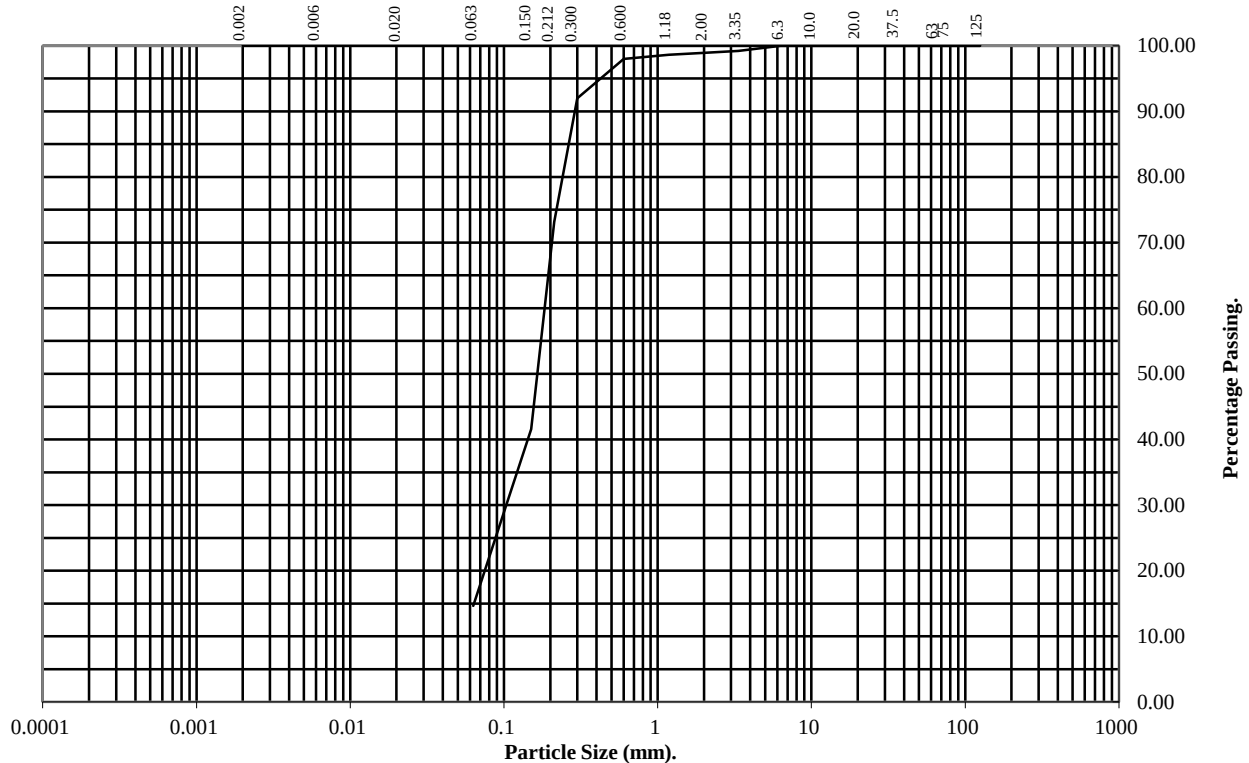
19.00

Sample Number:

Base Depth(m):

Sample Type:

D



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	99
2	99
1.18	99
0.6	98
0.3	92
0.212	73
0.15	42
0.063	15

Soil Fraction	Total Percentage
Cobbles	0
Gravel	1
Sand	84
Silt/Clay	15

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

BHH

Top Depth (m):

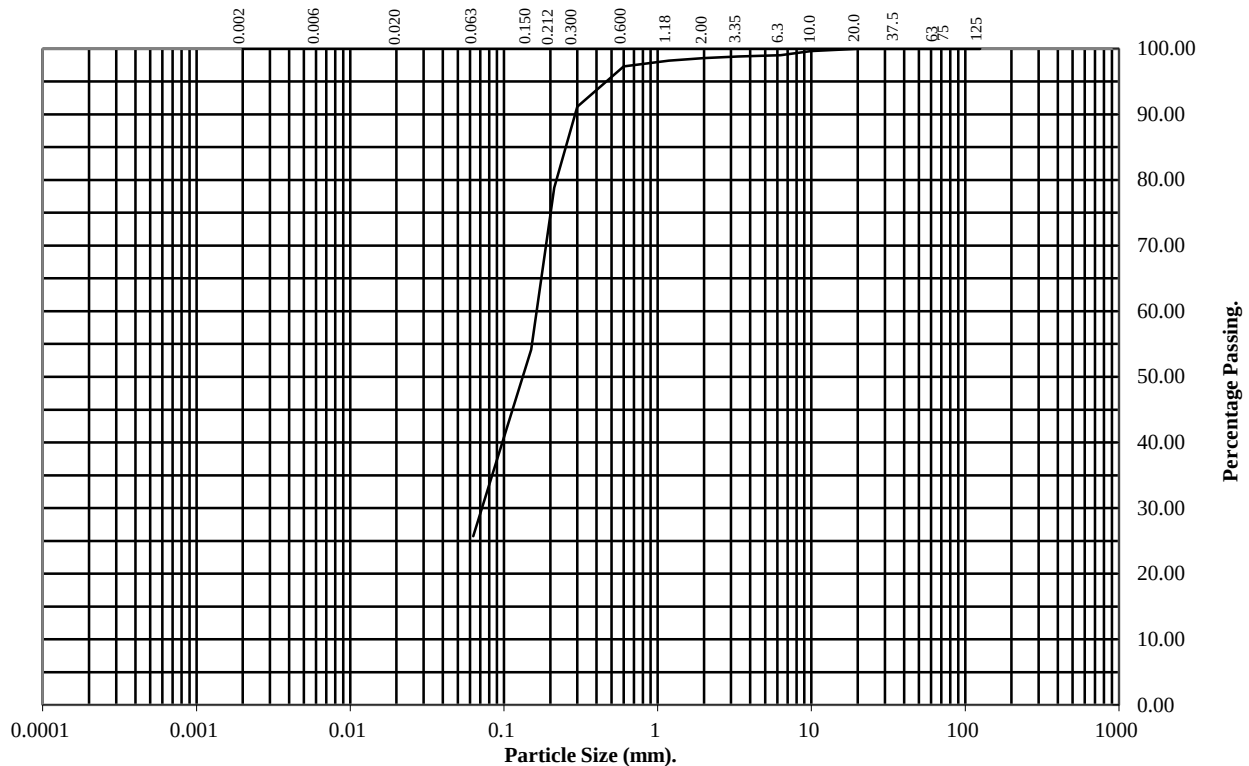
10.00

Sample Number:

Base Depth(m):

Sample Type:

B



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	99
3.35	99
2	99
1.18	98
0.6	97
0.3	91
0.212	79
0.15	54
0.063	26

Soil Fraction	Total Percentage
Cobbles	0
Gravel	1
Sand	73
Silt/Clay	26

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

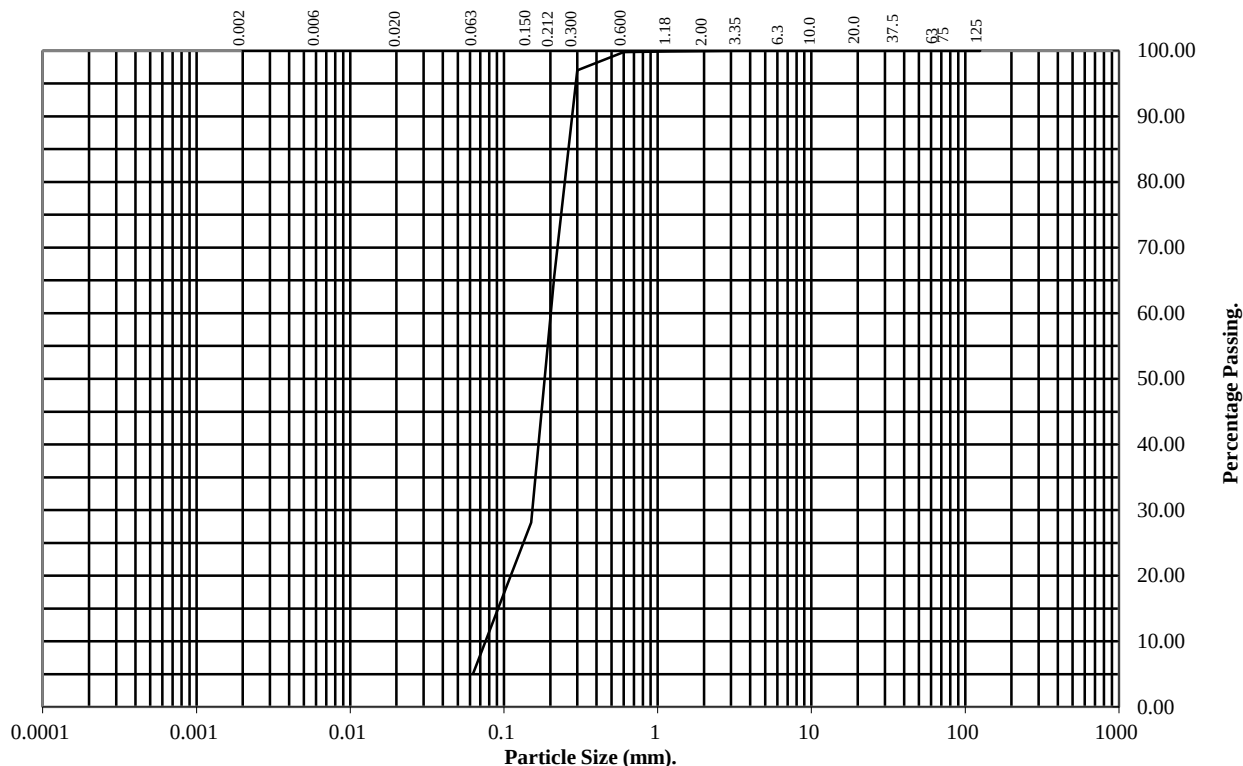
Hole Number: BHH

Top Depth (m): 14.00

Sample Number:

Base Depth(m):

Sample Type: D



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.6	100
0.3	97
0.212	66
0.15	28
0.063	5

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	95
Silt/Clay	5

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

BHI

Top Depth (m):

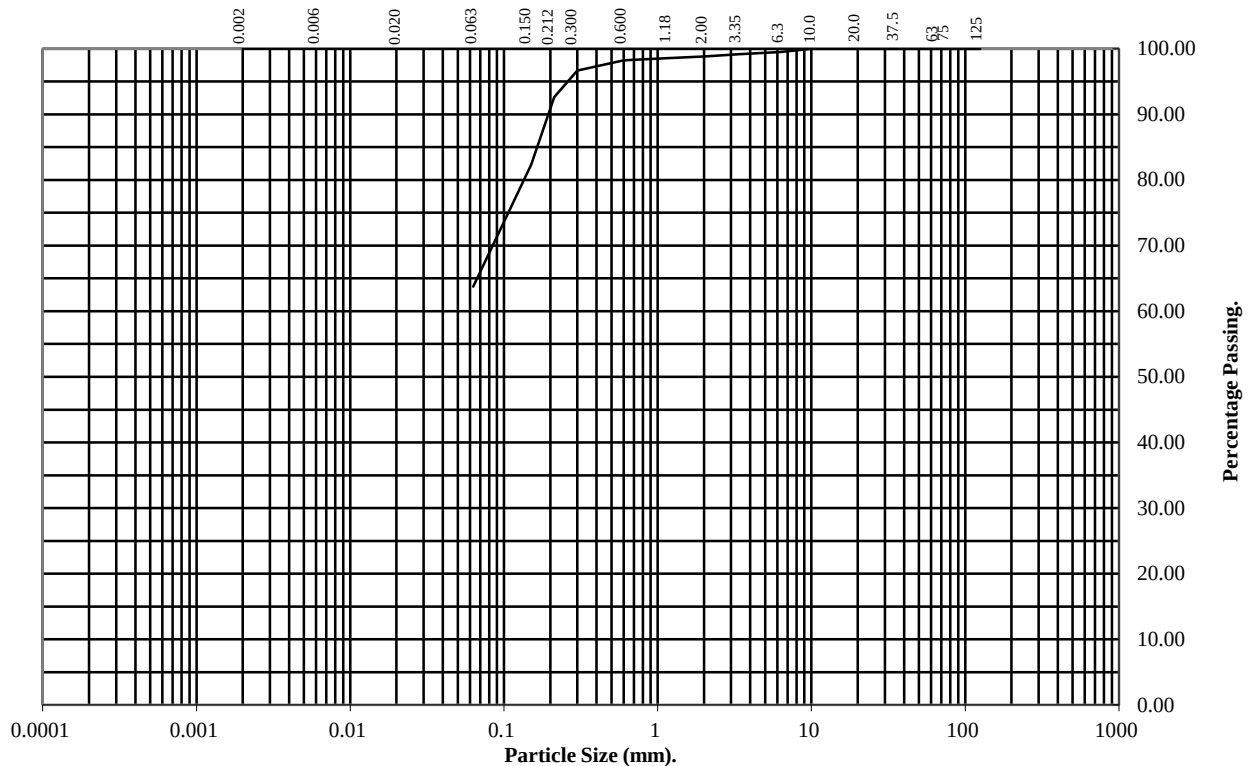
4.00

Sample Number:

Base Depth(m):

Sample Type:

B



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	99
3.35	99
2	99
1.18	99
0.6	98
0.3	97
0.212	93
0.15	82
0.063	64

Soil Fraction	Total Percentage
Cobbles	0
Gravel	1
Sand	35
Silt/Clay	64

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

BHI

Top Depth (m):

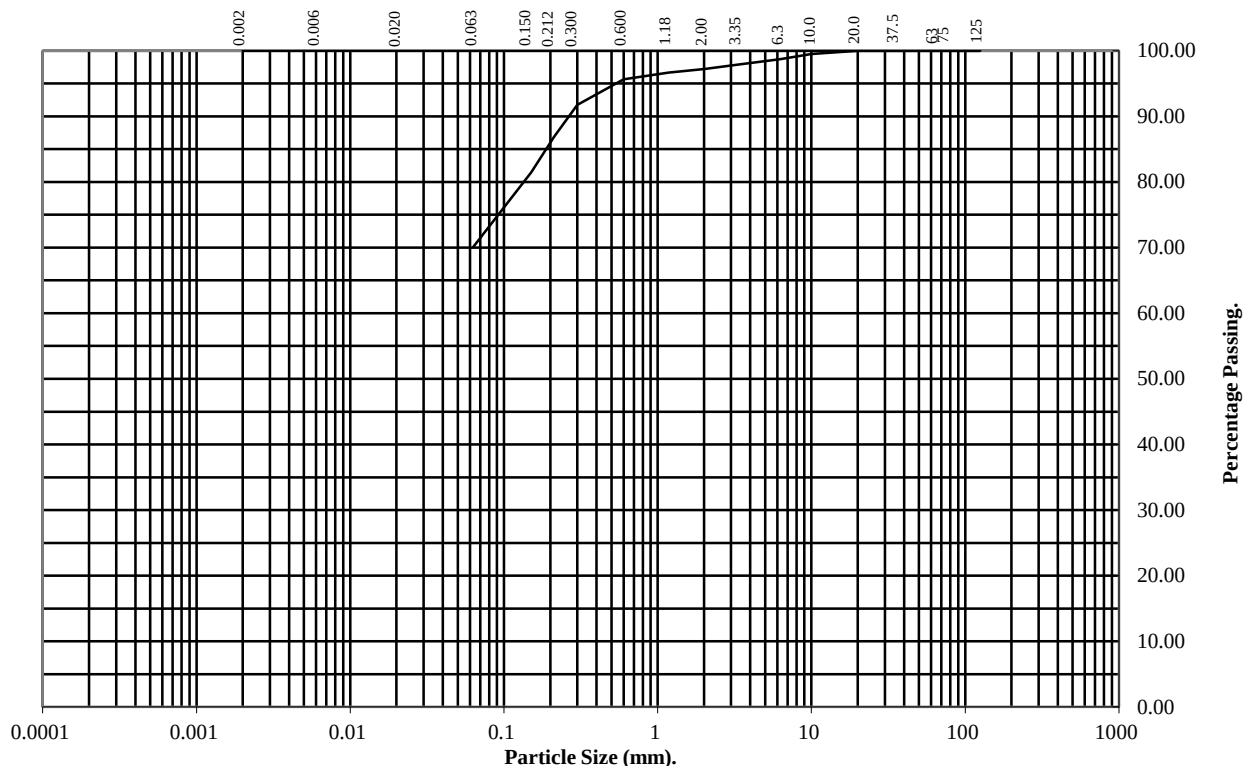
6.00

Sample Number:

Base Depth(m):

Sample Type:

B



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	99
6.3	99
3.35	98
2	97
1.18	97
0.6	96
0.3	92
0.212	87
0.15	81
0.063	70

Soil Fraction	Total Percentage
Cobbles	0
Gravel	3
Sand	27
Silt/Clay	70

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

BHI

Top Depth (m):

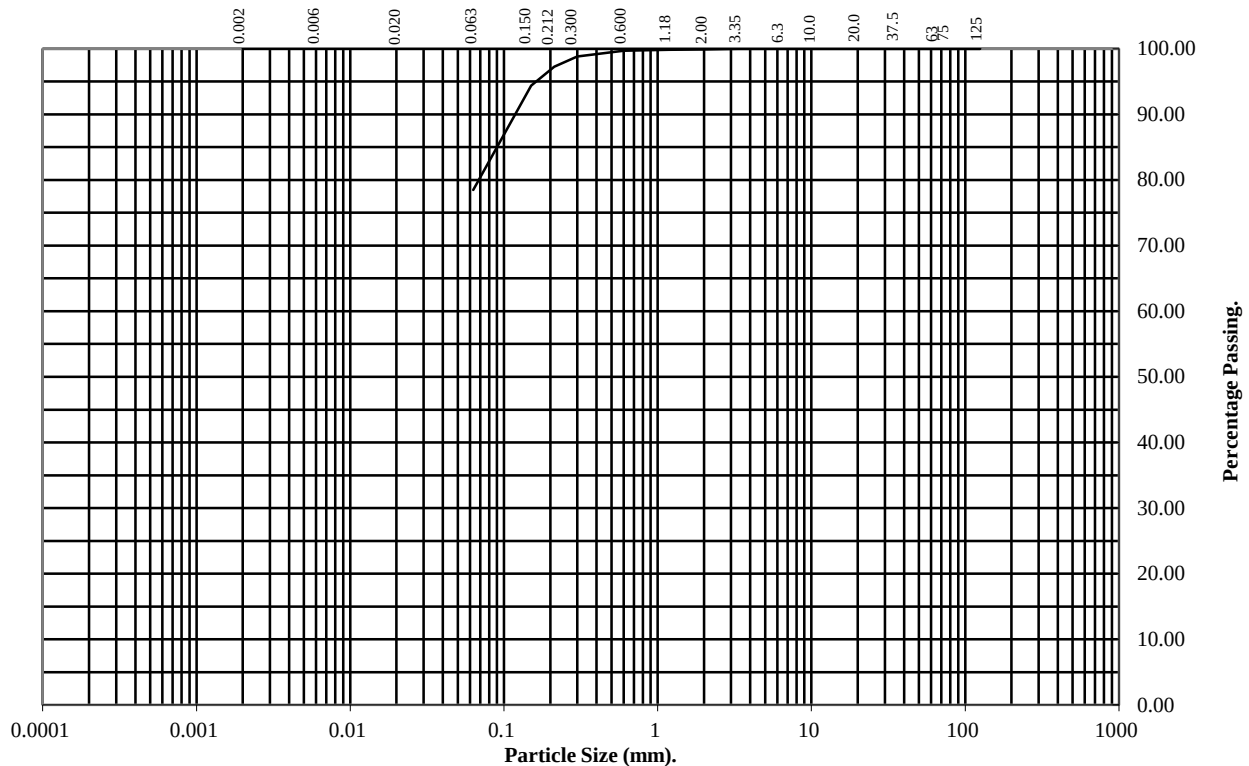
10.00

Sample Number:

Base Depth(m):

Sample Type:

B



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.6	100
0.3	99
0.212	97
0.15	94
0.063	78

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	22
Silt/Clay	78

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

BHI

Top Depth (m):

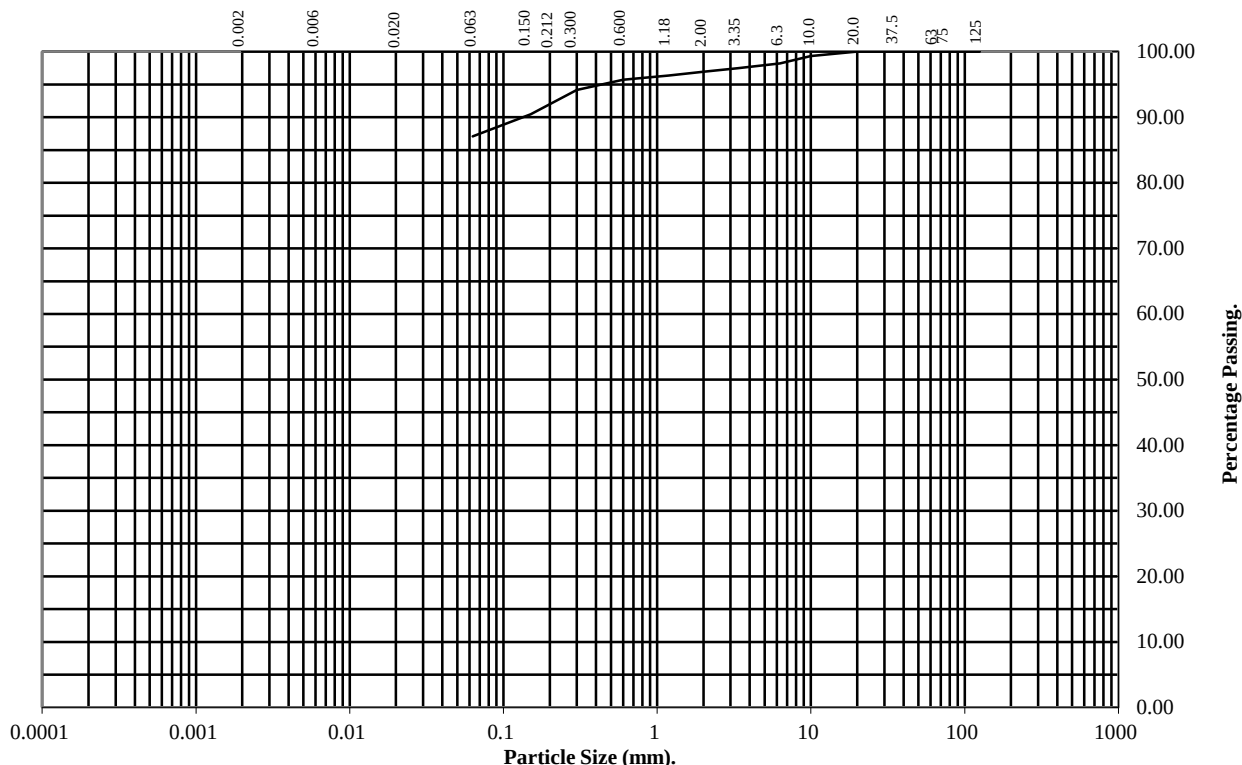
13.00

Sample Number:

Base Depth(m):

Sample Type:

B



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	99
6.3	98
3.35	98
2	97
1.18	96
0.6	96
0.3	94
0.212	92
0.15	90
0.063	87

Soil Fraction	Total Percentage
Cobbles	0
Gravel	3
Sand	10
Silt/Clay	87

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

BHI

Top Depth (m):

