

GROUND INVESTIGATION REPORT

**Proposed Educational Development
The Hamilton Centre, Reading**

Prepared for: Hampshire County Council

Date: March 2019

Report No: 6305



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EXECUTIVE SUMMARY

Proposals		Hampshire County Council is proposing the construction of a new extension to the existing Hamilton Centre building in Reading. The proposed development will consist of a new extension to the north comprising a new sports hall, new kitchen and dining hall, a plant room and storage along with associated infrastructure.
Geology		The Geological Map of the area shows the site to be underlain by the Lambeth Group, which typically comprises vertically and laterally variable sequences mainly of clay, some silty or sandy, with some sands and gravels, minor limestones and lignites and occasional sandstone and conglomerate. No Superficial Deposits are shown to overlie the solid geology of the area.
Field Investigation		In order to confirm the underlying ground conditions at the site, field investigations comprising 6No. mini percussive boreholes, 4No. concrete cores and 6No. hand excavated inspection pits were undertaken on the 18th and 19th of February 2019. The soil sequence beneath the proposed development typically revealed a layer of Made Ground comprising placed topsoil locally overlying brownish red slightly sandy GRAVEL / gravelly SAND / sandy gravelly CLAY with brick to a depth of between 0.25m and 0.95m. The Made Ground was underlain by Residual Soils comprising firm to stiff greyish and orange brown slightly gravelly slightly sandy to sandy CLAY to a depth of between 0.80m and 1.90m. Finally, the Residual Soils were underlain by the Bedrock geology of the Lambeth Group comprising stiff to very stiff, locally firm, greyish brown grading to greenish and bluish grey slightly sandy silty CLAY to the maximum investigated depth of 5.00m. Groundwater was encountered within WS1 to WS4 at depths of between 2.20m and 3.40m.
Contamination	Chemical Testing & Evaluation	Eight samples of soil collected from the site were tested for a site-specific suite of contaminants. The soil chemical testing has revealed no elevated levels of contaminants with regards to Public Open Space – Residential land use scenario. Two Asphalt core samples from the old tennis court area showed CC4 in the north west corner of the tennis courts is positive for Coal Tar contamination. CC3 in the south east corner is inconclusive for Coal Tar contamination.
Engineering Recommendations	Foundation and Floor Slab Solution	It is recommended that a foundation solution for the proposed developments comprise either traditional strip/trench fill or pad and beam foundations within the Residual Soils comprising firm to stiff greyish and orange brown slightly gravelly slightly sandy to sandy CLAY, with an allowable bearing capacity of 100kN/m². The depth to this horizon is typically between 0.25m to 0.95m bgl. Based on plasticity testing, to avoid damage from frost heave and thermal shrinkage, the base of the foundations should lie at least 0.90m below final ground level. Due to the plastic nature of the underlying deposits and depth of Made Ground, floor slabs should be designed as suspended.
	Earthworks	A Class 2A or 2B classification should be adopted for general cohesive fill materials for any proposed earthworks at the site.
	Highways	A nominal CBR value of 1.75% should be used when designing new access road and car parking areas.
	Buried Concrete	All buried concrete should, as a minimum, conform to Class AC-1 of BRE Special Digest 1 for foundations within the Residual Soils.

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Drawing 3.3: SPT vs Depth

SECTION 1 Introduction and Proposed Development

Hampshire County Council is proposing the construction of a new extension to the existing Hamilton Centre building in Reading. The proposed development will consist of a new extension to the north comprising a new sports hall, new kitchen and dining hall, a plant room and storage along with associated infrastructure.

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

The main objectives of the Ground Investigation were to:

- Establish the ground conditions of the site, including logging of the holes and undertaking of in-situ testing,
- Provide recommendations for a suitable and economic foundation/floor slab solution for the development, and
- Collect representative samples for laboratory testing, and provide an evaluation of the results.

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

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

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

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

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

1.1 Limitations and Exceptions of Investigation

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

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

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

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

The ground investigation was limited by the following site constraints:

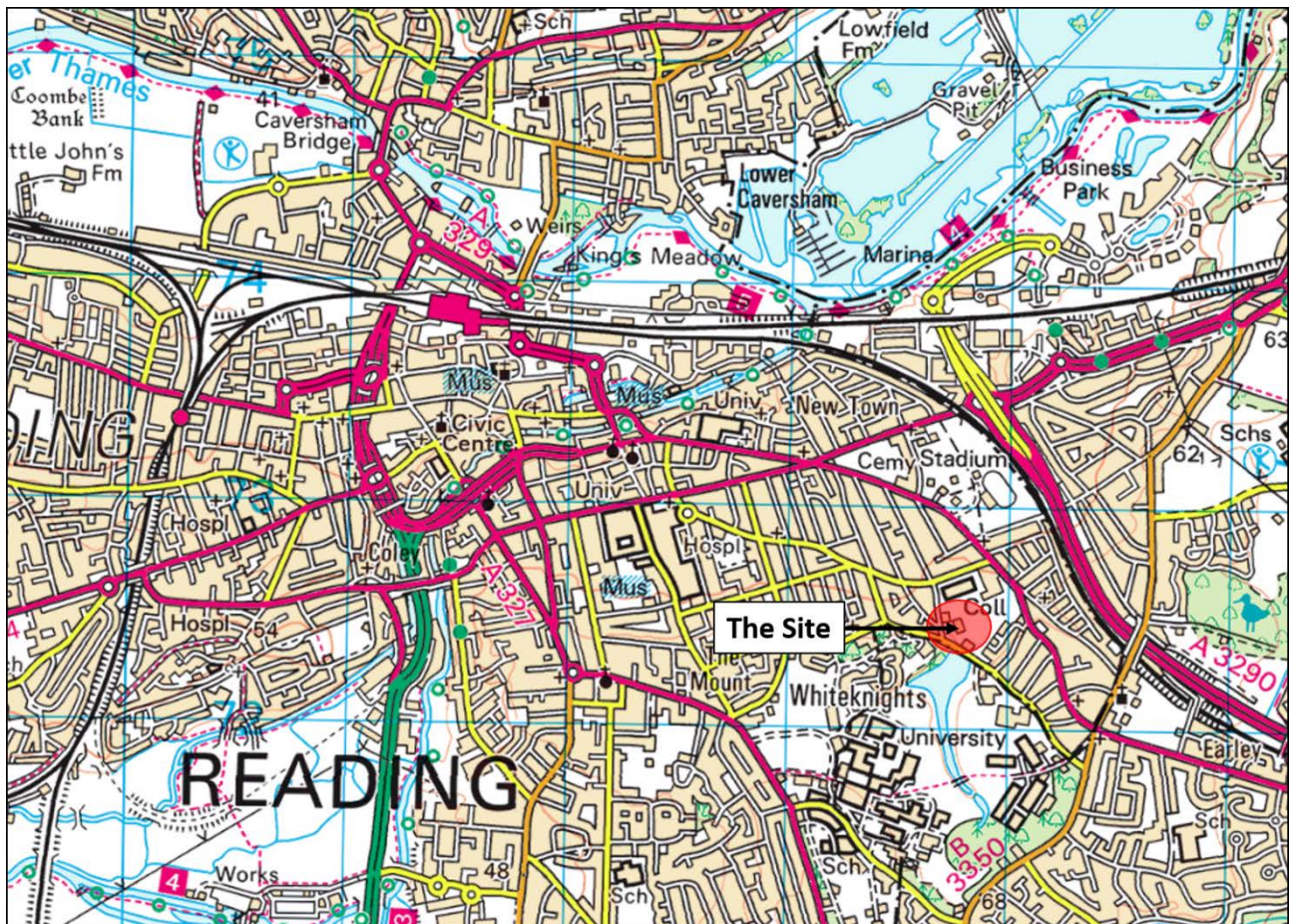
- The presence of underground services and utilities,
- The presence of existing buildings, structures and/or hard standing,
- The presence of underground obstructions, structures and/or unexpected ground conditions, and
- The presence of time restraints outside of our reasonable control.

SECTION 2 Site Setting

2.1 Physical Setting

The proposed development is to be located on land within the property boundaries of The Hamilton Centre, Reading, RG1 5SG.

The site is centred approximately on National Grid Reference (NGR) 473767, 174277. The site location is presented in **Drawing 2.1** below.



Drawing 2.1: Site Location Plan

The site is irregular in shape with a plan area of approximately 0.72 hectares and sits between approximately 52m and 61m above ordnance datum (aod).

The topography of the site is typically flat, although a slope leads down to the site from Hamilton Road in the west. The topography of the surrounding area typically slopes gently towards the North.

The site is bound by UTC Reading and Alfred Sutton School to the north, open land used as playing fields to the east, Lakeside residential home south and by Hamilton Road with residential dwellings beyond to the west.

2.1.1 Current Use and Site Conditions

A walk-over survey was undertaken on the 18th of February 2019 by a Terra Firma (South) Engineer. The site is accessed via Hamilton Road to the west. At the time of the walk-over survey the site currently comprises the derelict Hamilton Centre building with associated grounds and infrastructure. A basement occupies the north east corner of the existing building which appears to have flooded.

2.2 Geological Setting

The 1:50, 000-scale Geological Map of the area shows the site to be underlain by the Lambeth Group of Paleogene Age. The Lambeth Group typically comprises vertically and laterally variable sequences mainly of clay, some silty or sandy, with some sands and gravels, minor limestones and lignites and occasional sandstone and conglomerate.

No Superficial Deposits are shown to overlie the solid geology of the area.

Due to the nature and history of the site the presence of significant made ground cannot be ruled out.

2.3 Historical Setting

The historical setting of the site has not been requested as part of this investigation but the site is known to have been part of a historic brick field.

2.4 Previous Investigation

There has been one previous investigation at the site, as summarised below:

1. Ashdown Site Investigation Ltd, Report No. LW21153, June 2010

The ground investigation was for a proposed redevelopment of the western side of the Hamilton Centre to comprise a new childrens external play area and new access ramps and steps. As part of the development, retaining walls will be required.

The investigation comprised 4 window sampling holes and 3 hand excavated inspection pits to expose existing foundations.

The ground investigation confirmed a thin layer of Made Ground underlain by the London Clay Formation and Lambeth Group.

Groundwater was encountered between 1.20m and 5.00m.

Strip foundations of up to 1.50m width with a net allowable bearing capacity of 175kN/m² were recommended for foundations up to 1.00m depth. Higher loadings of up to 250kN/m² were recommended for the underlying stiff soils encountered below depths of 1.00m and 2.00m on similar sized footings.

Concrete should comply with DS-3 Design Sulfate Class and an AC-3 ACEC classification.

1 sample was tested for a typical suite of contaminants which revealed no elevations against Soil Screening Values and Generic Assessment Criteria

SECTION 3 Field Investigation

3.1 General

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

- 6No. mini percussive boreholes (WS1-WS6),
- 6No. hand excavated trial pits (HP1 – HP6),
- 4No. in-situ California Bearing Ratio (CBR) tests (HP3 – HP6), and
- 2No. Concrete Core Holes (CC1 – CC4).

The site works were carried out at the site on the 18th and 19th of February 2019.

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

- Risk Assessment & Method Statement (RAMS) was issued and approved beforehand,
- Underground Utility Plans were obtained by the relevant Statutory Undertakers,
- Before any excavation, all exploratory hole locations were scanned using a Cable Avoidance Tool (CAT), and
- Before any drilling, a 1.20m deep inspection pit was excavated at each borehole location.

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

The site works were supervised by Terra Firma (South), who also logged the exploratory holes to the requirements of BS5930:2015.

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



Drawing 3.1: Exploratory Hole Location Plan – Hamilton Centre

An additional two core holes (CC3 and CC4) were undertaken in the old tennis courts on the opposite side of the playing field to the east of the Hamilton Centre as shown in **Drawing 3.2** below:



Drawing 3.2: Exploratory Hole Location Plan – Old Tennis Court Area

3.2 Exploratory Holes

3.2.1 Mini Percussive Boreholes

The windowless sampling boreholes were bored using a premier 110 drilling rig.

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

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

All boreholes were backfilled using arisings, topped up with bentonite and reinstated using turf arisings.

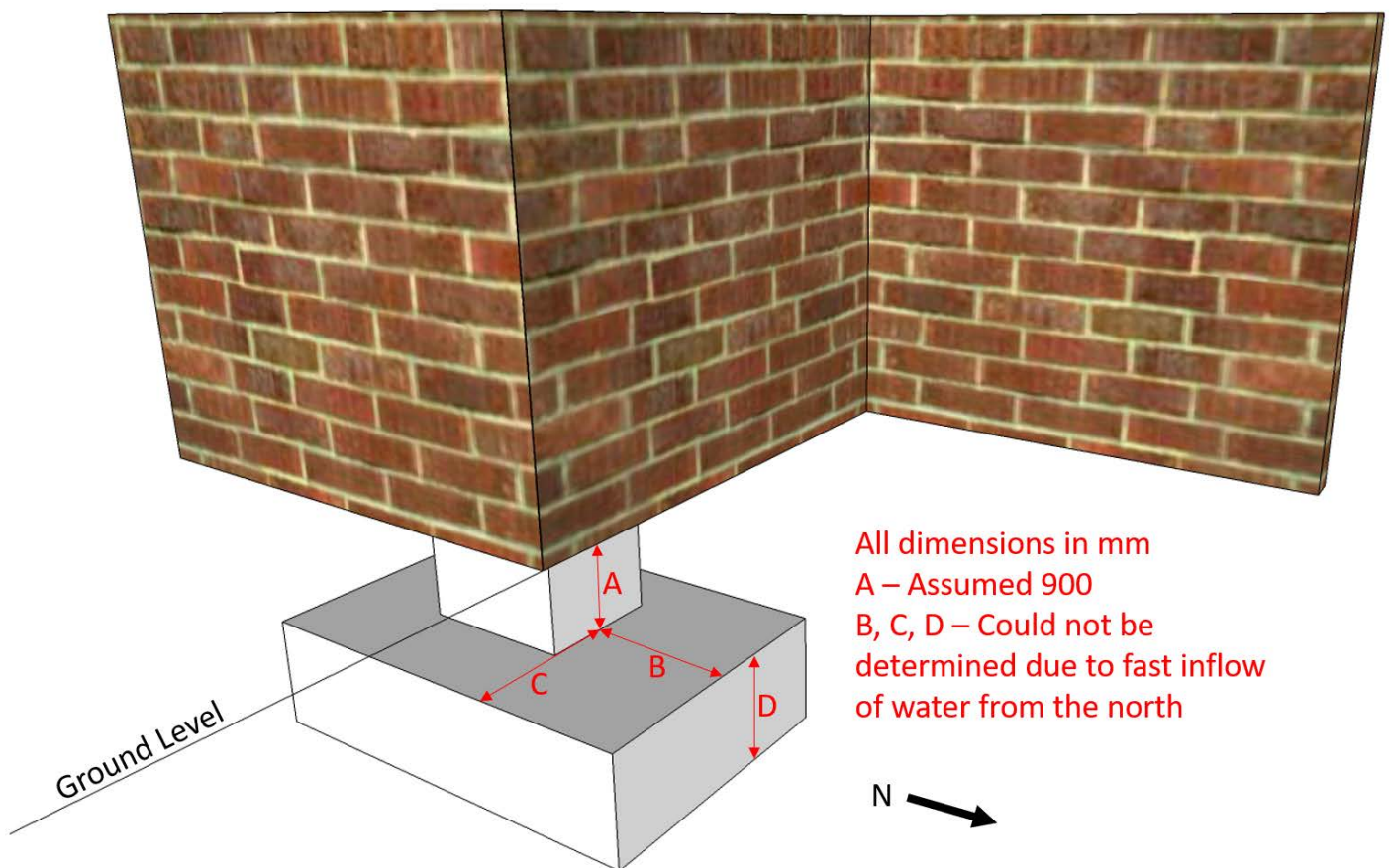
3.2.2 Hand Excavated Trial Pits

The hand excavated trial pits were sunk using conventional digging tools, limited to a maximum investigated depth of 1.20m and used to obtain in-situ CBR values and expose existing foundations.

HP1 and HP2 were used to expose existing foundations. HP1 encountered a fast inflow of perched water at 0.60m flowing in from the north preventing further exposure of this pit. A submersible pump was used to drain the pit. However, the inflow of water was too fast to enable further excavation. It is assumed the top of the foundation is at 0.90m due to a constant solid surface across the base of the pit at this depth. The extent of this pad foundation could not be determined due to the inflow of water.

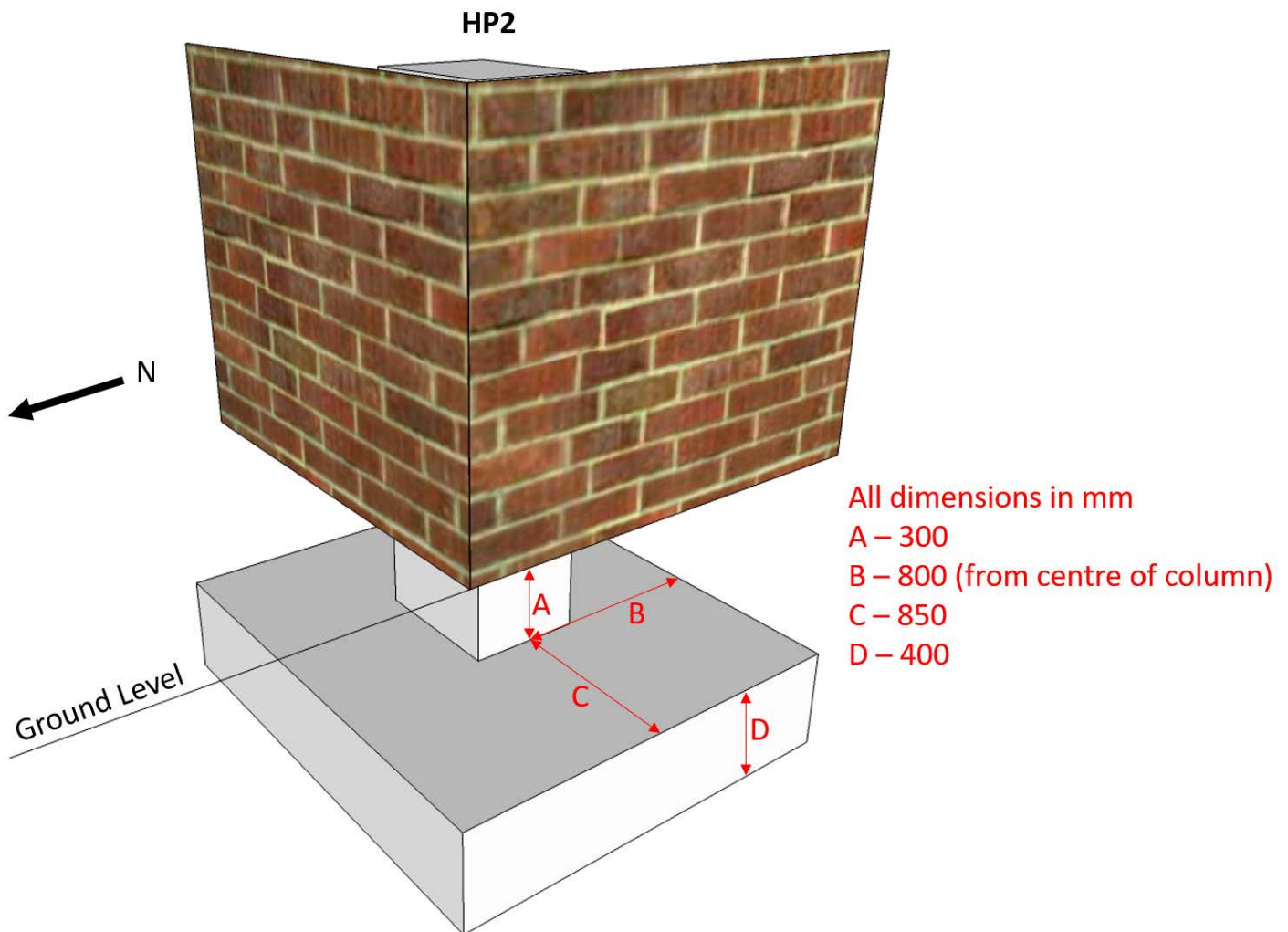
A Schematic drawing of this pit is shown below:

HP1



HP2 encountered a concrete pad foundation at 0.30m bgl. This pad was 0.80m wide from the centre of the column and stepped out 0.85m. The pad was 0.40m thick.

A Schematic drawing of this pit is shown below:



Following completion of soil logging, in-situ testing and sampling, the hand excavated trial pits were backfilled using arisings and re-compacted as best as practicably possible using hand tools.