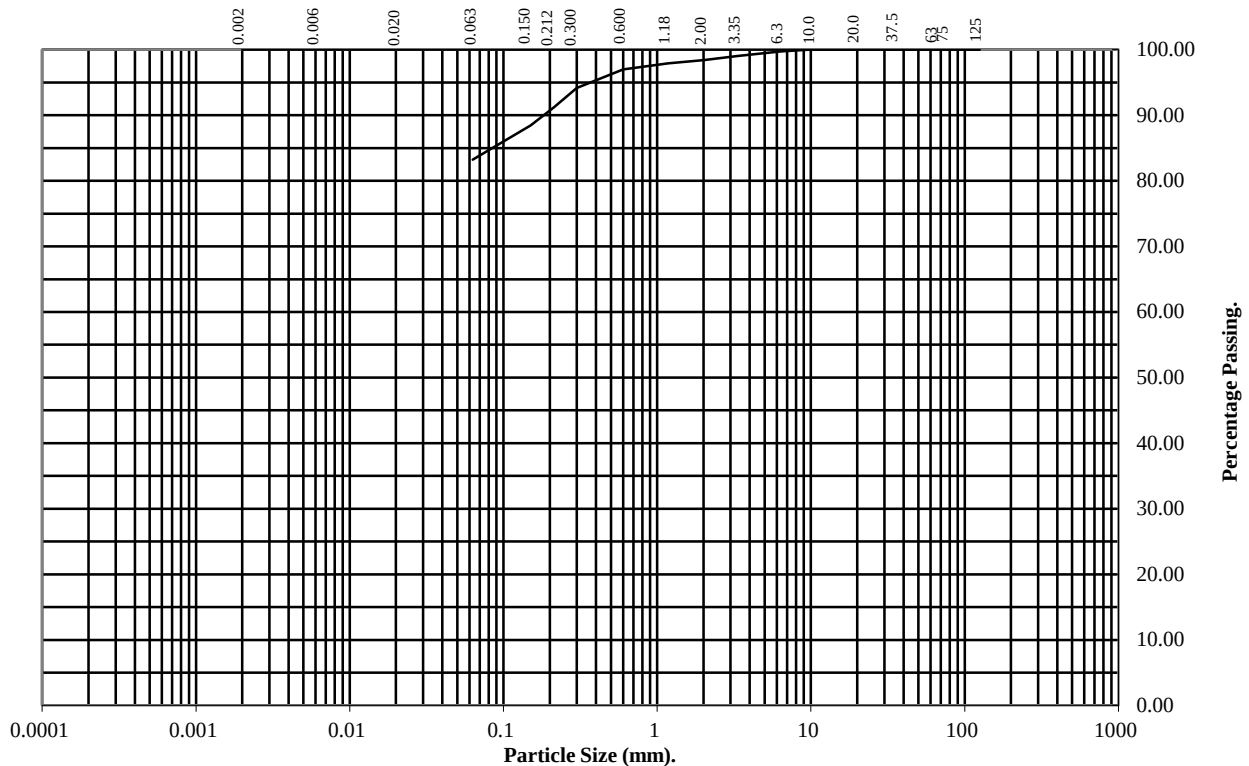
15.50

Sample Number:

Base Depth(m):

Sample Type:

B



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	99
2	98
1.18	98
0.6	97
0.3	94
0.212	91
0.15	88
0.063	83

Soil Fraction	Total Percentage
Cobbles	0
Gravel	2
Sand	15
Silt/Clay	83

Remarks:

See Summary of Soil Descriptions



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Trows Lane Farm

Contract No:

PSL17/2664

Client Ref:

R2392

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

BHI

Top Depth (m):

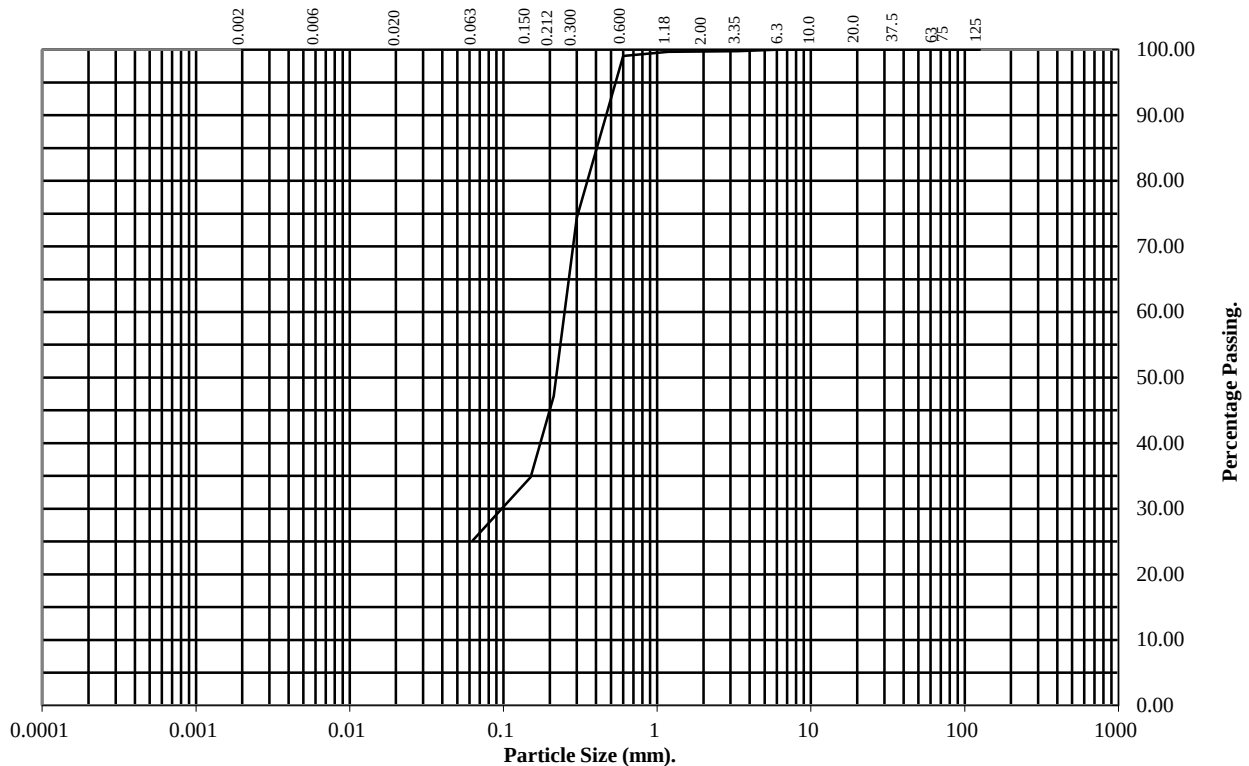
17.00

Sample Number:

Base Depth(m):

Sample Type:

B



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.6	99
0.3	74
0.212	47
0.15	35
0.063	25

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	75
Silt/Clay	25

Remarks:

See Summary of Soil Descriptions



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Trows Lane Farm

Contract No:
PSL17/2664
Client Ref:
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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

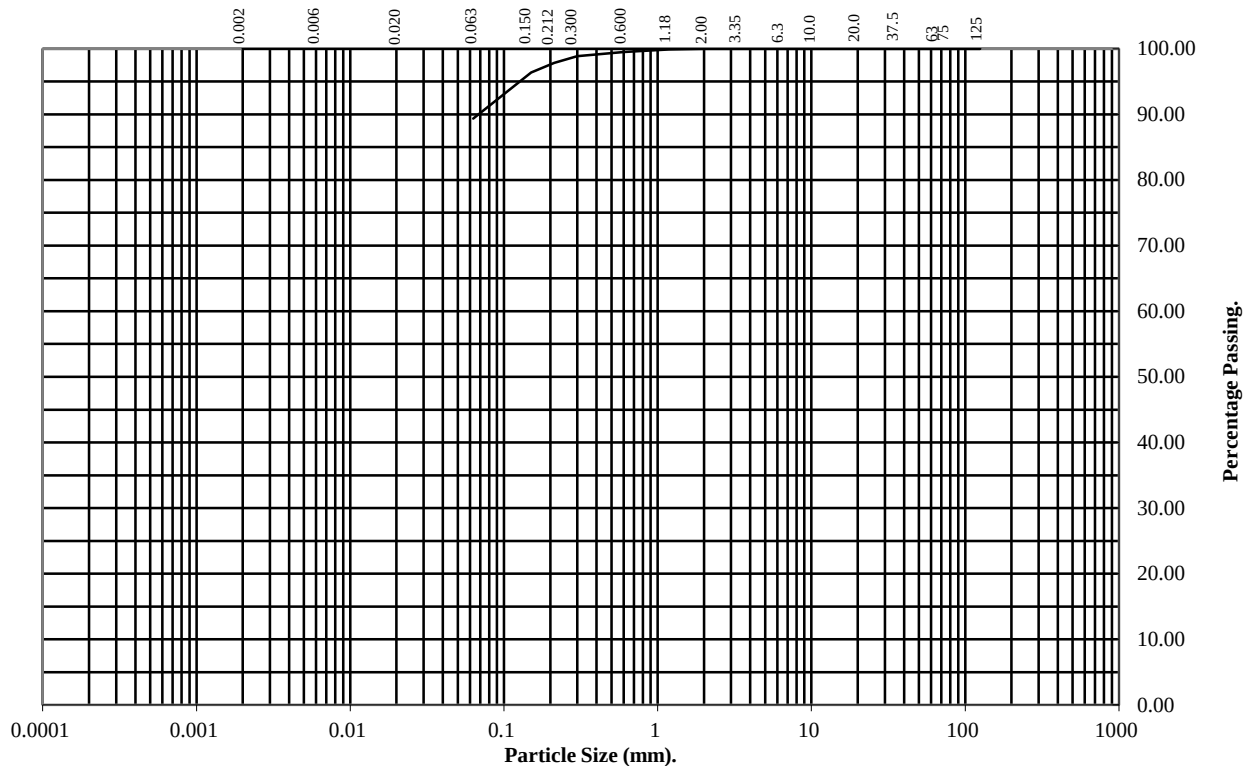
Hole Number: BHJ

Top Depth (m): 3.50

Sample Number:

Base Depth(m):

Sample Type: B



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.6	100
0.3	99
0.212	98
0.15	96
0.063	89

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	11
Silt/Clay	89

Remarks:

See Summary of Soil Descriptions



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Client Ref:
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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

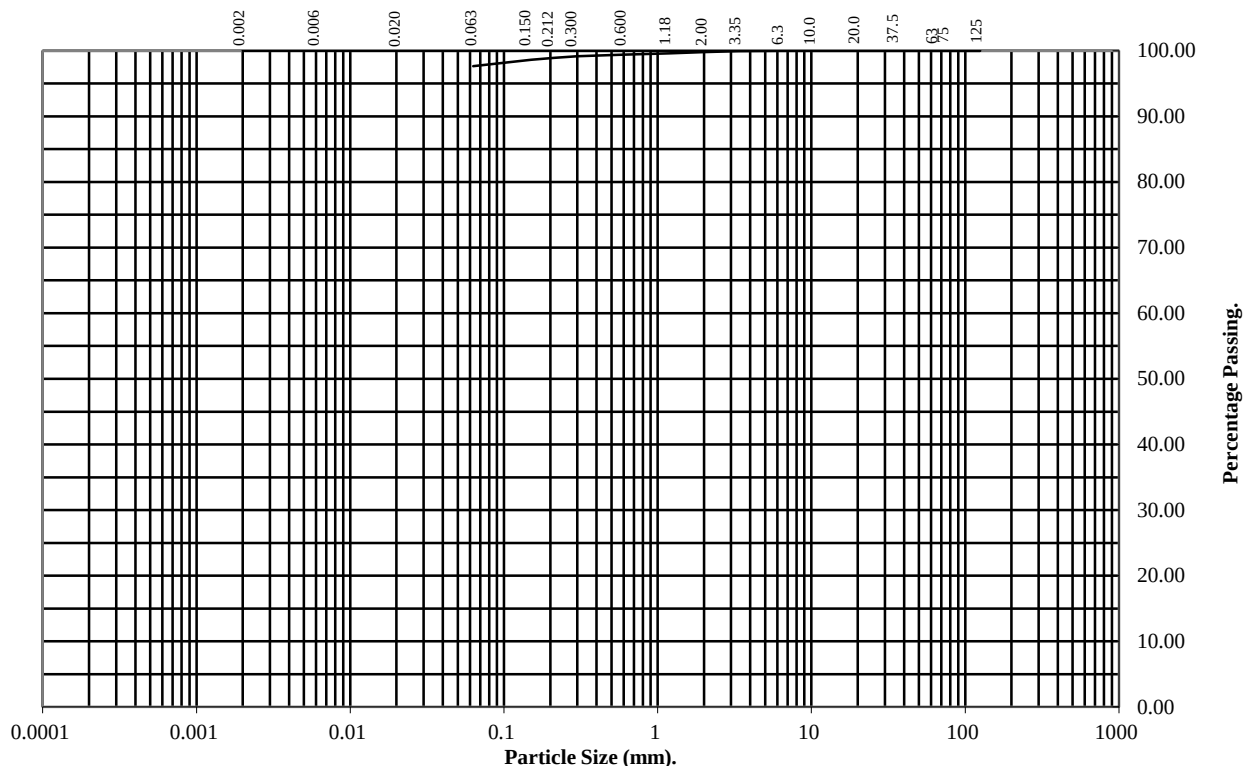
Hole Number: BHJ

Top Depth (m): 4.50

Sample Number:

Base Depth(m):

Sample Type: B



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.6	99
0.3	99
0.212	99
0.15	99
0.063	98

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	2
Silt/Clay	98

Remarks:

See Summary of Soil Descriptions



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Client Ref:

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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

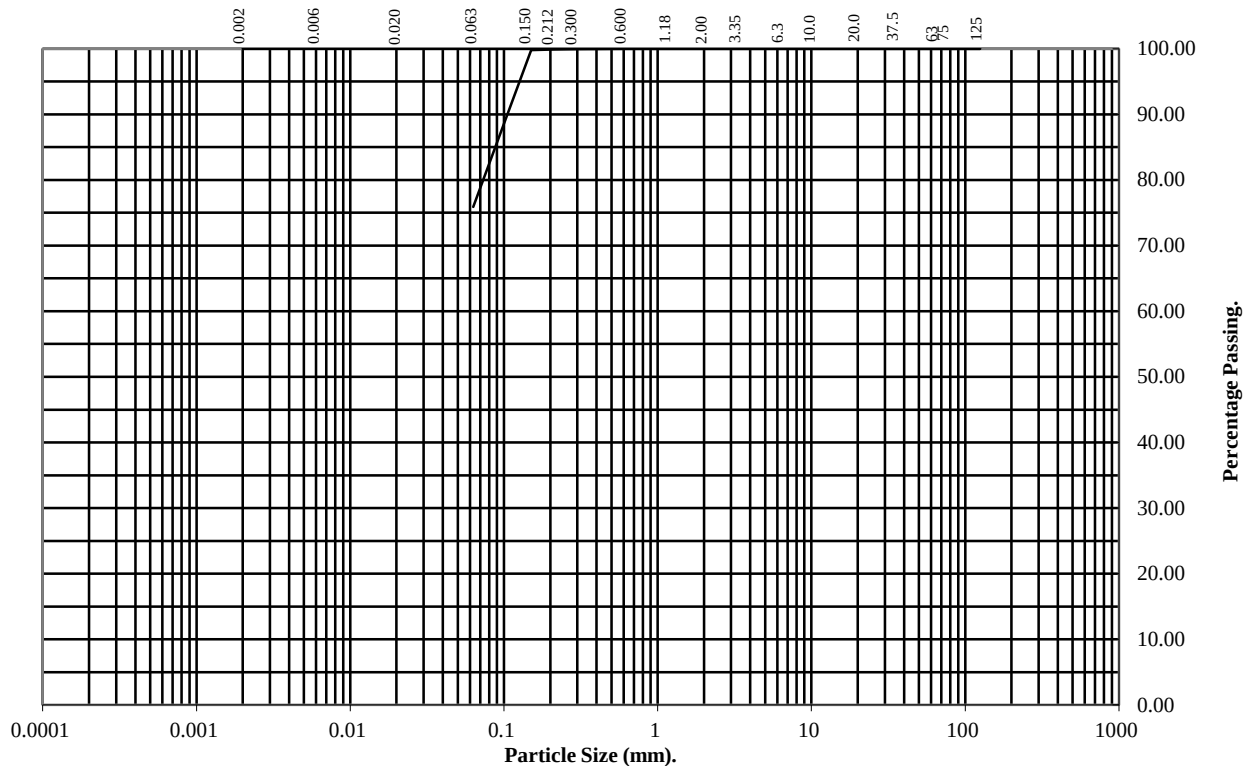
Hole Number: BHJ

Top Depth (m): 7.00

Sample Number:

Base Depth(m):

Sample Type: D



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.6	100
0.3	100
0.212	100
0.15	100
0.063	76

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	24
Silt/Clay	76

Remarks:

See Summary of Soil Descriptions



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Trows Lane Farm

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Client Ref:
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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

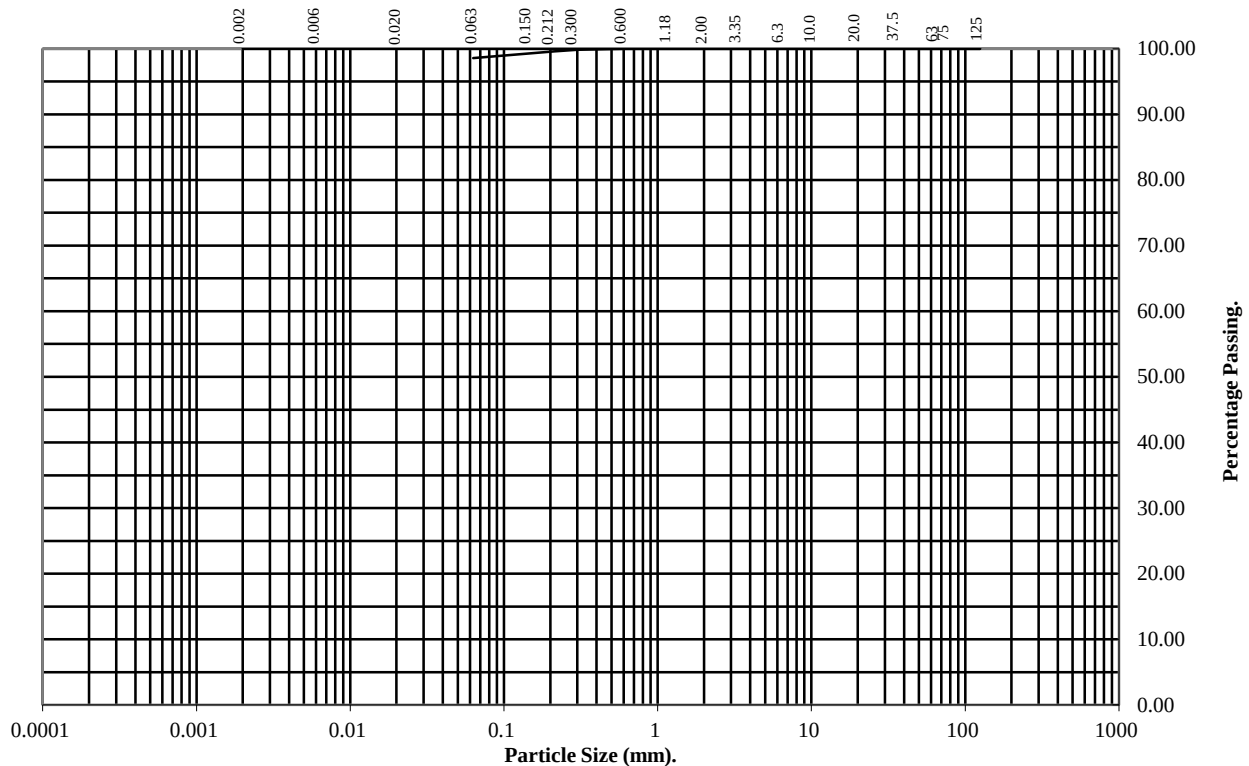
Hole Number: BHJ

Top Depth (m): 9.00

Sample Number:

Base Depth(m):

Sample Type: B



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.6	100
0.3	100
0.212	100
0.15	99
0.063	99

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	1
Silt/Clay	99

Remarks:

See Summary of Soil Descriptions



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Trows Lane Farm

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Client Ref:

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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

BHK

Top Depth (m):

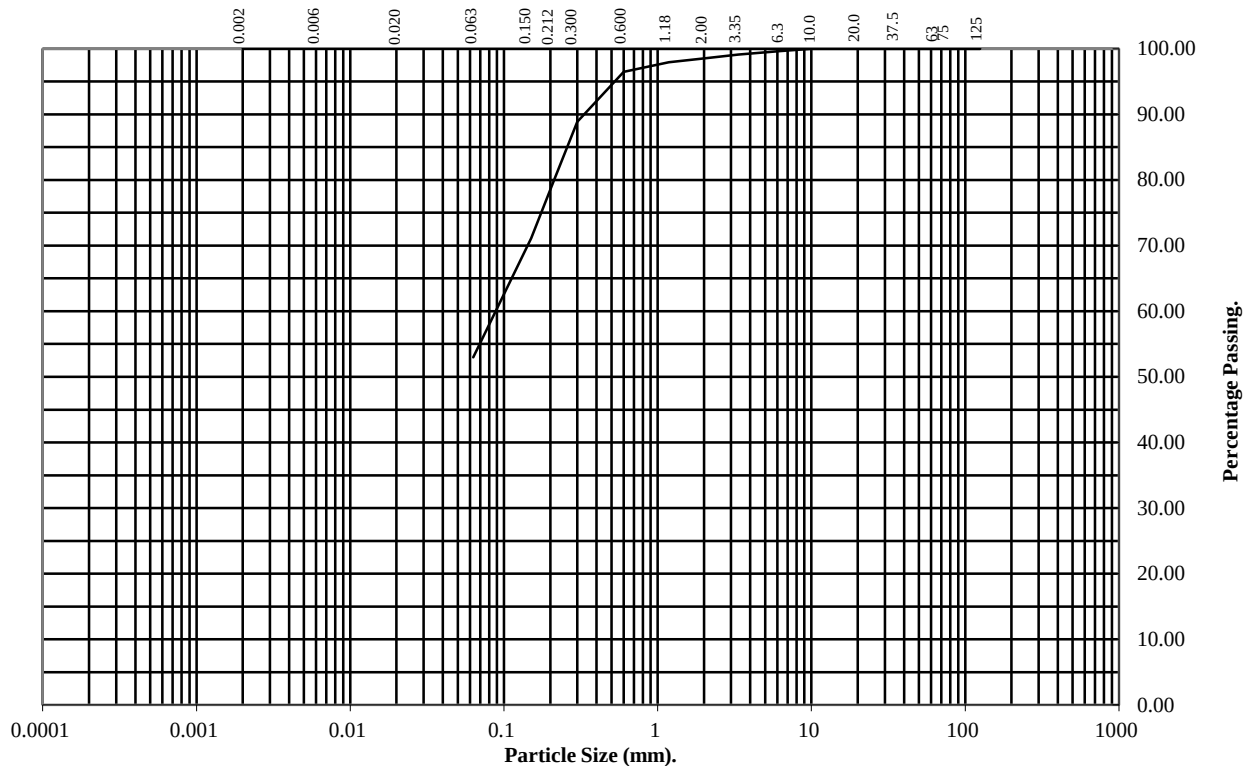
6.00

Sample Number:

Base Depth(m):

Sample Type:

D



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	99
2	99
1.18	98
0.6	96
0.3	89
0.212	80
0.15	71
0.063	53

Soil Fraction	Total Percentage
Cobbles	0
Gravel	1
Sand	46
Silt/Clay	53

Remarks:

See Summary of Soil Descriptions



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Trows Lane Farm

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Client Ref:

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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

BHK

Top Depth (m):