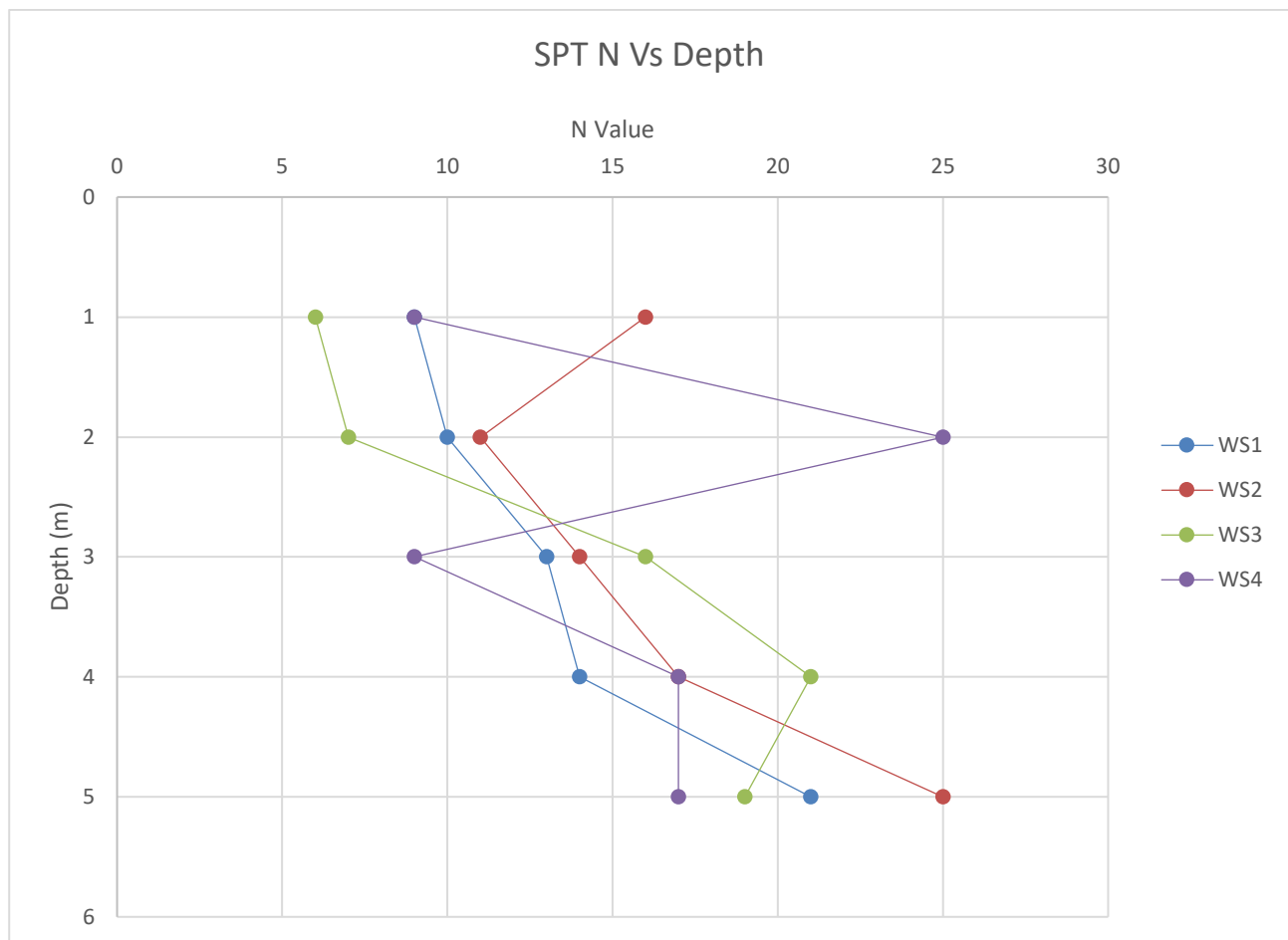
3.3 In-situ Testing

3.3.1 Strength Testing

SPTs

SPT N Values taken within the Lambeth Group revealed an average N value of 14.8 (Range 6 to 25).

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



Drawing 3.3: SPT vs Depth

The in-situ strength tests were carried out in accordance with 'Methods of test for soils for civil engineering purposes – Part 9 (BS 1377): 1999'.

3.3.2 California Bearing Ratio (CBR) Testing

The in-situ CBR tests (4No.) were carried out using a MEXE Cone Penetrometer. The probes were typically sunk to a depth of <0.50m from below ground level, targeting the proposed formation layer.

The in-situ CBR tests were carried out in accordance with 'Methods of test for soils for civil engineering purposes – Part 9 (BS 1377): 1999'.

The in-situ CBR test results are presented on the relevant trial pit logs and should be referred to for specific depth related values.

3.4 Sampling

3.4.1 Sampling Quality Assurance

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

- The use of nitrile gloves at each sampling point.

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

3.4.2 Soil Chemical Test Sampling Regime

During the intrusive investigation small disturbed soil and/or water samples were collected for chemical testing.

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

Table 3.1: Chemical Test Sample Descriptions			
Sample No.		Sample Type	Description
WS1	0.30	MG	Greyish brown slightly clayey gravelly SAND
WS1	0.75	MG	Dark greyish brown slightly gravelly slightly sandy CLAY
WS2	0.30	MG	Greyish brown slightly clayey gravelly SAND
WS2	0.60	RS	Greyish and orangish brown slightly gravelly slightly sandy CLAY
WS3	0.15	MG	Dark brown slightly gravelly slightly sandy CLAY
WS3	0.40	RS	Brownish grey mottled brown slightly gravelly slightly sandy CLAY
WS4	0.15	MG	Dark brown slightly gravelly slightly sandy silty CLAY
WS4	0.80	RS	Greyish and orangish brown slightly gravelly slightly sandy CLAY
CC3	-	Asphalt	Asphalt core
CC4	-	Asphalt	Asphalt core

Notes

- Sample Type: MG (Made Ground), RS (Residual Soils)

3.4.3 Soil Property Test Sampling Regime

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

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

Table 3.2: Soil Property Test Sample Descriptions			
Sample No.		Sample Type	Description
WS1	1.00	RS	Brown sandy CLAY and SILT
WS1	2.00	B	Brown sandy CLAY
WS1	2.50	B	Dark brown sandy CLAY
WS2	0.70	RS	Brown silty clayey SAND
WS2	1.50	B	Brown sandy CLAY
WS2	2.50	B	Dark grey sandy CLAY
WS3	0.50	RS	Dark brown slightly gravelly very sandy CLAY
WS3	1.00	B	Brown clayey very silty SAND
WS4	1.00	RS	Brown sandy CLAY
WS4	1.50	B	Dark brown sandy CLAY
WS5	0.70	RS	Brown sandy CLAY
WS6	1.20	B	Brown slightly gravelly sandy CLAY

Notes

- Sample Type: RS (Residual Soils), B (Bedrock)

SECTION 4 Ground Conditions

4.1 Summary

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

Table 4.1: Summary of Ground Conditions					
Depth (mbgl)		Thickness (m)		Stratum	
From	To	Min	Max		
0.00	0.25 / 0.95	0.25	0.95	Typically placed topsoil comprising dark brown clayey silty SAND or slightly sandy silty CLAY	<i>Made Ground (surface material)</i>
				Brownish red slightly sandy GRAVEL / gravelly SAND of brick overlying greyish brown sandy gravelly CLAY	<i>Made Ground (backfilled historic brick field - WS1 and WS6 only)</i>
0.25 / 0.95	0.80 / 1.90	0.55	1.05	Firm to stiff greyish and orange brown slightly gravelly slightly sandy to sandy CLAY	<i>Residual Soils</i>
0.80 / 1.90	>5.00	Unproven		Stiff to very stiff, locally firm, greyish brown grading to greenish and bluish grey slightly sandy silty CLAY. Locally very sandy.	<i>Solid Bedrock Lambeth Group</i>

Within trial pits, the estimated strength of granular deposits was determined from visual assessment only (ease/difficulty of excavation and pit stability).

4.2 Stability

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

4.3 Strata Details

4.3.1 Made Ground

The Made Ground was encountered within all exploratory holes and typically comprised a layer of placed topsoil material with occasional brick fragments.

Deeper Made Ground was encountered in WS1 and WS6 comprising variable amounts of gravel, sand and clay with brick and concrete and is assumed to be part of the backfilled brick field that covers this area of the site.

No visual or olfactory evidence of contamination was encountered within the Made Ground material.

4.3.2 Residual Soils

The Residual Soils were encountered within all exploratory holes and comprised a firm to stiff mottled CLAY with variable concentrations of silt and sand. Locally rare flint gravel was present throughout the stratum.

No visual or olfactory evidence of contamination was encountered within the Residual Soils.

4.3.3 Bedrock Geology

The Bedrock Geology was encountered within all exploratory holes with the exception of WS6.

The encountered bedrock geology comprised the Lambeth Group and was typically recovered as stiff to very stiff, locally firm greyish brown CLAY that graded into bluish and greenish grey with depth. Variable concentrations of sand and silt were recorded within the bedrock geology.

4.4 Water Strikes

During site works, groundwater was encountered within HP1, WS1, WS2, WS3 and WS4 at depths of between 2.20m and 3.40m, rising to a depth of between 0.80m and 1.95m after 20 minutes.

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

Table 4.2: Summary of Groundwater				
Hole Location	Groundwater Strike Depth (mbgl)	Groundwater Depth (mbgl) after 20 mins	Comments	Water Bearing Strata
HP1	0.60	0.60	Fast inflow of perched water	MG
WS1	2.40	1.60	Slight Rise	B
WS2	2.20	1.40	Slight Rise	B
WS3	3.40	1.95	Slight Rise	B
WS4	3.00	0.80	Slight Rise	B

Notes

- Water Bearing Strata: MG (Made Ground), B (Bedrock)

SECTION 5 Laboratory Chemical Testing

5.1 General

During the recent site works, eight soil samples and two asphalt cores were taken and despatched to the laboratories of Chemtest for laboratory chemical testing.

The following chemical testing was undertaken:

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

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

5.2 Evaluation of Analytical Results

5.2.1 Soils

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

Table 5.2: Soil Chemical Test Results – Inorganics (Metals)					
Substance	Land Use / Guideline Values	Measured Levels of Substances (mg/kg)		Number of exceedances	95% UCL
	POS-R	Min	Max		
Arsenic	79	9.8	15	0	-
Cadmium	220	0.1	0.23	0	-
Chromium	1500	17	25	0	-
Chromium VI	21	0.5	0.5	0	-
Copper	12000	9.7	120	0	-
Lead	630	13	120	0	-
Mercury (Total)	120	0.1	0.55	0	-
Nickel	230	12	30	0	-
Selenium	1100	0.2	0.65	0	-
Zinc	81000	28	140	0	-

Notes

- C4SL - Provisional Category 4 Screening Levels
- S4UL - Suitable for Use Levels

- POS-R (Public Open Space- Residential)
- A total of 8 representative soil samples were tested for these substances

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

Table 5.3: Soil Chemical Test Results – Inorganics (General)					
Substance	Land Use / Guideline Values (mg/kg)	Measured Levels of Substances (mg/kg)		Number of exceedances	95% UCL
	POS-R	Min	Max		
pH (pH Units)	Considered in BRE SD1, BS3882, BS8601 and/or UKWIR	7.8	8.7	0	-
Cyanide (Total)	0.50 (LoD)	0.5	0.5	0	-
Cyanide (Free)	0.50 (LoD)	0.5	0.5	0	-
Thiocyanate	5 (LoD)	5	5	0	-
Organic Matter	Considered in Organic Contaminant Guideline Value Assessment, BS3882 and/or BS8601	0.4	3.8	0	-
Ammoniacal Nitrogen	-	1.6	8.6	0	-
Sulphate (2:1) (g/l)	Considered in BRE SD1	0.01	0.056	0	-
Sulphide	Considered in BRE SD1	1.1	32	0	-
Sulphur (%)	-	0.026	0.12	0	-
Sulphate (Total) (%)	Considered in BRE SD1	0.015	0.38	0	-

Notes

- BRE SD1: 2005 - Concrete in Aggressive Ground
- BS 3882: 2015 - Specification for Topsoil
- BS 8601: 2013 - Specification for Subsoil and requirements for use
- UKWIR – Guidance for the Selection of Water Supply Pipe to be used in Brownfield Sites: 2010
- POS-R (Public Open Space- Residential)
- LoD - Limit of Detection
- A total of 8 representative soil samples were tested for these substances

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

Table 5.4: Soil Chemical Test Results – Organics (General)						
Substance		Land Use / Guideline Values (mg/kg)	Measured Levels of Substances (mg/kg)		Number of exceedances	95% UCL
			Min	Max		
SOM		POS-R				
Total Phenol	1	440	0.3	0.3	0	-
	2.5	690			0	
	6	1300			0	
Total PAH*		2 (LoD)	2	250	5	111.2
Total EPH _(C10-C40) **	1	3800+	10	180	0	-
	2.5	3800+			0	
	6	3800+			0	

Notes

- **S4UL** - Suitable for Use Levels
- POS-R (Public Open Space- Residential)
- LoD - Limit of Detection
- SOM - Soil Organic Matter
- * Total PAH - Poly-Aromatic Hydrocarbons, EPA 16 (See Speciated PAH Results Table)
- ** Total EPH – Extractable Petroleum Hydrocarbons, Ali/Aro (See Speciated PH Results Table)
- + Based on worse-case Aromatic C₁₆-C₂₁ fraction
- A total of 8 representative soil samples were tested for these substances

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

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

Table 5.5: Soil Chemical Test Results – Organics (Speciated PAH)						
Substance	Land Use / Guideline Values (mg/kg)		Measured Levels of Substances (mg/kg)		Number of exceedances	95% UCL
	SOM	POS-R	Min	Max		
Naphthalene	1	4900	0.1	1.6	0	-
	2.5	4900			0	
	6	4900			0	
Acenaphthylene	1	15000	0.1	1.6	0	-
	2.5	15000			0	
	6	15000			0	
Acenaphthene	1	15000	0.1	1.1	0	-
	2.5	15000			0	
	6	15000			0	
Fluorene	1	9900	0.1	1.2	0	-
	2.5	9900			0	
	6	9900			0	
Phenanthrene	1	3100	0.1	14	0	-
	2.5	3100			0	
	6	3100			0	
Anthracene	1	74000	0.1	5.2	0	-
	2.5	74000			0	
	6	74000			0	
Fluoranthene	1	3100	0.1	43	0	-
	2.5	3100			0	
	6	3100			0	
Pyrene	1	7400	0.1	39	0	-
	2.5	7400			0	
	6	7400			0	
Benzo(a)anthracene	1	29	0.1	20	0	-
	2.5	29			0	

	6	29			0	
Chrysene	1	57	0.1	20	0	-
	2.5	57			0	
	6	57			0	
Benzo(b)fluoranthene	1	7.1	0.1	26	0	10.9
	2.5	7.2			1	
	6	7.2			0	
Benzo(k)fluoranthene	1	190	0.1	12	0	-
	2.5	190			0	
	6	190			0	
Benzo(a)pyrene		10	0.1	24	1	8.8
Indeno(1,2,3-cd)pyrene	1	82	0.1	19	0	-
	2.5	82			0	
	6	82			0	
Dibenzo(a,h)anthracene	1	0.57	0.1	5.6	0	2.1
	2.5	0.57			1	
	6	0.58			0	
Benzo(g,h,i)perylene	1	640	0.1	19	0	-
	2.5	640			0	
	6	640			0	

Notes

- C4SL - Provisional Category 4 Screening Levels
- S4UL - Suitable for Use Levels
- POS-R (Public Open Space- Residential)
- SOM - Soil Organic Matter
- A total of 8 representative soil samples were tested for these substances

A summary of the Asbestos detection testing is given in the table below.

Table 5.6: Soil Chemical Test Results – Miscellaneous (Asbestos)				
Sample No. & Depth (m)		ID Result	Comments	Total Mass (%)
WS1	0.30	No Asbestos Detected	-	N/A
WS1	0.75	No Asbestos Detected	-	N/A
WS2	0.30	No Asbestos Detected	-	N/A
WS2	0.60	No Asbestos Detected	-	N/A
WS3	0.15	No Asbestos Detected	-	N/A
WS3	0.40	No Asbestos Detected	-	N/A
WS4	0.15	No Asbestos Detected	-	N/A
WS4	0.80	No Asbestos Detected	-	N/A

5.3 Waste Acceptance Procedure

Any materials to be removed from site should be subject to the Waste Acceptance Procedure (WAP) in order to appropriately classify the waste for the correct type of landfill.

We recommend that the attached results be made available to the relevant parties to determine its classification and acceptance before haulage.

Table 5.7: Waste Acceptance Criteria Testing

Sample Location	Sample Depth (m)	Comments	Landfill Waste Acceptance
WS1	0.30	-	Inert
WS3	0.15	-	Inert
WS4	0.15	Fails inert waste on Total PAH's	SNRHW

Based on the results of the WAC testing, the shallow deposits from WS1 and WS3 have been classed as inert waste. However, the shallow deposits from WS4 failed inert criteria on Total PAH's and so is classed as Stable Non-Reactive Hazardous Waste (SNRHW).

The results of the WAC testing have been included in **Annex B**.

5.4 Asphalt Testing

4No. core samples of the surface asphalt due for removal from the site were taken and subjected to Polycyclic Aromatic Hydrocarbon spray testing. The pictures in the table below show the core before and after testing. Only CC3 and CC4 (located within the separate tennis court area) showed detections of PAH's and these cores were sent for further laboratory analysis comprising a Coal Tar / Bitumen suite.

A summary of the asphalt testing results is given in the table below:

Table 5.8: Asphalt Testing

Sample Location		Measured Levels of Substances (mg/kg)			
		CC1	CC2	CC3	CC4
PAK Spray before					
PAK Spray After					
TPH >C6-C10	Mg/kg	-	-	<1.0	<1.0
TPH >C10-C21	Mg/kg	-	-	630	430
TPH >C21-C41	Mg/kg	-	-	6800	3800

Total TPH >C6-C40	Mg/kg	-	-	7400	4200
Coal Tar	%	-	-	0.56	0.27
Coal Tar	Mg/kg			5600	2700
Naphthalene	Mg/kg	-	-	1.6	1.4
Acenaphthylene	Mg/kg	-	-	3.5	2.0
Acenaphthene	Mg/kg	-	-	4.6	3.2
Fluorene	Mg/kg	-	-	4.6	5.2
Phenanthrene	Mg/kg	-	-	55	61
Anthracene	Mg/kg	-	-	18	19
Fluoranthene	Mg/kg	-	-	130	130
Pyrene	Mg/kg	-	-	120	120
Benzo(a)anthracene	Mg/kg	-	-	69	63
Chrysene	Mg/kg	-	-	59	49
Benzo(b)fluoranthene	Mg/kg	-	-	59	52
Benzo(k)fluoranthene	Mg/kg	-	-	36	25
Benzo(a)pyrene	Mg/kg	-	-	59	50
Indeno(1,2,3-c,d)Pyrene	Mg/kg	-	-	42	30
Dibenzo(a,h)Anthracene	Mg/kg	-	-	10	8.2
Benzo(g,h,i)perylene	Mg/kg	-	-	38	29
Coronene	Mg/kg	-	-	<0.10	<0.10
Carbazole	Mg/kg	-	-	0.70	5.1
VOC's	Mg/kg	-	-	<0.50	<0.50
SVOC's	Mg/kg	-	-	<0.50	<0.50
SVOC TIC	Mg/kg	-	-	Non-Detected	Dibenzothiophene

Interpretation of the results from the chemical lab indicate that only CC4 contains Coal Tar contamination. CC3 did not detect the biomarker Dibenzothiophene however elevated PAH's were detected. Therefore, the presence of Coal Tar in CC3 is inconclusive.

SECTION 6 Geotechnical Laboratory Testing Results

6.1 General

A number of bulk, undisturbed and solid core samples were collected, and dispatched to the UKAS accredited laboratories of I2 Analytical for soil and/or rock property testing, in accordance with the following:

1. Methods of test for soils for civil engineering purposes – Parts 1 to 8 (BS 1377): 1999.
2. The International Society for Rock Mechanics (ISRM) Methods: 1985.

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

6.1.1 Classification Testing

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

- 12No. Moisture Content (MC)
- 12No. Plasticity Index (P.I)
- 3No. Particle Size Distribution (PSD)
- 3No. Sedimentation Analysis (SA)
- 3No. Organic Matter (OM)

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

- 3No. BRE SD1 Suite A

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

Table 6.1: Summary of Soil Classification Test Results

Test		Location	WS1	WS1	WS1	WS1	WS2	WS2	WS2	WS2	WS3	WS3	WS3	WS4	WS4	WS5	WS6
		Depth (m)	0.30	1.00	2.00	2.50	0.30	0.70	1.50	2.50	0.40	0.60	1.00	1.00	1.50	0.80	1.20
		Unit	MG	RS	B	B	MG	RS	B	B	RS	RS	B	RS	B	RS	B
Moisture Content		%	15	25	24	24	19	21	24	22	14	23	22	23	28	27	33
Plasticity	Liquid Limit	%	-	52	39	35	-	37	36	37	-	32	38	34	44	37	38
	Plastic Limit	%	-	27	21	21	-	18	21	20	-	17	18	20	20	20	21
	Plasticity Index	%	-	25	18	14	-	19	15	17	-	15	20	14	24	17	17
	% <425µm	%	-	100	100	100	-	100	100	100	-	91	100	100	100	100	99
	Modified PI	%	-	25	18	14	-	19	15	17	-	13.6	20	14	24	17	16.8
Particle Size Distribution	Cobbles	%	-	0.0	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-
	Gravels	%	-	0.0	-	-	-	0.0	-	-	-	-	0.0	-	-	-	-
	Sands	%	-	28.8	-	-	-	41.4	-	-	-	-	42.4	-	-	-	-
	Silt & Clay	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Silt	%	-	35.9	-	-	-	29.7	-	-	-	-	33.8	-	-	-	-
	Clay	%	-	35.3	-	-	-	28.9	-	-	-	-	23.8	-	-	-	-
BRE	Total Sulphate	%	0.14	-	-	-	0.025	-	-	-	0.042	-	-	-	-	-	-
	2:1 Sulphate	g/l	0.021	-	-	-	<0.010	-	-	-	0.056	-	-	-	-	-	-
	pH	-	8.3	-	-	-	8.5	-	-	-	8.0	-	-	-	-	-	-
	Chloride	Cl/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total Sulphur	%	0.069	-	-	-	0.036	-	-	-	0.032	-	-	-	-	-	-
Organic Matter		%	2.9	0.3	-	-	<0.40	0.5	-	-	1.3	-	1.0	-	-	-	-

Notes

- Unit: MG (Made Ground), RS (Residual Soils), B (Bedrock)

SECTION 7 Engineering Recommendations

7.1 Preparation of Site

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

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

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

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

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

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

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

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

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

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

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

7.2 Foundation Solution

The site investigation has revealed a layer of Made Ground comprising placed topsoil locally overlying brownish red slightly sandy GRAVEL / gravelly SAND / sandy gravelly CLAY with brick to a depth of between 0.25m and 0.95m. The Made Ground was underlain by Residual Soils comprising firm to stiff greyish and orange brown slightly gravelly slightly sandy to sandy CLAY to a depth of between 0.80m and 1.90m. Finally, the Residual Soils were underlain by the Bedrock geology of the Lambeth Group comprising stiff to very stiff, locally firm, greyish brown grading to greenish and bluish grey slightly sandy silty CLAY to the maximum investigated depth of 5.00m.

During drilling groundwater was encountered between 2.20m and 3.40m bgl.

The Made Ground is variable in respect to their thickness and geotechnical properties and if foundations were extended to these strata in their current state it would lead to unacceptable levels of differential settlement.

Based on the encountered ground conditions the following foundation solutions are recommended:

Option 1: Traditional Strip/Trench Fill

In order to avoid unacceptable levels of differential settlement we recommend that mass concrete strip/trench foundations be extended into the underlying Residual Soils comprising firm to stiff greyish and orange brown slightly gravelly slightly sandy to sandy CLAY.

Option 2: Pad and Beam

Alternatively, a pad and beam foundation solution can be utilised at the site.

The pad foundations should be extended into the underlying Residual Soils mentioned above. A reinforced concrete ring beam should then span between the pads.

The depth to the above founding horizon is likely to vary between typically 0.25m and 0.95m below the existing ground level.

For the above foundation solutions and in-situ materials it is recommended that a presumed bearing resistance of 100kN/m² is used for design purposes. This value is based on the engineer's logs, in-situ strength testing and specific SPT calibration energy ratio.

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

Due to the depth of shallow groundwater excavations and foundations should be kept as shallow as possible, not ignoring frost protection outlined below.

It is also recommended that the foundations achieve a minimum penetration of 200mm into the foundation bearing stratum.

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

7.2.1 Detailed Depth Recommendations

Plasticity of Underlying Soil

In accordance with BS8004 guidance, plasticity tests, summarised in Section 7.1.1, show the deposits beneath the site exhibit low to medium shrinkage potential. Therefore, given the foundation solution recommended above, to avoid damage from frost heave or thermal shrinkage the base of the foundations should lie at least 0.90 below final ground level.

It should be noted deeper foundations than those stated above maybe required near the tree route system located onsite.

7.2.2 Floor Slabs

Due to the depth of Made Ground underlying the site (>600mm) ground floor slabs should be designed as suspended.

7.3 Excavations and Formations

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

Groundwater was encountered between 2.20 and 3.40m bgl. Therefore, it is unlikely that groundwater may be encountered during foundation excavations. Any inflows should be dealt with using conventional pumping techniques.

It should also be noted that during times of high rainfall a higher groundwater table may be encountered.

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

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

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

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

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

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

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

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

7.4 Earthworks

Soil property testing comprising Plasticity (PI) [and Particle Size Distribution] testing was undertaken on samples from the shallow deposits.

Based on the above testing, the following classes should be adopted for any proposed earthworks:

Table 7.1: Earthworks Classification

Stratum	Earthworks Class	Compaction Method*
Residual Soils	2A/B	Table 6/4 Method 2
Bedrock	2A/B	Table 6/4 Method 2

Notes:

- * - Compaction method in accordance with Volume 1 Specification For Highway Works

It is likely that the in-situ materials can be used as structural fill. This material should be placed at or close to its optimum moisture content/maximum dry density and compacted in layers as per the requirements of the Specification for Highway Works.

These requirements should be followed by the appointed groundwork's contractor.

In order to ensure that the materials are being placed at or near to their maximum dry density, in-situ density tests should be undertaken during the earthworks. Following completion of the earthworks plate loading tests should be undertaken on the finished plateau.

On placing any fill onto the existing ground, to avoid slippage at this interface the existing ground should be cut and benched. Appropriate drainage measures should be incorporated at the top and bottom of any slopes. Such drainage measures should be positively connected to an appropriate source.

7.5 New Access Road and Car Parking Areas

The in-situ CBR tests (4No) were carried out using a MEXE within the area of the proposed car park. The tests were typically undertaken at the base of the topsoil material.

The in-situ CBR test results are presented on the relevant exploratory hole logs in **Annex A** and should be referred to for specific depth related values.

Average CBR values for the Mexe testing are presented in the table below.

Table 7.2: Average CBR Test Results

Location	Average CBR Value (%)
HP3	1.75%
HP4	2.5%
HP5	1.75%
HP6	1.75%

Allowances should be made for the removal of any soft spots and their replacement with well-compacted imported granular materials as previously described.

7.6 Protection of Buried Concrete

The laboratory testing carried on samples of the near surface soils recorded pH values between 8.0 and 8.5, water-soluble sulphate concentrations between <0.010 mg/l and 0.056 g/l.

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

Based on the above and using guidance within BRE Special Digest 1 (2005) it is recommended that any buried concrete within the site conforms to class AC-1.

Annex A: Exploratory Hole Logs

Project Name The Hamilton Centre, Reading	Project No. 6305	Date 19/02/2019 to 19/02/2019	Hole Type IP
Client Hampshire County Council	Co-ords E: N: L:	Water Strike Details Depth Strike Remarks	Logged By PS
Contractor Oakland SI	Plant Used Hand Tools		Approved By PS
			Scale 1:50

Samples and Results			Depth, (Thickness)	Level	Stratum Description	Legend
Results	Type	Depth				
			(0.08) 0.08		MADE GROUND: CONCRETE	
					MADE GROUND: Loose sandy clayey GRAVEL and COBBLES of brick, concrete and flint.	
			(0.62)			
			0.70 (0.15) 0.85		Soft to firm brown slightly gravelly sandy CLAY.	
			1		End of Trial Pit at 0.85m	
			2			
			3			
			4			

Trial Pit Photographs

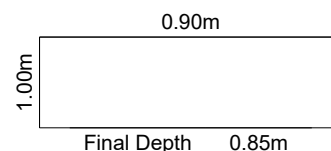


Remarks

Concrete pad foundation exposed at 0.30m, stepping out 0.85m, was 0.80m wide and is 0.40m thick.

Pit Stability: Stable

Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.



 Consulting Geo-Technical & Geo-Environmental Engineers Site Investigation Contractors				The Slate Barn, Lower Lowley, Dunsford, Exeter, EX6 7BP 01647 252414 www.terrafirmasouth.co.uk				Borehole No. HP3 Sheet 1 of 1	
Project Name The Hamilton Centre, Reading				Project No. 6305		Date 18/02/2019 to 18/02/2019		Hole Type IP	
Client Hampshire County Council				Co-ords E: N: L:		Water Strike Details		Logged By PS	
						Depth Strike Remarks			
Contractor Terra Firma (South)			Plant Used Hand Tools				Approved By PS		Scale 1:50
Samples and Results			Depth, (Thickness)	Level	Stratum Description				Legend
Results	Type	Depth							
			(0.20) 0.20 (0.05) 0.25		MADE GROUND: Grass over loose dark brown slightly gravelly slightly clayey silty SAND. Occasional rootlets and brick fragments. Firm greyish and orangish brown slightly gravelly slightly sandy to sandy CLAY. Gravel is subrounded fine to medium of flint.				
					End of Trial Pit at 0.25m				
Remarks CBR @ 0.25 - 1.5%, 2%, 2%						0.30m Final Depth 0.25m			
Pit Stability: Stable									
Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.									

Project Name The Hamilton Centre, Reading		Project No. 6305	Date 18/02/2019 to 18/02/2019		Hole Type IP
Client Hampshire County Council		Co-ords E: N: L:	Water Strike Details		Logged By PS
			Depth Strike	Remarks	
Contractor Terra Firma (South)	Plant Used Hand Tools				Approved By PS
					Scale 1:50

Samples and Results			Depth, (Thickness)	Level	Stratum Description	Legend
Results	Type	Depth				
			(0.20) 0.20 (0.05) 0.25		MADE GROUND: Grass over soft to firm dark brown slightly gravelly slightly sandy silty CLAY. Occasional rootlets and brick fragments. Firm greyish and orangish brown slightly gravelly slightly sandy to sandy CLAY. Gravel is subrounded fine to medium of flint.	
					End of Trial Pit at 0.25m	
			1			
			2			
			3			
			4			

Remarks

CBR @ 0.25 - 2%, 2.5%, 2.75%

Pit Stability:	Stable
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Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.

0.30m

0.30m

Final Depth	0.25m
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Project Name The Hamilton Centre, Reading		Project No. 6305	Date 18/02/2019 to 18/02/2019		Hole Type IP
Client Hampshire County Council		Co-ords E: N: L:	Water Strike Details		Logged By PS
			Depth Strike	Remarks	
Contractor Terra Firma (South)	Plant Used Hand Tools				Approved By PS
					Scale 1:50

Samples and Results			Depth, (Thickness)	Level	Stratum Description	Legend
Results	Type	Depth				
			(0.20) 0.20 (0.05) 0.25		MADE GROUND: Grass over soft to firm dark brown slightly gravelly slightly sandy silty CLAY. Occasional rootlets and brick fragments.	
					Firm greyish and orangish brown slightly gravelly slightly sandy to sandy CLAY. Gravel is subrounded fine to medium of flint.	
					End of Trial Pit at 0.25m	
			1			
			2			
			3			
			4			

Remarks

CBR @ 0.25 - 2%, 2.5%, 1%

Pit Stability:	Stable
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Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.

0.30m

0.30m

Final Depth	0.25m
-------------	-------

Project Name The Hamilton Centre, Reading		Project No. 6305	Date 18/02/2019 to 18/02/2019		Hole Type IP
Client Hampshire County Council		Co-ords E: N: L:	Water Strike Details		Logged By PS
			Depth Strike	Remarks	
Contractor Terra Firma (South)	Plant Used Hand Tools				Approved By PS
					Scale 1:50

Samples and Results			Depth, (Thickness)	Level	Stratum Description	Legend
Results	Type	Depth				
			(0.20) 0.20 (0.05) 0.25		MADE GROUND: Grass over soft to firm dark brown slightly gravelly slightly sandy silty CLAY. Occasional rootlets and brick fragments. Firm greyish and orangish brown slightly gravelly slightly sandy to sandy CLAY. Gravel is subrounded fine to medium of flint.	
					End of Trial Pit at 0.25m	
			1			
			2			
			3			
			4			

Remarks CBR @ 0.25 - 1.5%, 2%, 1.75%		
		Pit Stability: Stable
		Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.

Project Name The Hamilton Centre, Reading	Project No. 6305	Date 18/02/2019 to 18/02/2019	Hole Type WLS
Client Hampshire County Council	Co-ords E: N: L:	Water Strike Details Depth Strike Time Elapsed Rose To	Logged By PS
Contractor Oakland SI	Plant Used Premier 110		Approved By PS
			Scale 1:50

Samples and Results			Depth, (Thickness)	Level	Stratum Description	Legend	Well	
Results	Type	Depth						
N=9 (1,1/2,2,2,3)	ES	0.30	(0.25)		MADE GROUND: Grass over loose dark brown slightly gravelly slightly clayey silty SAND. Occasional rootlets.			
			0.25		MADE GROUND: Loose greyish brown slightly clayey gravelly SAND. Gravel is subrounded fine to medium of flint, concrete and brick.			
	ES	0.75	(0.30)					
			0.55		MADE GROUND: Medium dense brownish red slightly sandy GRAVEL of subangular to subrounded fine to coarse brick			
			(0.10)		MADE GROUND: Stiff dark greyish brown slightly gravelly slightly sandy CLAY. Gravel is subrounded fine to coarse of brick, concrete, clinker and flint. Slight organic odour.			
N=10 (2,2/2,3,2,3)	B SPT(S)	1.00	0.65		Firm to stiff greyish and orangish brown slightly gravelly slightly sandy to sandy CLAY. Gravel is subrounded fine to medium of flint. Occasional partings and pockets of orange sand. Rare shell fragments.			
			(0.30)					
	B	2.00	0.95					
			(0.95)					
			1.90		Stiff brown slightly gravelly slightly sandy silty CLAY. Gravel is subrounded fine to medium of flint and rare shell fragments.			
N=13 (3,2/3,2,4,4)	B SPT(S)	2.50	(0.50)		Firm, becoming stiff with depth, grey slightly sandy silty CLAY with occasional shell fragments.			
			2.40					
	SPT(S)	3.00						
			(2.60)					
			3.60 to 3.90m - With bands of broken shell fragments					
N=14 (2,2/3,3,4,4)	SPT(S)	4.00						
	SPT(S)	5.00						
			4.30 to 5.00m - Occasional pockets of dark green glauconitic sand					
			End of Borehole at 5.00m					
N=21 (3,3/4,5,5,7)	SPT(S)	5.00						
	SPT(S)							

Remarks	Borehole Diameter		
	Base Depth	Diameter	Remarks
Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.			

Project Name The Hamilton Centre, Reading	Project No. 6305	Date 18/02/2019 to 18/02/2019	Hole Type WLS
Client Hampshire County Council	Co-ords E: N: L:	Water Strike Details Depth Strike 2.20 Time Elapsed 20 Rose To 1.40	Logged By PS
Contractor Oakland SI	Plant Used Premier 110		Approved By PS
			Scale 1:50

Samples and Results			Depth, (Thickness)	Level	Stratum Description	Legend	Well
Results	Type	Depth					
N=16 (1,9/4,5,3,4)	ES	0.30	(0.20) 0.20 (0.15) 0.35		MADE GROUND: Grass over loose dark brown slightly gravelly slightly clayey silty SAND. Occasional rootlets and brick fragments.		
	ES B	0.60 0.70			MADE GROUND: Loose greyish brown slightly clayey gravelly SAND. Gravel is subrounded fine to medium of flint and concrete.		
	SPT(S)	1.00	(1.05)	1	Firm to stiff greyish and orangish brown slightly gravelly slightly sandy to sandy CLAY. Gravel is subrounded fine to medium of flint. Occasional partings and pockets of orange sand. Rare shell fragments.		
	B	1.50	1.40		Stiff brown slightly gravelly slightly sandy silty CLAY. Gravel is subrounded fine to medium of flint and rare shell fragments.		
N=11 (2,1/2,3,3,3)	SPT(S)	2.00	(0.80)	2			
	B	2.50	2.20		Stiff, becoming very stiff with depth, grey and greenish grey slightly sandy silty CLAY with occasional bands of shell fragments. Locally glauconitic.		
N=14 (2,3/3,3,4,4)	SPT(S)	3.00		3			
N=17 (2,2/3,3,5,6)	SPT(S)	4.00	(2.80)	4			
N=25 (3,5/5,6,6,8)	SPT(S)	5.00		5			
				6			
					End of Borehole at 5.00m		

Remarks	Borehole Diameter		
	Base Depth	Diameter	Remarks

Project Name The Hamilton Centre, Reading				Project No. 6305	Date 18/02/2019 to 18/02/2019			Hole Type WLS	
Client Hampshire County Council				Co-ords E: N: L:	Water Strike Details			Logged By PS	
					Depth Strike	Time Elapsed	Rose To	Approved By PS	
Contractor Oakland SI				Plant Used Premier 110	3.40	20	1.95		
Samples and Results			Depth, (Thickness)	Level	Stratum Description			Legend	Well
Results	Type	Depth							
N=6 (1,1/1,2,1,2)	ES	0.15	(0.25)		MADE GROUND: Grass over soft to firm dark brown slightly gravelly slightly sandy silty CLAY. Occasional rootlets and brick fragments.				
	ES	0.40	0.25		Firm brownish grey mottled orangish brown slightly gravelly slightly sandy CLAY. Gravel is subrounded fine to medium of flint.				
	B	0.60	(0.55)						
N=6 (1,1/1,2,1,2)	B	1.00	1		Firm to stiff brown slightly gravelly slightly sandy silty CLAY. Gravel is subrounded fine to medium of flint and rare shell fragments.				
	SPT(S)	1.00							
			(1.60)						
N=7 (1,2/1,2,2,2)	SPT(S)	2.00	2		Stiff greyish brown sandy CLAY. Occasional shell fragments. Locally silty.				
			2.40						
			(0.60)						
N=16 (1,2/3,3,5,5)	SPT(S)	3.00	3	3.00	Stiff becoming very stiff bluish grey mottled reddish brown slightly silty CLAY				
N=21 (2,4/3,5,6,7)	SPT(S)	4.00	4	(2.00)	End of Borehole at 5.00m				
N=19 (2,2/3,4,5,7)	SPT(S)	5.00	5	5.00					

Remarks	Borehole Diameter		
	Base Depth	Diameter	Remarks
Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.			

Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.



Consulting Geo-Technical & Geo-Environmental Engineers
Site Investigation Contractors

The Slate Barn, Lower Lowley,
Dunsford, Exeter, EX6 7BP
01647 252414
www.terrafirmasouth.co.uk

Borehole No.
WS4
Sheet 1 of 1

Project Name The Hamilton Centre, Reading				Project No. 6305		Date 18/02/2019 to 18/02/2019			Hole Type WLS	
Client Hampshire County Council				Co-ords E: N: L:		Water Strike Details			Logged By PS	
Contractor Oakland SI						Plant Used Premier 110			Depth Strike 3.00	Time Elapsed 20
Scale 1:50										

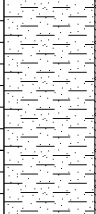
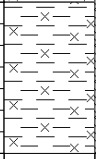
Samples and Results			Depth, (Thickness)	Level	Stratum Description	Legend	Well
Results	Type	Depth					
N=9 (1,1/2,2,3,2)	ES	0.15	(0.30)	1	MADE GROUND: Grass over soft to firm dark brown slightly gravelly slightly sandy silty CLAY. Occasional rootlets and brick fragments.		
			0.30				
	ES	0.80	(1.00)				
	B SPT(S)	1.00 1.00		2	Firm to stiff greyish and orangish brown slightly gravelly slightly sandy to sandy CLAY. Gravel is subrounded fine to medium of flint. Occasional partings and pockets of orange sand. Rare shell fragments.		
			1.30				
	B	1.50	(0.70)	2	Stiff brown slightly gravelly slightly sandy silty CLAY. Gravel is subrounded fine to medium of flint and rare shell fragments.		
			2.00				
N=25 (2,2/7,7,7,4)	SPT(S)	2.00		3	Stiff, becoming very stiff with depth, grey sandy silty CLAY with occasional bands of shell fragments. Locally glauconitic and very sandy.		
N=9 (1,2/2,2,2,3)	SPT(S)	3.00	(3.00)	4			
N=17 (2,2/3,4,5,5)	SPT(S)	4.00		5			
N=17 (1,3/3,3,5,6)	SPT(S)	5.00		6	End of Borehole at 5.00m		

Remarks

Borehole Diameter

Base Depth	Diameter	Remarks

Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.

 Consulting Geo-Technical & Geo-Environmental Engineers Site Investigation Contractors				The Slate Barn, Lower Lowley, Dunsford, Exeter, EX6 7BP 01647 252414 www.terrafirmasouth.co.uk				Borehole No. WS5 Sheet 1 of 1	
Project Name The Hamilton Centre, Reading				Project No. 6305	Date 19/02/2019 to 19/02/2019			Hole Type WLS	
Client Hampshire County Council				Co-ords E: N: L:	Water Strike Details			Logged By PS	
Contractor Oakland SI					Depth Strike Time Elapsed Rose To			Approved By PS	
Plant Used Premier 110								Scale 1:50	
Samples and Results			Depth, (Thickness)	Level	Stratum Description			Legend	Well
Results	Type	Depth							
	B	0.70	(0.30) 0.30 (1.00) 1 1.30 (0.70) 2 2.00 3 4 5 6		MADE GROUND: Grass over soft to firm dark brown slightly gravelly slightly sandy silty CLAY. Occasional rootlets and brick fragments. Firm to stiff greyish and orangish brown slightly gravelly slightly sandy to sandy CLAY. Gravel is subrounded fine to medium of flint. Occasional partings and pockets of orange sand. Rare shell fragments. Firm to stiff brown slightly gravelly slightly sandy silty CLAY. Gravel is subrounded fine to medium of flint and rare shell fragments. End of Borehole at 2.00m			  	
Remarks					Borehole Diameter				
					Base Depth	Diameter	Remarks		

Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.

Project Name The Hamilton Centre, Reading		Project No. 6305	Date 19/02/2019 to 19/02/2019			Hole Type WLS
Client Hampshire County Council		Co-ords E: N: L:	Water Strike Details			Logged By PS
			Depth Strike	Time Elapsed	Rose To	
Contractor Oakland SI	Plant Used Premier 110					Approved By PS
					Scale 1:50	

Samples and Results			Depth, (Thickness)	Level	Stratum Description	Legend	Well				
Results	Type	Depth									
	B	1.20	(0.25)		MADE GROUND: Grass over loose dark brown slightly gravelly slightly clayey silty SAND. Occasional rootlets.						
			0.25		MADE GROUND: Medium dense brownish red slightly sandy GRAVEL of subangular to subrounded fine to coarse brick						
			(0.35)								
			0.60		MADE GROUND: Stiff dark greyish brown sandy gravelly CLAY. Gravel is subrounded fine to coarse of brick, concrete, clinker and flint. Slight organic odour.						
			(0.30)								
			0.90		Firm to stiff greyish and orangish brown slightly gravelly slightly sandy to sandy CLAY. Gravel is subrounded fine to medium of flint. Occasional partings and pockets of orange sand. Rare shell fragments.						
			1								
			(1.10)								
			2		2.00	End of Borehole at 2.00m					
		</									

Remarks	Borehole Diameter		
	Base Depth	Diameter	Remarks
Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.			

Notes: For all symbols and abbreviations please see key sheet. All depths and measurements in metres. Stratum thicknesses given in brackets.