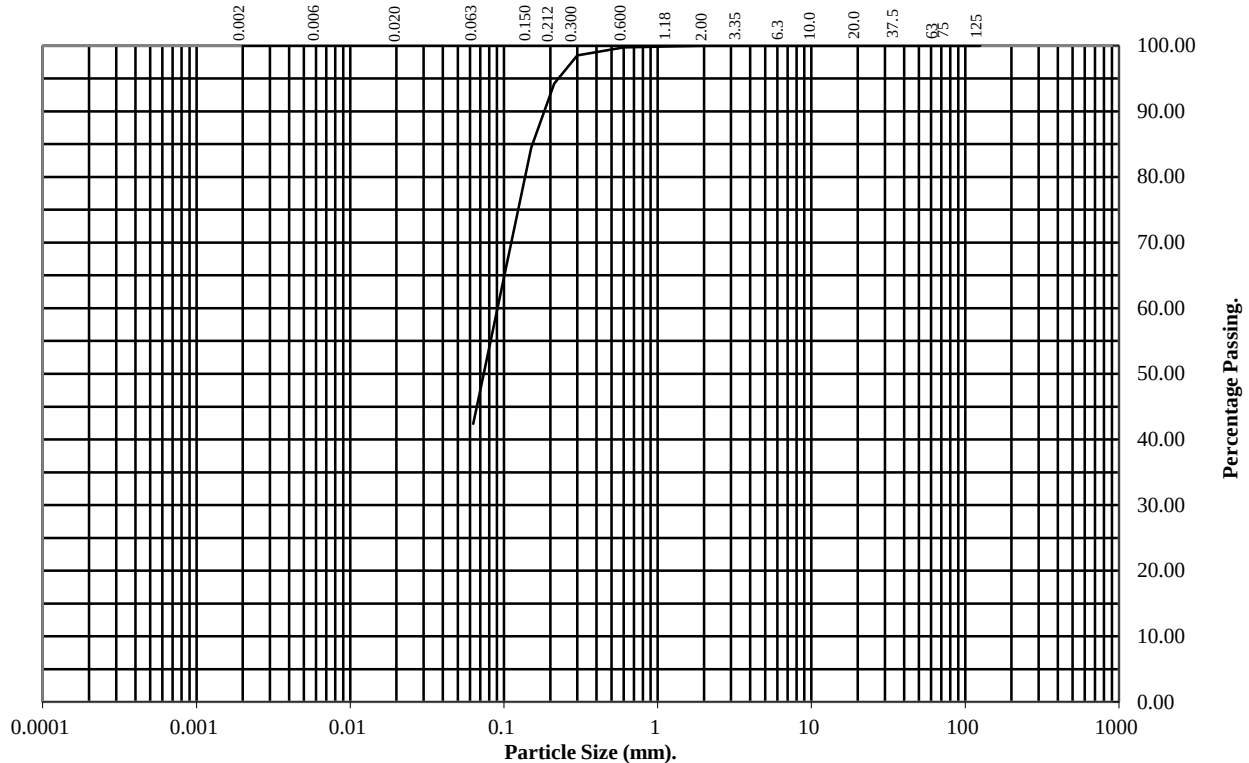
10.00

Sample Number:

Base Depth(m):

Sample Type:

D



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.6	100
0.3	99
0.212	94
0.15	84
0.063	42

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	58
Silt/Clay	42

Remarks:

See Summary of Soil Descriptions



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Trows Lane Farm

Contract No:

PSL17/2664

Client Ref:

R2392

PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

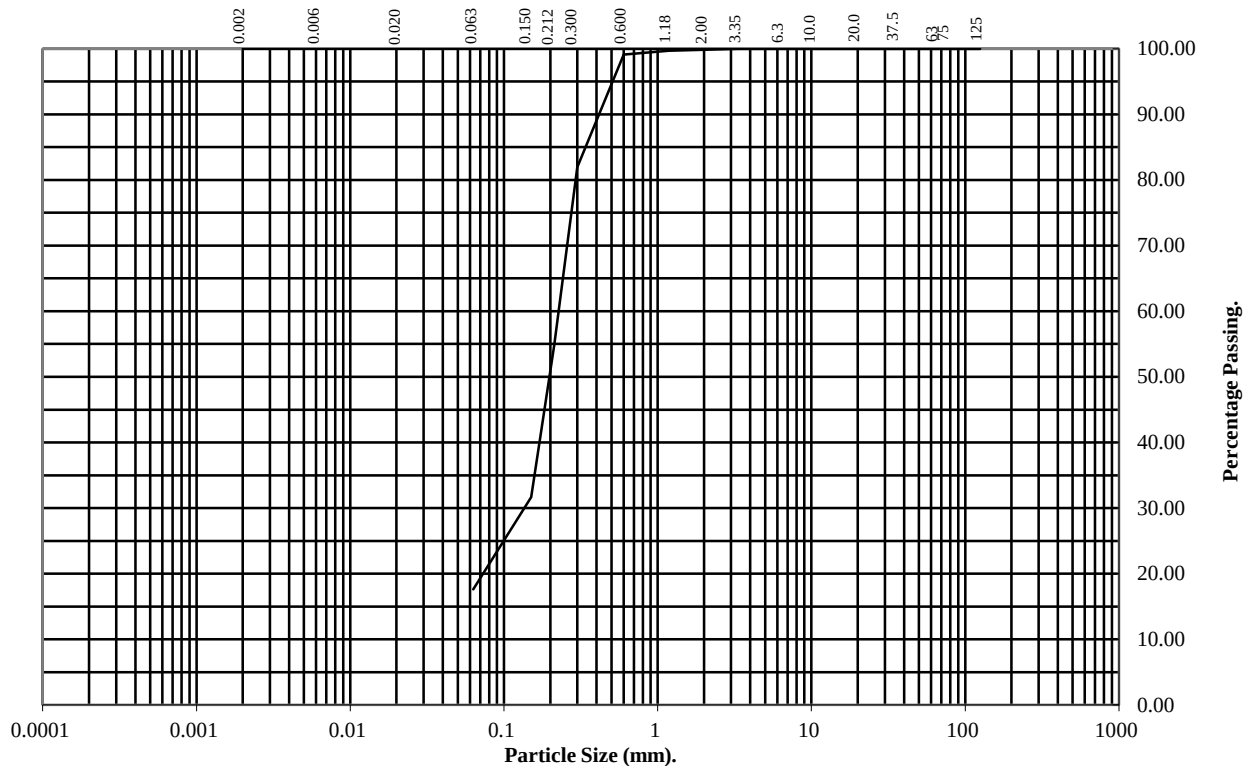
Hole Number: BHL

Top Depth (m): 3.00

Sample Number:

Base Depth(m): 4.00

Sample Type: B



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.6	99
0.3	82
0.212	55
0.15	32
0.063	18

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	82
Silt/Clay	18

Remarks:

See Summary of Soil Descriptions



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Trows Lane Farm

Contract No:
PSL17/2664
Client Ref:
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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

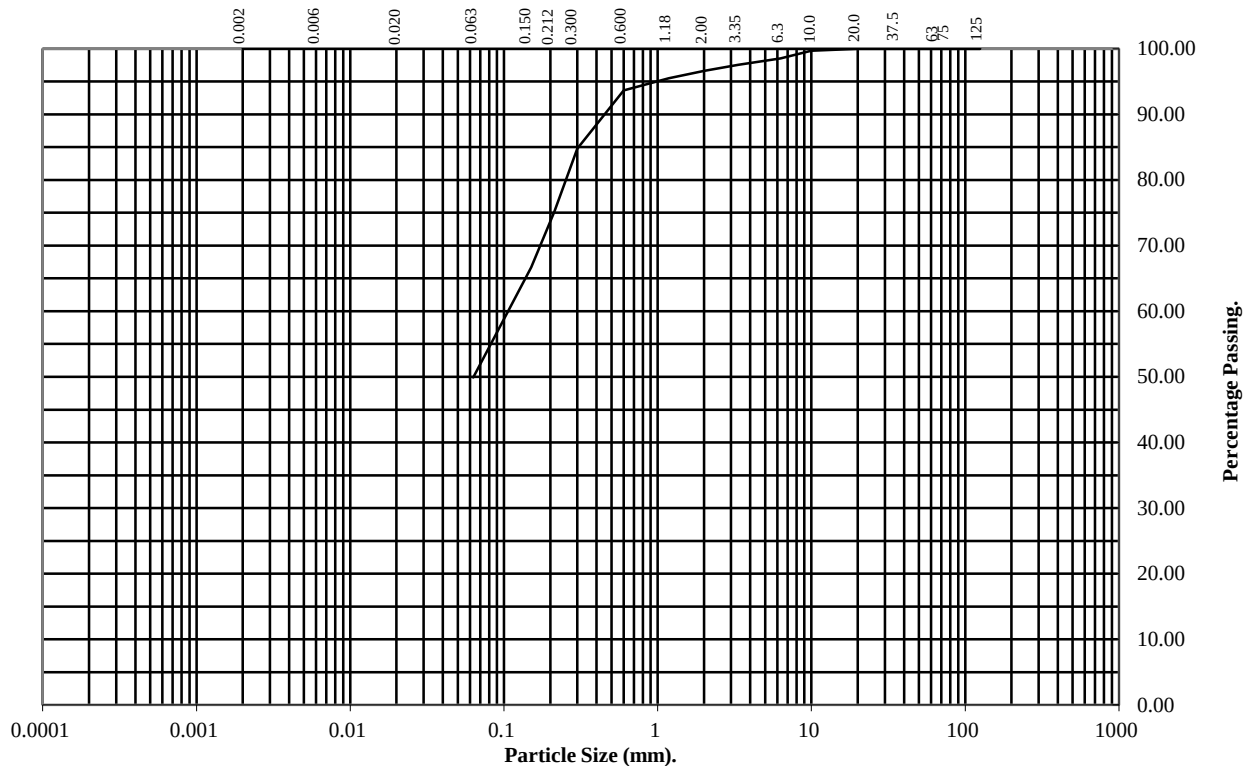
Hole Number: BHL

Top Depth (m): 13.00

Sample Number:

Base Depth(m):

Sample Type: D



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	98
3.35	98
2	97
1.18	96
0.6	94
0.3	85
0.212	75
0.15	67
0.063	50

Soil Fraction	Total Percentage
Cobbles	0
Gravel	3
Sand	47
Silt/Clay	50

Remarks:

See Summary of Soil Descriptions



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Client Ref:
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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

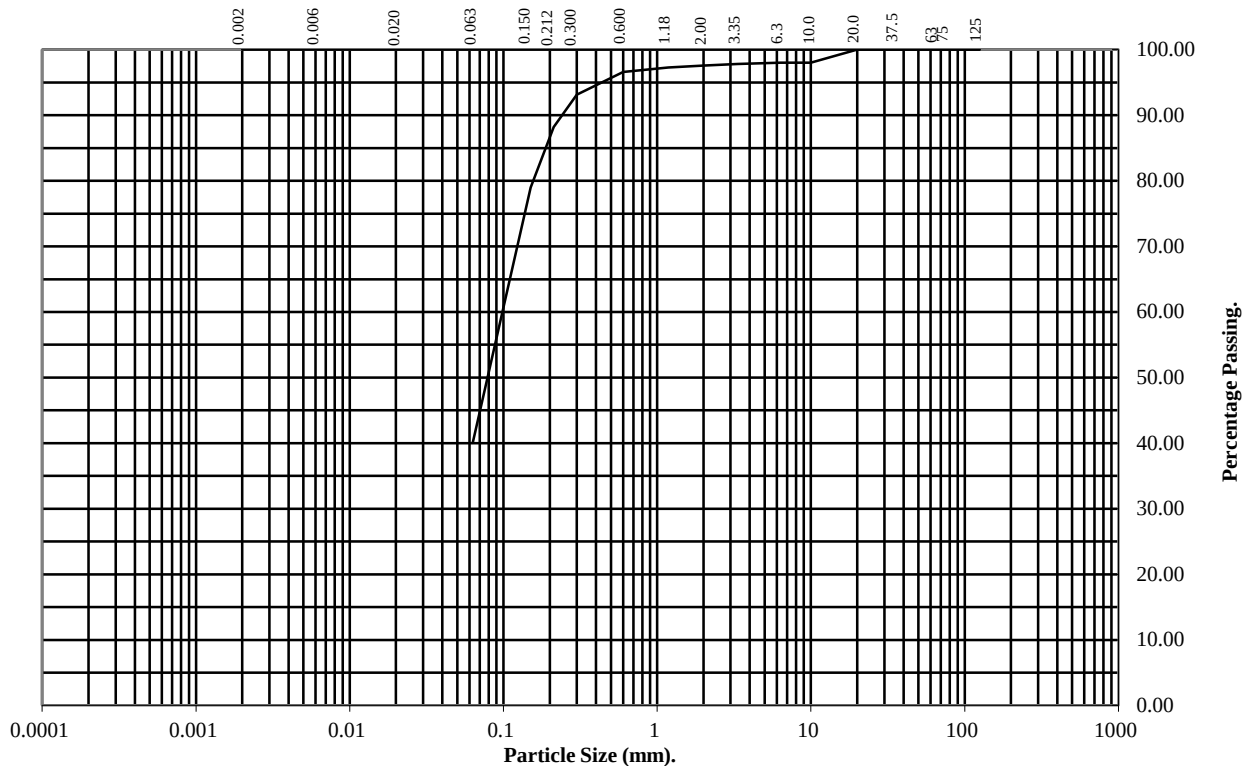
Hole Number: BHL

Top Depth (m): 16.00

Sample Number:

Base Depth(m):

Sample Type: B



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	98
6.3	98
3.35	98
2	98
1.18	97
0.6	97
0.3	93
0.212	88
0.15	79
0.063	40

Soil Fraction	Total Percentage
Cobbles	0
Gravel	2
Sand	58
Silt/Clay	40

Remarks:

See Summary of Soil Descriptions



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Client Ref:
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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

BHM

Top Depth (m):

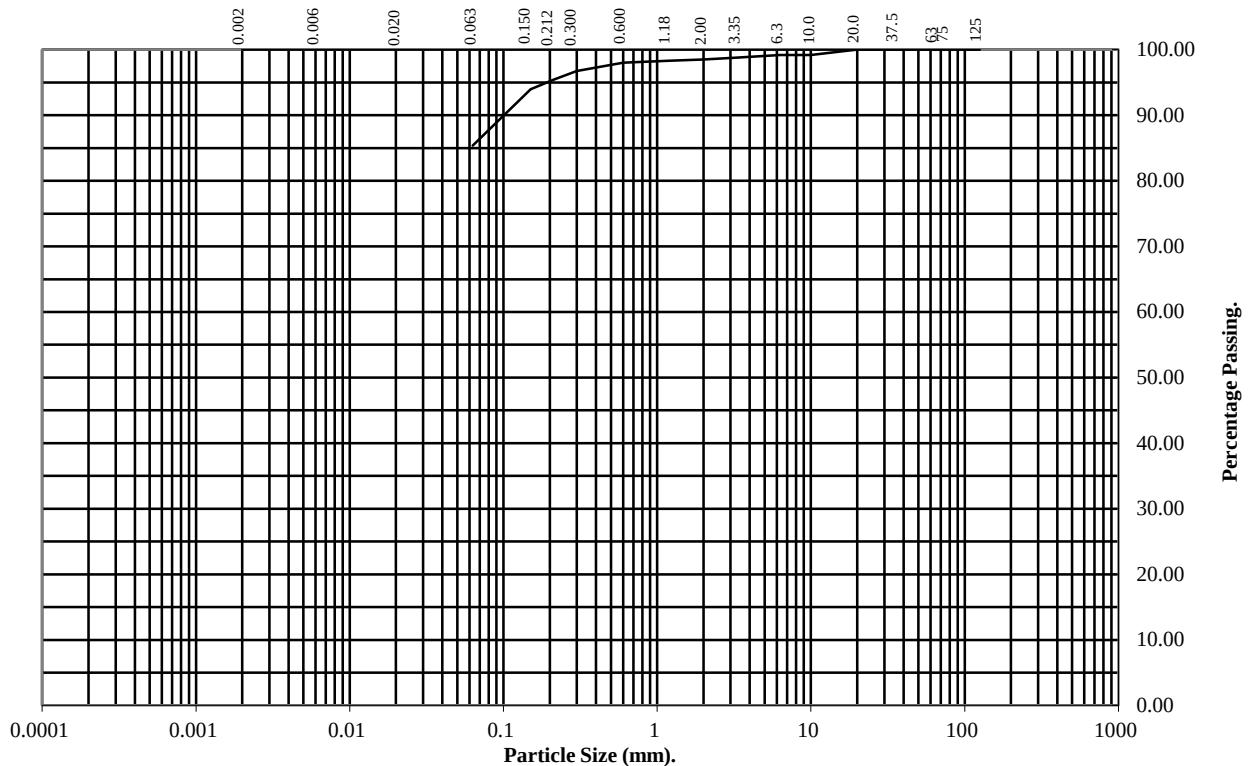
1.90

Sample Number:

Base Depth(m):

Sample Type:

B



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	99
6.3	99
3.35	99
2	98
1.18	98
0.6	98
0.3	97
0.212	95
0.15	94
0.063	85

Soil Fraction	Total Percentage
Cobbles	0
Gravel	2
Sand	13
Silt/Clay	85

Remarks:

See Summary of Soil Descriptions



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Trows Lane Farm

Contract No:

PSL17/2664

Client Ref:

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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

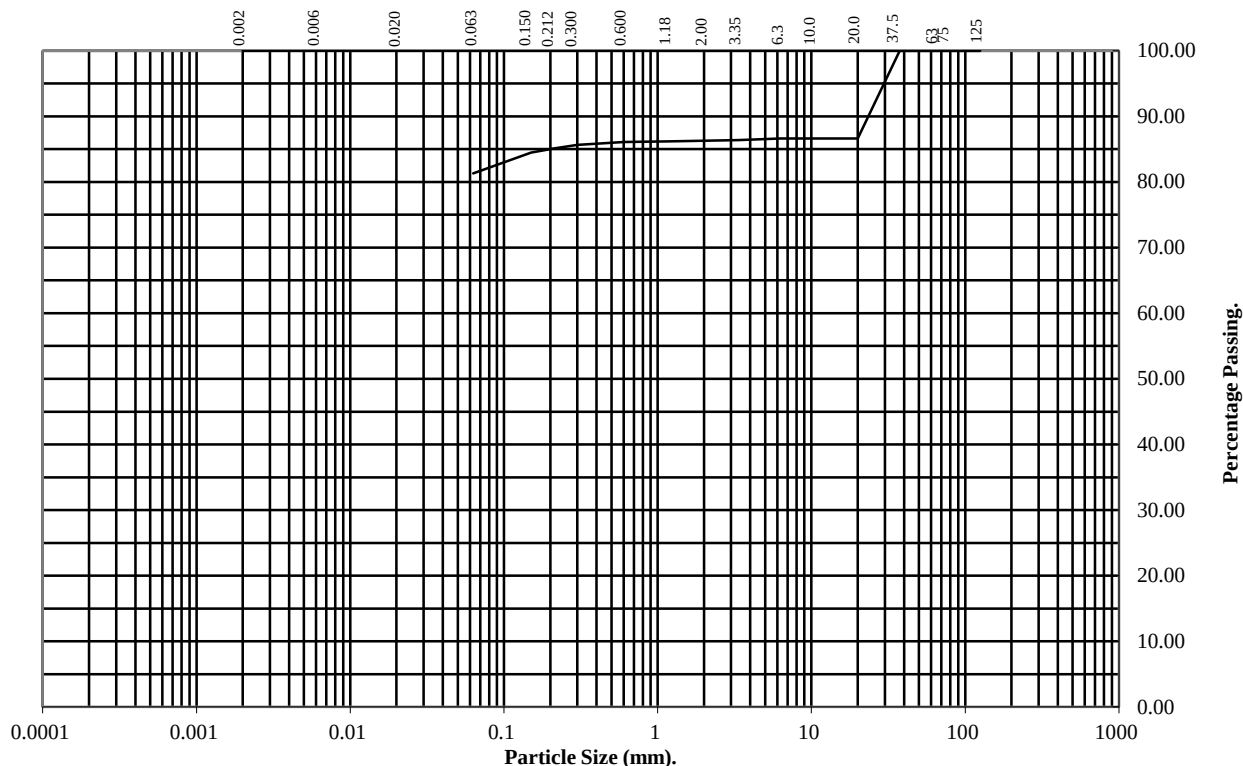
Hole Number: BHM

Top Depth (m): 2.50

Sample Number:

Base Depth(m):

Sample Type: D



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	87
10	87
6.3	87
3.35	86
2	86
1.18	86
0.6	86
0.3	86
0.212	85
0.15	84
0.063	81

Soil Fraction	Total Percentage
Cobbles	0
Gravel	14
Sand	5
Silt/Clay	81

Remarks:

See Summary of Soil Descriptions



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Trows Lane Farm

Contract No:

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Client Ref:

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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

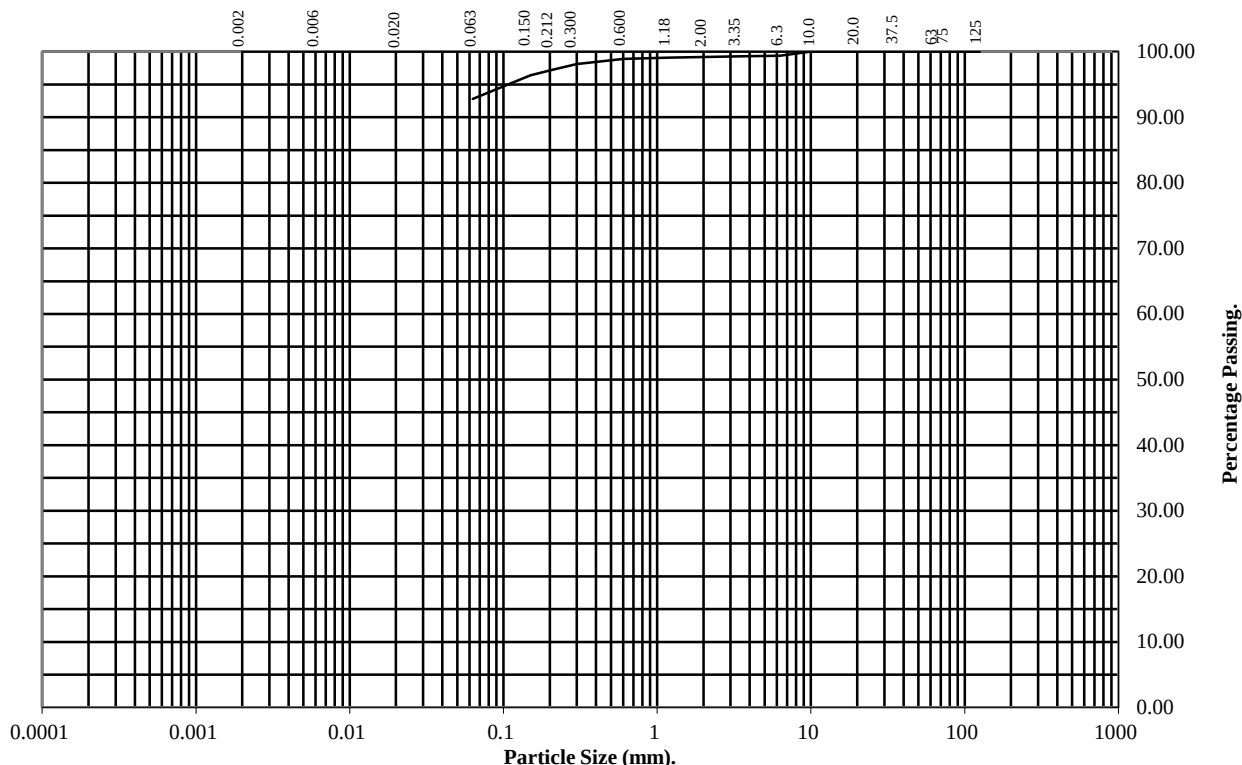
Hole Number: BHM

Top Depth (m): 6.00

Sample Number:

Base Depth(m):

Sample Type: B



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	99
3.35	99
2	99
1.18	99
0.6	99
0.3	98
0.212	97
0.15	96
0.063	93

Soil Fraction	Total Percentage
Cobbles	0
Gravel	1
Sand	6
Silt/Clay	93

Remarks:

See Summary of Soil Descriptions



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Client Ref:
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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

BHM

Top Depth (m):

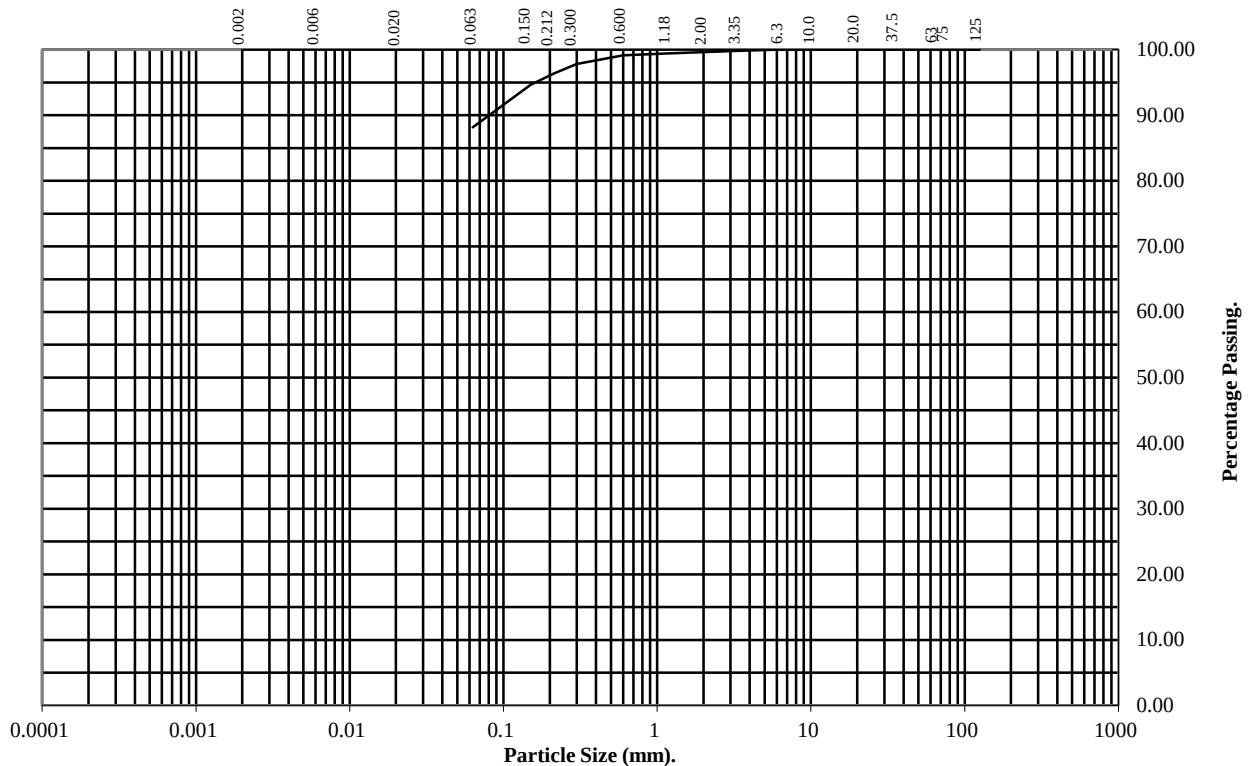
7.50

Sample Number:

Base Depth(m):

Sample Type:

B



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	99
0.6	99
0.3	98
0.212	96
0.15	95
0.063	88

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	12
Silt/Clay	88

Remarks:

See Summary of Soil Descriptions



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Client Ref:

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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

BHN

Top Depth (m):

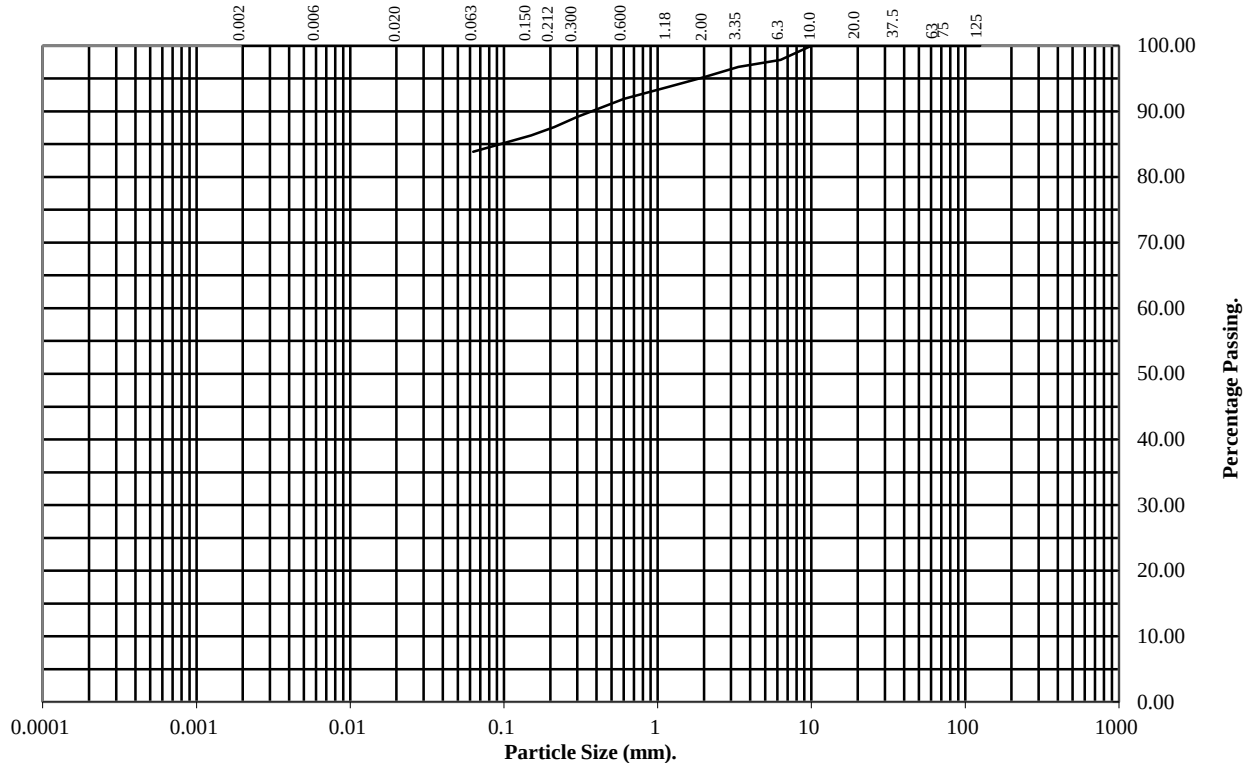
2.60

Sample Number:

Base Depth(m):

Sample Type:

B



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	98
3.35	97
2	95
1.18	94
0.6	92
0.3	89
0.212	88
0.15	86
0.063	84

Soil Fraction	Total Percentage
Cobbles	0
Gravel	5
Sand	11
Silt/Clay	84

Remarks:

See Summary of Soil Descriptions



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Trows Lane Farm

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Client Ref:

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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

BHN

Top Depth (m):

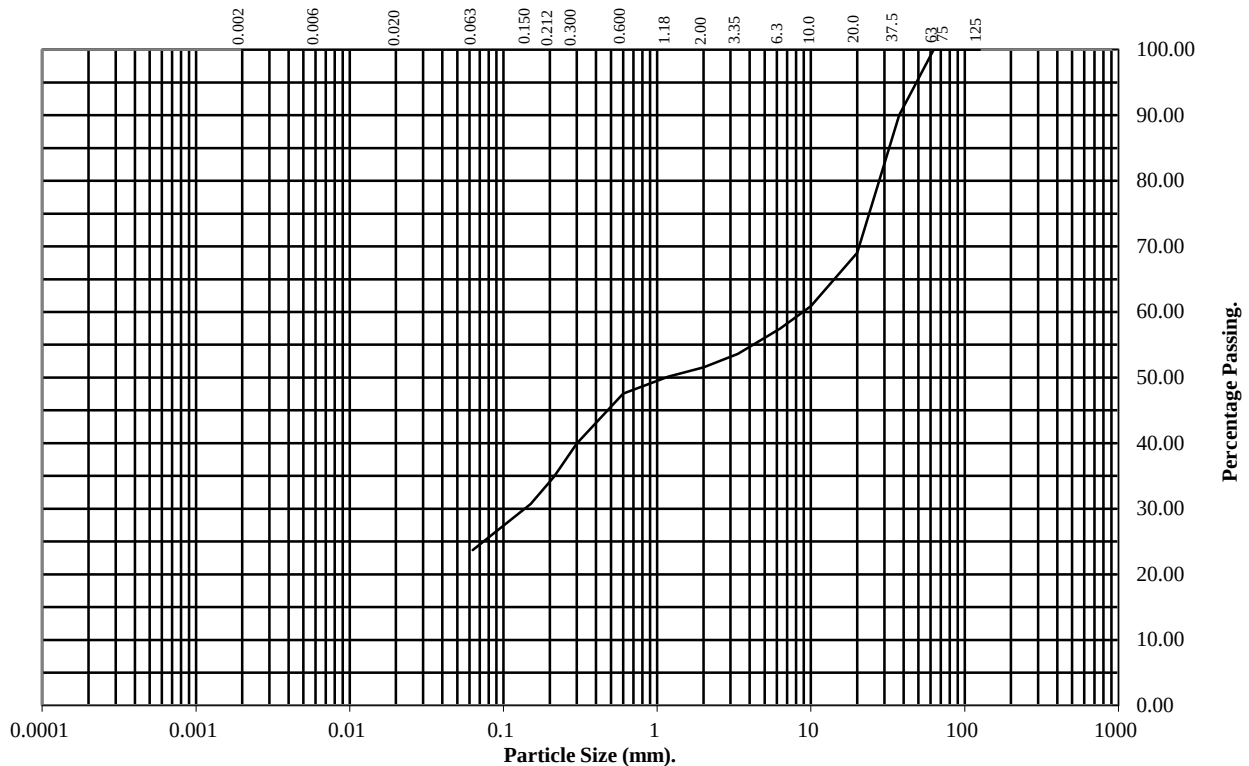
4.50

Sample Number:

Base Depth(m):

Sample Type:

B



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	90
20	69
10	61
6.3	57
3.35	54
2	52
1.18	50
0.6	48
0.3	40
0.212	35
0.15	31
0.063	24

Soil Fraction	Total Percentage
Cobbles	0
Gravel	48
Sand	28
Silt/Clay	24

Remarks:

See Summary of Soil Descriptions



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Client Ref:

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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

BHN

Top Depth (m):

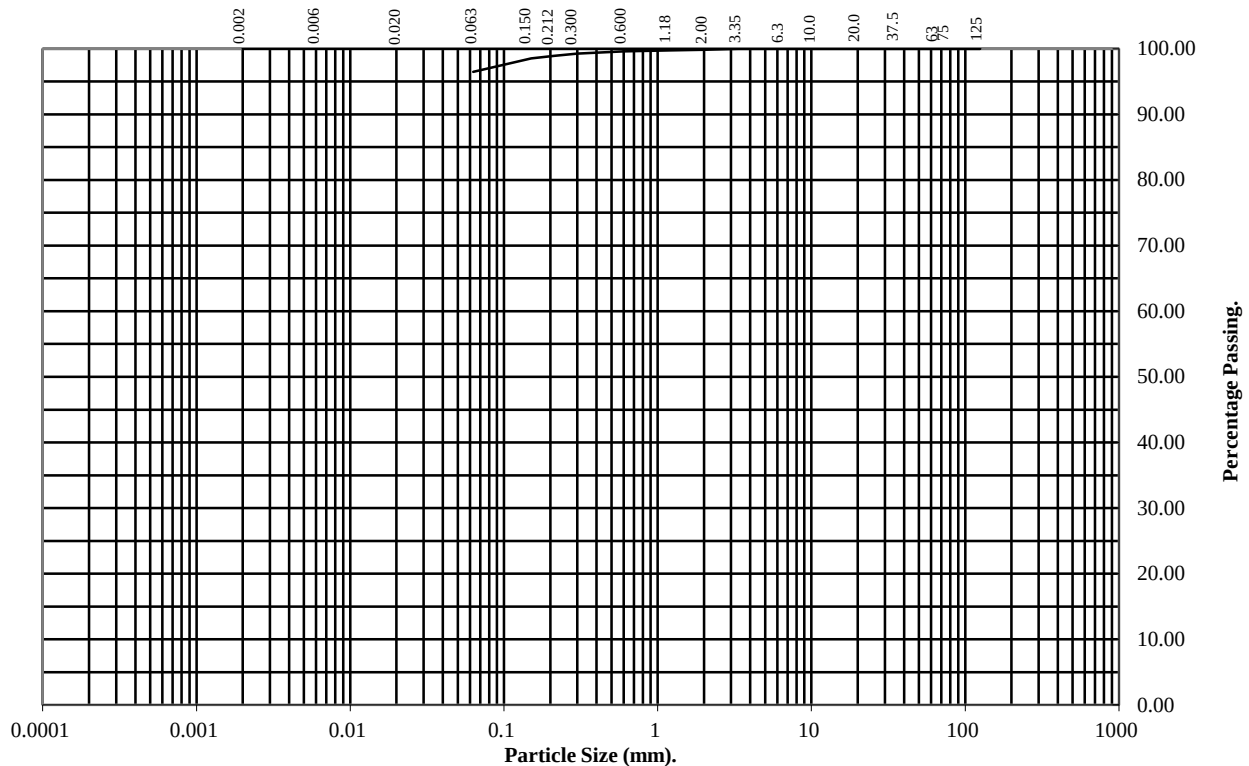
7.00

Sample Number:

Base Depth(m):

Sample Type:

B



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	100
1.18	100
0.6	100
0.3	99
0.212	99
0.15	99
0.063	96

Soil Fraction	Total Percentage
Cobbles	0
Gravel	0
Sand	4
Silt/Clay	96

Remarks:

See Summary of Soil Descriptions



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Trows Lane Farm

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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

BHN

Top Depth (m):

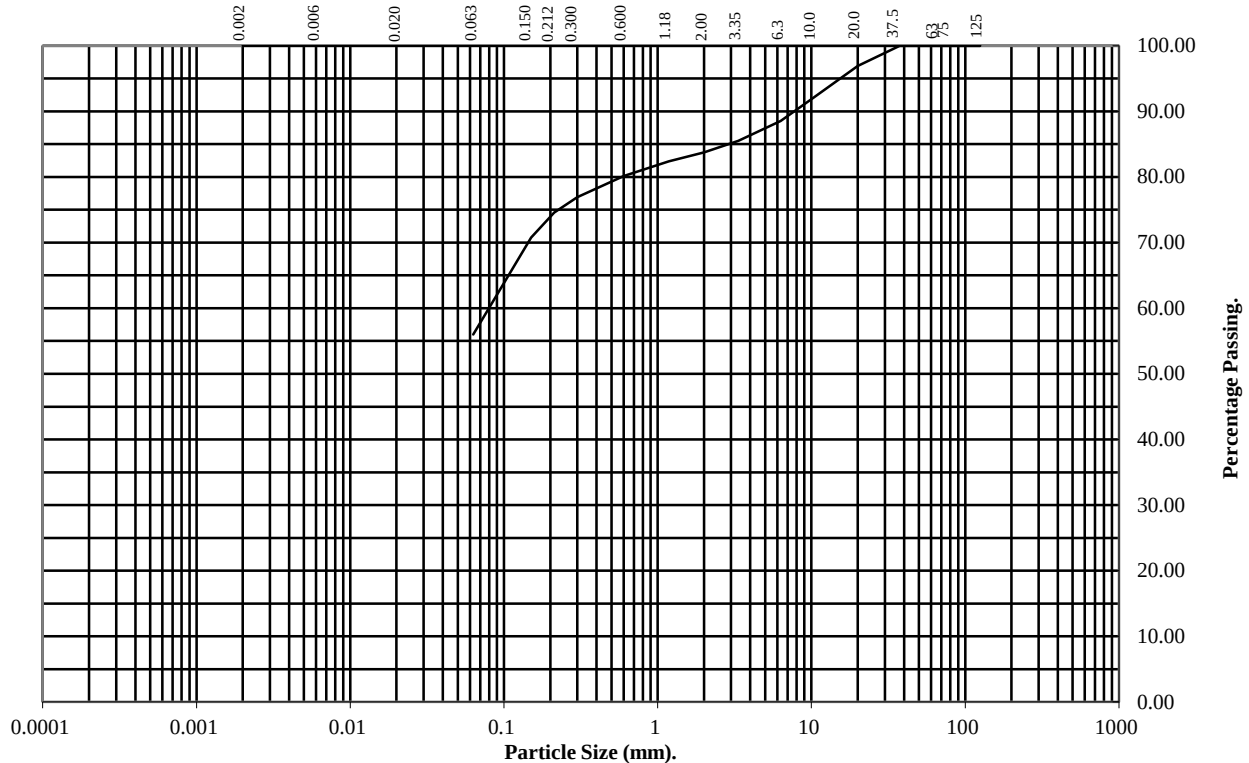
8.90

Sample Number:

Base Depth(m):

Sample Type:

B



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	97
10	92
6.3	89
3.35	86
2	84
1.18	82
0.6	80
0.3	77
0.212	75
0.15	71
0.063	56

Soil Fraction	Total Percentage
Cobbles	0
Gravel	16
Sand	28
Silt/Clay	56

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

BHN

Top Depth (m):

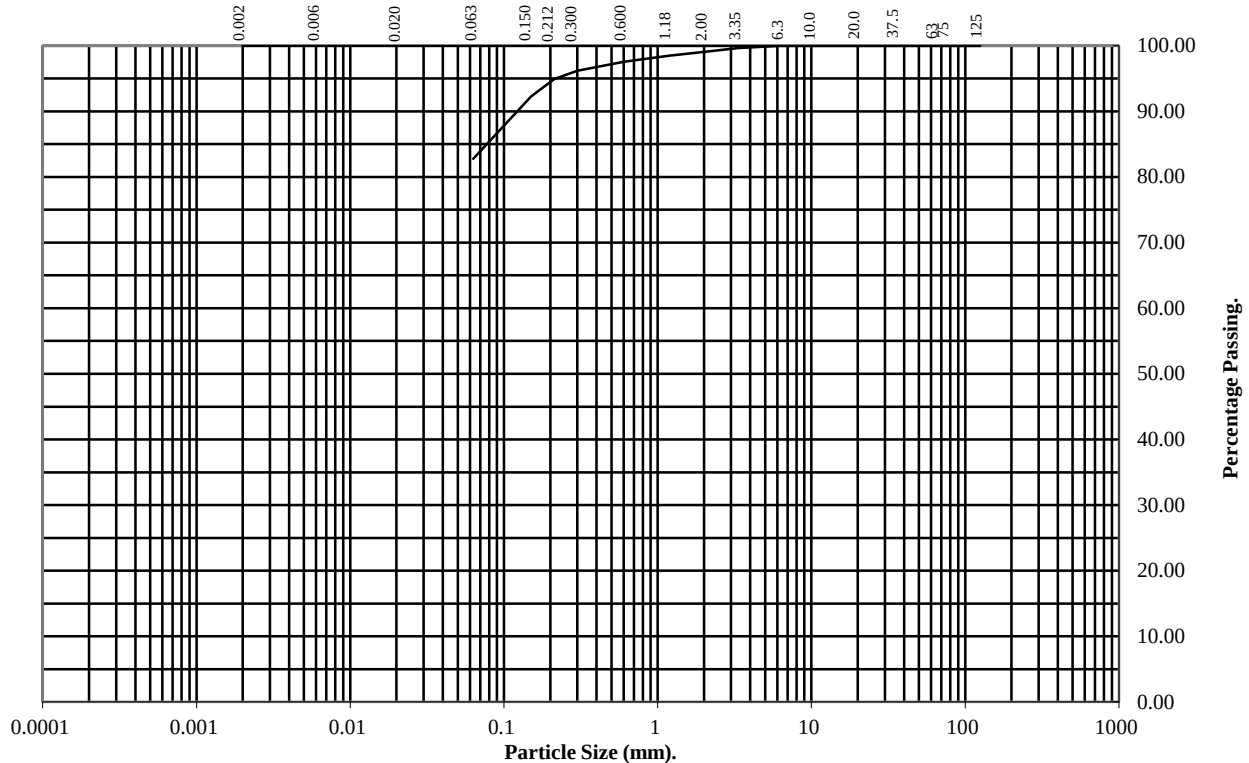
10.00

Sample Number:

Base Depth(m):

Sample Type:

B



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	100
10	100
6.3	100
3.35	100
2	99
1.18	98
0.6	98
0.3	96
0.212	95
0.15	92
0.063	83

Soil Fraction	Total Percentage
Cobbles	0
Gravel	1
Sand	16
Silt/Clay	83

Remarks:

See Summary of Soil Descriptions



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PARTICLE SIZE DISTRIBUTION TEST

BS1377 : Part 2 : 1990

Wet Sieve, Clause 9.2

Hole Number:

BHN

Top Depth (m):

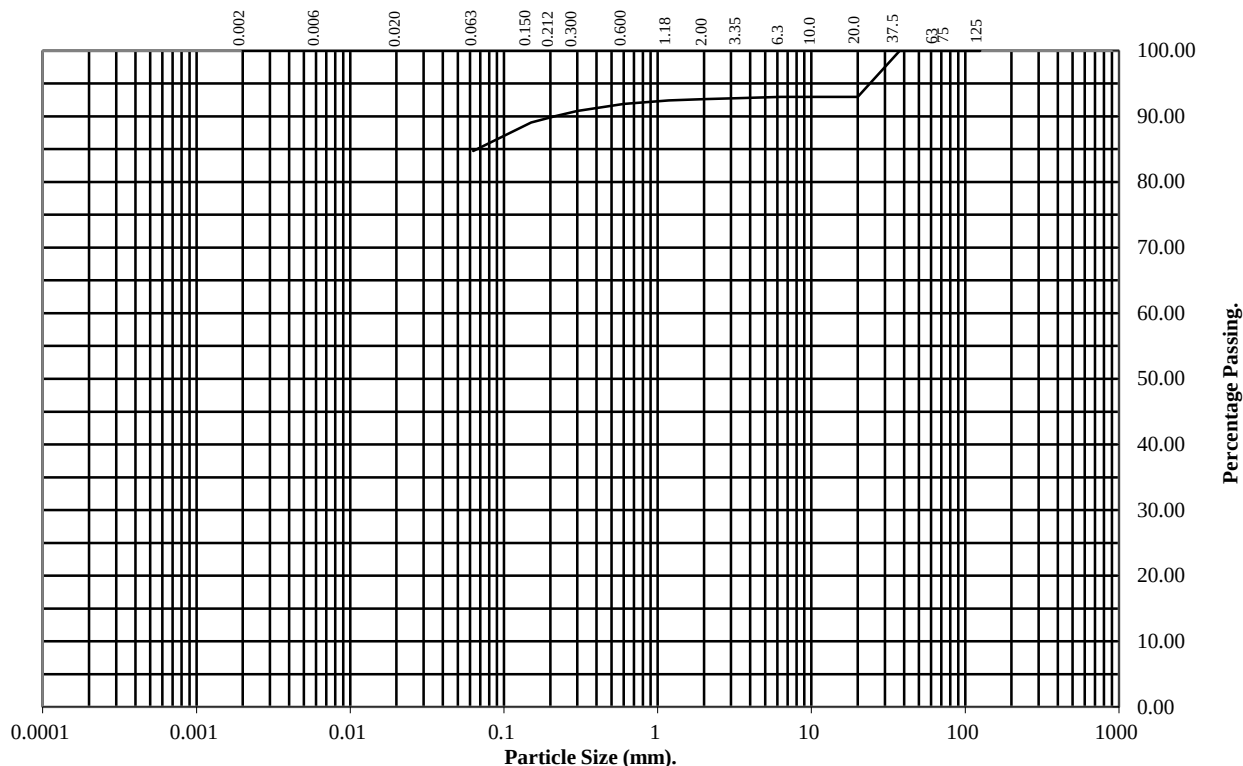
12.00

Sample Number:

Base Depth(m):

Sample Type:

D



BS Test Sieve	Percentage Passing
125	100
75	100
63	100
37.5	100
20	93
10	93
6.3	93
3.35	93
2	93
1.18	92
0.6	92
0.3	91
0.212	90
0.15	89
0.063	85

Soil Fraction	Total Percentage
Cobbles	0
Gravel	7
Sand	8
Silt/Clay	85

Remarks:

See Summary of Soil Descriptions



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Trows Lane Farm

Contract No:

PSL17/2664

Client Ref:

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DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : 1990

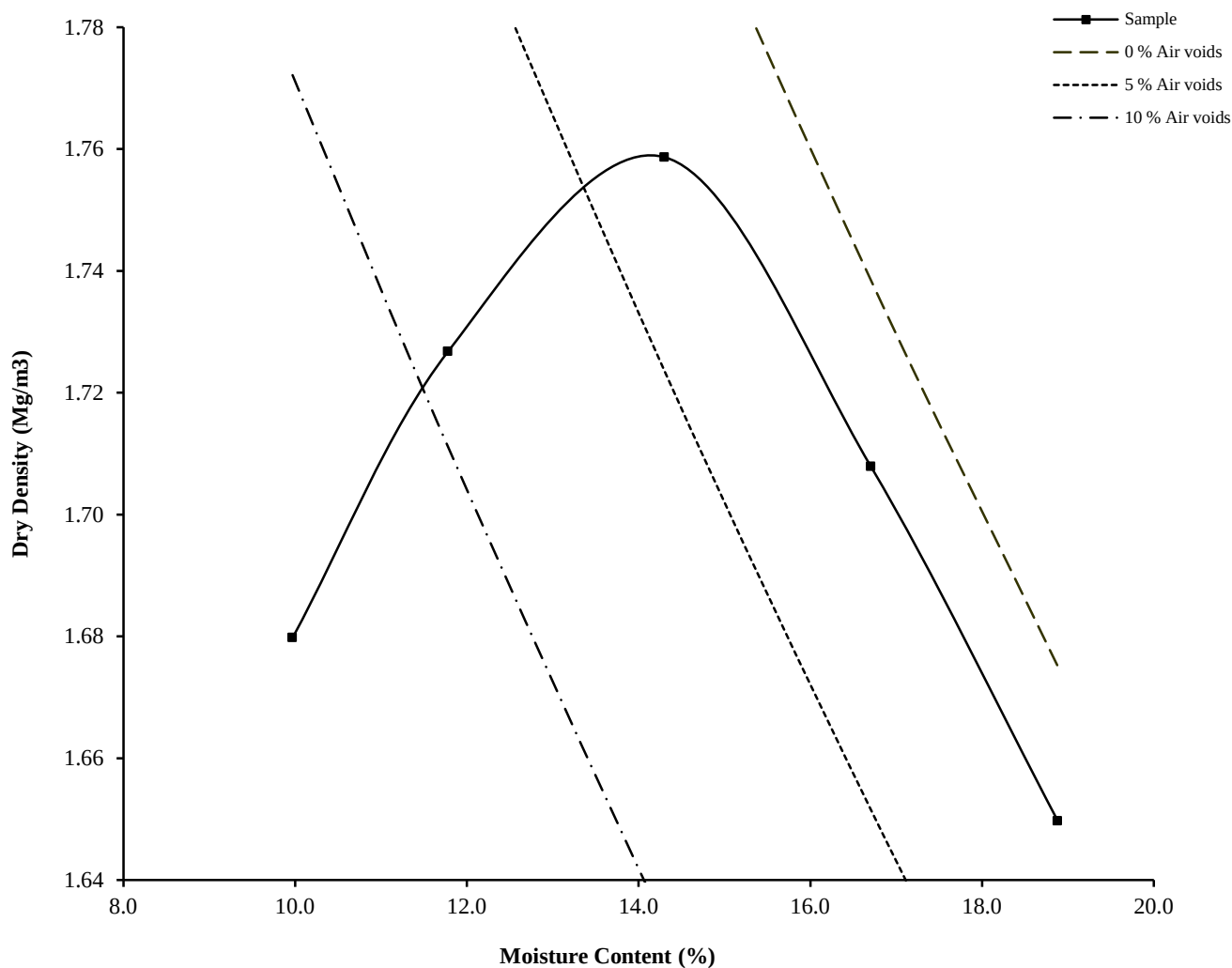
Hole Number: BHF

Top Depth (m) : 4.00

Sample Number:

Base Depth (m) : 5.00

Sample Type: B



Initial Moisture Content:	31	Method of Compaction:	2.5kg	Separate Samples
Particle Density (Mg/m3):	2.45	Assumed	Material Retained on 37.5 mm Test Sieve (%):	0
Maximum Dry Density (Mg/m3):	1.76		Material Retained on 20.0 mm Test Sieve (%):	0
Optimum Moisture Content (%):	14			
Remarks				
See summary of soil descriptions.				

		Trows Lane Farm	Contract
			PSL17/2664
			Client Ref
			R2392

DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : 1990

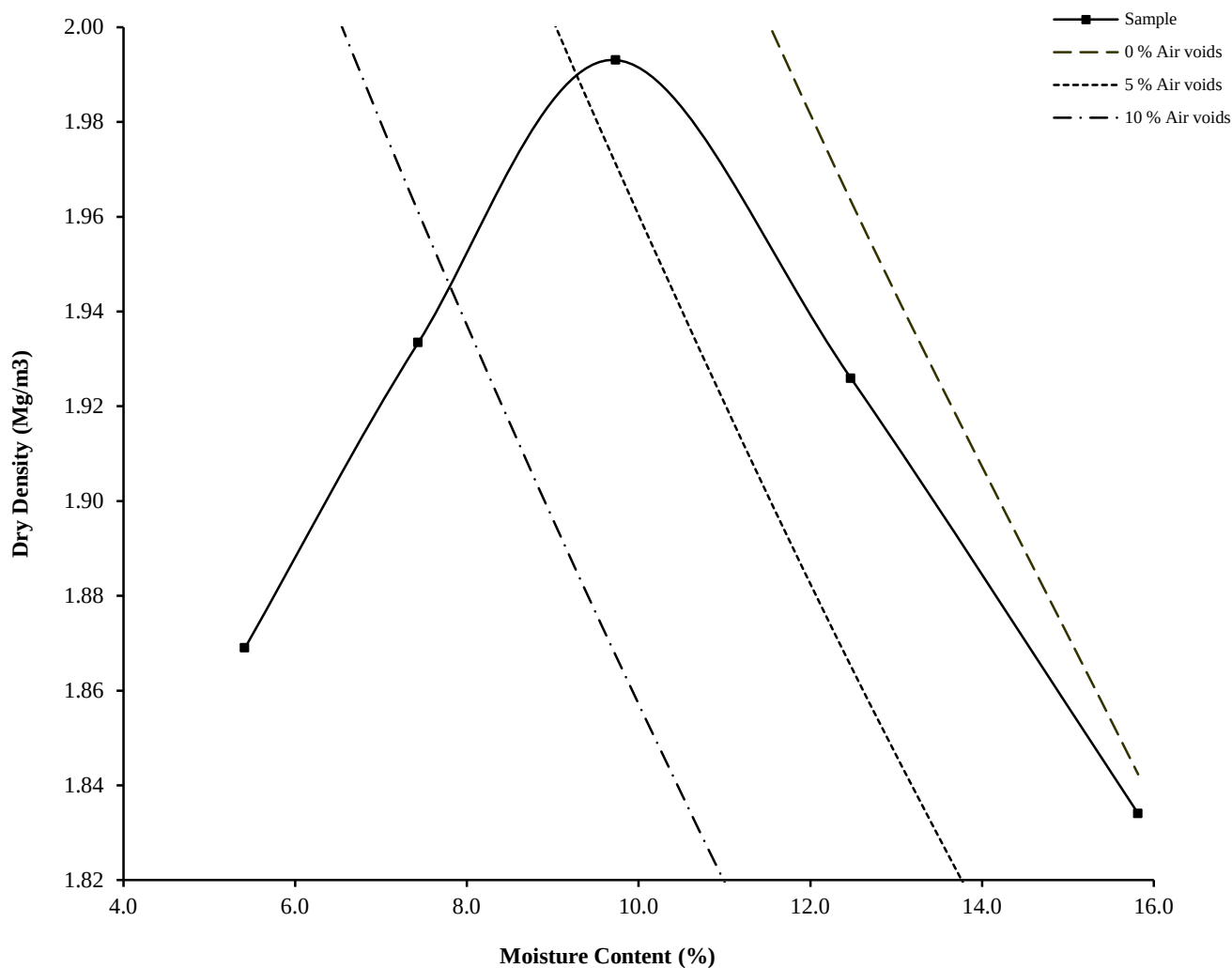
Hole Number: BHG

Top Depth (m) : 3.30

Sample Number:

Base Depth (m) :

Sample Type: B



Initial Moisture Content:	16	Method of Compaction:	2.5kg	Separate Samples
Particle Density (Mg/m ³):	2.60	Assumed	Material Retained on 37.5 mm Test Sieve (%):	0
Maximum Dry Density (Mg/m ³):	1.99		Material Retained on 20.0 mm Test Sieve (%):	0
Optimum Moisture Content (%):	10			
Remarks				
See summary of soil descriptions.				

		Trows Lane Farm	Contract
			PSL17/2664
			Client Ref
			R2392

DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : 1990

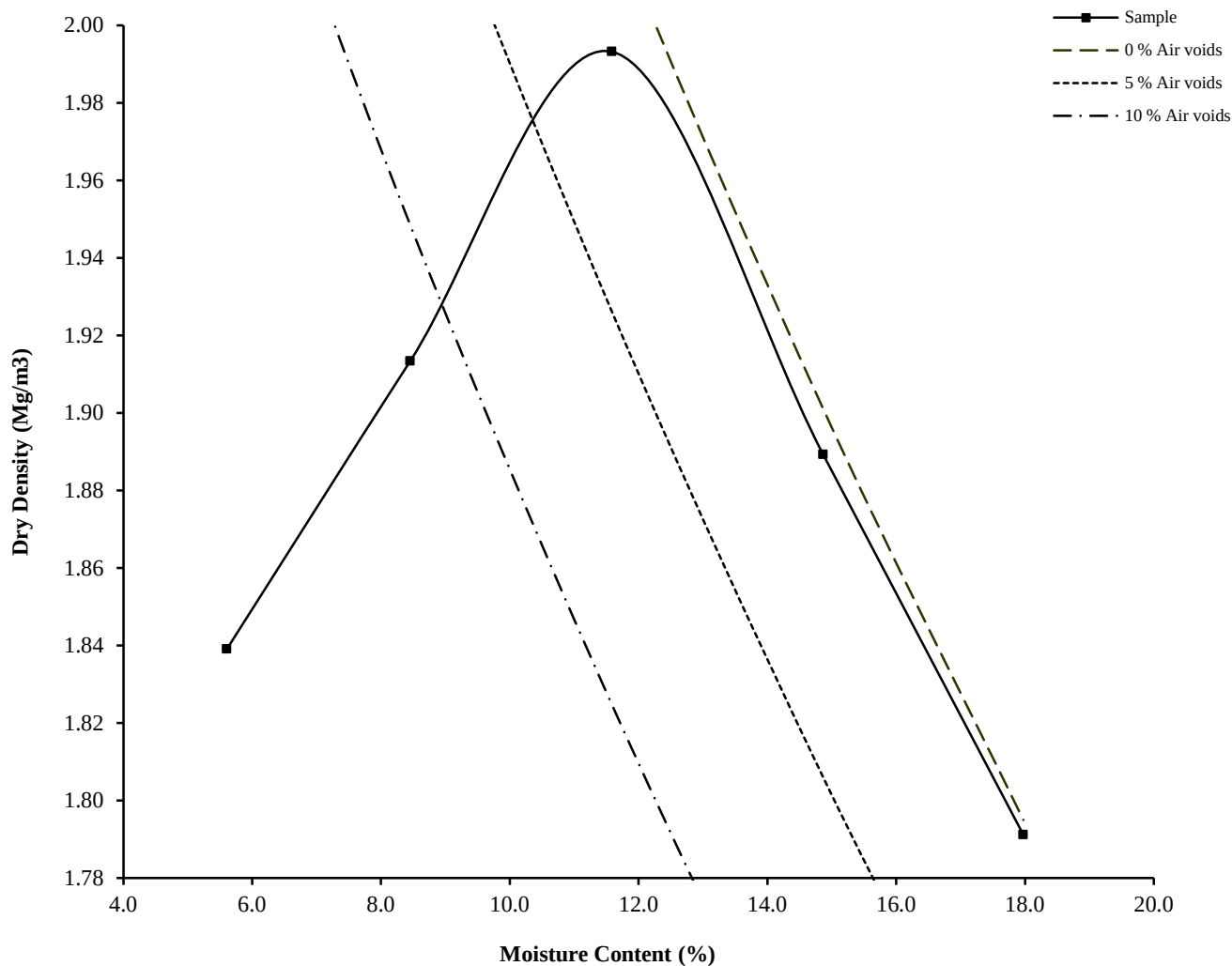
Hole Number: BHG

Top Depth (m) : 7.30

Sample Number:

Base Depth (m) :

Sample Type: B



Initial Moisture Content:	15	Method of Compaction:	2.5kg	Separate Samples
Particle Density (Mg/m ³):	2.65	Assumed	Material Retained on 37.5 mm Test Sieve (%):	0
Maximum Dry Density (Mg/m ³):	1.99		Material Retained on 20.0 mm Test Sieve (%):	0
Optimum Moisture Content (%):	12			
Remarks				
See summary of soil descriptions.				

		Trows Lane Farm	Contract
			PSL17/2664
			Client Ref
			R2392

DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : 1990

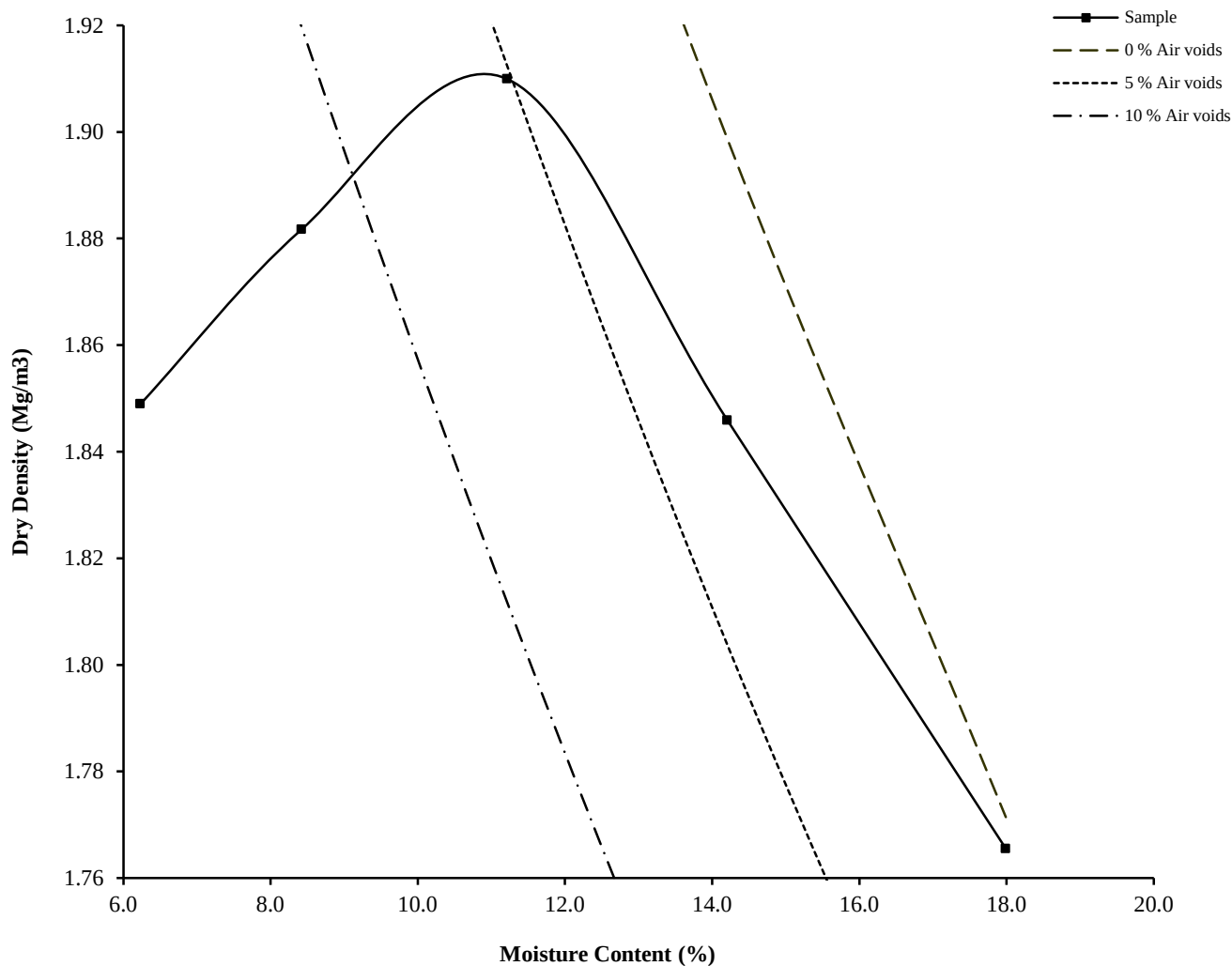
Hole Number: BHI

Top Depth (m) : 10.00

Sample Number:

Base Depth (m) :

Sample Type: B



Initial Moisture Content:	18	Method of Compaction:	2.5kg	Separate Samples
Particle Density (Mg/m ³):	2.60	Assumed	Material Retained on 37.5 mm Test Sieve (%):	0
Maximum Dry Density (Mg/m ³):	1.91		Material Retained on 20.0 mm Test Sieve (%):	0
Optimum Moisture Content (%):	11			
Remarks				
See summary of soil descriptions.				

		Trows Lane Farm	Contract
			PSL17/2664
			Client Ref
			R2392

DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : 1990

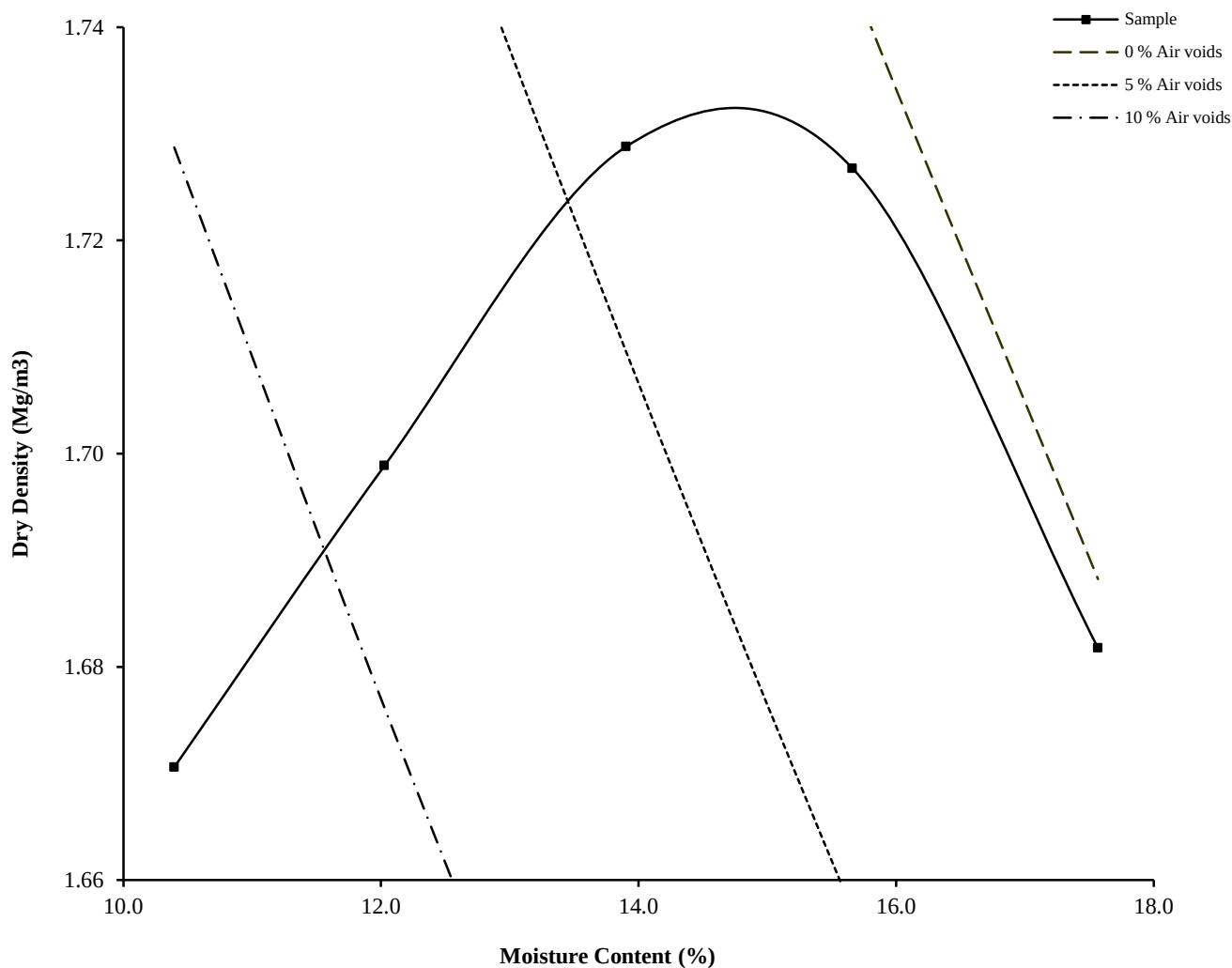
Hole Number: BHJ

Top Depth (m) : 2.50

Sample Number:

Base Depth (m) :

Sample Type: B



Initial Moisture Content:	28	Method of Compaction:	2.5kg	Separate Samples
Particle Density (Mg/m3):	2.40	Assumed	Material Retained on 37.5 mm Test Sieve (%):	0
Maximum Dry Density (Mg/m3):	1.73		Material Retained on 20.0 mm Test Sieve (%):	0
Optimum Moisture Content (%):	15			
Remarks				
See summary of soil descriptions.				