Annex B: Chemical Test Results



Amended Report

Report No.: 19-07237 & 19-08382

Initial Date of Issue: 14-Mar-2019 **Date of Re-Issue:** 19-Mar-2019

Client: Terra Firma

Client Address: The Slate Barn
Lower Lowley
Dunsford
Devon
EX6 7BP

Contact(s): Info

Project: 6305 The Hamilton Centre, Reading

Quotation No.: **Date Received:** 27-Feb-2019

Order No.: 6305 **Date Instructed:** 28-Feb-2019

No. of Samples: 10

Turnaround (Wkdays): 7 **Results Due:** 08-Mar-2019

Date Approved: 14-Mar-2019

Approved By:



Details: Martin Dyer, Laboratory Manager

Results - Miscellaneous Solid

Client: Terra Firma	Chemtest Job No.:				19-08382	19-08382
Quotation No.:	Chemtest Sample ID.:				789425	789426
	Sample Location:				CC3	CC4
	Sample Type:				MISCSOLID	MISCSOLID
Determinand	Accred.	SOP	Units	LOD		
Chromatogram (TPH)	N			N/A	See Attached	See Attached
Fuel Type	N	2670		N/A	PAH/H.oil	PAH/H.oil
TPH >C6-C10	N	2670	mg/kg	1.0	< 1.0	< 1.0
TPH >C10-C21	N	2670	mg/kg	1.0	630	430
TPH >C21-C40	N	2670	mg/kg	1.0	6800	3800
Total TPH >C6-C40	N	2670	mg/kg	10.0	7400	4200
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	290	120
Coal Tar Quantification (%)	N		%	0.001	0.56	0.27
Coal Tar Quantification	N		mg/kg	10.0	5600	2700
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	5600	2700
Total Petroleum Hydrocarbons	N	2680	mg/kg	10	5900	2800
Naphthalene	N	2700	mg/kg	0.10	1.6	1.4
Acenaphthylene	N	2700	mg/kg	0.10	3.5	2.0
Acenaphthene	N	2700	mg/kg	0.10	4.6	3.2
Fluorene	N	2700	mg/kg	0.10	4.6	5.2
Phenanthrene	N	2700	mg/kg	0.10	55	61
Anthracene	N	2700	mg/kg	0.10	18	19
Fluoranthene	N	2700	mg/kg	0.10	130	130
Pyrene	N	2700	mg/kg	0.10	120	120
Benzo[a]anthracene	N	2700	mg/kg	0.10	69	63
Chrysene	N	2700	mg/kg	0.10	54	49
Benzo[b]fluoranthene	N	2700	mg/kg	0.10	59	52
Benzo[k]fluoranthene	N	2700	mg/kg	0.10	36	25
Benzo[a]pyrene	N	2700	mg/kg	0.10	59	50
Indeno(1,2,3-c,d)Pyrene	N	2700	mg/kg	0.10	42	30
Dibenz(a,h)Anthracene	N	2700	mg/kg	0.10	10	8.2
Benzo[g,h,i]perylene	N	2700	mg/kg	0.10	38	29
Coronene	N	2700	mg/kg	0.10	< 0.10	< 0.10
Total Of 17 PAH's	N	2700	mg/kg	2.0	710	650
Double Ratio Fluoranthene:Pyrene	U	2700		0.010	1.1	1.1
Double Ratio						
Benzo(a)Anthracene:Chrysene	U	2700		0.010	1.3	1.3
N-Nitrosodimethylamine	N	2790	mg/kg	0.50	< 0.50	< 0.50
Phenol	N	2790	mg/kg	0.50	< 0.50	< 0.50
2-Chlorophenol	N	2790	mg/kg	0.50	< 0.50	< 0.50
1,3-Dichlorobenzene	N	2790	mg/kg	0.50	< 0.50	< 0.50
1,4-Dichlorobenzene	N	2790	mg/kg	0.50	< 0.50	< 0.50
1,2-Dichlorobenzene	N	2790	mg/kg	0.50	< 0.50	< 0.50
2-Methylphenol	N	2790	mg/kg	0.50	< 0.50	< 0.50
Bis(2-Chloroisopropyl)Ether	N	2790	mg/kg	0.50	< 0.50	< 0.50
Hexachloroethane	N	2790	mg/kg	0.50	< 0.50	< 0.50
N-Nitrosodi-n-propylamine	N	2790	mg/kg	0.50	< 0.50	< 0.50

Project: 6305 The Hamilton Centre, Reading

Client: Terra Firma	Chemtest Job No.:				19-08382	19-08382
Quotation No.:	Chemtest Sample ID.:				789425	789426
	Sample Location:				CC3	CC4
	Sample Type:				MISCSOLID	MISCSOLID
Determinand	Accred.	SOP	Units	LOD		
4-Methylphenol	N	2790	mg/kg	0.50	< 0.50	< 0.50
Nitrobenzene	N	2790	mg/kg	0.50	< 0.50	< 0.50
Isophorone	N	2790	mg/kg	0.50	< 0.50	< 0.50
2-Nitrophenol	N	2790	mg/kg	0.50	< 0.50	< 0.50
2,4-Dimethylphenol	N	2790	mg/kg	0.50	< 0.50	< 0.50
Bis(2-Chloroethoxy)Methane	N	2790	mg/kg	0.50	< 0.50	< 0.50
2,4-Dichlorophenol	N	2790	mg/kg	0.50	< 0.50	< 0.50
1,2,4-Trichlorobenzene	N	2790	mg/kg	0.50	< 0.50	< 0.50
Naphthalene	N	2790	mg/kg	0.50	< 0.50	< 0.50
4-Chloroaniline	N	2790	mg/kg	0.50	< 0.50	< 0.50
Hexachlorobutadiene	N	2790	mg/kg	0.50	< 0.50	< 0.50
4-Chloro-3-Methylphenol	N	2790	mg/kg	0.50	< 0.50	< 0.50
2-Methylnaphthalene	N	2790	mg/kg	0.50	< 0.50	< 0.50
4-Nitrophenol	N	2790	mg/kg	0.50	< 0.50	< 0.50
Hexachlorocyclopentadiene	N	2790	mg/kg	0.50	< 0.50	< 0.50
2,4,6-Trichlorophenol	N	2790	mg/kg	0.50	< 0.50	< 0.50
2,4,5-Trichlorophenol	N	2790	mg/kg	0.50	< 0.50	< 0.50
2-Chloronaphthalene	N	2790	mg/kg	0.50	< 0.50	< 0.50
2-Nitroaniline	N	2790	mg/kg	0.50	< 0.50	< 0.50
Acenaphthylene	N	2790	mg/kg	0.50	< 0.50	0.63
Dimethylphthalate	N	2790	mg/kg	0.50	< 0.50	< 0.50
2,6-Dinitrotoluene	N	2790	mg/kg	0.50	< 0.50	< 0.50
Acenaphthene	N	2790	mg/kg	0.50	0.78	2.9
3-Nitroaniline	N	2790	mg/kg	0.50	< 0.50	< 0.50
Dibenzofuran	N	2790	mg/kg	0.50	< 0.50	1.2
2,4-Dinitrotoluene	N	2790	mg/kg	0.50	< 0.50	< 0.50
Fluorene	N	2790	mg/kg	0.50	0.50	2.3
Diethyl Phthalate	N	2790	mg/kg	0.50	< 0.50	< 0.50
4-Nitroaniline	N	2790	mg/kg	0.50	< 0.50	< 0.50
2-Methyl-4,6-Dinitrophenol	N	2790	mg/kg	0.50	< 0.50	< 0.50
Azobenzene	N	2790	mg/kg	0.50	< 0.50	< 0.50
4-Bromophenylphenyl Ether	N	2790	mg/kg	0.50	< 0.50	< 0.50
Hexachlorobenzene	N	2790	mg/kg	0.50	< 0.50	< 0.50
Pentachlorophenol	N	2790	mg/kg	0.50	< 0.50	< 0.50
Phenanthrene	N	2790	mg/kg	0.50	4.4	18
Anthracene	N	2790	mg/kg	0.50	2.1	7.2
Carbazole	N	2790	mg/kg	0.50	0.70	5.1
Di-N-Butyl Phthalate	N	2790	mg/kg	0.50	< 0.50	< 0.50
Fluoranthene	N	2790	mg/kg	0.50	13	24
Pyrene	N	2790	mg/kg	0.50	12	18
Butylbenzyl Phthalate	N	2790	mg/kg	0.50	< 0.50	< 0.50
Benzo[a]anthracene	N	2790	mg/kg	0.50	10	14

Project: 6305 The Hamilton Centre, Reading

Client: Terra Firma	Chemtest Job No.:				19-08382	19-08382
Quotation No.:	Chemtest Sample ID.:				789425	789426
	Sample Location:				CC3	CC4
	Sample Type:				MISCSOLID	MISCSOLID
Determinand	Accred.	SOP	Units	LOD		
Chrysene	N	2790	mg/kg	0.50	8.7	12
Bis(2-Ethylhexyl)Phthalate	N	2790	mg/kg	0.50	< 0.50	< 0.50
Di-N-Octyl Phthalate	N	2790	mg/kg	0.50	< 0.50	< 0.50
Benzo[b]fluoranthene	N	2790	mg/kg	0.50	13	17
Benzo[k]fluoranthene	N	2790	mg/kg	0.50	4.9	7.4
Benzo[a]pyrene	N	2790	mg/kg	0.50	10	9.7
Indeno(1,2,3-c,d)Pyrene	N	2790	mg/kg	0.50	5.4	8.5
Dibenz(a,h)Anthracene	N	2790	mg/kg	0.50	2.4	4.1
Benzo[g,h,i]perylene	N	2790	mg/kg	0.50	5.8	8.0
Moisture	N		%	0.10	< 0.10	< 0.10
Interpretive Report	N			N/A	See Below	See Below
SVOC TIC	N	2790	mg/kg	N/A	None Detected	See Below
(SVOC TIC) Dibenzothiophene	N	2790	mg/kg	N/A		4.2

Sample 789425 is inconclusive for coal tar contamination. Dibenzothiophene, a biomarker present in coal tar, has not been detected by SVOC analysis. This, in conjunction with the elevated PAH contamination detected, provides an inconclusive result for the presence of coal tar in this sample.

Sample 789426 contains coal tar contamination. Dibenzothiophene, a biomarker present in coal tar, has been detected by SVOC analysis. This, in conjunction with the elevated PAH contamination detected, confirms the presence of coal tar in this sample.

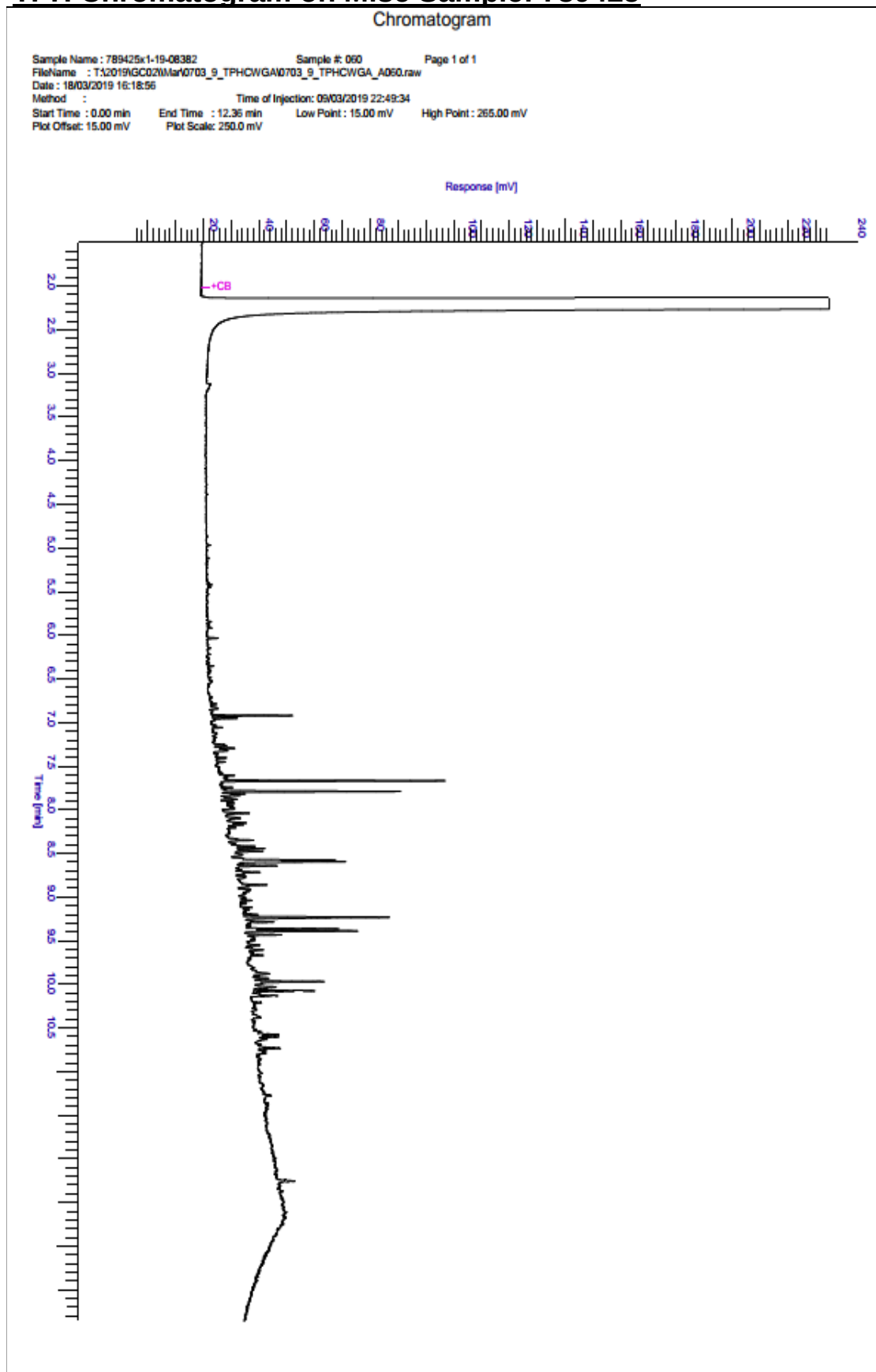
Results - Soil

Client: Terra Firma	Chemtest Job No.:				19-07237	19-07237	19-07237	19-07237	19-07237	19-07237	19-07237	19-07237
Quotation No.:	Chemtest Sample ID.:				783607	783608	783609	783610	783611	783612	783613	783614
Order No.: 6305	Client Sample Ref.:				1	2	1	2	1	2	1	2
	Sample Location:				WS1	WS1	WS2	WS2	WS3	WS3	WS4	WS4
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.30	0.75	0.30	0.60	0.15	0.40	0.15	0.80
	Date Sampled:				18-Feb-2019	18-Feb-2019	18-Feb-2019	18-Feb-2019	18-Feb-2019	18-Feb-2019	18-Feb-2019	18-Feb-2019
	Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD								
ACM Type	U	2192		N/A	-	-	-	-	-	-	-	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-	-	-	-	-	-	-	-
Moisture	N	2030	%	0.020	15	16	16	19	14	14	14	19
pH	U	2010		N/A	8.7	8.0	8.4	8.4	7.8	8.1	8.2	8.4
pH (2.5:1)	N	2010		N/A	8.3			8.5		8.0		
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.021			< 0.010		0.056		
Total Sulphur	U	2175	%	0.010	0.069	0.12	0.036	0.036	0.063	0.032	0.048	0.026
Cyanide (Free)	U	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cyanide (Total)	U	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Thiocyanate	U	2300	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	5.7	11	3.1	2.5	2.3	1.1	32	1.1
Ammoniacal Nitrogen	U	2425	mg/kg	0.50	3.1	8.6	3.0	3.0	3.3	3.6	3.2	1.6
Sulphate (Total)	U	2430	%	0.010	0.14	0.38	0.067	0.025	0.068	0.042	0.075	0.015
Arsenic	U	2450	mg/kg	1.0	10	14	11	15	14	9.9	13	9.8
Cadmium	U	2450	mg/kg	0.10	0.10	0.23	< 0.10	0.13	0.19	< 0.10	0.16	0.11
Chromium	U	2450	mg/kg	1.0	18	25	21	23	23	17	21	24
Copper	U	2450	mg/kg	0.50	20	24	16	15	120	9.7	30	15
Mercury	U	2450	mg/kg	0.10	0.11	0.27	0.10	< 0.10	0.39	< 0.10	0.55	< 0.10
Nickel	U	2450	mg/kg	0.50	18	22	22	30	23	12	25	23
Lead	U	2450	mg/kg	0.50	70	99	38	14	59	20	120	13
Selenium	U	2450	mg/kg	0.20	0.29	0.65	0.45	0.29	0.63	0.37	0.53	< 0.20
Zinc	U	2450	mg/kg	0.50	52	84	47	52	140	28	82	44
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	2.9	3.8	1.3	< 0.40	2.9	1.3	3.3	0.48
Total TPH >C6-C40	U	2670	mg/kg	10	< 10	100	160	< 10	95	< 10	180	< 10
Naphthalene	U	2700	mg/kg	0.10	0.30	1.6	0.26	< 0.10	0.41	< 0.10	0.41	< 0.10
Acenaphthylene	U	2700	mg/kg	0.10	1.0	0.93	1.3	< 0.10	1.6	< 0.10	0.69	< 0.10
Acenaphthene	U	2700	mg/kg	0.10	0.16	1.1	< 0.10	< 0.10	0.17	< 0.10	0.45	< 0.10
Fluorene	U	2700	mg/kg	0.10	0.22	1.2	< 0.10	< 0.10	0.25	< 0.10	0.86	< 0.10
Phenanthrene	U	2700	mg/kg	0.10	3.5	9.0	2.0	< 0.10	4.8	< 0.10	14	< 0.10
Anthracene	U	2700	mg/kg	0.10	1.5	2.5	1.6	< 0.10	2.4	< 0.10	5.2	< 0.10
Fluoranthene	U	2700	mg/kg	0.10	8.1	11	6.0	< 0.10	12	< 0.10	43	< 0.10
Pyrene	U	2700	mg/kg	0.10	7.6	9.9	5.7	< 0.10	11	< 0.10	39	< 0.10
Benzo[a]anthracene	U	2700	mg/kg	0.10	3.6	4.4	2.2	< 0.10	4.3	< 0.10	20	< 0.10
Chrysene	U	2700	mg/kg	0.10	3.5	4.3	2.5	< 0.10	4.4	< 0.10	20	< 0.10
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	3.5	3.7	2.0	< 0.10	5.6	< 0.10	26	< 0.10

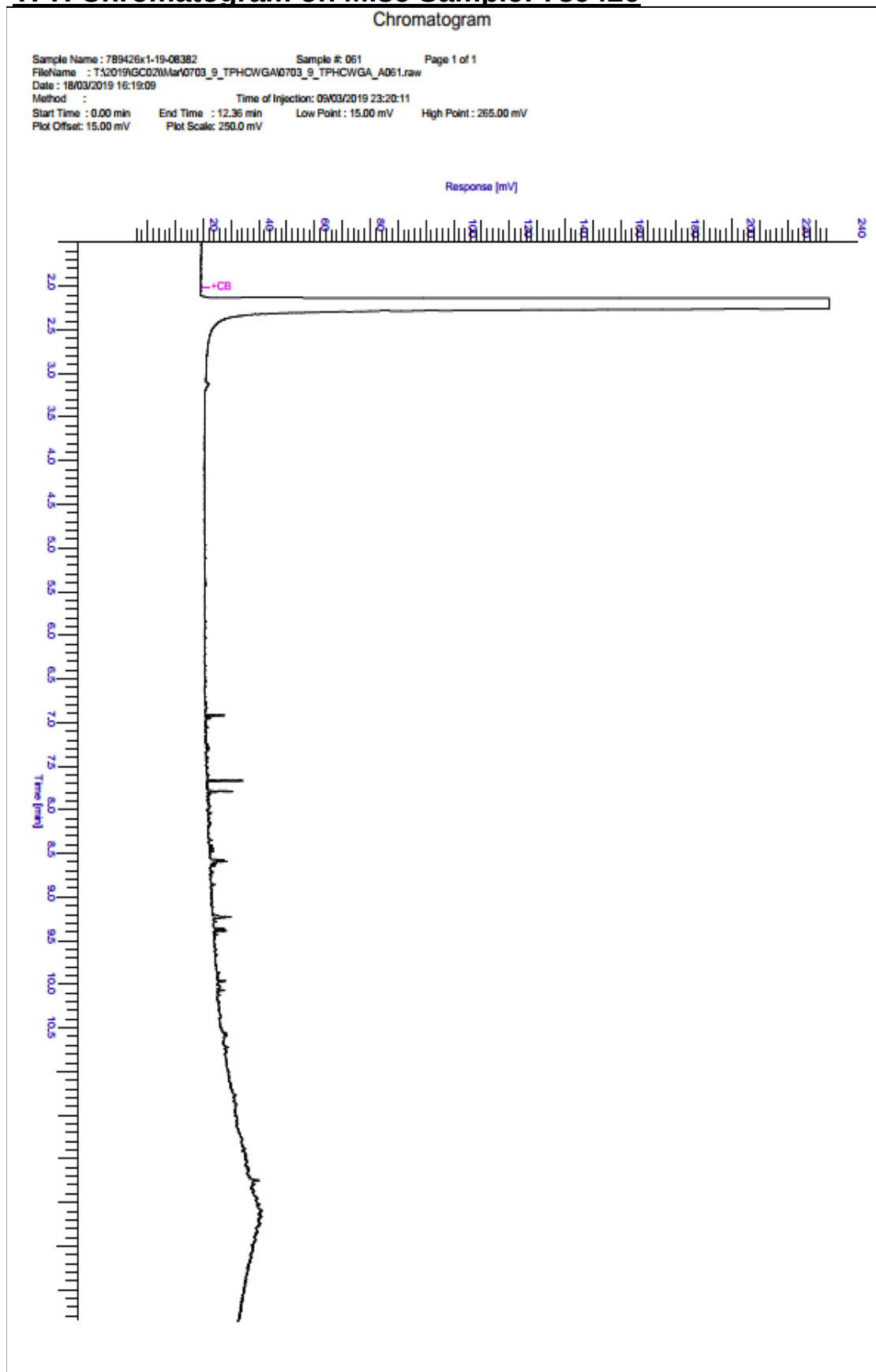
Results - Soil

Client: Terra Firma	Chemtest Job No.:				19-07237	19-07237	19-07237	19-07237	19-07237	19-07237	19-07237	19-07237
Quotation No.:	Chemtest Sample ID.:				783607	783608	783609	783610	783611	783612	783613	783614
Order No.: 6305	Client Sample Ref.:				1	2	1	2	1	2	1	2
	Sample Location:				WS1	WS1	WS2	WS2	WS3	WS3	WS4	WS4
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.30	0.75	0.30	0.60	0.15	0.40	0.15	0.80
	Date Sampled:				18-Feb-2019	18-Feb-2019	18-Feb-2019	18-Feb-2019	18-Feb-2019	18-Feb-2019	18-Feb-2019	18-Feb-2019
	Asbestos Lab:				DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM	DURHAM
Determinand	Accred.	SOP	Units	LOD								
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	1.9	2.1	1.5	< 0.10	2.8	< 0.10	12	< 0.10
Benzo[a]pyrene	U	2700	mg/kg	0.10	3.8	3.8	2.3	< 0.10	4.3	< 0.10	24	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	3.5	3.3	1.9	< 0.10	< 0.10	< 0.10	19	< 0.10
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	0.14	< 0.10	0.55	< 0.10	< 0.10	< 0.10	5.6	< 0.10
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	3.1	4.4	2.3	< 0.10	< 0.10	< 0.10	19	< 0.10
Total Of 16 PAH's	U	2700	mg/kg	2.0	45	63	32	< 2.0	54	< 2.0	250	< 2.0
Total Phenols	U	2920	mg/kg	0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30

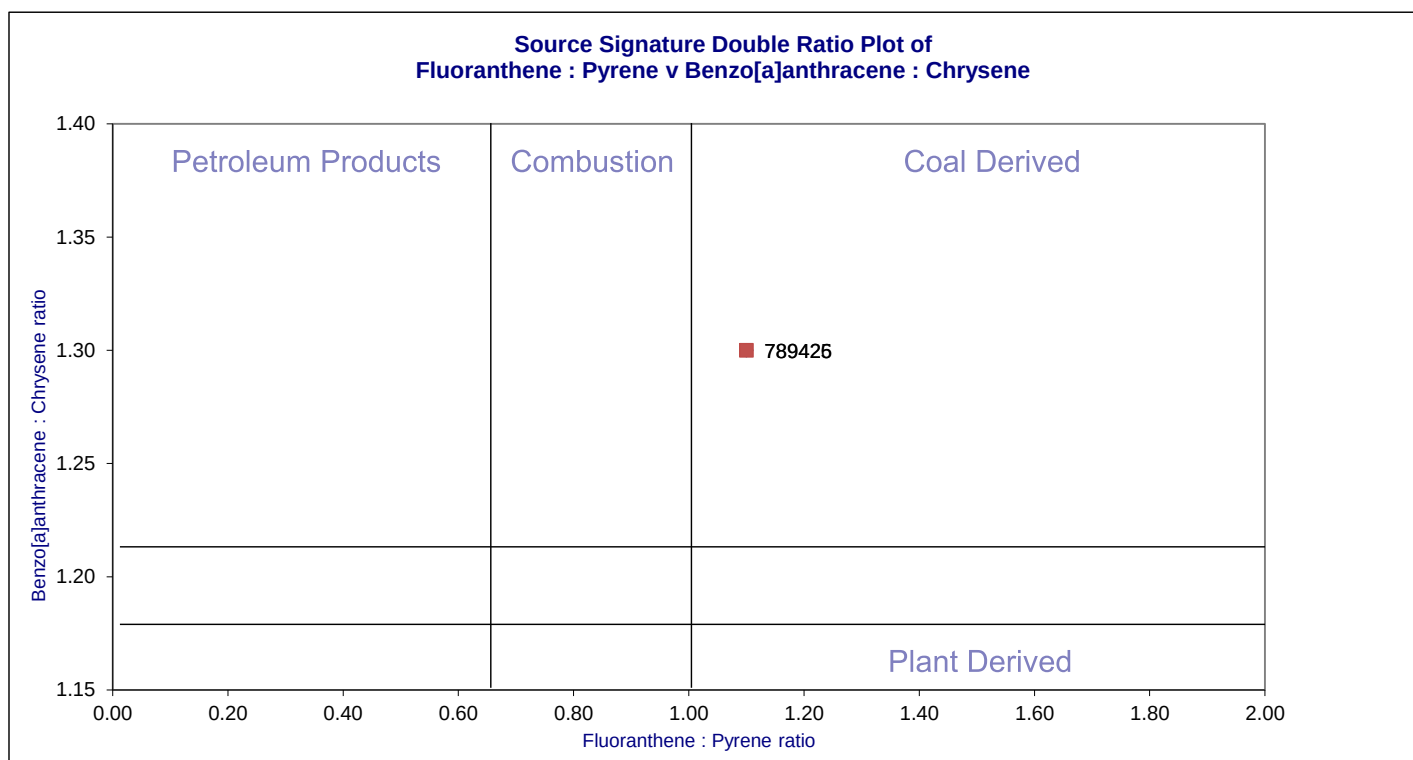
TPH Chromatogram on Misc Sample: 789425



TPH Chromatogram on Misc Sample: 789426



Double Ratio Plot



Sample No.	Fluoranthene	Pyrene	Benzo[a]Anthracene	Chrysene	Fluoranthene : Pyrene Ratio	Benzo[a]Anthracene : Chrysene Ratio
789425	130	120	69	54	1.10	1.30
789426	130	120	63	49	1.10	1.30

Results - Single Stage WAC

Project: 6305 The Hamilton Centre, Reading

Chemtest Job No: 19-07237					Landfill Waste Acceptance Criteria		
Chemtest Sample ID: 783607					Limits		
Sample Ref: 1					Inert Waste Landfill	Stable, Non-reactive hazardous waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID:							
Sample Location: WS1							
Top Depth(m): 0.30							
Bottom Depth(m):							
Sampling Date: 18-Feb-2019							
Determinand	SOP	Accred.	Units				
Total Organic Carbon	2625	U	%	1.7	3	5	6
Loss On Ignition	2610	U	%	2.8	--	--	10
Total BTEX	2760	U	mg/kg	< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg	< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg	< 10	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg	45	100	--	--
pH	2010	U		8.7	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.053	--	To evaluate	To evaluate
Eluate Analysis				10:1 Eluate mg/l	10:1 Eluate mg/kg	Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg	
Arsenic	1450	U	0.0021	< 0.050	0.5	2	25
Barium	1450	U	0.0039	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.010	0.04	1	5
Chromium	1450	U	< 0.0010	< 0.050	0.5	10	70
Copper	1450	U	< 0.0010	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	0.0014	< 0.050	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.050	0.4	10	40
Lead	1450	U	0.0038	0.038	0.5	10	50
Antimony	1450	U	< 0.0010	< 0.010	0.06	0.7	5
Selenium	1450	U	< 0.0010	< 0.010	0.1	0.5	7
Zinc	1450	U	< 0.0010	< 0.50	4	50	200
Chloride	1220	U	2.9	29	800	15000	25000
Fluoride	1220	U	0.33	3.3	10	150	500
Sulphate	1220	U	6.8	68	1000	20000	50000
Total Dissolved Solids	1020	N	72	710	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	12	120	500	800	1000

Solid Information

Dry mass of test portion/kg	0.090
Moisture (%)	15

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - Single Stage WAC

Project: 6305 The Hamilton Centre, Reading

Chemtest Job No: 19-07237					Landfill Waste Acceptance Criteria		
Chemtest Sample ID: 783611					Limits		
Sample Ref: 1					Inert Waste Landfill	Stable, Non-reactive hazardous waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID:							
Sample Location: WS3							
Top Depth(m): 0.15							
Bottom Depth(m):							
Sampling Date: 18-Feb-2019							
Determinand	SOP	Accred.	Units				
Total Organic Carbon	2625	U	%	1.7	3	5	6
Loss On Ignition	2610	U	%	3.9	--	--	10
Total BTEX	2760	U	mg/kg	< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg	< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg	95	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg	54	100	--	--
pH	2010	U		7.8	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.017	--	To evaluate	To evaluate
Eluate Analysis			10:1 Eluate mg/l	10:1 Eluate mg/kg	Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg		
Arsenic	1450	U	< 0.0010	< 0.050	0.5	2	25
Barium	1450	U	0.0030	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.010	0.04	1	5
Chromium	1450	U	< 0.0010	< 0.050	0.5	10	70
Copper	1450	U	0.0019	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	< 0.0010	< 0.050	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.050	0.4	10	40
Lead	1450	U	0.0013	0.013	0.5	10	50
Antimony	1450	U	< 0.0010	< 0.010	0.06	0.7	5
Selenium	1450	U	< 0.0010	< 0.010	0.1	0.5	7
Zinc	1450	U	< 0.0010	< 0.50	4	50	200
Chloride	1220	U	< 1.0	< 10	800	15000	25000
Fluoride	1220	U	0.20	2.0	10	150	500
Sulphate	1220	U	3.6	36	1000	20000	50000
Total Dissolved Solids	1020	N	29	290	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	8.8	88	500	800	1000

Solid Information

Dry mass of test portion/kg	0.090
Moisture (%)	14

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - Single Stage WAC

Project: 6305 The Hamilton Centre, Reading

Chemtest Job No: 19-07237					Landfill Waste Acceptance Criteria		
Chemtest Sample ID: 783613					Limits		
Sample Ref: 1					Inert Waste Landfill	Stable, Non-reactive hazardous waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID:							
Sample Location: WS4							
Top Depth(m): 0.15							
Bottom Depth(m):							
Sampling Date: 18-Feb-2019							
Determinand	SOP	Accred.	Units				
Total Organic Carbon	2625	U	%	1.9	3	5	6
Loss On Ignition	2610	U	%	4.3	--	--	10
Total BTEX	2760	U	mg/kg	< 0.010	6	--	--
Total PCBs (7 Congeners)	2815	U	mg/kg	< 0.10	1	--	--
TPH Total WAC (Mineral Oil)	2670	U	mg/kg	180	500	--	--
Total (Of 17) PAH's	2700	N	mg/kg	250	100	--	--
pH	2010	U		8.2	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.022	--	To evaluate	To evaluate
Eluate Analysis				10:1 Eluate mg/l	10:1 Eluate mg/kg	Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg	
Arsenic	1450	U	< 0.0010	< 0.050	0.5	2	25
Barium	1450	U	0.0036	< 0.50	20	100	300
Cadmium	1450	U	< 0.00010	< 0.010	0.04	1	5
Chromium	1450	U	< 0.0010	< 0.050	0.5	10	70
Copper	1450	U	< 0.0010	< 0.050	2	50	100
Mercury	1450	U	< 0.00050	< 0.0050	0.01	0.2	2
Molybdenum	1450	U	< 0.0010	< 0.050	0.5	10	30
Nickel	1450	U	< 0.0010	< 0.050	0.4	10	40
Lead	1450	U	0.0015	0.015	0.5	10	50
Antimony	1450	U	< 0.0010	< 0.010	0.06	0.7	5
Selenium	1450	U	< 0.0010	< 0.010	0.1	0.5	7
Zinc	1450	U	< 0.0010	< 0.50	4	50	200
Chloride	1220	U	< 1.0	< 10	800	15000	25000
Fluoride	1220	U	0.26	2.6	10	150	500
Sulphate	1220	U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020	N	31	310	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	7.8	78	500	800	1000

Solid Information

Dry mass of test portion/kg	0.090
Moisture (%)	14

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

SOP	Title	Parameters included	Method summary
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1450	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2015	Acid Neutralisation Capacity	Acid Reserve	Titration
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Alkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N-dimethyl-p-phenylenediamine.
2425	Extractable Ammonium in soils	Ammonium	Extraction with potassium chloride solution / analysis by 'Aquakem 600' Discrete Analyser using sodium salicylate and sodium dichloroisocyanurate.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID

SOP	Title	Parameters included	Method summary
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2790	Semi-Volatile Organic Compounds (SVOCs) in Soils by GC-MS	Semi-volatile organic compounds(cf. USEPA Method 8270)	Acetone/Hexane extraction / GC-MS
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.
640	Characterisation of Waste (Leaching)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge

Report Information

Key

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

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

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

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

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

Sample Deviation Codes

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

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt

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

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com

Annex C: Soil Property Test Results



TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS



4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.3 and 5

Client: Terrafirma South
Client Address: The Slate Barn, Lower Lowley,
Dunsford, Devon,
EX6 7BP
Contact: Paul Standish
Site Name: The Hamilton Centre, Reading
Site Address: Not Given

Client Reference: 6305
Job Number: 19-31341
Date Sampled: Not Given
Date Received: 04/03/2019
Date Tested: 08/03/2019
Sampled By: Not Given

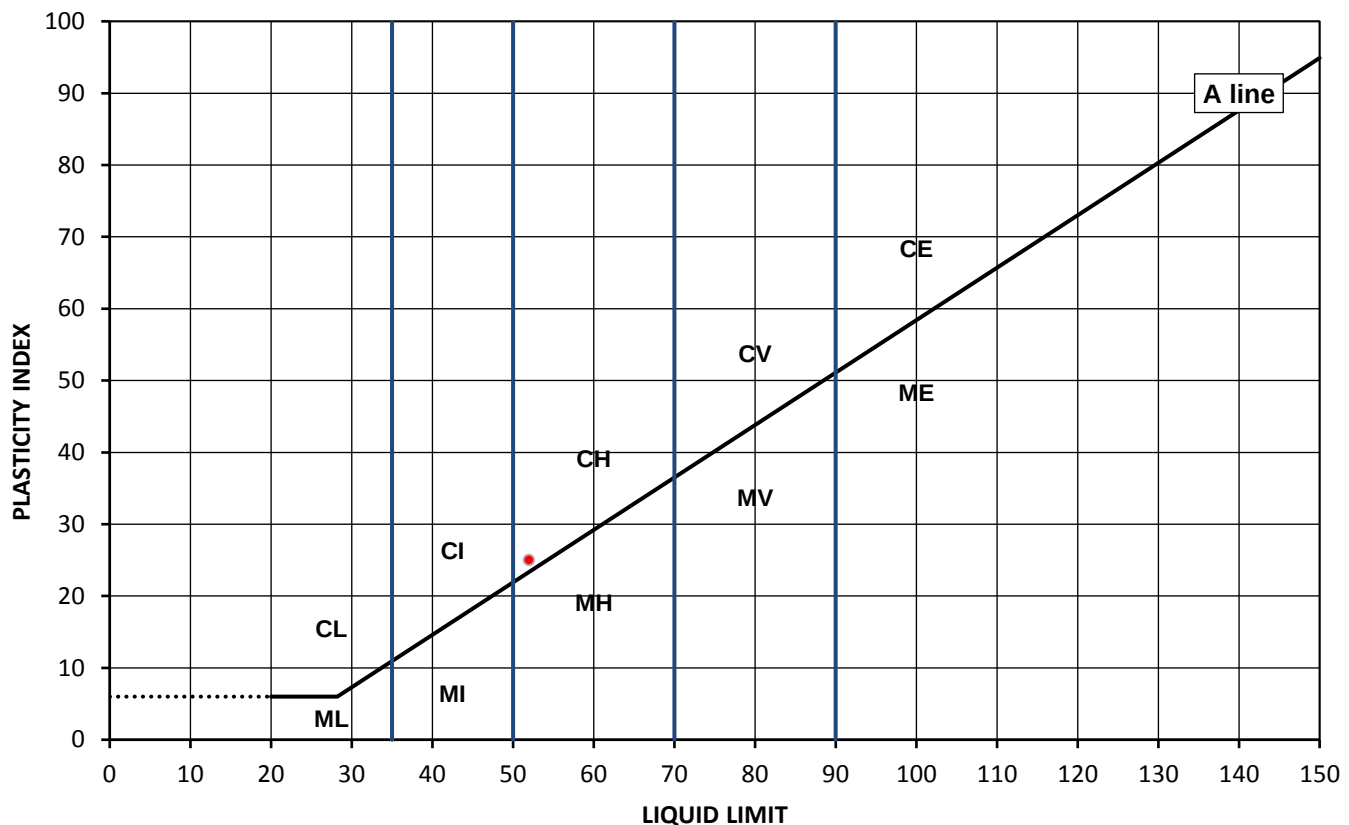
Test Results

Laboratory Reference: 1168564
Hole No.: WS1
Sample Reference: 3
Soil Description: Brown sandy CLAY and SILT

Depth Top [m]: 1.00
Depth Base [m]: Not Given
Sample Type: B

Sample Preparation: Tested in natural condition

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
25	52	27	25	100



Legend, based on BS 5930:2015 Code of practice for site investigations

C	Clay	Plasticity	Liquid Limit
M	Silt	L	Low
		I	Medium
		H	High
		V	Very high
		E	Extremely high
			below 35
			35 to 50
			50 to 70
			70 to 90
			exceeding 90
	Organic	O	append to classification for organic material (eg CHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Approved: Dariusz Piotrowski
PL Geotechnical Laboratory Manager
Date Reported: 15/03/2019

Signed: Darren Berrill
Geotechnical General Manager

GF 236.4

*Opinions and interpretations expressed here in are outside of the scope of the UKAS Accreditation.
This report may not be reproduced other than in full without the prior written approval of the issuing laboratory.
The results included within the report are representative of the samples submitted for analysis.
The analysis was carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland.*



TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS



Environmental Science

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.3 and 5

Client: Terrafirma South
Client Address: The Slate Barn, Lower Lowley,
Dunsford, Devon,
EX6 7BP
Contact: Paul Standish
Site Name: The Hamilton Centre, Reading
Site Address: Not Given

Client Reference: 6305
Job Number: 19-31341
Date Sampled: Not Given
Date Received: 04/03/2019
Date Tested: 08/03/2019
Sampled By: Not Given

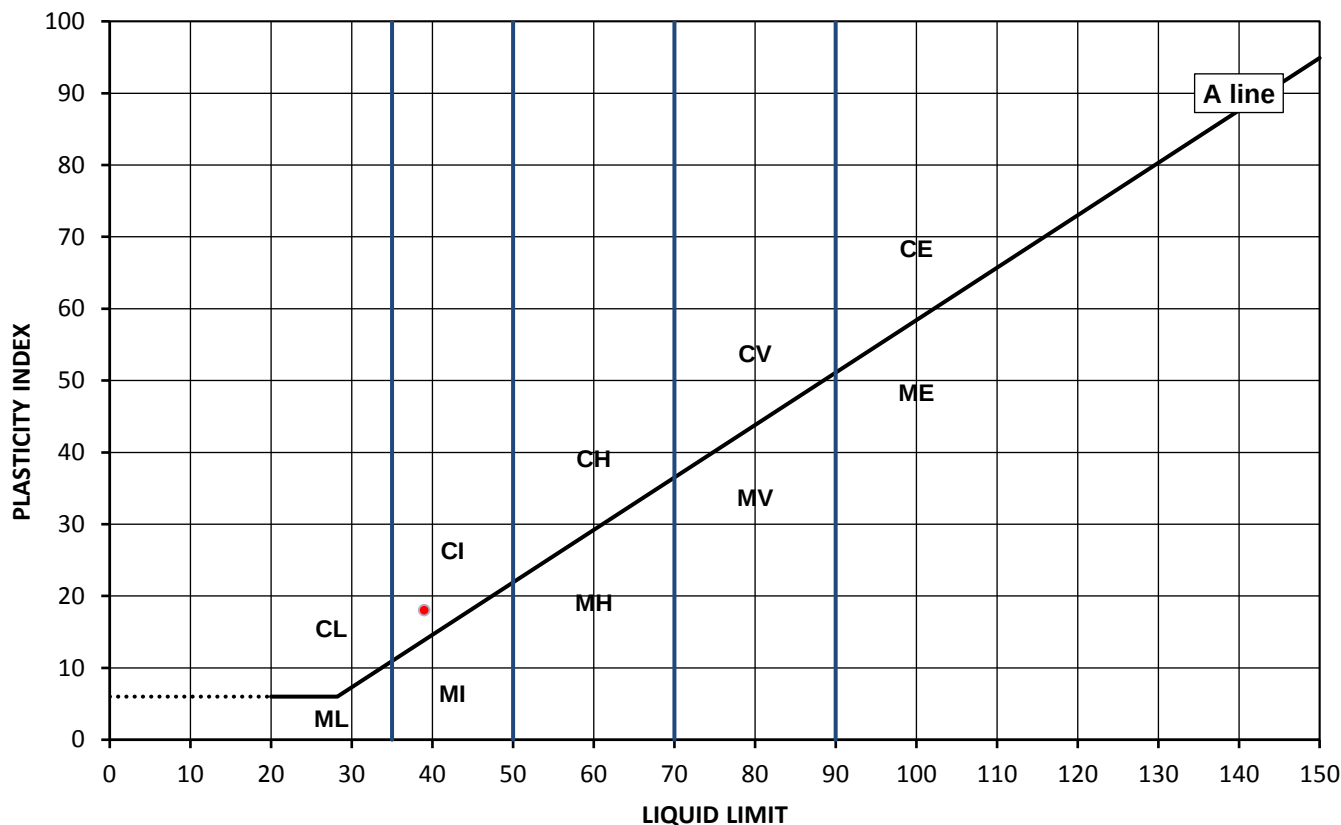
Test Results

Laboratory Reference: 1168565
Hole No.: WS1
Sample Reference: 4
Soil Description: Brown sandy CLAY

Depth Top [m]: 2.00
Depth Base [m]: Not Given
Sample Type: B

Sample Preparation: Tested in natural condition

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
24	39	21	18	100



Legend, based on BS 5930:2015 Code of practice for site investigations

C	Clay	Plasticity	Liquid Limit
M	Silt	L	Low
		I	Medium
		H	High
		V	Very high
		E	Extremely high
			below 35
			35 to 50
			50 to 70
			70 to 90
			exceeding 90
	Organic	O	append to classification for organic material (eg CHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Approved: Dariusz Piotrowski
PL Geotechnical Laboratory Manager
Date Reported: 15/03/2019

Signed: Darren Berrill
Geotechnical General Manager

GF 236.4

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TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS



4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.3 and 5

Client: Terrafirma South
Client Address: The Slate Barn, Lower Lowley,
Dunsford, Devon,
EX6 7BP
Contact: Paul Standish
Site Name: The Hamilton Centre, Reading
Site Address: Not Given

Client Reference: 6305
Job Number: 19-31341
Date Sampled: Not Given
Date Received: 04/03/2019
Date Tested: 08/03/2019
Sampled By: Not Given