		Trows Lane Farm	Contract
			PSL17/2664
			Client Ref
			R2392

DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : 1990

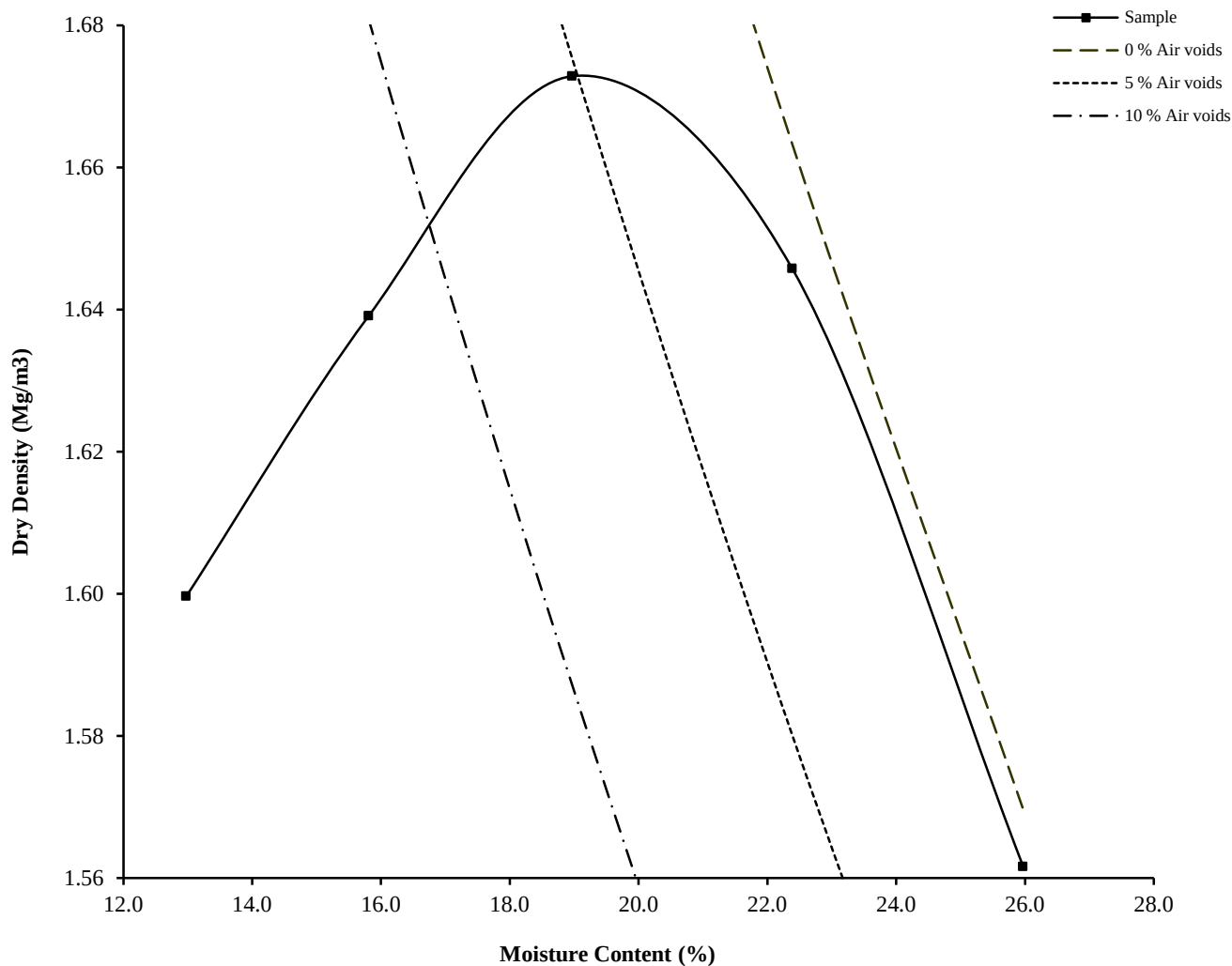
Hole Number: BHJ

Top Depth (m) : 4.50

Sample Number:

Base Depth (m) :

Sample Type: B



Initial Moisture Content:	31	Method of Compaction:	2.5kg	Separate Samples
Particle Density (Mg/m ³):	2.65	Assumed	Material Retained on 37.5 mm Test Sieve (%):	0
Maximum Dry Density (Mg/m ³):	1.67		Material Retained on 20.0 mm Test Sieve (%):	0
Optimum Moisture Content (%):	19			
Remarks				
See summary of soil descriptions.				

		Trows Lane Farm	Contract
			PSL17/2664
			Client Ref
			R2392

DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : 1990

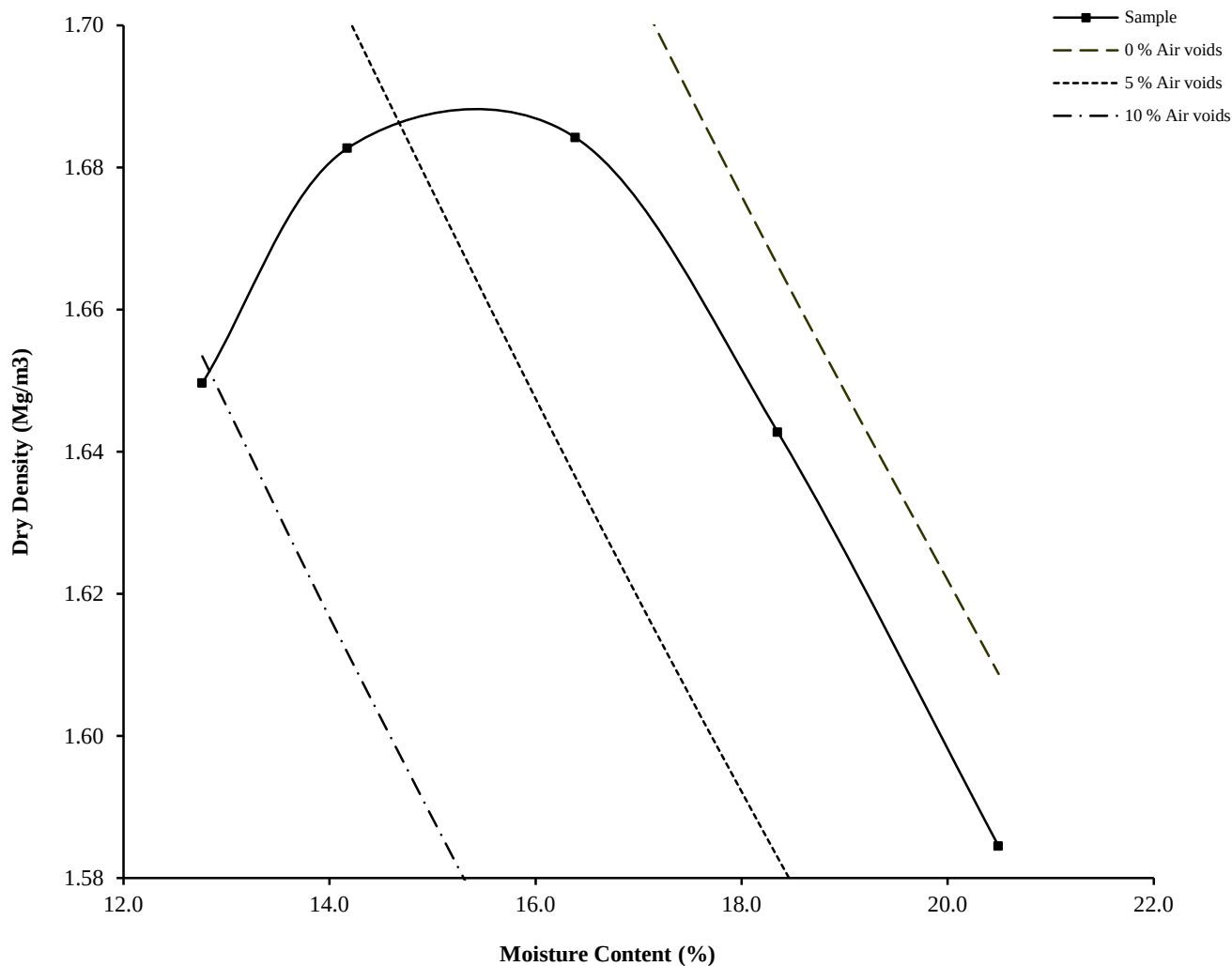
Hole Number: BHL

Top Depth (m) : 5.00

Sample Number:

Base Depth (m) : 6.00

Sample Type: B



Initial Moisture Content:	16	Method of Compaction:	2.5kg	Separate Samples
Particle Density (Mg/m ³):	2.40	Assumed	Material Retained on 37.5 mm Test Sieve (%):	0
Maximum Dry Density (Mg/m ³):	1.68		Material Retained on 20.0 mm Test Sieve (%):	0
Optimum Moisture Content (%):	15			
Remarks				
See summary of soil descriptions.				

		Trows Lane Farm	Contract
			PSL17/2664
			Client Ref
			R2392

DRY DENSITY / MOISTURE CONTENT RELATIONSHIP

BS 1377 : Part 4 : 1990

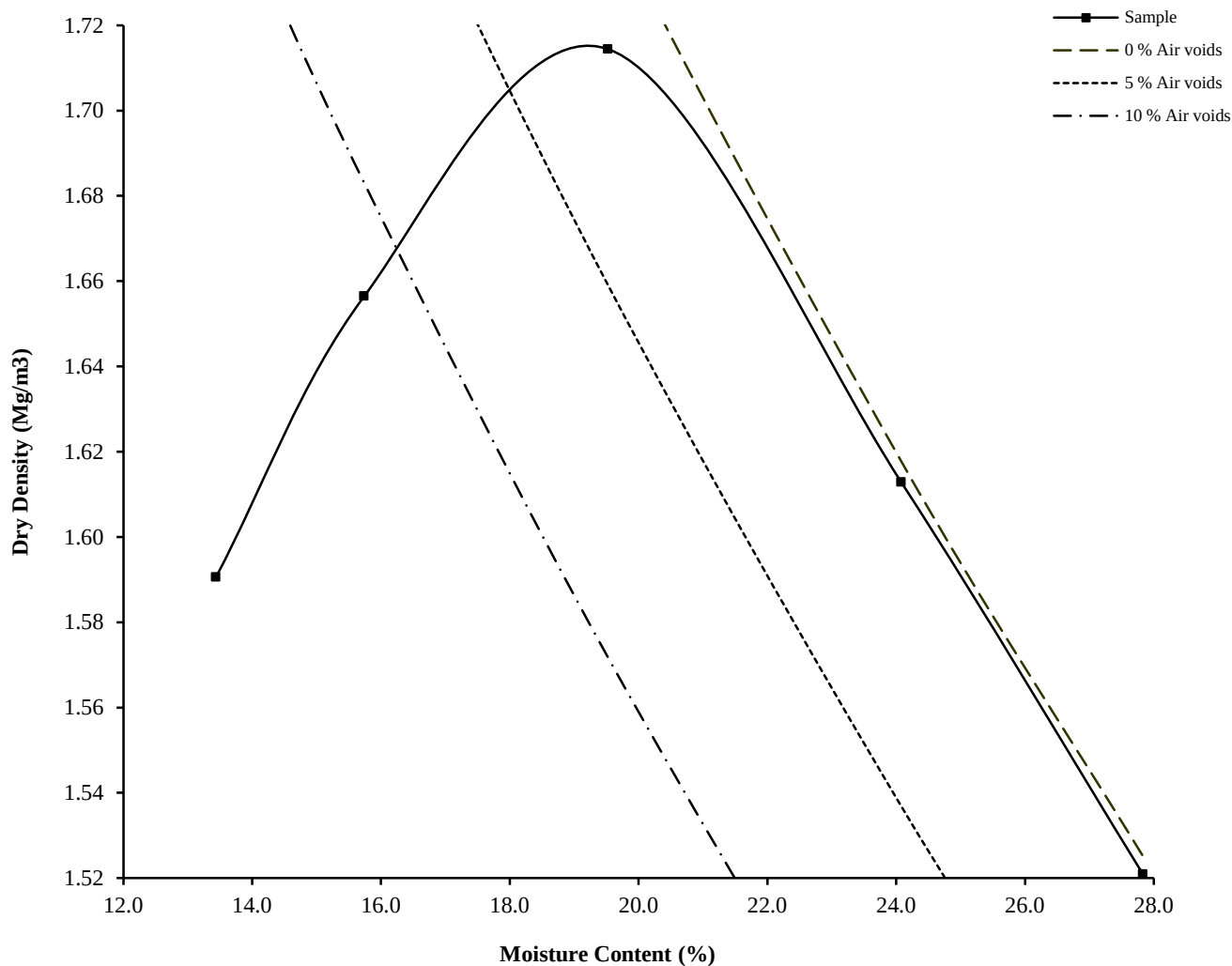
Hole Number: BHN

Top Depth (m) : 2.60

Sample Number:

Base Depth (m) :

Sample Type: B



Initial Moisture Content:	24	Method of Compaction:	2.5kg	Separate Samples
Particle Density (Mg/m ³):	2.65	Assumed	Material Retained on 37.5 mm Test Sieve (%):	0
Maximum Dry Density (Mg/m ³):	1.71		Material Retained on 20.0 mm Test Sieve (%):	0
Optimum Moisture Content (%):	19			
Remarks				
See summary of soil descriptions.				

		Trows Lane Farm	Contract
			PSL17/2664
			Client Ref
			R2392

CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

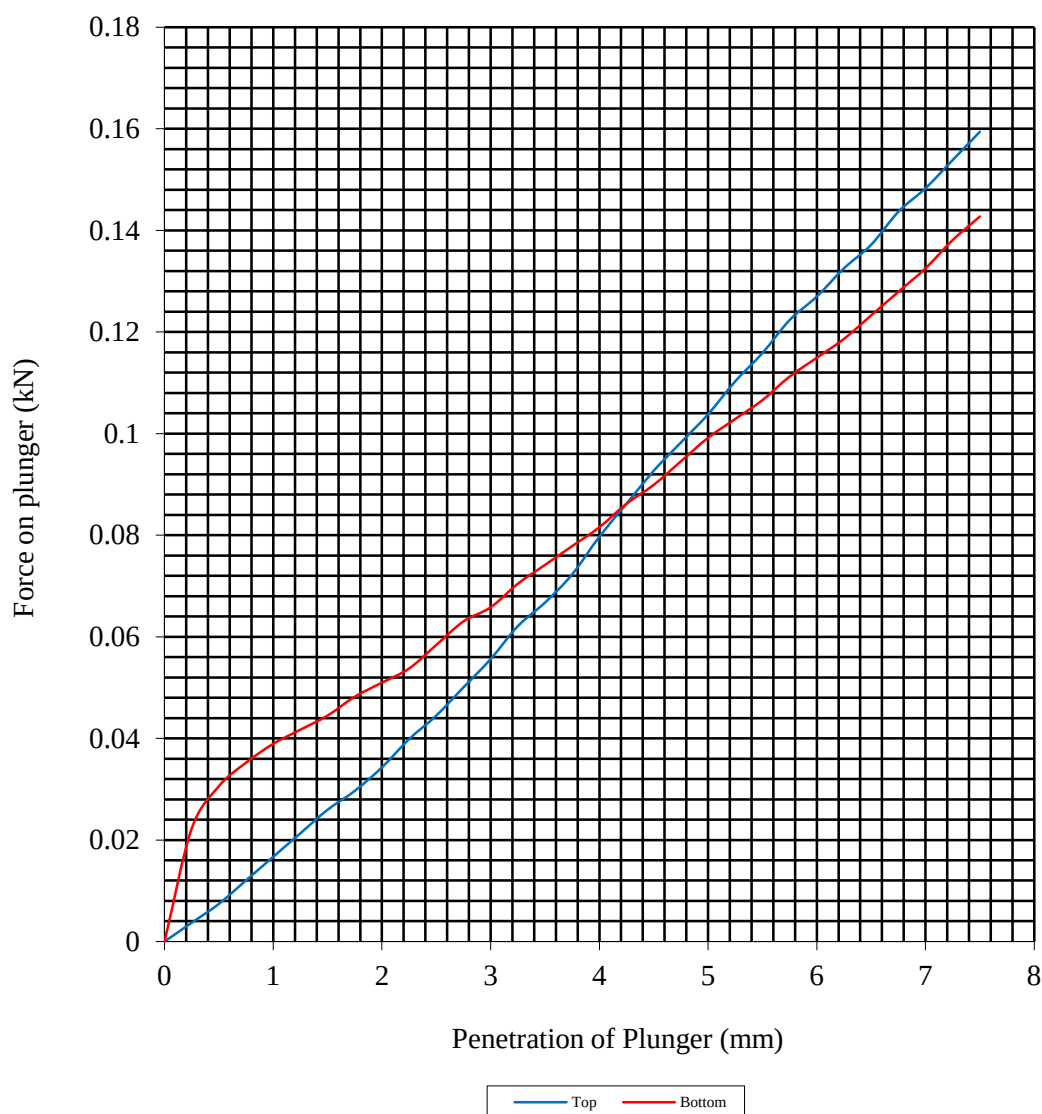
Hole Number: WS7

Top Depth (m): 2.00

Sample Number:

Base Depth (m): 2.50

Sample Type: D



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	19	Surcharge Kg:	4.20	Sample Top	19	Sample Top	0.5
Bulk Density Mg/m3:	2.01	Soaking Time hrs	0	Sample Bottom	20	Sample Bottom	0.5
Dry Density Mg/m3:	1.69	Swelling mm:	0.00	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:		0					
Compaction Conditions		2.5kg					

		Trows Lane Farm	Contract No:
			PSL17/2664
			Client Ref:
			R2392

CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

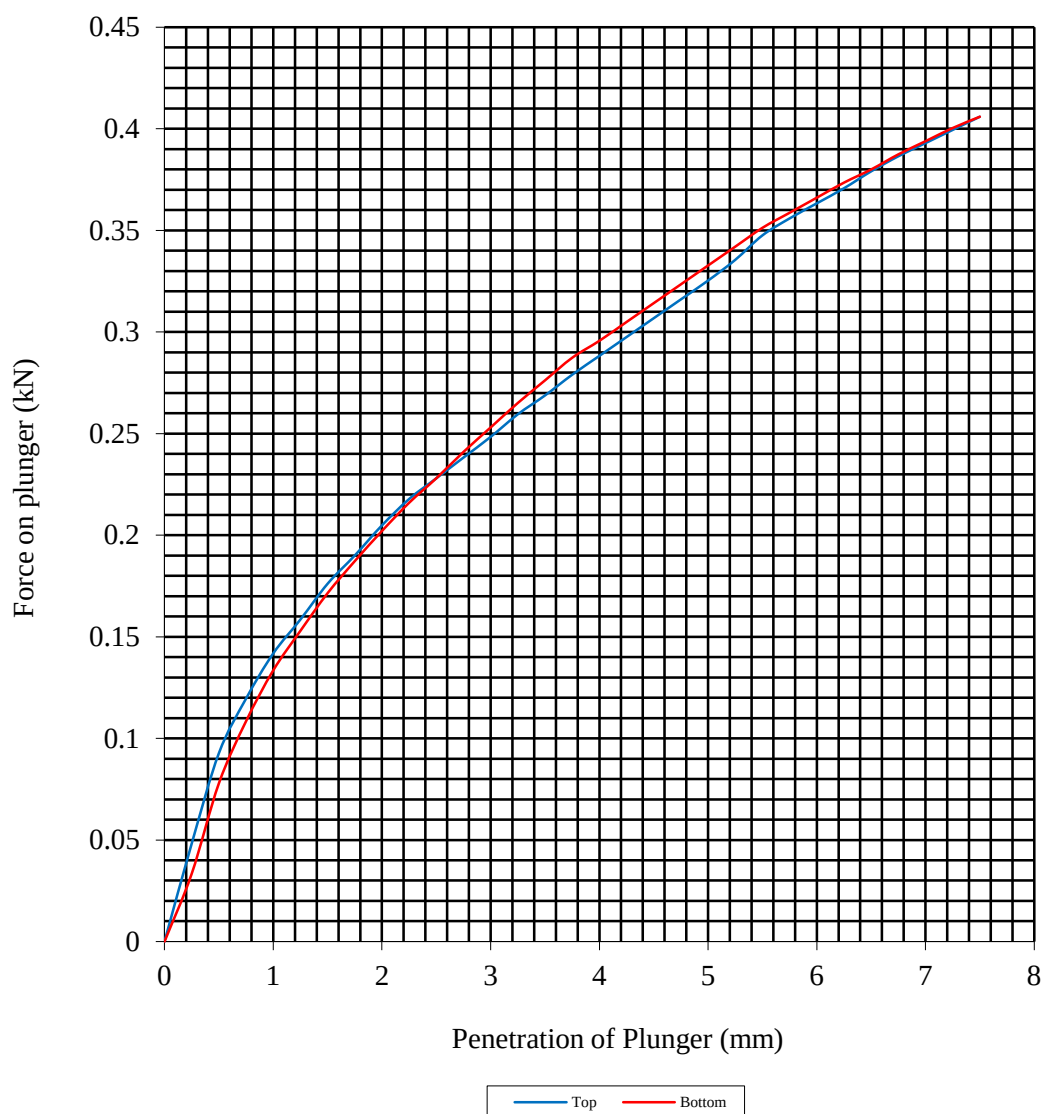
Hole Number: BHF

Top Depth (m): 3.20

Sample Number:

Base Depth (m): 4.00

Sample Type: B



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	33	Surcharge Kg:	4.20	Sample Top	32	Sample Top	1.7
Bulk Density Mg/m ³ :	1.89	Soaking Time hrs	0	Sample Bottom	33	Sample Bottom	1.7
Dry Density Mg/m ³ :	1.43	Swelling mm:	0.00	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:			0				
Compaction Conditions		2.5kg					



PSL
Professional Soils Laboratory

Trows Lane Farm

Contract No:
PSL17/2664
Client Ref:
R2392

CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

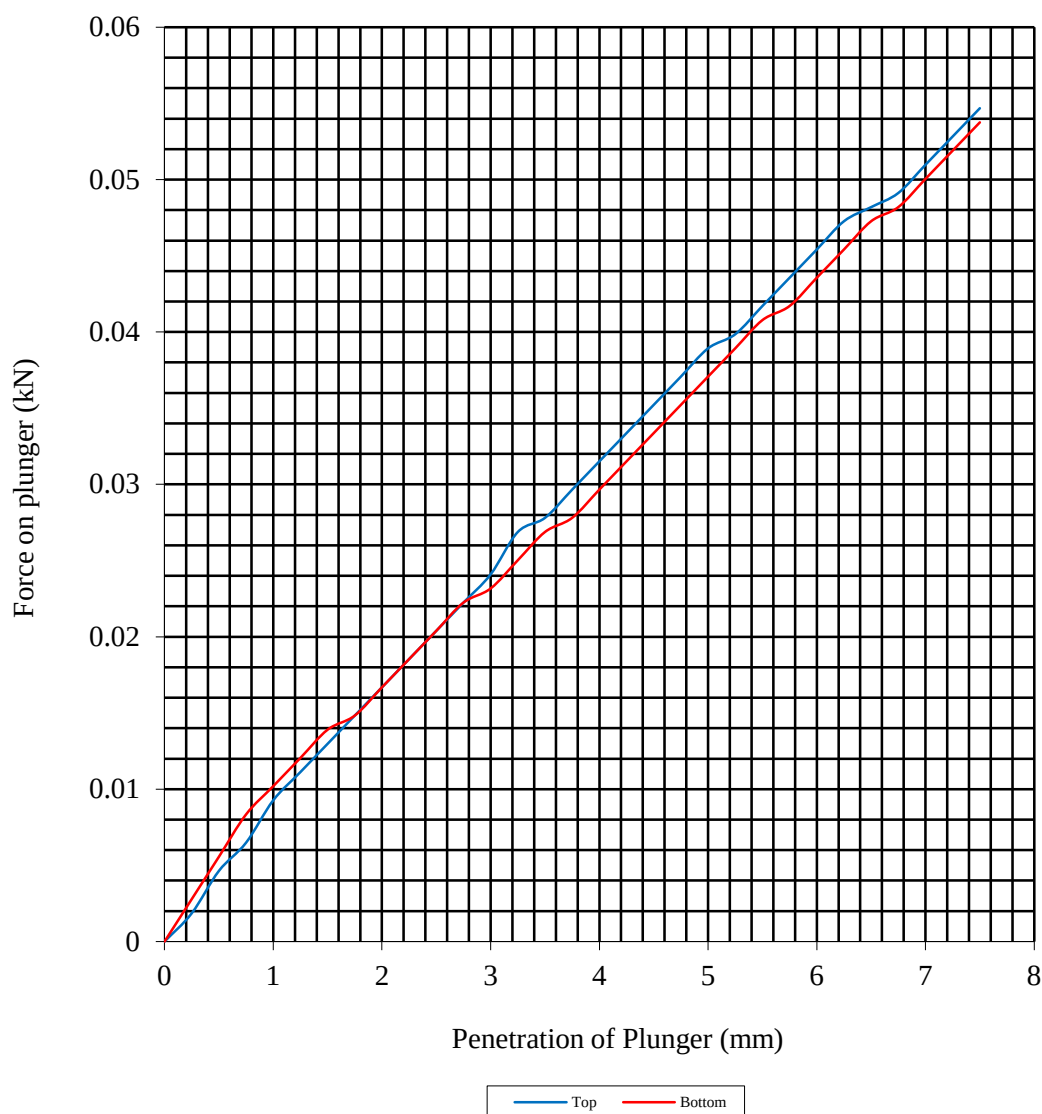
Hole Number: BHG

Top Depth (m): 2.30

Sample Number:

Base Depth (m):

Sample Type: B



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	17	Surcharge Kg:	4.20	Sample Top	16	Sample Top	0.2
Bulk Density Mg/m3:	2.12	Soaking Time hrs	0	Sample Bottom	17	Sample Bottom	0.2
Dry Density Mg/m3:	1.82	Swelling mm:	0.00	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:			0				
Compaction Conditions		2.5kg					

		Trows Lane Farm	Contract No:
			PSL17/2664
			Client Ref:
			R2392

CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

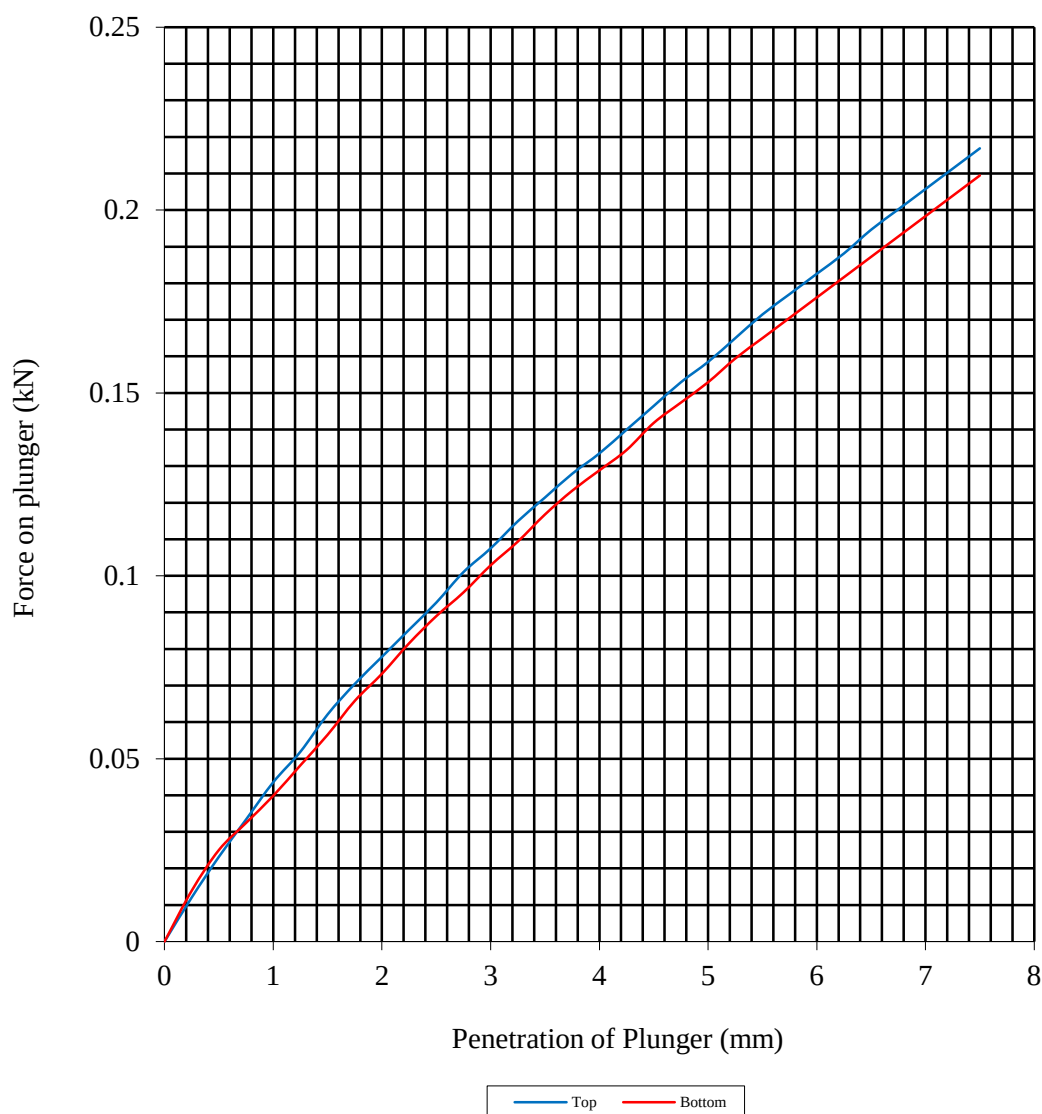
Hole Number: BHG

Top Depth (m): 6.30

Sample Number:

Base Depth (m):

Sample Type: B



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	15	Surcharge Kg:	4.20	Sample Top	15	Sample Top	0.8
Bulk Density Mg/m3:	2.17	Soaking Time hrs	0	Sample Bottom	15	Sample Bottom	0.8
Dry Density Mg/m3:	1.89	Swelling mm:	0.00	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:		0					
Compaction Conditions		2.5kg					

 4043		Trows Lane Farm	Contract No:
			PSL17/2664
			Client Ref:
			R2392

CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

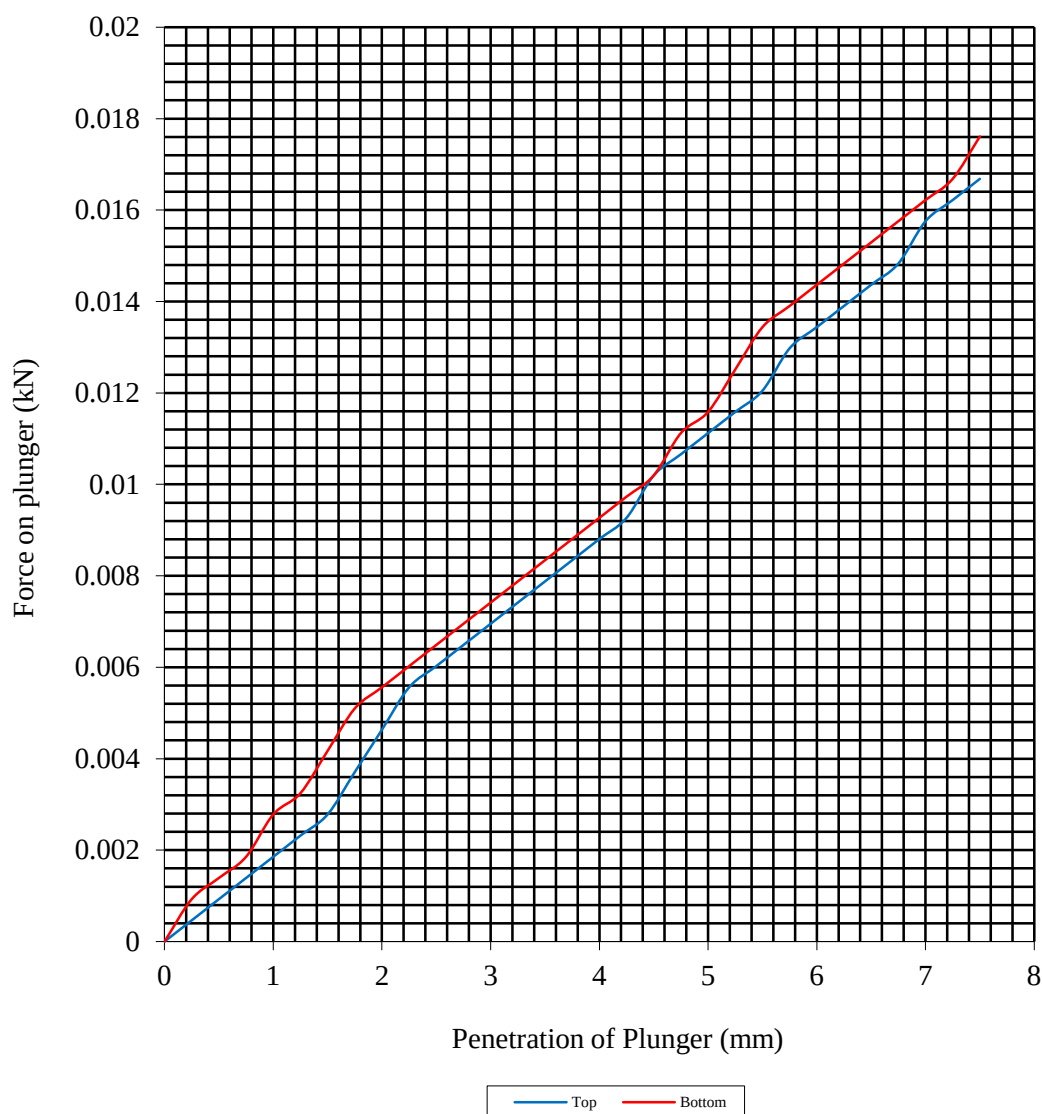
Hole Number: BHI

Top Depth (m): 4.00

Sample Number:

Base Depth (m):

Sample Type: B



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	24	Surcharge Kg:	4.20	Sample Top	25	Sample Top	0.1
Bulk Density Mg/m3:	1.98	Soaking Time hrs	0	Sample Bottom	24	Sample Bottom	0.1
Dry Density Mg/m3:	1.60	Swelling mm:	0.00	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:			0				
Compaction Conditions		2.5kg					

		Trows Lane Farm	Contract No:
			PSL17/2664
			Client Ref:
			R2392

CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

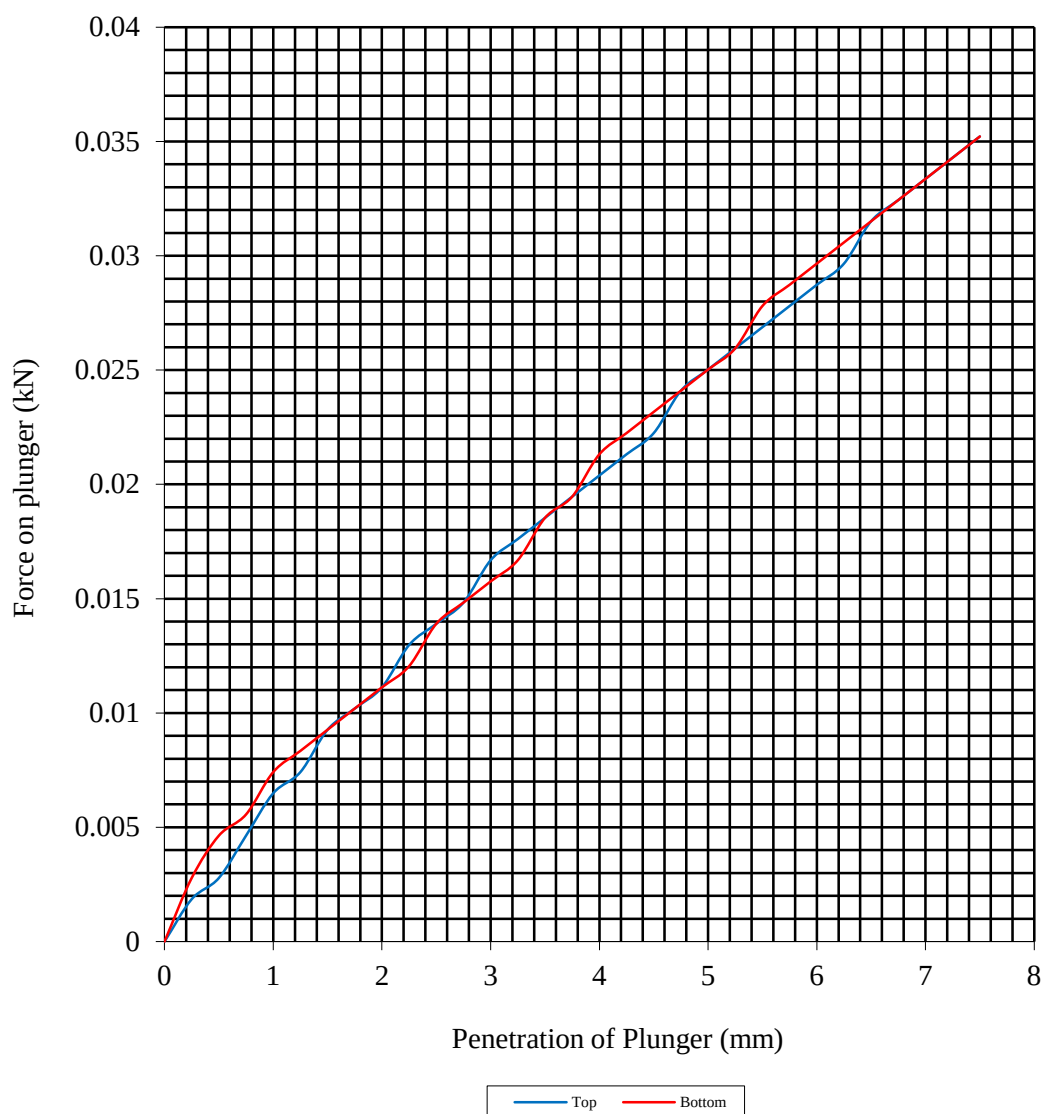
Hole Number: BHJ

Top Depth (m): 3.50

Sample Number:

Base Depth (m):

Sample Type: B



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	27	Surcharge Kg:	4.20	Sample Top	26	Sample Top	0.1
Bulk Density Mg/m3:	1.95	Soaking Time hrs	0	Sample Bottom	27	Sample Bottom	0.1
Dry Density Mg/m3:	1.54	Swelling mm:	0.00	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:		0					
Compaction Conditions		2.5kg					

		Trows Lane Farm	Contract No:
			PSL17/2664
			Client Ref:
			R2392

CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

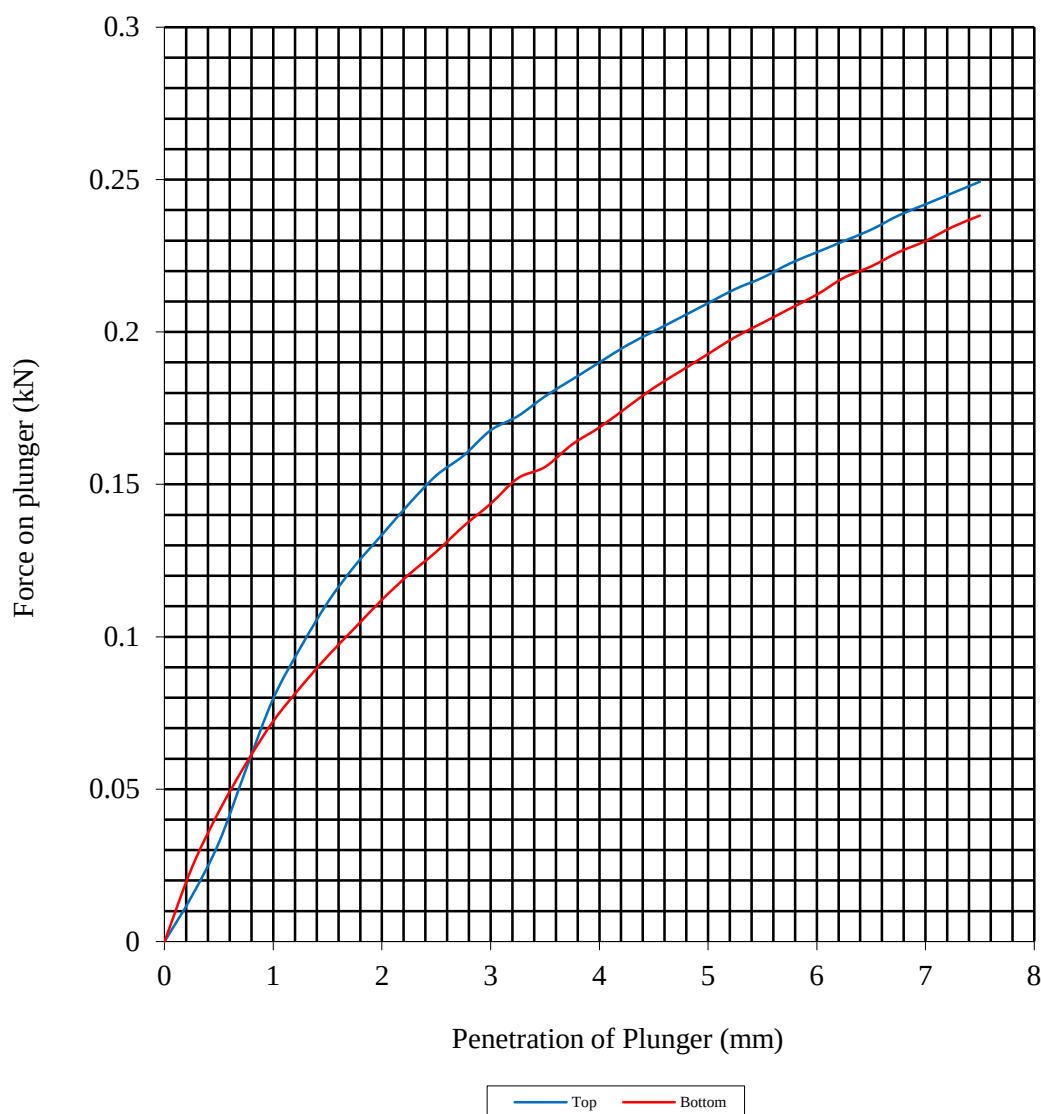
Hole Number: BHJ

Top Depth (m): 4.00

Sample Number:

Base Depth (m):

Sample Type: B



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	30	Surcharge Kg:	4.20	Sample Top	30	Sample Top	1.2
Bulk Density Mg/m3:	1.92	Soaking Time hrs	0	Sample Bottom	30	Sample Bottom	1.0
Dry Density Mg/m3:	1.48	Swelling mm:	0.00	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:		0					
Compaction Conditions		2.5kg					

		Trows Lane Farm	Contract No:
			PSL17/2664
			Client Ref:
			R2392

CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

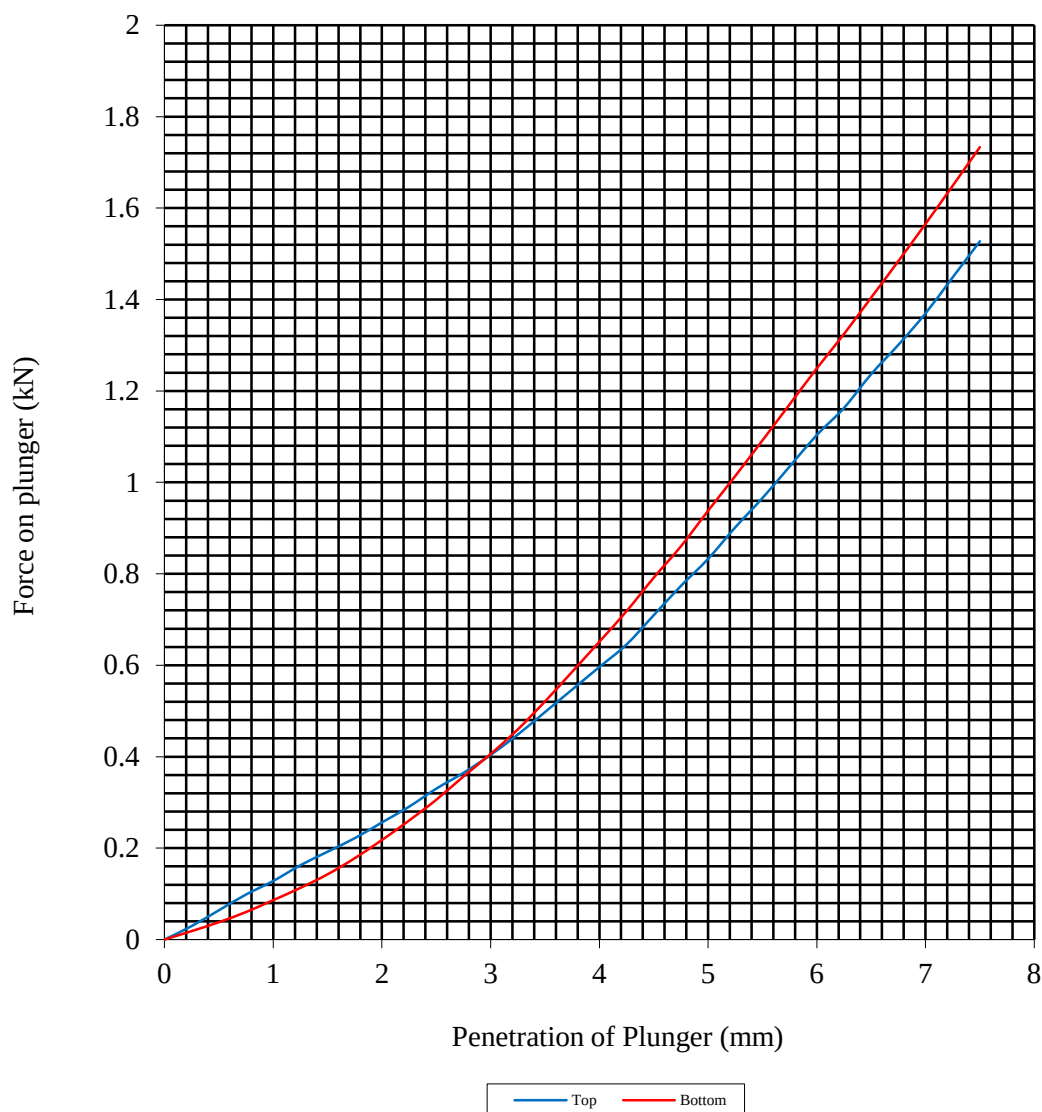
Hole Number: BHL

Top Depth (m): 3.00

Sample Number:

Base Depth (m): 4.00

Sample Type: B



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	18	Surcharge Kg:	4.20	Sample Top	19	Sample Top	4.2
Bulk Density Mg/m3:	1.93	Soaking Time hrs	0	Sample Bottom	18	Sample Bottom	4.7
Dry Density Mg/m3:	1.63	Swelling mm:	0.00	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:			0				
Compaction Conditions		2.5kg					

		Trows Lane Farm	Contract No:
			PSL17/2664
			Client Ref:
			R2392

APPENDIX I

Chemical Laboratory Test Results -SAL

Concept Life Sciences

Certificate of Analysis

Hadfield House
Hadfield Street
Cornbrook
Manchester
M16 9FE
Tel : 0161 874 2400
Fax : 0161 874 2468

Report Number: 658192-1

Date of Report: 15-Jun-2017

Customer: Smith Grant LLP
Station House
Station Road
Ruabon
Wrexham
LL14 6DL

Customer Contact: Mr Ben Thomas

Customer Job Reference: R2392

Customer Site Reference: Trows Lane Farm

Date Job Received at Concept: 29-May-2017

Date Analysis Started: 05-Jun-2017

Date Analysis Completed: 14-Jun-2017

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation

This report should not be reproduced except in full without the written approval of the laboratory

Tests covered by this certificate were conducted in accordance with Concept SOPs



Report checked
and authorised by :
Aleksandra Pacula
Project Manager

Issued by :
Aleksandra Pacula
Project Manager



Concept Reference: 658192 Project Site: Trows Lane Farm Customer Reference: R2392					
Soil MCERTS Preparation					
Analysed as Soil					
Concept Reference		658192 001	658192 002	658192 003	658192 004
Customer Sample Reference		WS1	WS2	WS3	WS4
End Date Sampled		30/05/17	30/05/17	30/05/17	30/05/17
Depth		0.60	0.80	1.80	0.90
Date Sampled		16-MAY-2017	16-MAY-2017	16-MAY-2017	16-MAY-2017
Determinand	Method	Test Sample	LOD	Units	
Moisture @105C	T162	AR	0.1	%	25
Retained on 10mm sieve	T2	M40	0.1	%	<0.1

Concept Reference: 658192 Project Site: Trows Lane Farm Customer Reference: R2392					
Soil MCERTS Preparation					
Analysed as Soil					
Concept Reference		658192 006	658192 007	658192 008	658192 009
Customer Sample Reference		WS6	WS8	WS9	WS10
End Date Sampled		30/05/17	30/05/17	30/05/17	30/05/17
Depth		2.60	1.00	1.00	1.50
Date Sampled		16-MAY-2017	16-MAY-2017	16-MAY-2017	16-MAY-2017
Determinand	Method	Test Sample	LOD	Units	
Moisture @105C	T162	AR	0.1	%	5.8
Retained on 10mm sieve	T2	M40	0.1	%	<0.1

Concept Reference: 658192 Project Site: Trows Lane Farm Customer Reference: R2392					
Soil MCERTS Preparation					
Analysed as Soil					
Concept Reference		658192 012	658192 013	658192 014	658192 016
Customer Sample Reference		WS12	WS13	BHD	BHD
End Date Sampled		30/05/17	30/05/17	30/05/17	30/05/17
Depth		4.10	5.60	1.50	5.50
Date Sampled		16-MAY-2017	16-MAY-2017	16-MAY-2017	16-MAY-2017
Determinand	Method	Test Sample	LOD	Units	
Moisture @105C	T162	AR	0.1	%	13
Retained on 10mm sieve	T2	M40	0.1	%	<0.1

Concept Reference: 658192 Project Site: Trows Lane Farm Customer Reference: R2392					
Soil MCERTS Preparation					
Analysed as Soil					
Concept Reference		658192 019	658192 020	658192 022	658192 023
Customer Sample Reference		BHF	BHG	BHG	BHH
End Date Sampled		30/05/17	30/05/17	30/05/17	30/05/17
Depth		7.00	11.00	15.00	10.00
Date Sampled		16-MAY-2017	16-MAY-2017	16-MAY-2017	16-MAY-2017
Determinand	Method	Test Sample	LOD	Units	
Moisture @105C	T162	AR	0.1	%	15
Retained on 10mm sieve	T2	M40	0.1	%	<0.1

Concept Reference: 658192 Project Site: Trows Lane Farm Customer Reference: R2392					
Soil MCERTS Preparation					
Analysed as Soil					
Concept Reference		658192 025	658192 027	658192 029	658192 030
Customer Sample Reference		BHI	BHI	BHJ	BHK
End Date Sampled		30/05/17	30/05/17	30/05/17	30/05/17
Depth		10.00	13.00	5.00	6.00
Date Sampled		16-MAY-2017	16-MAY-2017	16-MAY-2017	16-MAY-2017
Determinand	Method	Test Sample	LOD	Units	
Moisture @105C	T162	AR	0.1	%	8.9
Retained on 10mm sieve	T2	M40	0.1	%	<0.1

Concept Reference: 658192 Project Site: Trows Lane Farm Customer Reference: R2392					
Soil MCERTS Preparation					
Analysed as Soil					
Concept Reference		658192 033	658192 035	658192 036	658192 037
Customer Sample Reference		BHL	BHM	BHM	BHN
End Date Sampled		30/05/17	30/05/17	30/05/17	30/05/17
Depth		11.00	3.50	5.50	7.00
Date Sampled		16-MAY-2017	16-MAY-2017	16-MAY-2017	16-MAY-2017
Determinand	Method	Test Sample	LOD	Units	
Moisture @105C	T162	AR	0.1	%	8.7
Retained on 10mm sieve	T2	M40	0.1	%	<0.1

Concept Reference: 658192 Project Site: Trows Lane Farm Customer Reference: R2392					
Soil Miscellaneous					
Analysed as Soil					
Concept Reference		658192 001	658192 002	658192 003	658192 004
Customer Sample Reference		WS1	WS2	WS3	WS4
End Date Sampled		30/05/17	30/05/17	30/05/17	30/05/17
Depth		0.60	0.80	1.80	0.90
Date Sampled		16-MAY-2017	16-MAY-2017	16-MAY-2017	16-MAY-2017
Determinand	Method	Test Sample	LOD	Units	
pH	T7	AR			6.1
(Water Soluble) SO4 expressed as SO4	T242	AR	0.01	g/l	<0.01

Concept Reference: 658192 Project Site: Trows Lane Farm Customer Reference: R2392					
Soil Miscellaneous					
Analysed as Soil					
Concept Reference		658192 006	658192 007	658192 008	658192 009
Customer Sample Reference		WS6	WS8	WS9	WS10
End Date Sampled		30/05/17	30/05/17	30/05/17	30/05/17
Depth		2.60	1.00	1.00	1.50
Date Sampled		16-MAY-2017	16-MAY-2017	16-MAY-2017	16-MAY-2017
Determinand	Method	Test Sample	LOD	Units	
pH	T7	AR			5.8
(Water Soluble) SO4 expressed as SO4	T242	AR	0.01	g/l	<0.01

Index to symbols used in 658192-1

Value	Description
M40	Analysis conducted on sample assisted dried at no more than 40C. Results are reported on a dry weight basis.
AR	As Received
M	Analysis is MCERTS accredited
N	Analysis is not UKAS accredited

Notes

These samples have been analysed exceeding recommended holding times of 5 days for pH. It is possible therefore that the results provided may be compromised.

Method Index

Value	Description
T2	Grav
T162	Grav (1 Dec) (105 C)
T242	2:1 Extraction/ICP/OES (TRL 447 T1)
T7	Probe

Accreditation Summary

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
Moisture @105C	T162	AR	0.1	%	N	001-010,012-014,016,018-020,022-025,027,029-030,032-033,035-037,039
Retained on 10mm sieve	T2	M40	0.1	%	N	001-010,012-014,016,018-020,022-025,027,029-030,032-033,035-037,039
pH	T7	AR			M	001-010,012-014,016,018-020,022-025,027,029-030,032-033,035-037,039
(Water Soluble) SO4 expressed as SO4	T242	AR	0.01	g/l	N	001-010,012-014,016,018-020,022-025,027,029-030,032-033,035-037,039

APPENDIX J

Resume of Soils Geotechnical Properties

Laboratory test results and soil parameters

Sample ID	TP04	TP06	TP09	TP10	TP14	TP16	TP18	TP18	TP19	WS01	WS01	WS02	WS02	WS03	WS03	WS03	WS04	WS05
Depth(m):	0.80	1.10	0.90	1.30	1.50	1.00	1.00	2.50	1.40	1.50	4.50	1.40	4.60	1.10	2.50	3.50	1.60	0.80
Stratigraphy	HGD	HGD	HGD	HGD	HGD	HGD	HGD	HGD	HGD	HGD	HGD	HGD	HGD	HGD	HGD	HGD	HGD	HGD
Sieve (mm)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)
125	100.00		100.00	100.00	100.00		100.00		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
75	100.00		100.00	100.00	100.00		100.00		92.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
63	100.00		96.00	97.00	100.00		96.50		90.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
37.5	100.00		92.00	94.00	100.00		93.00		88.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
20	100.00		90.00	90.00	100.00		86.00		82.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
10	100.00		86.00	89.00	99.00		83.00		78.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	93.00
6.3	100.00		83.00	88.00	99.00		82.00		74.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	91.00
3.35	99.00		81.00	85.00	99.00		80.00		70.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	90.00
2	99.00		80.00	85.00	99.00		79.00		68.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	88.00
1.18	99.00		79.00	84.00	99.00		78.00		67.00	99.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	88.00
0.6	99.00		78.00	83.00	98.00		76.00		65.00	99.00	100.00	100.00	100.00	100.00	100.00	100.00	99.00	86.00
0.3	96.00		66.00	70.00	88.00		71.00		49.00	98.00	100.00	99.00	99.00	99.00	100.00	100.00	99.00	74.00
0.212	90.00		40.00	49.00	68.00		68.00		31.00	96.00	100.00	99.00	99.00	98.00	99.00	100.00	98.00	60.00
0.15	84.00		28.00	29.00	48.00		58.00		15.00	91.00	100.00	98.00	92.00	98.00	99.00	99.00	96.00	46.00
0.063	28.40		10.70	10.70	18.80		39.00		4.80	46.00	99.00	96.00	69.00	85.00	49.00	54.00	67.00	26.00
Sieve 0.425 mm	98	100	75	80	96	100	75	100	62		100	100	100					
L _L (%)		34.00				30.00		55.00			45.00	33.00	28.00					
L _p (%)		15.00				19.00		28.00			25.00	19.00	21.00					
IP (%)		19.00				11.00		27.00			20.00	14.00	7.00					
Moisture(%)		16.00				23.00		35.00			24.00	28.00	25.00					
Dry density (Mg/m ³)																		
Bulk density (Mg/m ³)																		
CBR % (top)																		
CBR % (bottom)																		
Modified IP'		19				11		27		20	14	7						
Consistency Index I _c		0.95				0.64		0.74		1.05	0.36	0.43						
Liquidity Index I _L		0.05				0.36		0.26		-0.05	0.64	0.57						
Compression index C _c		0.22				0.18		0.41		0.32	0.21	0.16						
Gravel content	1.00		20.00	15.00	1.00		21.00		32.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.00
Sand content	70.60		69.30	74.30	80.20		40.00		63.20	54.00	1.00	4.00	31.00	15.00	51.00	46.00	33.00	62.00
Fines content	28.40		10.70	10.70	18.80		39.00		4.80	46.00	99.00	96.00	69.00	85.00	49.00	54.00	67.00	26.00
USCS		CL				CL		CH			CI	CL	CL					

Clay Volume Change Potential (NHBC)

Modified Plasticity Index I_p' (%) Volume Change Potential

>60 very high
40-60 high

Compression Index C_c

C_c 0.0-0.19 low compressibility
C_c 0.2-0.39 medium compressibility
C_c > 0.4 high compressibility

Consistency Index I_c

I_c 0-0.25 very soft to soft, qu approximately 0.25-1kg/cm²
I_c 0.25-0.5 soft to firm,
I_c 0.5-0.75 firm to stiff,
I_c 0.75-1 stiff to very stiff, qu approximately 1-5kg/cm²

Liquidity Index I_L

I_L ~ 0, overconsolidated soil
I_L ~ 1, normally consolidated
I_L ≥ 0.2, plastic soil but with little expansion

HGD Hummocky Glacial Deposits
MG Made Ground - undivided
FILL Made Ground - engineered fill
ALL Alluvium

	Minimum	Maximum
SO4 g/l	<0.01	0.05
pH value	5.10	8.20
Modified IP'	7	32
Consistency Index I _c	0.36	1.25
Liquidity Index I _L	-0.25	0.64
Compression index C _c	0.14	0.43
Percentage of fines (%)	1	99
Moisture (%)	15	35

Sample ID	WS05	WS05	WS06	WS06	WS07	WS07	WS08	WS08	WS09	WS09	WS09	WS10	WS10	WS11	WS12	WS13	BHD	BHD
Depth(m):	2.40	3.70	0.80	1.60	1.20	2.00	0.80	2.60	2.60	3.80	5.50	2.60	3.60	4.80	4.40	2.60	1.50	2.50
Stratigraphy	HGD	HGD	HGD	HGD	HGD	HGD	HGD	HGD	HGD	HGD	HGD	MG	HGD	HGD	HGD	FILL	HGD	HGD
Sieve (mm)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)
125	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
75	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
63	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
37.5	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
20	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
10	100.00	100.00	99.00	100.00	100.00	100.00	99.00	100.00	100.00	100.00	100.00	100.00	99.00	100.00	89.00	100.00	100.00	100.00
6.3	100.00	100.00	97.00	100.00	100.00	100.00	99.00	100.00	100.00	100.00	100.00	100.00	98.00	100.00	84.00	100.00	100.00	100.00
3.35	100.00	100.00	96.00	100.00	100.00	100.00	98.00	100.00	100.00	100.00	100.00	98.00	97.00	100.00	82.00	99.00	100.00	100.00
2	100.00	99.00	95.00	100.00	100.00	100.00	98.00	100.00	100.00	100.00	100.00	95.00	96.00	100.00	80.00	98.00	100.00	100.00
1.18	99.00	99.00	95.00	100.00	100.00	99.00	98.00	100.00	100.00	100.00	100.00	90.00	96.00	100.00	76.00	98.00	99.00	100.00
0.6	99.00	99.00	94.00	100.00	98.00	98.00	97.00	99.00	100.00	99.00	100.00	85.00	94.00	100.00	70.00	97.00	99.00	99.00
0.3	89.00	99.00	87.00	95.00	79.00	77.00	91.00	98.00	100.00	98.00	100.00	75.00	83.00	96.00	52.00	90.00	97.00	98.00
0.212	77.00	98.00	79.00	57.00	56.00	60.00	84.00	88.00	100.00	98.00	99.00	63.00	73.00	68.00	39.00	79.00	95.00	97.00
0.15	69.00	98.00	71.00	19.00	36.00	44.00	77.00	65.00	95.00	97.00	99.00	52.00	66.00	38.00	28.00	68.00	93.00	96.00
0.063	60.00	95.00	60.00	1.00	17.00	30.00	66.00	31.00	31.00	94.00	70.00	40.00	55.00	21.00	16.00	48.00	87.00	93.00
Sieve 0.425 mm		99	91										89			94	98	
L _L (%)		49.00	31.00										26.00			30.00	49.00	
L _P (%)		24.00	17.00										15.00			18.00	23.00	
IP (%)		25.00	14.00										11.00			12.00	26.00	
Moisture(%)		29.00	15.00		17.00	19.00							16.00			15.00	28.00	
Dry density (Mg/m³)						1.69												
Bulk density (Mg/m³)						2.01												
CBR % (top)						0.50												
CBR % (bottom)						0.50												
Modified IP'		25	13										10			11	25	
Consistency Index I _c		0.80	1.14										0.91			1.25	0.81	
Liquidity Index I _L		0.20	-0.14										0.09			-0.25	0.19	
Compression index C _c		0.35	0.19										0.14			0.18	0.35	
Gravel content	0.00	1.00	5.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	5.00	4.00	0.00	20.00	2.00	0.00	0.00
Sand content	40.00	4.00	35.00	99.00	83.00	70.00	32.00	69.00	69.00	6.00	30.00	55.00	41.00	79.00	64.00	50.00	13.00	7.00
Fines content	60.00	95.00	60.00	1.00	17.00	30.00	66.00	31.00	31.00	94.00	70.00	40.00	55.00	21.00	16.00	48.00	87.00	93.00
USCS		CI	CL										CL			CL	CI	

Sample ID	BHD	BHD	BHF	BHF	BHF	BHG	BHG	BHG	BHG	BHG	BHG	BHG	BHH	BHH	BHI	BHI	BHI	BHI
Depth(m):	3.50	6.50	3.20	12.00	15.00	2.30	4.30	6.30	7.30	12.00	14.90	19.00	10.00	14.00	4.00	6.00	10.00	13.00
Stratigraphy	HGD	HGD	HGD	HGD	HGD	HGD	HGD	HGD	HGD	HGD	HGD	HGD	HGD	HGD	HGD	HGD	HGD	HGD
Sieve (mm)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)
125	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
75	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
63	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
37.5	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
20	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
10	100.00	100.00	100.00	100.00	97.00	100.00	98.00		100.00	100.00	97.00	100.00	100.00	100.00	100.00	99.00	100.00	99.00
6.3	100.00	100.00	100.00	100.00	97.00	100.00	96.00		100.00	100.00	97.00	100.00	99.00	100.00	99.00	99.00	100.00	98.00
3.35	100.00	100.00	100.00	100.00	95.00	99.00	95.00		99.00	100.00	96.00	99.00	99.00	100.00	99.00	98.00	100.00	98.00
2	99.00	100.00	100.00	100.00	94.00	98.00	94.00		99.00	99.00	95.00	99.00	99.00	100.00	99.00	97.00	100.00	97.00
1.18	99.00	100.00	100.00	100.00	94.00	97.00	93.00		98.00	99.00	95.00	99.00	98.00	100.00	99.00	97.00	100.00	96.00
0.6	99.00	99.00	99.00	100.00	92.00	95.00	91.00		96.00	99.00	93.00	98.00	97.00	100.00	98.00	96.00	100.00	96.00
0.3	98.00	98.00	99.00	99.00	61.00	84.00	78.00		86.00	88.00	85.00	92.00	91.00	97.00	97.00	92.00	99.00	94.00
0.212	97.00	98.00	98.00	99.00	32.00	71.00	64.00		75.00	53.00	76.00	73.00	79.00	66.00	93.00	87.00	97.00	92.00
0.15	95.00	95.00	98.00	98.00	19.00	61.00	52.00		66.00	24.00	68.00	42.00	54.00	28.00	82.00	81.00	94.00	90.00
0.063	93.00	15.00	96.00	94.00	9.00	49.00	37.00		55.00	7.00	56.00	15.00	26.00	5.00	64.00	70.00	78.00	87.00
Sieve 0.425 mm				99												94		95
L _L (%)				49.00												28.00		55.00
L _P (%)				23.00												15.00		23.00
IP (%)				26.00												13.00		32.00
Moisture(%)			33.00	23.00		17.00		15.00							24.00	21.00		26.00
Dry density (Mg/m ³)			1.43			1.82		1.89							1.60			
Bulk density (Mg/m ³)			1.89			2.12		2.17							1.98			
CBR % (top)			1.70			0.20		0.80							0.10			
CBR % (bottom)			1.70			0.20		0.80							0.10			
Modified IP'				26												12		30
Consistency Index I _c				1.00												0.54		0.91
Liquidity Index I _L				0.00												0.46		0.09
Compression index C _c				0.35												0.16		0.41
Gravel content	1.00	0.00	0.00	0.00	6.00	2.00	6.00		1.00	1.00	5.00	1.00	1.00	0.00	1.00	3.00	0.00	3.00
Sand content	6.00	85.00	4.00	6.00	85.00	49.00	57.00		44.00	92.00	39.00	84.00	73.00	95.00	35.00	27.00	22.00	10.00
Fines content	93.00	15.00	96.00	94.00	9.00	49.00	37.00		55.00	7.00	56.00	15.00	26.00	5.00	64.00	70.00	78.00	87.00
USCS				CI												CL		CH

Sample ID	BHI	BHI	BHJ	BHJ	BHJ	BHJ	BHJ	BHK	BHK	BHL	BHL	BHL	BHM	BHM	BHM	BHM	BHN	BHN
Depth(m):	15.50	17.00	3.50	4.00	4.50	7.00	9.00	6.00	10.00	3.00	13.00	16.00	1.90	2.50	6.00	7.50	2.60	4.50
Stratigraphy	HGD	HGD	HGD	HGD	HGD	HGD	HGD	HGD	HGD	HGD	HGD	HGD	AL	HGD	HGD	HGD	HGD	HGD
Sieve (mm)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)	Passing(%)
125	100.00	100.00	100.00		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
75	100.00	100.00	100.00		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
63	100.00	100.00	100.00		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
37.5	100.00	100.00	100.00		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	90.00
20	100.00	100.00	100.00		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	87.00	100.00	100.00	69.00
10	100.00	100.00	100.00		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	98.00	99.00	87.00	100.00	100.00	61.00
6.3	100.00	100.00	100.00		100.00	100.00	100.00	100.00	100.00	100.00	100.00	98.00	98.00	99.00	87.00	99.00	100.00	57.00
3.35	99.00	100.00	100.00		100.00	100.00	100.00	99.00	100.00	100.00	98.00	98.00	99.00	99.00	86.00	99.00	100.00	54.00
2	98.00	100.00	100.00		100.00	100.00	100.00	99.00	100.00	100.00	97.00	98.00	98.00	98.00	86.00	99.00	100.00	52.00
1.18	98.00	100.00	100.00		100.00	100.00	100.00	98.00	100.00	100.00	96.00	97.00	98.00	98.00	86.00	99.00	99.00	50.00
0.6	97.00	99.00	100.00		99.00	100.00	100.00	96.00	100.00	99.00	94.00	97.00	98.00	98.00	86.00	99.00	99.00	48.00
0.3	94.00	74.00	99.00		99.00	100.00	100.00	89.00	99.00	82.00	85.00	93.00	97.00	98.00	86.00	98.00	98.00	40.00
0.212	91.00	47.00	98.00		99.00	100.00	100.00	80.00	94.00	55.00	75.00	88.00	95.00	98.00	85.00	97.00	96.00	35.00
0.15	88.00	35.00	96.00		99.00	100.00	99.00	71.00	84.00	32.00	67.00	79.00	94.00	94.00	84.00	96.00	95.00	31.00
0.063	83.00	25.00	89.00		98.00	76.00	99.00	53.00	42.00	18.00	50.00	40.00	85.00	81.00	93.00	88.00	84.00	24.00
Sieve 0.425 mm	96				99		100							86			91	
L _L (%)	41.00				48.00		58.00							47.00			49.00	
L _P (%)	21.00				23.00		26.00							21.00			24.00	
IP (%)	20.00				25.00		32.00							26.00			25.00	
Moisture(%)	18.00		27.00	30.00	31.00		27.00			18.00				20.00			24.00	
Dry density (Mg/m ³)			1.54	1.48						1.63								
Bulk density (Mg/m ³)			1.95	1.92						1.93								
CBR % (top)			0.10	1.20						4.20								
CBR % (bottom)			0.10	1.00						4.70								
Modified IP'	19				25		32							22			23	
Consistency Index I _c	1.15				0.68		0.97							1.04			1.00	
Liquidity Index I _L	-0.15				0.32		0.03							-0.04			0.00	
Compression index C _c	0.28				0.34		0.43							0.33			0.35	
Gravel content	2.00	0.00	0.00		0.00	0.00	0.00	1.00	0.00	0.00	3.00	2.00	2.00	14.00	1.00	0.00	5.00	48.00
Sand content	15.00	75.00	11.00		2.00	24.00	1.00	46.00	58.00	82.00	47.00	58.00	13.00	5.00	6.00	12.00	11.00	28.00
Fines content	83.00	25.00	89.00		98.00	76.00	99.00	53.00	42.00	18.00	50.00	40.00	85.00	81.00	93.00	88.00	84.00	24.00
USCS	CI				CI		CH							CI			CI	

Sample ID	BHN	BHN	BHN	BHN
Depth(m):	7.00	8.90	10.00	12.00
Stratigraphy	HGD	HGD	HGD	HGD
Sieve (mm)	Passing(%)	Passing(%)	Passing(%)	Passing(%)
125	100.00	100.00	100.00	100.00
75	100.00	100.00	100.00	100.00
63	100.00	100.00	100.00	100.00
37.5	100.00	100.00	100.00	100.00
20	100.00	97.00	100.00	93.00
10	100.00	92.00	100.00	93.00
6.3	100.00	89.00	100.00	93.00
3.35	100.00	86.00	100.00	93.00
2	100.00	84.00	99.00	93.00
1.18	100.00	82.00	98.00	92.00
0.6	100.00	80.00	98.00	92.00
0.3	99.00	77.00	96.00	91.00
0.212	99.00	75.00	95.00	90.00
0.15	99.00	71.00	92.00	89.00
0.063	96.00	56.00	83.00	85.00
Sieve 0.425 mm	99			
L _L (%)	51.00			
L _P (%)	23.00			
IP (%)	28.00			
Moisture(%)	23.00			
Dry density (Mg/m ³)				
Bulk density (Mg/m ³)				
CBR % (top)				
CBR % (bottom)				
Modified IP'	28			
Consistency Index I _c	1.00			
Liquidity Index I _L	0.00			
Compression index C _c	0.37			
Gravel content	0.00	16.00	1.00	7.00
Sand content	4.00	28.00	16.00	8.00
Fines content	96.00	56.00	83.00	85.00
USCS	CH			