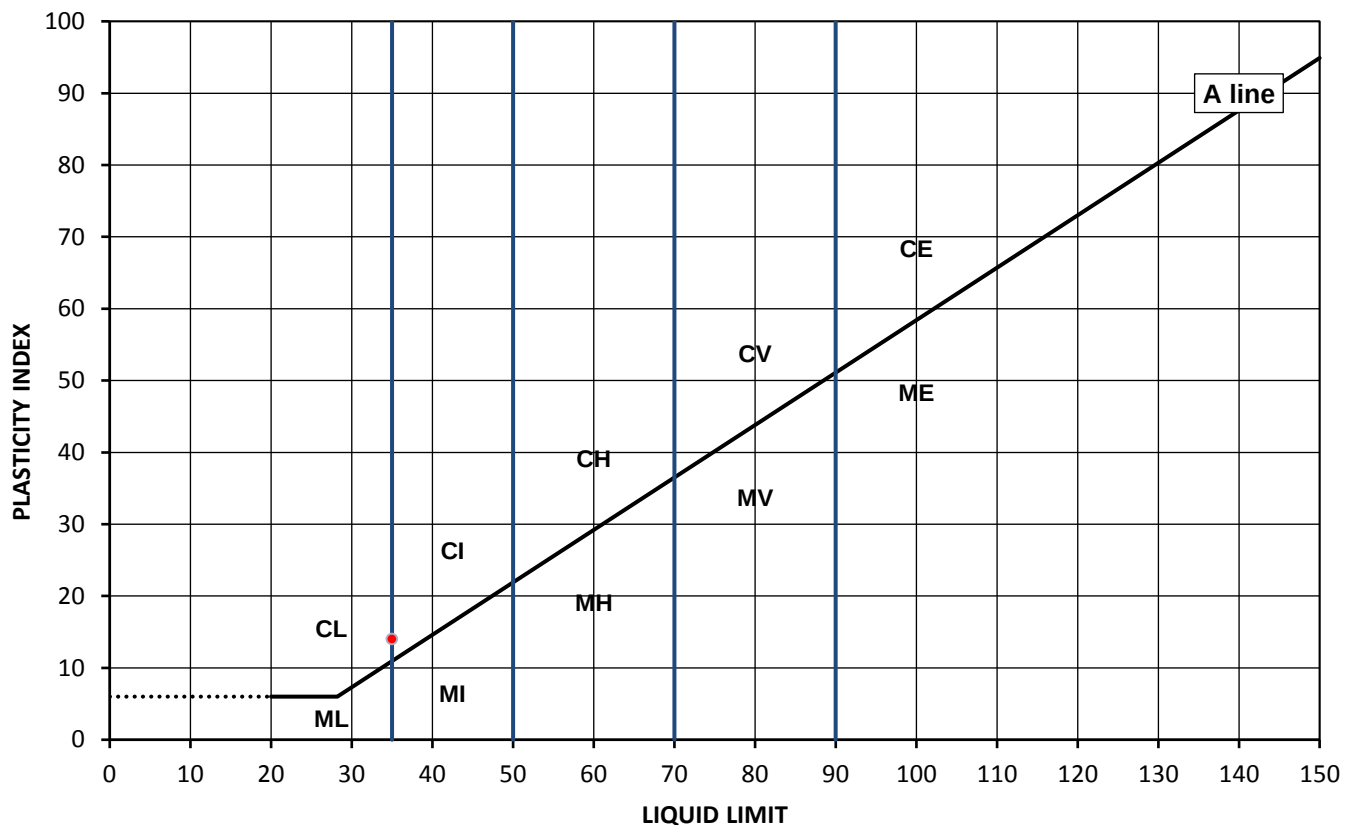
Test Results

Laboratory Reference: 1168566
Hole No.: WS1
Sample Reference: 5
Soil Description: Dark brown sandy CLAY

Depth Top [m]: 2.50
Depth Base [m]: Not Given
Sample Type: B

Sample Preparation: Tested in natural condition

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
24	35	21	14	100



Legend, based on BS 5930:2015 Code of practice for site investigations

C	Clay	Plasticity	Liquid Limit
M	Silt	L	Low
		I	Medium
		H	High
		V	Very high
		E	Extremely high
			below 35
			35 to 50
			50 to 70
			70 to 90
			exceeding 90
	Organic	O	append to classification for organic material (eg CHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Approved: Dariusz Piotrowski
PL Geotechnical Laboratory Manager
Date Reported: 15/03/2019

Signed: Darren Berrill
Geotechnical General Manager

GF 236.4

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TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS



4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.3 and 5

Client: Terrafirma South
Client Address: The Slate Barn, Lower Lowley,
Dunsford, Devon,
EX6 7BP
Contact: Paul Standish
Site Name: The Hamilton Centre, Reading
Site Address: Not Given

Client Reference: 6305
Job Number: 19-31341
Date Sampled: Not Given
Date Received: 04/03/2019
Date Tested: 08/03/2019
Sampled By: Not Given

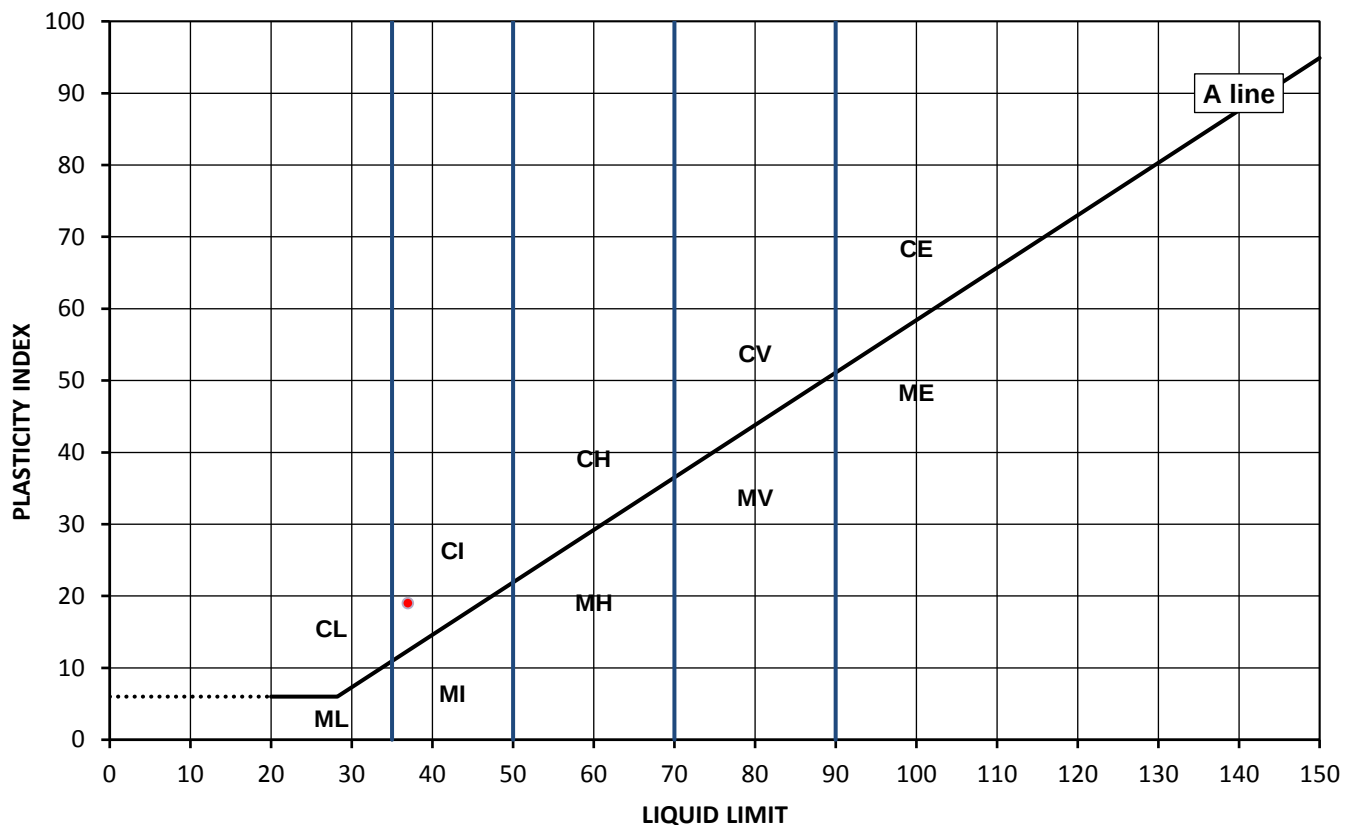
Test Results

Laboratory Reference: 1168567
Hole No.: WS2
Sample Reference: 3
Soil Description: Brown silty clayey SAND

Depth Top [m]: 0.70
Depth Base [m]: Not Given
Sample Type: B

Sample Preparation: Tested in natural condition

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
21	37	18	19	100



Legend, based on BS 5930:2015 Code of practice for site investigations

C	Clay	Plasticity	Liquid Limit
M	Silt	L	Low
		I	Medium
		H	High
		V	Very high
		E	Extremely high
			below 35
			35 to 50
			50 to 70
			70 to 90
			exceeding 90
	Organic	O	append to classification for organic material (eg CHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Approved: Dariusz Piotrowski
PL Geotechnical Laboratory Manager
Date Reported: 15/03/2019

Signed: Darren Berrill
Geotechnical General Manager

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Liquid and Plastic Limits

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Watford Herts WD18 8YS



4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.3 and 5

Client: Terrafirma South
Client Address: The Slate Barn, Lower Lowley,
Dunsford, Devon,
EX6 7BP
Contact: Paul Standish
Site Name: The Hamilton Centre, Reading
Site Address: Not Given

Client Reference: 6305
Job Number: 19-31341
Date Sampled: Not Given
Date Received: 04/03/2019
Date Tested: 06/03/2019
Sampled By: Not Given

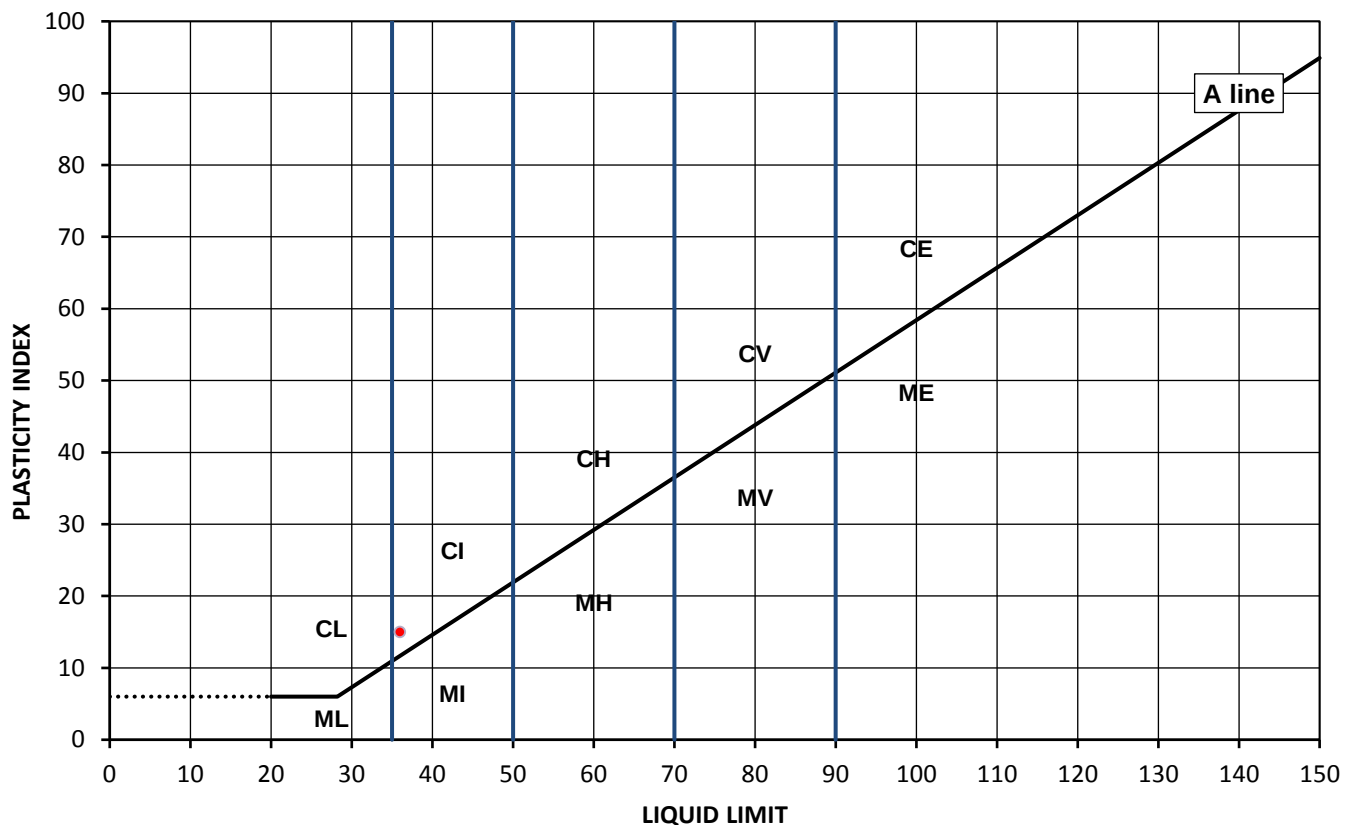
Test Results

Laboratory Reference: 1168568
Hole No.: WS2
Sample Reference: 4
Soil Description: Brown sandy CLAY

Depth Top [m]: 1.50
Depth Base [m]: Not Given
Sample Type: B

Sample Preparation: Tested in natural condition

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
24	36	21	15	100



Legend, based on BS 5930:2015 Code of practice for site investigations

C	Clay	Plasticity	Liquid Limit
M	Silt	L	Low
		I	Medium
		H	High
		V	Very high
		E	Extremely high
			below 35
			35 to 50
			50 to 70
			70 to 90
			exceeding 90
	Organic	O	append to classification for organic material (eg CHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Approved: Dariusz Piotrowski
PL Geotechnical Laboratory Manager
Date Reported: 15/03/2019

Signed: Darren Berrill
Geotechnical General Manager

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TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS



4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.3 and 5

Client: Terrafirma South
Client Address: The Slate Barn, Lower Lowley,
Dunsford, Devon,
EX6 7BP
Contact: Paul Standish
Site Name: The Hamilton Centre, Reading
Site Address: Not Given

Client Reference: 6305
Job Number: 19-31341
Date Sampled: Not Given
Date Received: 04/03/2019
Date Tested: 08/03/2019
Sampled By: Not Given

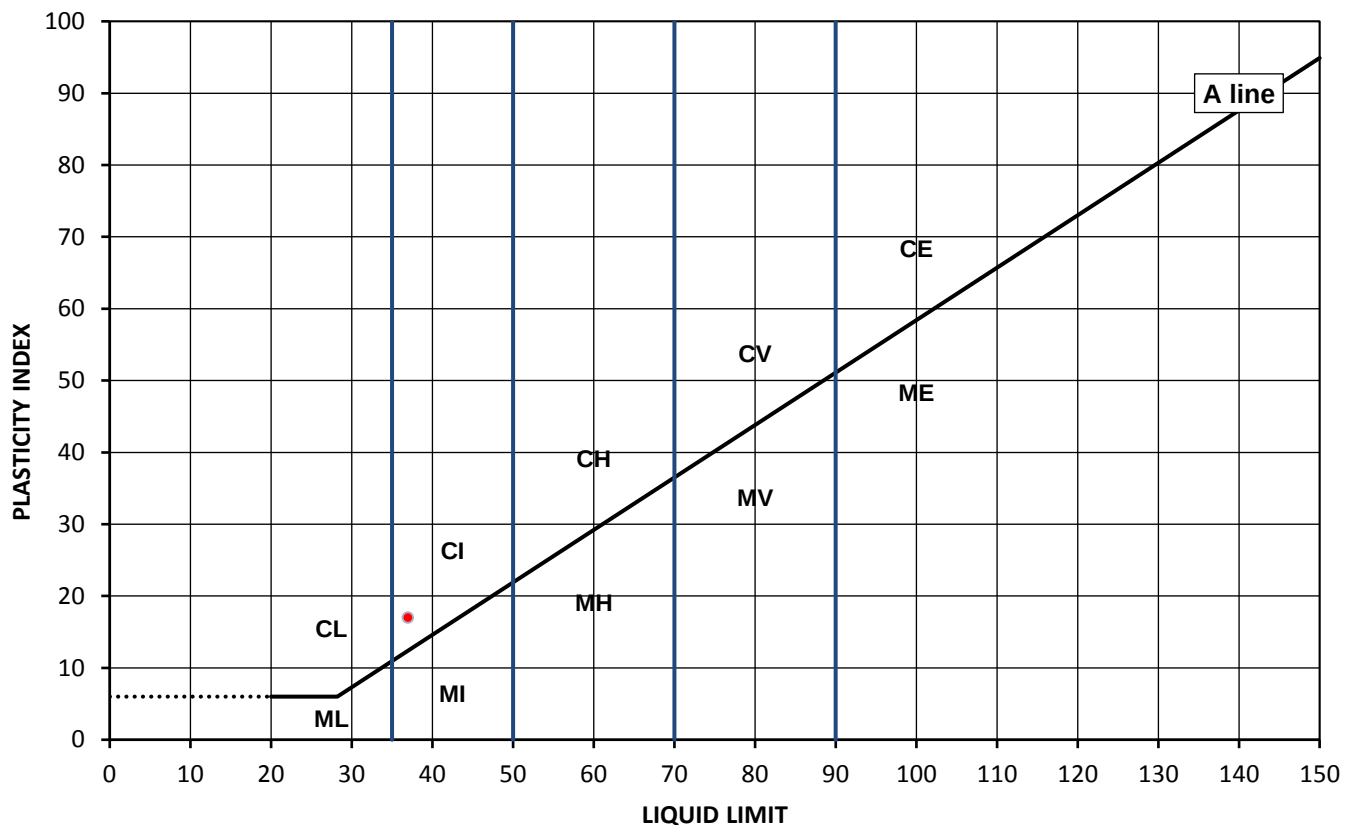
Test Results

Laboratory Reference: 1168569
Hole No.: WS2
Sample Reference: 5
Soil Description: Dark grey sandy CLAY

Depth Top [m]: 2.50
Depth Base [m]: Not Given
Sample Type: B

Sample Preparation: Tested in natural condition

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
22	37	20	17	100



Legend, based on BS 5930:2015 Code of practice for site investigations

C	Clay	Plasticity	Liquid Limit
M	Silt	L	Low
		I	Medium
		H	High
		V	Very high
		E	Extremely high
			below 35
			35 to 50
			50 to 70
			70 to 90
			exceeding 90
	Organic	O	append to classification for organic material (eg CHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Approved: Dariusz Piotrowski
PL Geotechnical Laboratory Manager
Date Reported: 15/03/2019

Signed: Darren Berrill
Geotechnical General Manager

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TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS



4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.3 and 5

Client: Terrafirma South
Client Address: The Slate Barn, Lower Lowley,
Dunsford, Devon,
EX6 7BP
Contact: Paul Standish
Site Name: The Hamilton Centre, Reading
Site Address: Not Given

Client Reference: 6305
Job Number: 19-31341
Date Sampled: Not Given
Date Received: 04/03/2019
Date Tested: 08/03/2019
Sampled By: Not Given

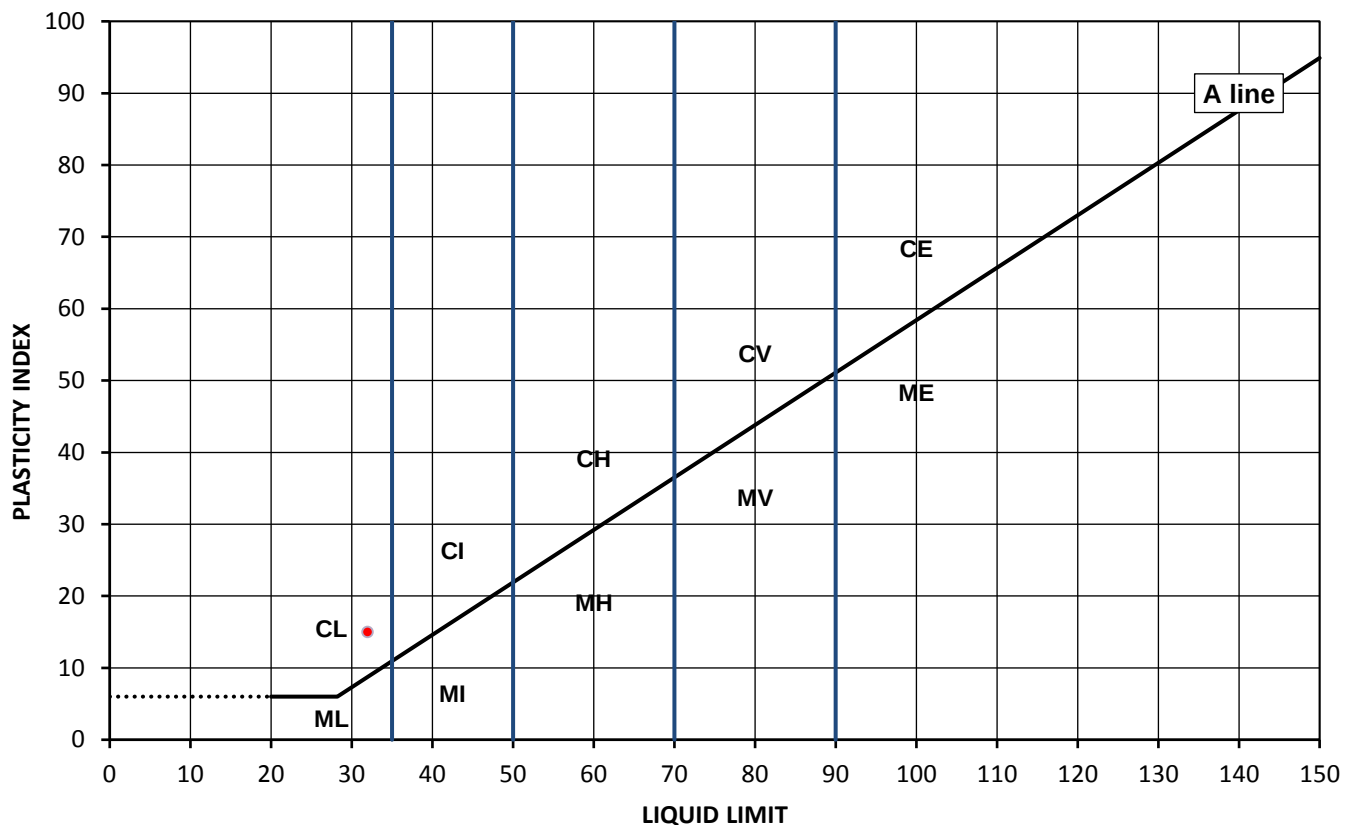
Test Results

Laboratory Reference: 1168570
Hole No.: WS3
Sample Reference: 3
Soil Description: Dark brown slightly gravelly very sandy CLAY

Depth Top [m]: 0.60
Depth Base [m]: Not Given
Sample Type: B

Sample Preparation: Tested after >425um removed by hand

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
23	32	17	15	91



Legend, based on BS 5930:2015 Code of practice for site investigations

C	Clay	Plasticity	Liquid Limit
M	Silt	L	Low
		I	Medium
		H	High
		V	Very high
		E	Extremely high
			below 35
			35 to 50
			50 to 70
			70 to 90
			exceeding 90
	Organic	O	append to classification for organic material (eg CHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

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PL Geotechnical Laboratory Manager
Date Reported: 15/03/2019

Signed: Darren Berrill
Geotechnical General Manager

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Liquid and Plastic Limits

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Watford Herts WD18 8YS



4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.3 and 5

Client: Terrafirma South
Client Address: The Slate Barn, Lower Lowley,
Dunsford, Devon,
EX6 7BP
Contact: Paul Standish
Site Name: The Hamilton Centre, Reading
Site Address: Not Given

Client Reference: 6305
Job Number: 19-31341
Date Sampled: Not Given
Date Received: 04/03/2019
Date Tested: 08/03/2019
Sampled By: Not Given

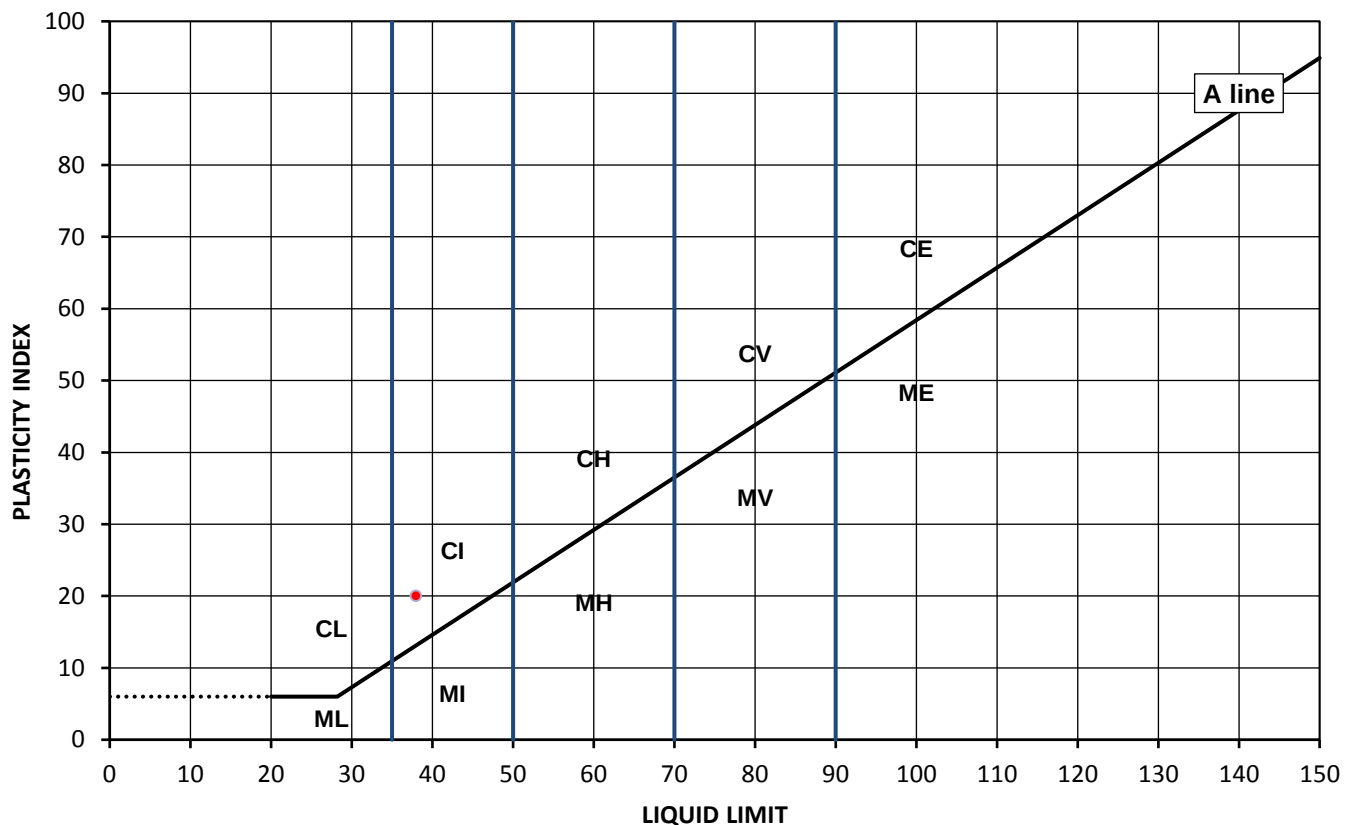
Test Results

Laboratory Reference: 1168571
Hole No.: WS3
Sample Reference: 4
Soil Description: Brown clayey very silty SAND

Depth Top [m]: 1.00
Depth Base [m]: Not Given
Sample Type: B

Sample Preparation: Tested in natural condition

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
22	38	18	20	100



Legend, based on BS 5930:2015 Code of practice for site investigations

C	Clay	Plasticity	Liquid Limit
M	Silt	L	Low
		I	Medium
		H	High
		V	Very high
		E	Extremely high
			below 35
			35 to 50
			50 to 70
			70 to 90
			exceeding 90
	Organic	O	append to classification for organic material (eg CHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

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PL Geotechnical Laboratory Manager
Date Reported: 15/03/2019

Signed: Darren Berrill
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TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS



4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.3 and 5

Client: Terrafirma South
Client Address: The Slate Barn, Lower Lowley,
Dunsford, Devon,
EX6 7BP
Contact: Paul Standish
Site Name: The Hamilton Centre, Reading
Site Address: Not Given

Client Reference: 6305
Job Number: 19-31341
Date Sampled: Not Given
Date Received: 04/03/2019
Date Tested: 08/03/2019
Sampled By: Not Given

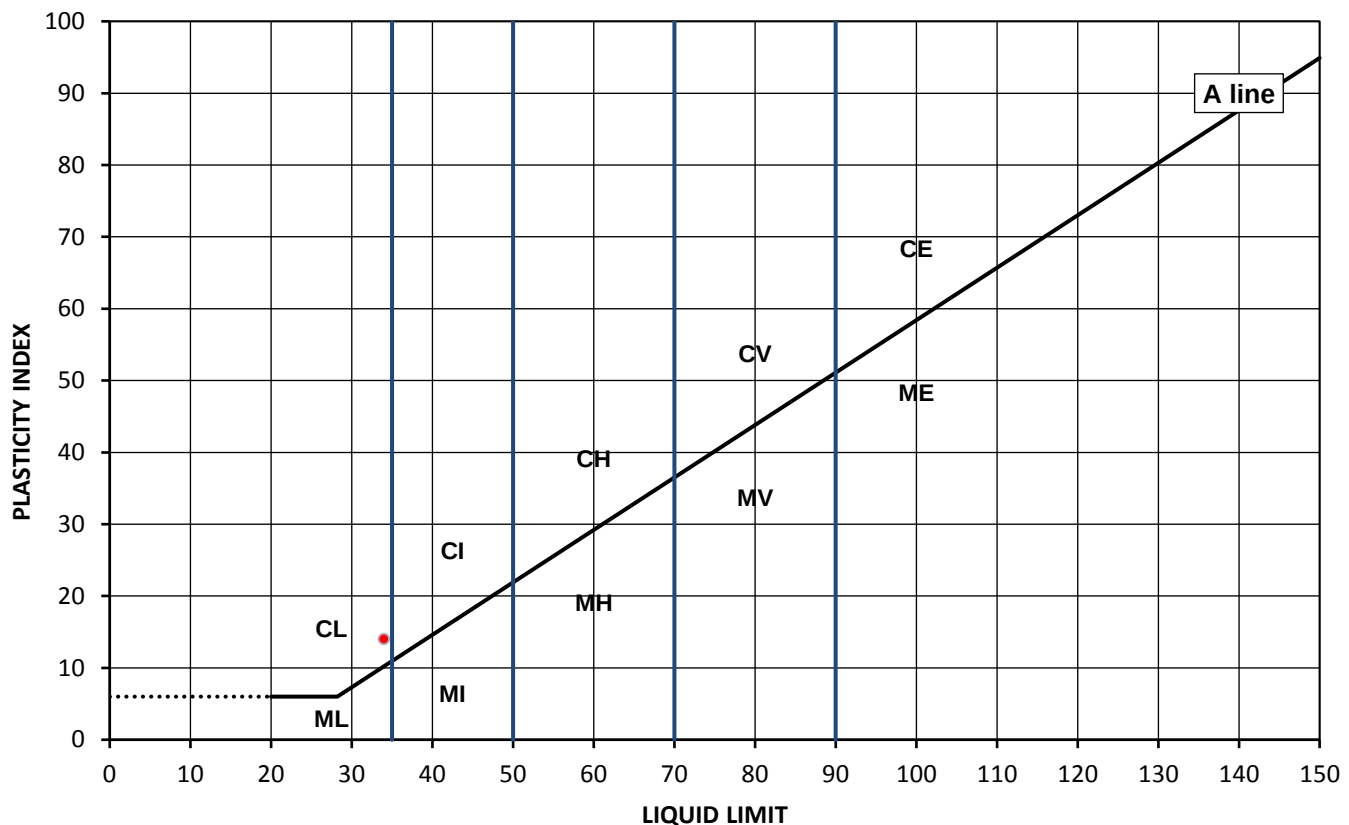
Test Results

Laboratory Reference: 1168572
Hole No.: WS4
Sample Reference: 3
Soil Description: Brown sandy CLAY

Depth Top [m]: 1.00
Depth Base [m]: Not Given
Sample Type: B

Sample Preparation: Tested in natural condition

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
23	34	20	14	100



Legend, based on BS 5930:2015 Code of practice for site investigations

C	Clay	Plasticity	Liquid Limit
M	Silt	L	Low
		I	Medium
		H	High
		V	Very high
		E	Extremely high
			below 35
			35 to 50
			50 to 70
			70 to 90
			exceeding 90
	Organic	O	append to classification for organic material (eg CHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Approved: Dariusz Piotrowski
PL Geotechnical Laboratory Manager
Date Reported: 15/03/2019

Signed: Darren Berrill
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TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS



Environmental Science

4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.3 and 5

Client: Terrafirma South
Client Address: The Slate Barn, Lower Lowley,
Dunsford, Devon,
EX6 7BP
Contact: Paul Standish
Site Name: The Hamilton Centre, Reading
Site Address: Not Given

Client Reference: 6305
Job Number: 19-31341
Date Sampled: Not Given
Date Received: 04/03/2019
Date Tested: 08/03/2019
Sampled By: Not Given

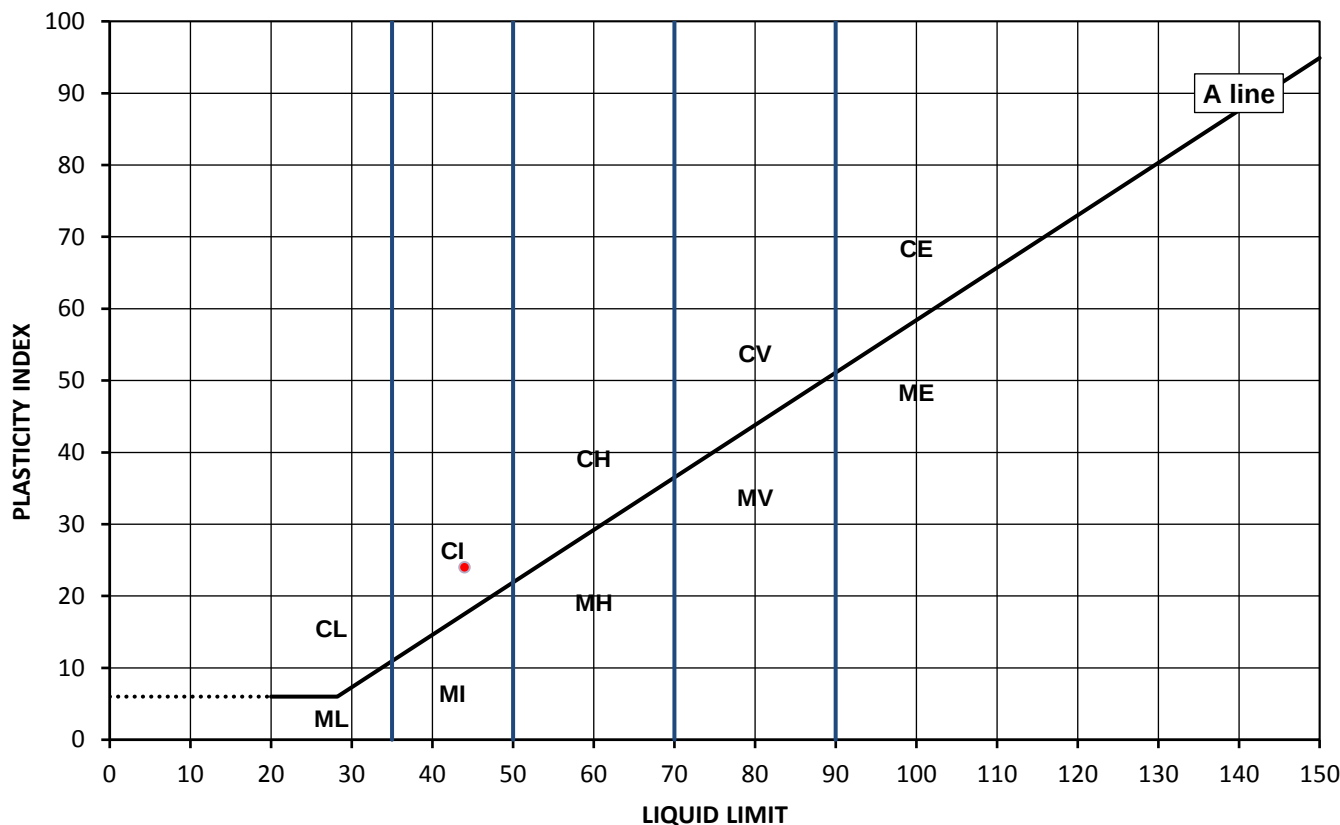
Test Results

Laboratory Reference: 1168573
Hole No.: WS4
Sample Reference: 4
Soil Description: Dark brown sandy CLAY

Depth Top [m]: 1.50
Depth Base [m]: Not Given
Sample Type: B

Sample Preparation: Tested in natural condition

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
28	44	20	24	100



Legend, based on BS 5930:2015 Code of practice for site investigations

C	Clay	Plasticity	Liquid Limit
M	Silt	L	Low
		I	Medium
		H	High
		V	Very high
		E	Extremely high
			below 35
			35 to 50
			50 to 70
			70 to 90
			exceeding 90
	Organic	O	append to classification for organic material (eg CHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

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PL Geotechnical Laboratory Manager
Date Reported: 15/03/2019

Signed: Darren Berrill
Geotechnical General Manager

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Environmental Science

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Client: Terrafirma South
Client Address: The Slate Barn, Lower Lowley,
Dunsford, Devon,
EX6 7BP
Contact: Paul Standish
Site Name: The Hamilton Centre, Reading
Site Address: Not Given

Client Reference: 6305
Job Number: 19-31341
Date Sampled: Not Given
Date Received: 04/03/2019
Date Tested: 08/03/2019
Sampled By: Not Given

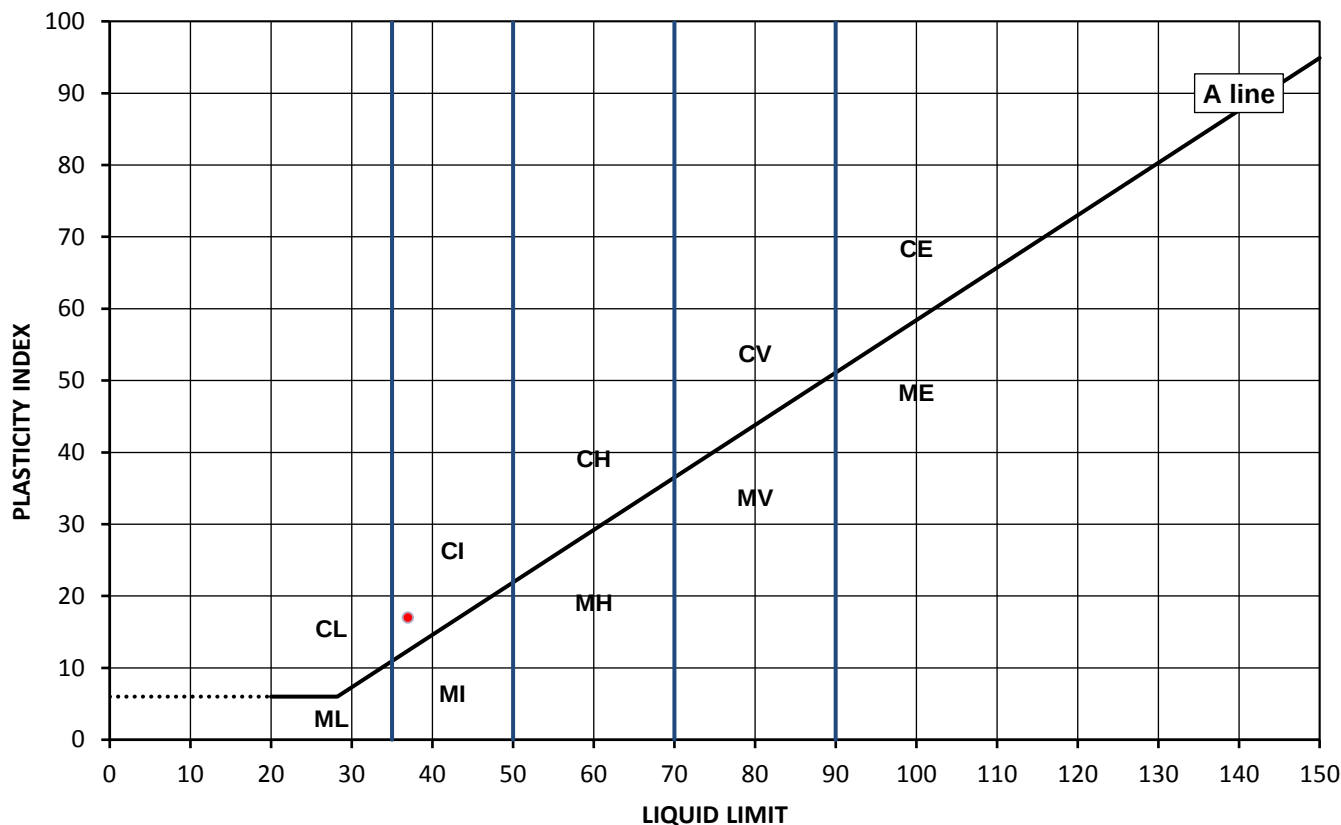
Test Results

Laboratory Reference: 1168574
Hole No.: WS5
Sample Reference: 1
Soil Description: Brown sandy CLAY

Depth Top [m]: 0.70
Depth Base [m]: Not Given
Sample Type: B

Sample Preparation: Tested in natural condition

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
27	37	20	17	100



Legend, based on BS 5930:2015 Code of practice for site investigations

C	Clay	Plasticity	Liquid Limit
M	Silt	L	Low
		I	Medium
		H	High
		V	Very high
		E	Extremely high
			below 35
			35 to 50
			50 to 70
			70 to 90
			exceeding 90
	Organic	O	append to classification for organic material (eg CHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Approved: Dariusz Piotrowski
PL Geotechnical Laboratory Manager
Date Reported: 15/03/2019

Signed: Darren Berrill
Geotechnical General Manager

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4041

Tested in Accordance with: BS 1377-2: 1990: Clause 4.3 and 5

Client: Terrafirma South
Client Address: The Slate Barn, Lower Lowley,
Dunsford, Devon,
EX6 7BP
Contact: Paul Standish
Site Name: The Hamilton Centre, Reading
Site Address: Not Given

Client Reference: 6305
Job Number: 19-31341
Date Sampled: Not Given
Date Received: 04/03/2019
Date Tested: 08/03/2019
Sampled By: Not Given

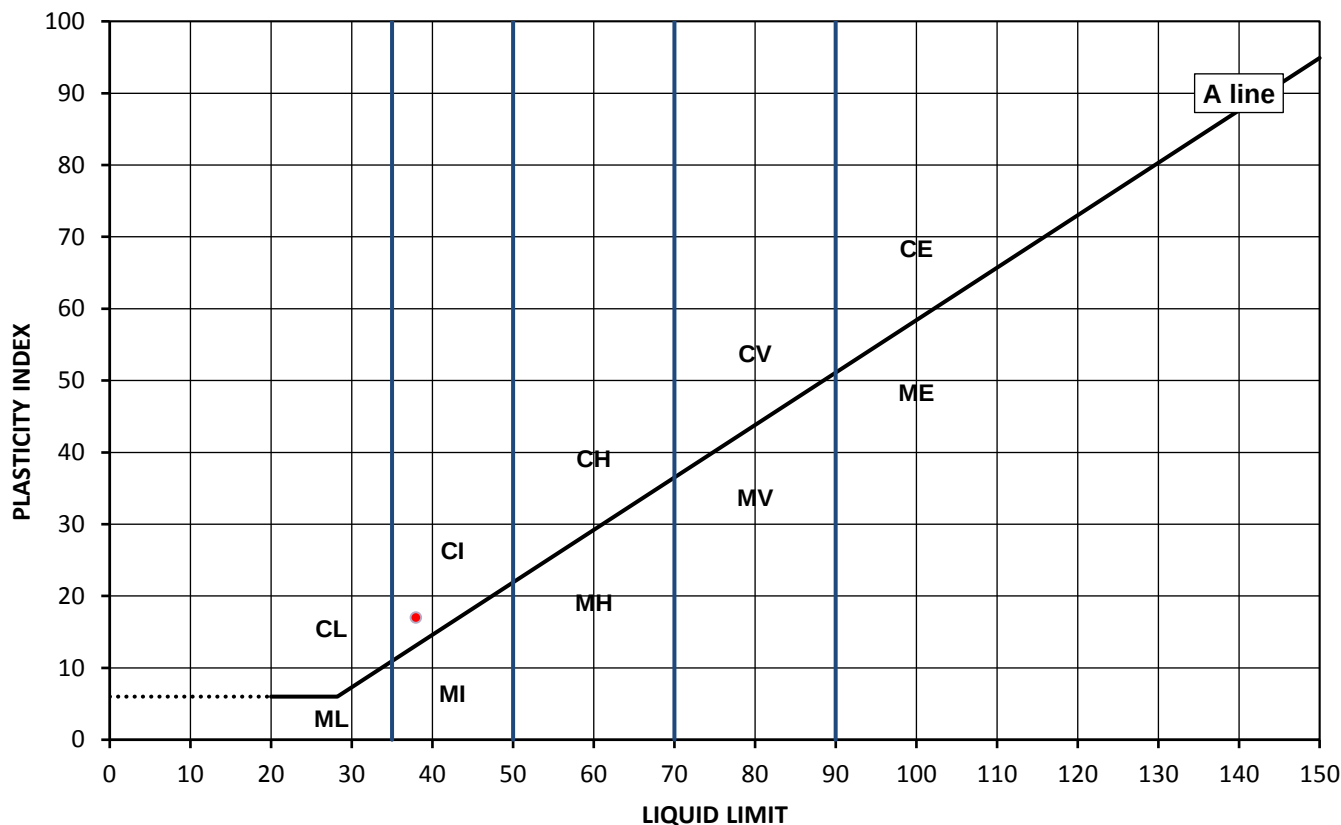
Test Results

Laboratory Reference: 1168575
Hole No.: WS6
Sample Reference: 1
Soil Description: Brown slightly gravelly sandy CLAY

Depth Top [m]: 1.20
Depth Base [m]: Not Given
Sample Type: B

Sample Preparation: Tested after washing to remove >425um

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
33	38	21	17	99



Legend, based on BS 5930:2015 Code of practice for site investigations

C	Clay	Plasticity	Liquid Limit
M	Silt	L	Low
		I	Medium
		H	High
		V	Very high
		E	Extremely high
			below 35
			35 to 50
			50 to 70
			70 to 90
			exceeding 90
	Organic	O	append to classification for organic material (eg CHO)

Note: Moisture Content by BS 1377-2: 1990: Clause 3.2

Remarks:

Approved: Dariusz Piotrowski
PL Geotechnical Laboratory Manager
Date Reported: 15/03/2019

Signed: Darren Berrill
Geotechnical General Manager

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SUMMARY REPORT

Summary of Classification Test Results

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS



Tested in Accordance with:

MC by BS 1377-2: 1990: Clause 3.2; WC by BS EN 17892-1: 2014; Atterberg
by BS 1377-2: 1990: Clause 4.3, Clause 4.4 and 5; PD by BS 1377-2: 1990:
Clause 8.2

Client Reference: 6305

Job Number: 19-31341

Date Sampled: Not Given

Date Received: 04/03/2019

Date Tested: 06/03 - 08/03/2019

Sampled By: Not Given

Client: Terrafirma South
Client Address: The Slate Barn, Lower Lowley,
Dunsford, Devon,
EX6 7BP
Contact: Paul Standish
Site Name: The Hamilton Centre, Reading
Site Address: Not Given

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	MC	WC	Atterberg				Density			Total Porosity#		
		Reference	Depth Top m	Depth Base m	Type					% Passing 425um	LL	PL	PI	bulk Mg/m3	dry Mg/m3	PD Mg/m3			
1168564	WS1	3	1.00	Not Given	B	Brown sandy CLAY and SILT	Atterberg 4 Point	25		100	52	27	25						
1168565	WS1	4	2.00	Not Given	B	Brown sandy CLAY	Atterberg 4 Point	24		100	39	21	18						
1168566	WS1	5	2.50	Not Given	B	Dark brown sandy CLAY	Atterberg 4 Point	24		100	35	21	14						
1168567	WS2	3	0.70	Not Given	B	Brown silty clayey SAND	Atterberg 4 Point	21		100	37	18	19						
1168568	WS2	4	1.50	Not Given	B	Brown sandy CLAY	Atterberg 4 Point	24		100	36	21	15						
1168569	WS2	5	2.50	Not Given	B	Dark grey sandy CLAY	Atterberg 4 Point	22		100	37	20	17						
1168570	WS3	3	0.60	Not Given	B	Dark brown slightly gravelly very sandy CLAY	Atterberg 4 Point	23		91	32	17	15						
1168571	WS3	4	1.00	Not Given	B	Brown clayey very silty SAND	Atterberg 4 Point	22		100	38	18	20						
1168572	WS4	3	1.00	Not Given	B	Brown sandy CLAY	Atterberg 4 Point	23		100	34	20	14						
1168573	WS4	4	1.50	Not Given	B	Dark brown sandy CLAY	Atterberg 4 Point	28		100	44	20	24						

Note: # Non accredited; NP - Non plastic

Comments:

Approved: Dariusz Piotrowski
PL Geotechnical Laboratory Manager
Date Reported: 15/03/2019

Signed: Darren Berrill
Geotechnical General Manager

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4041

Client: Terrafirma South
 Client Address: The Slate Barn, Lower Lowley,
 Dunsford, Devon,
 EX6 7BP
 Contact: Paul Standish
 Site Name: The Hamilton Centre, Reading
 Site Address: Not Given

SUMMARY REPORT

Summary of Classification Test Results

Tested in Accordance with:

MC by BS 1377-2: 1990: Clause 3.2; WC by BS EN 17892-1: 2014; Atterberg
 by BS 1377-2: 1990: Clause 4.3, Clause 4.4 and 5; PD by BS 1377-2: 1990:
 Clause 8.2

i2 Analytical Ltd
 7 Woodshots Meadow
 Croxley Green Business Park
 Watford Herts WD18 8YS



Environmental Science

Client Reference: 6305

Job Number: 19-31341

Date Sampled: Not Given

Date Received: 04/03/2019

Date Tested: 08/03/2019

Sampled By: Not Given

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	MC	WC	Atterberg				Density			Total Porosity#		
		Reference	Depth Top m	Depth Base m	Type					% Passing 425um	LL	PL	PI	bulk Mg/m3	dry Mg/m3	PD Mg/m3			
1168574	WS5	1	0.70	Not Given	B	Brown sandy CLAY	Atterberg 4 Point	27		100	37	20	17						
1168575	WS6	1	1.20	Not Given	B	Brown slightly gravelly sandy CLAY	Atterberg 4 Point	33		99	38	21	17						

Note: # Non accredited; NP - Non plastic

Comments:

Approved: Dariusz Piotrowski
 PL Geotechnical Laboratory Manager
 Date Reported: 15/03/2019

Signed:

Darren Berrill
 Geotechnical General Manager

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 The analysis was carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Slaska, Poland."



TEST CERTIFICATE

Particle Size Distribution

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS



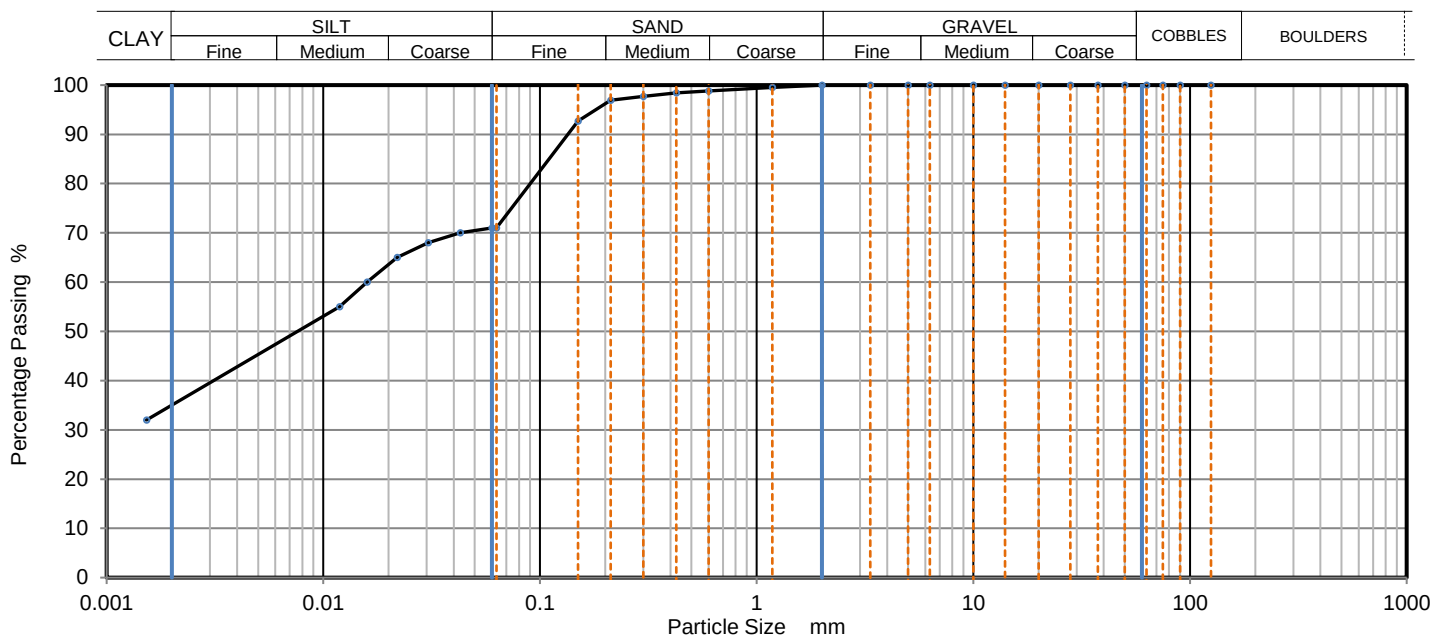
Client: Terrafirma South
Client Address: The Slate Barn, Lower Lowley,
Dunsford, Devon,
EX6 7BP
Contact: Paul Standish
Site Name: The Hamilton Centre, Reading
Site Address: Not Given

Client Reference: 6305
Job Number: 19-31341
Date Sampled: Not Given
Date Received: 04/03/2019
Date Tested: 08/03/2019
Sampled By: Not Given

Test Results:

Laboratory Reference: 1168564
Hole No.: WS1
Sample Reference: 3
Sample Description: Brown sandy CLAY and SILT

Depth Top [m]: 1.00
Depth Base [m]: Not Given
Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0600	71
90	100	0.0428	70
75	100	0.0305	68
63	100	0.0219	65
50	100	0.0159	60
37.5	100	0.0119	55
28	100	0.0015	32
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	99	Particle density (assumed) 2.65 Mg/m3	
0.425	98		
0.3	98		
0.212	97		
0.15	93		
0.063	71		

Dry Mass of sample [g]: 233

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	0.00
Sand	28.80
Silt	35.90
Clay	35.30

Grading Analysis		
D100	mm	2
D60	mm	0.016
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Note: Tested in Accordance with BS1377:Part 2:1990, clauses 9.2 and 9.5

Remarks:

Approved: Dariusz Piotrowski
PL Geotechnical Laboratory Manager
Date Reported: 15/03/2019

Signed: Darren Berrill
Geotechnical General Manager

GF 100.10

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TEST CERTIFICATE

Particle Size Distribution

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS



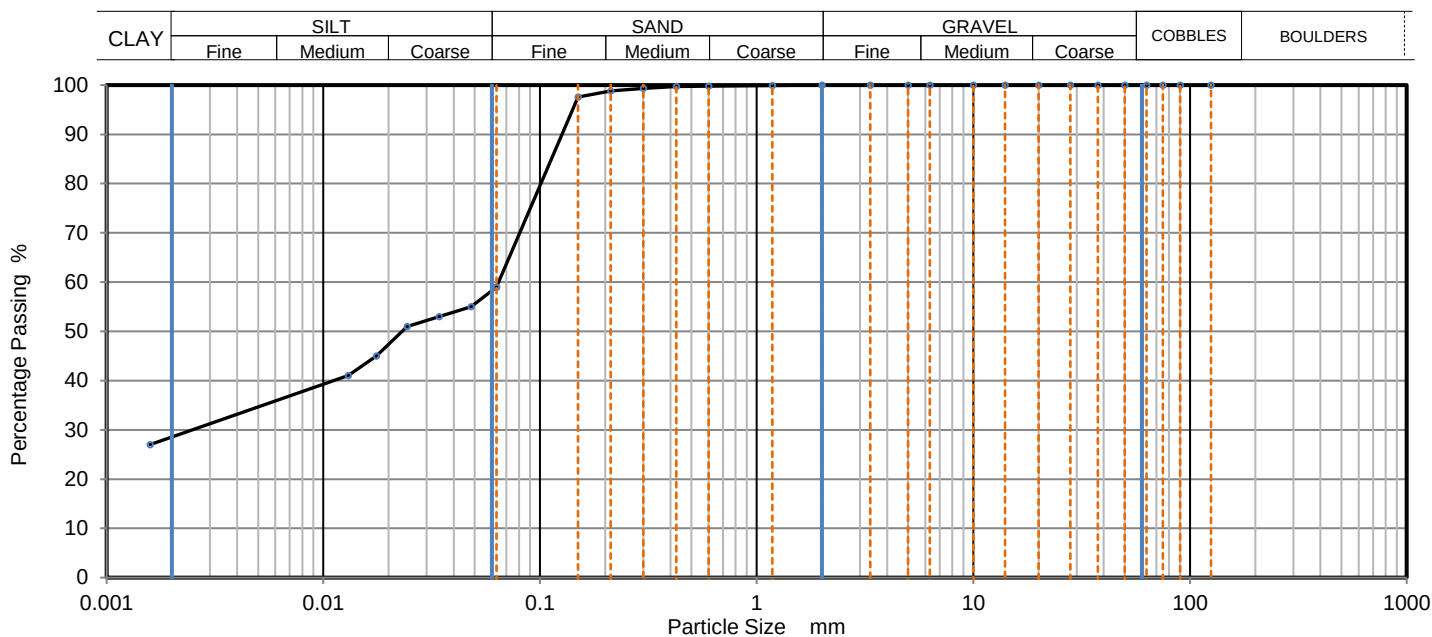
Client: Terrafirma South
Client Address: The Slate Barn, Lower Lowley,
Dunsford, Devon,
EX6 7BP
Contact: Paul Standish
Site Name: The Hamilton Centre, Reading
Site Address: Not Given

Client Reference: 6305
Job Number: 19-31341
Date Sampled: Not Given
Date Received: 04/03/2019
Date Tested: 08/03/2019
Sampled By: Not Given

Test Results:

Laboratory Reference: 1168567
Hole No.: WS2
Sample Reference: 3
Sample Description: Brown silty clayey SAND

Depth Top [m]: 0.70
Depth Base [m]: Not Given
Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	59
90	100	0.0481	55
75	100	0.0342	53
63	100	0.0244	51
50	100	0.0176	45
37.5	100	0.0130	41
28	100	0.0016	27
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100	Particle density (assumed) 2.65 Mg/m3	
0.425	100		
0.3	99		
0.212	99		
0.15	98		
0.063	59		

Dry Mass of sample [g]: 268

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	0.00
Sand	41.40
Silt	29.70
Clay	28.90

Grading Analysis		
D100	mm	2
D60	mm	0.065
D30	mm	0.00238
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Note: Tested in Accordance with BS1377:Part 2:1990, clauses 9.2 and 9.5

Remarks:

Approved: Dariusz Piotrowski
PL Geotechnical Laboratory Manager
Date Reported: 15/03/2019

Signed: Darren Berrill
Geotechnical General Manager

GF 100.10

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TEST CERTIFICATE

Particle Size Distribution

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS



Environmental Science

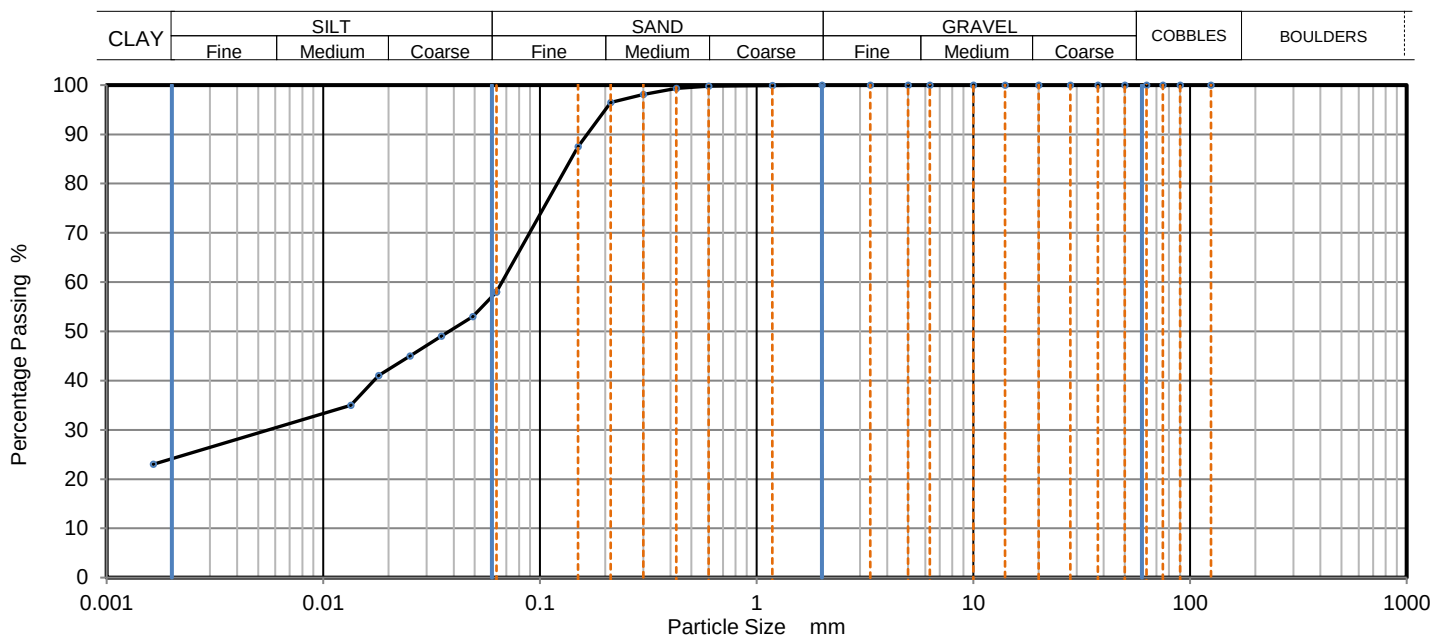
Client: Terrafirma South
Client Address: The Slate Barn, Lower Lowley,
Dunsford, Devon,
EX6 7BP
Contact: Paul Standish
Site Name: The Hamilton Centre, Reading
Site Address: Not Given

Client Reference: 6305
Job Number: 19-31341
Date Sampled: Not Given
Date Received: 04/03/2019
Date Tested: 08/03/2019
Sampled By: Not Given

Test Results:

Laboratory Reference: 1168571
Hole No.: WS3
Sample Reference: 4
Sample Description: Brown clayey very silty SAND

Depth Top [m]: 1.00
Depth Base [m]: Not Given
Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100	0.0630	58
90	100	0.0489	53
75	100	0.0351	49
63	100	0.0251	45
50	100	0.0180	41
37.5	100	0.0134	35
28	100	0.0016	23
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	100	Particle density (assumed) 2.65 Mg/m3	
0.425	99		
0.3	98		
0.212	97		
0.15	88		
0.063	58		

Dry Mass of sample [g]: 239

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	0.00
Sand	42.40
Silt	33.80
Clay	23.80

Grading Analysis		
D100	mm	5
D60	mm	0.0675
D30	mm	0.00574
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Note: Tested in Accordance with BS1377:Part 2:1990, clauses 9.2 and 9.5

Remarks:

Approved: Dariusz Piotrowski
PL Geotechnical Laboratory Manager
Date Reported: 15/03/2019

Signed: Darren Berrill
Geotechnical General Manager

GF 100.10

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Paul Standish
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t: 01923 225404

f: 01923 237404

e: reception@i2analytical.com

Analytical Report Number : 19-31335

Project / Site name: The Hamilton Centre, Reading

Samples received on: 04/03/2019

Your job number: 6305

Samples instructed on: 04/03/2019

Your order number: 6305

Analysis completed by: 11/03/2019

Report Issue Number: 1

Report issued on: 12/03/2019

Samples Analysed: 3 soil samples

Signed: 

Rexona Rahman
Head of Customer Services
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

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Analytical Report Number: 19-31335

Project / Site name: The Hamilton Centre, Reading

Your Order No: 6305

Lab Sample Number				1168538	1168539	1168540		
Sample Reference				WS1	WS2	WS3		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				1.00	0.70	0.60		
Date Sampled				Deviating	Deviating	Deviating		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		
Stone Content				%	0.1	NONE	< 0.1	< 0.1
Moisture Content				%	N/A	NONE	18	13
Total mass of sample received				kg	0.001	NONE	0.45	0.39
General Inorganics								
Organic Matter				%	0.1	MCERTS	0.3	0.5
							1.0	



Analytical Report Number : 19-31335

Project / Site name: The Hamilton Centre, Reading

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1168538	WS1	None Supplied	1.00	Light brown clay and sand with gravel.
1168539	WS2	None Supplied	0.70	Light brown clay and sand with gravel.
1168540	WS3	None Supplied	0.60	Light brown clay and sand with gravel.

Analytical Report Number : 19-31335

Project / Site name: The Hamilton Centre, Reading

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	BS1377 Part 3, 1990, Chemical and Electrochemical Tests""	L009-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Sample ID	Other ID	Sample Type	Job	Sample Number	Sample Deviation Code	test_name	test_ref	Test Deviation code
WS1		S	19-31335	1168538	a			
WS2		S	19-31335	1168539	a			
WS3		S	19-31335	1168540	a			